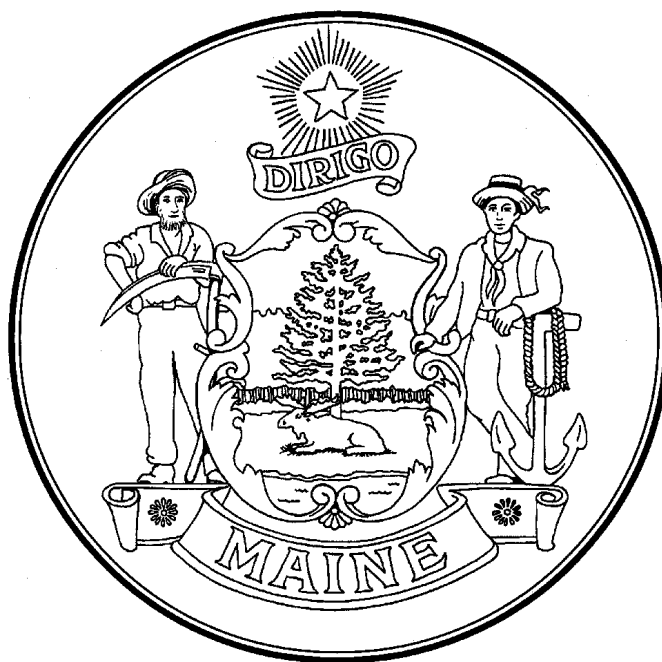


MAINE STATE LEGISLATURE

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THE LEGISLATURE,

OF THE

STATE OF MAINE,

DURING ITS SESSION

A. D. 1837.

AUGUSTA:
SMITH & ROBINSON,.....PRINTERS.

1837.

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SEVENTEENTH LEGISLATURE.

No. 19.

SENATE.

STATE OF MAINE.

IN BOARD OF INTERNAL IMPROVEMENTS, }
AUGUSTA, FEB. 8, 1837.

To the Senate and House of Representatives :

By order of this Board, I have the honor to lay before the two branches of the Legislature, the Report of Col. S. H. LONG, U. S. Topographical Engineer, on a Reconnoissance for a Rail Road from Portland to Bangor.

I am very respectfully, Your Obedient Servant,

A. R. NICHOLS, *Secretary.*

TO HIS EXCELLENCY

ROBERT P. DUNLAP,

GOVERNOR OF MAINE, AND PRESIDENT

OF THE

BOARD OF INTERNAL IMPROVEMENTS,

BRUNSWICK, (ME.)

REPORT

ON A

RECONNOISSANCE FOR A RAIL ROAD

FROM

PORTLAND TO BANGOR,

BY ORDER OF THE

BOARD OF INTERNAL IMPROVEMENTS

FOR THE

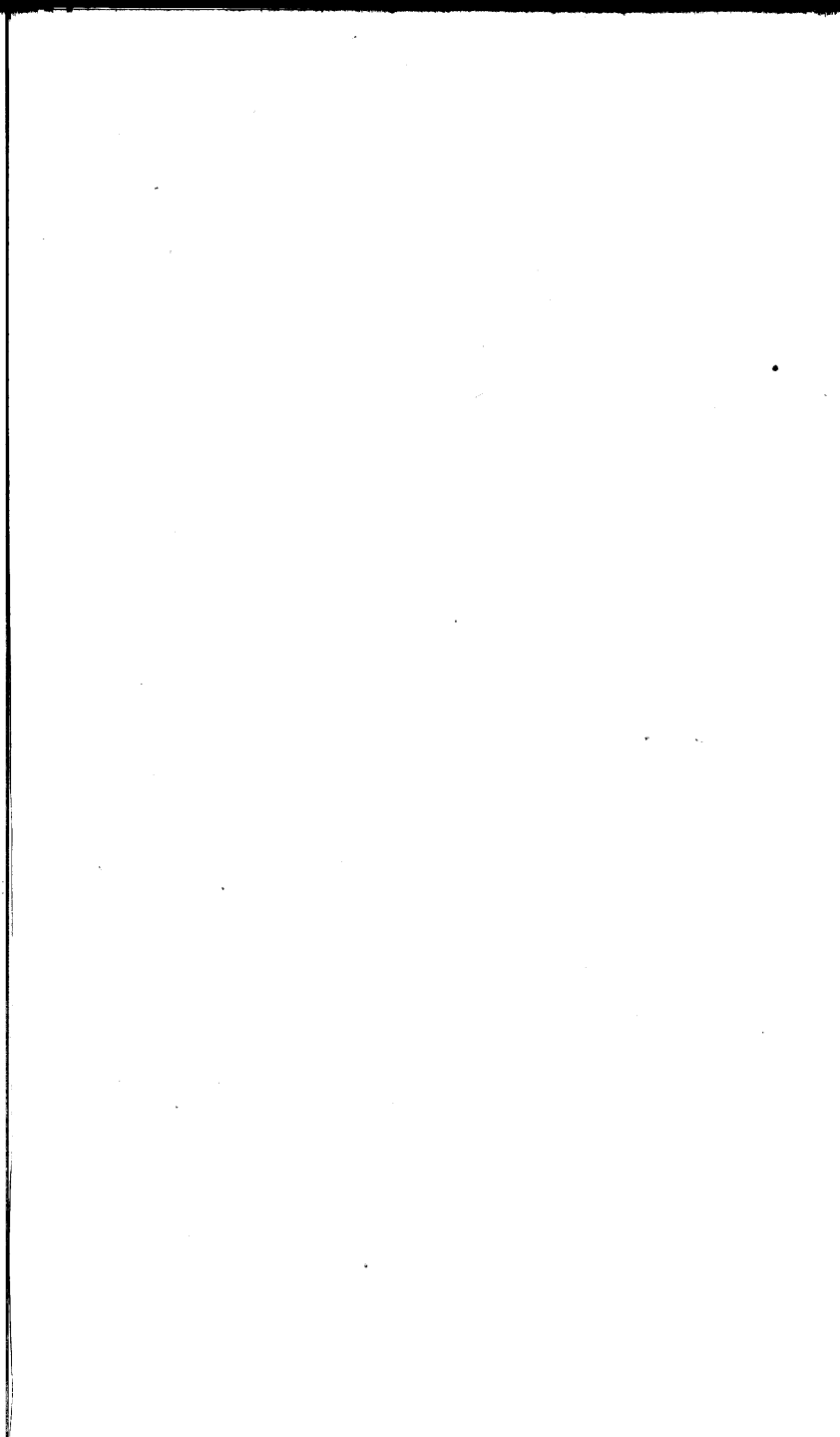
STATE OF MAINE.

BY LT. COL. S. H. LONG,
Of the U. S. Topographical Engineers.

AUGUSTA:

SMITH & ROBINSON, PRINTERS TO THE STATE.

1837.



REPORT.

HOPKINTON, DECEMBER 8th, 1836.

SIR:—In accordance with instructions from the Board of Internal Improvements for the State of Maine, dated August 19, 1836, and relating to a reconnoissance of a route for a Rail Road from Portland to a point at or near the head of tide on the Kennebec River and thence to Bangor, passing in a direction and on ground most favorable for that purpose, I have the honor to submit a brief statement of my proceedings, in reference to this service, together with my views in relation to the feasibility of a Rail Road on the contemplated route, and the probable cost of its construction.

In the prosecution of this service, my attention was first directed to the discovery of the most favorable route between the Kennebec River and the City of Bangor. With this object in view, four routes were examined leading through the following localities; viz. 1st. A route leading through the valley of Marsh Stream, the townships of Knox, Freedom, Palermo, &c. 2d. A route leading through the valley of Jackson Brook, Half Moon Stream, Thorndike, &c. 3d. A route leading across the great Swamp westward of Bangor, and passing southwardly of Hermon Hill:—thence through the valleys of Kinsley's and Martin's Streams, Plymouth Bog, &c. to 25 Mile Pond, and thence by 15 mile Pond, China Pond, Lower Webber Pond, &c. to Kennebec River one mile above Augusta. 4th. A route leading by the valley of the Kenduskeag, and passing thence northwardly of Hermon Hill, entering the valley of the Sowadabscook, and pursuing it upward to its source in the northeast corner of the township of Etna. This route then descends in the valley of Fergur-

son's Brook, Martin's Stream, and the southerly branch of the Sebasticook to Peottoma Point, and thence in the valleys of the Sebasticook and Kennebec Rivers to Augusta. The two routes last mentioned may be regarded as coincident between Bangor and the Sowadabscook, this portion of the route being susceptible of a connexion with either.

At a subsequent date, I engaged in the examination of the country between the head of tide in Kennebec River and Portland, and traversed in succession the following routes, viz. 1st. From Augusta via Vaughan's Valley, &c. in a direction for the outlet of Wentworth Pond. 2d. From Augusta via Gardiner, Cobbesseconte Pond, Flats of Cathance Stream, &c., to Brunswick; and thence through Freeport and North Yarmouth to Portland. 3d. From Portland via Shaw's Corner, Falmouth, Valley of Royal's River, &c. to South West Bend of the Androscoggin, and thence by Tar's Summit, Doubty's Heath, &c. to the Flats of Cathance, and thence by the route just before designated to Augusta. 4th. From Brunswick downward in the valley of the Androscoggin and Merry Meeting Bay to Bowdoinham village, and thence via Richmond village and the valley of the Kennebec, to Augusta. 5th. From Augusta through Gardiner, Litchfield, and Lisbon, to Little river village, and thence by Noyes' Swamp, and the valley of Royal's River to North Yarmouth. 6th. A route passing from the valley of Royal's River through Noyes' Swamp entering the valley of the Androscoggin above the narrows, and pursuing it to a point below Thompson's Hill, from which it enters the Cathance Flats. 7th. A route from Portland via Martin's Point, Broad Cove, Fore-side Road, Parker's Point, Porter's Landing, Brunswick, Cathance Flats, North easterly corner of Bowdoin, and thence via Hungry and Bowdoin Meadows to the outlet of Cobbesseconte Pond, and thence via Gardiner and Hallowell to Augusta.

Besides the several routes above designated, numerous others of greater or less extent variously connected with them, were also examined, all of which serve to show that the scope of the examinations has been sufficiently ex-

tended to embrace all routes coming within the perview of my instructions. It should moreover be observed, that examinations have been made with a view to ascertain the facilities presented for a connexion between the contemplated Portland and Bangor Rail Road, and the route recently surveyed for the Belfast and Quebec Rail Road, which was also required in my instructions.

I take this opportunity to signify my acknowledgements of the kind attentions and valuable assistance afforded me in the prosecution of my examinations, by the numerous Committees appointed in aid of the enterprise, and by other citizens who take a lively interest in its furtherance.

A particular description of all the routes examined, drawn from the copious notes that have been taken in reference to the same, will not be attempted in this paper; nor is it deemed advisable to set forth in detail all the reasons for any preference that may be given to one route over another. It will be sufficient for my present purpose to state in general terms, that the route to which a preference is given, is that least affected by ascents and descents, by abrupt curvatures, by excessive distance, by firmness of ground or substratum, and by the greatest freedom from expensive excavations and embankments. For more special views on these subjects I take leave to refer to my late report to His Excellency the Governor of Maine, on the reconnoissance of a route for a Rail Road from the coast of Maine to Quebec, p. 5 to 16. In agreement with the principles there advanced, I shall regard every ascent of thirty feet in the distance of a mile, as equivalent to an increased expenditure of twenty five thousand dollars, and shall regard an expenditure of that amount as safe and advisable in every case where an elevation of thirty feet can be avoided by that means; while at the same time, it should not be forgotten, that for the sake of reducing distance, an extra expenditure at the rate of \$25 per mile, is justifiable.

It is remarkable that two routes, most of the way distinct and independent of each other, are to be found between Portland and Augusta, as also between Augusta and Bangor. With respect to their relative distances, the

difference between them is probably very inconsiderable ; and in respect to their feasibility, the shades of difference are far less apparent than might reasonably be expected, in a country so varied and diversified as that traversed by the routes.

The routes alluded to, which are the only routes deemed worthy of particular notice in this paper, may be designated as follows : Between Augusta and Bangor, the first route, which may be called the Clinton route, pursues the valleys of the Kennebec and Sebec to the North East corner of Etna, and thence descends in the valley of the Sowadabscook to the cross in the edge of Carmel (a remarkable pass, where not only the valleys of the Sowadabscook and Kenduskeag, but the streams themselves become coincident and reciprocal) and thence in the valley of the Kenduskeag to Bangor. The second route, which may be designated as the China Route, ascends in the valley of Ellis Brook, passes by Lower Webber or Coleman Pond : along the margin of China Pond, and through the village of China, also, near 15 Mile Pond through the village of Unity, along the margin of 25 Mile Pond, through Troy and Plymouth, ascending in the valley of Martin's Stream, and descending in that of Kinsley's Stream, to the Sowadabscook, where it becomes coincident with the route before designated, to Bangor.

The Clinton route is deemed preferable to the China route, by reason of abrupt curvatures on many parts of the latter, especially on entering and pursuing the valley of Ellis Brook,—on passing from Coleman to China Pond, and from Twenty-five Mile Pond to Plymouth Bog, and on pursuing the valley of Kinsley's Stream;—by reason of ascents and descents, between Coleman and China Pond ; between China and Fifteen Mile Pond ;—between Fifteen Mile and Twenty-five Mile Ponds ;—and between the latter and Plymouth Bog;—by reason of much unsuitable ground in Plymouth Bog, and various other places ;—and by reason of the great amount of excavations and embankments in a general, if not a constant succession of small cuttings and fillings, all of which are believed to contribute to establish the preference already expressed.

Between Augusta and Portland, the two routes most favorable are as follows, viz.—a route passing through Gardiner, the north westerly parts of Richmond, and the easterly part of Bowdoin, to Brunswick, and thence by Porter's Landing, Parker's Point, Martin's Point, &c. to Portland, which may be called the Brunswick route. The other route, which we shall the Little River route, is coincident with the Brunswick route, from Augusta through the township of Gardiner. It thence passes through Litchfield, and the Northwest corner of Bowdoin, and descends in the valley of a branch of Little River to the village of that name, where it crosses the Androscoggin, passes through Noyes' Swamp, and pursues a direction to North Yarmouth village, and again becomes coincident with the Brunswick route, from Buxton's Corner to Portland.

Of these two routes, that leading through Brunswick is believed to be entitled to the preference, for the following reasons, viz :—on a distance of at least three miles, probably more, in the townships of Litchfield and Bowdoin, gradations of 50 or 60 feet per mile will be required. Through the same townships, as also in a part of Lisbon, the Little River route is very serpentine, and in places will require curvatures of small radius. The cost of construction would probably be somewhat less on this route than on the Brunswick route, owing to a much greater extent of bridging which will be required on the latter. But it is believed that this disadvantage will be amply compensated for, by the far greater facilities for transportation presented by the Brunswick route.

We now proceed to a more particular description of the entire route from Portland to Bangor, which we believe fairly entitled to a preference over any other that can be found.

The contemplated Road from Portland to Bangor, is to be regarded as a continuation of a Rail Road, already projected from Boston to Portland, a part of which is now in the progress of construction, and nearly the whole of it actually surveyed. That portion of it situated within the State of Maine, and extending to Portland, was surveyed during the last summer, and is pronounced favorable, the

gradations no where exceeding thirty-five feet per mile. The most favorable connexion between this route and the city of Portland is thought to be presented by crossing the tide flats of Casco River some distance above Vaughan's Bridge, and pursuing a direction across the isthmus joining Portland and Westbrook, to the southerly extremity of Back Cove, near the City Almshouse.

Regarding a point at or near the southerly extremity of Back Cove, as the commencement of the Portland and Bangor Rail Road, a location calculated to accommodate the city of Portland to the best advantage, is to be found in the immediate vicinity of the margin of Back Cove, or at any desirable distance from the shore and within the Cove by pursuing a locality in a curved direction leading round the margin of the Cove at a suitable elevation above tide in the former, or by pursuing a route somewhat more direct along the flats of the Cove, at a similar elevation above tide, in the latter case. Either method would sufficiently subserve the accommodation of the city; the latter however, though far more expensive, would be likely to effect this object to better advantage, inasmuch as the right of way would cost nothing, while at the same time an area for a depot, including warehouses, carriage parks, carriage houses, &c. would be created, amply sufficient for the business of the city and its immediate vicinity.

The length of the entire route from the point above designated to Bangor, is computed at one hundred and thirty-two miles, while the distance on the main travelled road leading from the same point through Brunswick, &c. to Bangor, is one hundred and twenty-seven miles, or five miles less than that on the proposed route.

For the sake of a more clear and succinct description of the route, we shall treat of it under the following heads or subdivisions, viz :

1st. FROM PORTLAND TO PARKER'S POINT—*embracing a distance of thirteen miles.*

From the point of commencement assumed as above, the route passes along the margin of Back Cove to Sandy

Point, where it must cross the Cove on a bridge about 350 yards long, and 15 or 20 feet above tide, situated near and a little above the present bridge, known by the name of Tukey's bridge. It proceeds thence on favorable ground to Martin's Point, where it must cross the Presumpscot River, by means of a bridge of about the same altitude, and probably 600 yards long, in addition to causeways of considerable extent at both ends of the bridge. It passes thence on favorable ground, to the valley of Muscle or Mill Brook, up which it ascends, at a moderate acclivity, to a point near Buxton's Corner, where it enters and pursues an alder flat, to the margin of Broad Cove, whence it traverses an extensive tract of diluvial ground of slightly varying aspect, quite to Parker's Point.

The gradations and curvatures on this position of the route may be made very gentle, at the expense of a few cuttings and fillings, not more than ten or twelve feet deep. The ground is generally easy of excavation, no cuttings in rock being apparently required.

The most formidable difficulties on this subdivision are the bridges required, each of which must be furnished with a Draw for the accommodation of shipping. The extra cost on account of bridges may be assumed at about \$75,000.

2D. FROM PARKER'S POINT TO BRUNSWICK—*embracing a distance of about thirteen miles.*

From Parker's Point the route must traverse the combined estuary of Royal's and Cozin's Rivers, which will require a bridge 900 or 1000 yards long, and probably 25 or 30 feet high, together with a draw for the accommodation of shipping.

Having crossed this estuary, the route passes over favorable ground, encountering several ravines of moderate size, in a direction towards Spar Brook, which, with its valley, must be crossed by means of a bridge or embankment, at least 100 yards long and about 30 feet high. It then passes in a direction for Weston's Point, near Porter's Landing, pursuing a track for the most part favorable.

The route next encounters two branches of Harraseekitt

River, which are two tide estuaries separated from each other by an elevated point of land, called Bartlett's Point, the passage of which will require an excavation, partially in rock, perhaps 20 or 25 feet deep, and two or three hundred yards long. Each branch of the Harraseekitt will require a bridge and embankments about 300 yards long, and 30 to 40 feet high, together with a draw in each.

From Rodick's Landing on the easterly branch of Harraseekitt River, the route ascends in the valley of Carter's Brook, which is often rugged, and in places serpentine, about three miles, when it enters upon rolling ground, and then on the extensive Plains of Brunswick, the last of which, with the exception of a few ravines, are very favorable for a Rail Road quite to the banks of Androscoggin River. Much of this subdivision will unavoidably be serpentine, but it is believed that the curvatures, without very heavy expense of excavation and embankment, may be limited to a radius not less than 1000 feet, and the gradations to 30 feet per mile.

On this subdivision, as well as on that before described, the extensive bridges required will occasion a very heavy expenditure, the extra allowance for which may be assumed at \$100,000.

3D. FROM BRUNSWICK TO WILLIAM'S SUMMIT—*near the north east angle of Bowdoin, embracing a distance of about fifteen miles.*

The most favorable crossing of the Androscoggin river is probably to be found a little above the town of Brunswick, at the narrows situated between Haley's Point and the foot of Stone's Boom, where a bridge and embankments, probably 150 yards long and 35 to 40 feet high, may be required. A bridge at this place will probably require a curvature of 600 feet radius, perhaps less, in order that the route may pass on the hill slopes of Haley's Point, and take a direction towards Topsham village, where the only practicable route in this vicinity is to be found. In pursuing the hill slopes, and especially in the rear of the village just mentioned, much deep cutting,

apparently in hills of sand, will be required, while at the same time an ascending gradation of about 30 feet per mile should be maintained. Having pursued a serpentine and ascending track along the hills of Haley's Point and Topsham, the route enters upon an extensive pine plain, which connects by gentle declivities with the flats of Cathance river, along which the route is to be continued.

With respect to the flats of the Cathance, much inconvenience is to be apprehended from the periodical inundations that prevail upon them, and from the softness and unstable character of the soil, which they present in many places. The former of these difficulties may no doubt, in part be remedied, by enlarging and deepening the channel of the river at the Falls, about five miles above the mouth of the river, and at which the flats commence and extend many miles above them. By such an operation the superabundant water with which the flats are often covered, may no doubt be conveyed away, and leave the flats measurably exempt from the inconvenience. The other difficulty can be obviated only by supporting the road-bed on a broad grillage of timber, bushes, &c. fortified wherever such helps are required, by piles firmly driven into the ground, on both sides of the road.

On parts of the route across the flats, it may be advisable to elevate the road above the surface, supporting it on trestles formed of piles driven many feet into the ground, and capped in a manner to receive the timbers required for the support of the road. Numerous examples of this sort are to be witnessed on the Charleston and Hamburg Rail Road at the crossings of the numerous swamps that occur on the route of that road, as also on many other railroads in this country.

The route then pursues its way along the flats of the Cathance seven or eight miles, in a direction towards Rogers' Mill, when it ascends in the valley of Rogers' Stream, at a rate not exceeding 35 feet per mile for a distance of two and a half miles, to William's Summit.

The country on the Cathance is one of peculiar aspect. It seems composed of extensive swamps or flats, alternating with ridges, knobs, and intervalles of hard land. The

ridges are often intercepted by deep and broad valleys, sunk nearly to a level with the flats, and affording easy passes between them. With respect to the particular direction proper for the route through this portion of the country, nothing at present can be definitely stated. No doubt can exist, as to the continuity of the flats in a favorable direction, although any route passing upon them must no doubt be slightly curved in many places. The principal difficulties to be apprehended on this part of the route, are those already adverted to, together with periodical inundations covering the flats to the depth of three or four feet.

4TH. FROM WILLIAM'S SUMMIT TO GARDINER—*embracing a distance of about eleven miles.*

From William's Summit, the route descends in the valley of Jack's Stream about one and a half miles, at gradations which may be limited to 35 feet per mile, the course being somewhat serpentine, and frequent cuttings and fillings being required in order to prevent curvatures of too small a radius. It then ascends in the valley of a branch of Jack's Stream, much cutting and filling, on hill-sides, being required, in order to maintain a proper elevation for the road; crosses a low summit, and enters Hungry Meadow. Having pursued this tract for a distance of about one and a half miles, it crosses another low summit, and enters Bowdoin Meadow. It proceeds thence in a direction for Shaw's Point near the lower extremity of Cobbesseconte or Pleasant Pond, having encountered a cutting partially in rock, about 15 feet deep, and 100 to 150 yards long, in its passage from Bowdoin Meadow to the valley of the Cobbesseconte. The route then proceeds downward in the valley of the stream just mentioned, about four and a half miles, on favorable ground to the upper or new Mills, in Gardiner, and continues downward in the same valley to the village of Gardiner, winding upon the slopes of the river hills, in order to maintain an elevation proper for entering the valley of the Kennebec river.

The gradations on this subdivision, with the exception of those already mentioned as occurring near Williams'

Summit, need not exceed 30 feet per mile; and the curvatures without much difficulty, may be limited to a radius of 800 or 1000 feet.

5th. FROM GARDINER TO AUGUSTA—*embracing a distance of about six miles.*

The road formation on this subdivision will no doubt prove more expensive than on any other equal portion of the route, owing to the rugged and broken character of the river hills of the Kennebec, and the numerous deep cuttings and embankments that will be required in order to pass them without incurring curvatures too abrupt.

On leaving the valley of the Cobbesseconte, after having traversed hill slopes for the distance of three-fourths mile, the route will probably pass a little to the westward of the Methodist meeting-house, through a deep cut 35 or 40 feet below the surface of the hill summit, and 150 to 200 yards long. It will proceed thence upward, along the slopes of the river hills, which are very irregular, and much indented by ravines, for a distance of about two miles, without incurring any very deep excavations, or very heavy embankments,—the general elevation of the road being about 90 feet above tide. At Loudon Hill, the Steam Mill, &c. much heavy cutting and filling will be required, together with two considerable bridges or culverts. On approaching Vaughan's Brook, much heavy cutting in hill sides, and considerable side-walling will be required. The crossing of the brook will require a bridge about 75 yards long, and 45 or 50 feet high. It then traverses the hill slope in front of Vaughan's Mansion, and winds through the town of Hallowell, by gentle curves, and at the expense of much excavation and embankment, in a direction to enter Fourth-street, at the upper part of the town. In its passage through Hallowell, it may without much difficulty be conducted on ground unoccupied by any buildings of much value, by maintaining an elevation 90 to 100 feet above tide.

Having passed the town of Hallowell, the route passes on ground somewhat more favorable for about a mile, although much cutting and filling will be required on this

distance. It then encounters a more irregular surface, diversified by ravines, gulleys, and tabular plains, elevated 15 or 20 feet above the appropriate level of the road, thus rendering a large amount of excavation and embankment, together with several expensive culverts, unavoidable. Its passage in front of the State House, and but a few rods from it, will serve, not only as an embellishment, but as an accommodation to that site.

On approaching the State House, and entering the City of Augusta, a gradation descending at the rate of 30 feet per mile should be adopted, in order to reach the upper part of the City at an elevation suitable for crossing the Kennebec river, and conducting the road on favorable ground upon the East side of the river. The appropriate elevation for this purpose will probably be about 60 feet above high tide.

The locality proposed for the road in its passage through the City, embraces a portion of the slopes of the river hills, situated between Water and State streets. By pursuing this locality, the route will encounter no very valuable building sites, occupied or unoccupied, while at the same time it will afford the most safe and convenient connexions between the road and the town, that could be devised. The mode of connexion here contemplated, provides for the passage of the Rail Road under the street leading from the State House to the lower end of Water-street, and at a sufficient elevation above all the other cross streets, to admit of a free passage for them, under the Rail Road. Much excavation and embankment, as also a very considerable expense of bridging across the streets, will of course be required, on this part of the route.

The crossing of the Kennebec river at the head of tide, will require a bridge about 600 yards long and 60 feet high, stretching obliquely across the river from the Gravel Hill on Water street at the upper part of the City, to the bluff bank on the East side of the river, a little below the lowermost lock of the Augusta Dam. The cost of such a structure, abutments and piers included, may be estimated at about \$75,000.

The cost of road formation on this subdivision, on the supposition that no excavations in rock will be required, which will probably prove true, and exclusive of bridges, may be assumed at an average of about \$16,000 per mile.

A summary of the foregoing distances, gives for the entire length of the Brunswick division of the Portland and Bangor Rail Road, fifty-eight miles, which probably somewhat exceeds the true distance.

We next proceed to a description of the Clinton division of the Portland and Bangor Rail Road, extending from Augusta to Bangor, and embracing a distance of seventy-four miles. This distance likewise is no doubt somewhat in excess.

1st. FROM AUGUSTA TO WINSLOW VILLAGE—*embracing a distance of eighteen miles.*

From a point on the river bank, opposite to the mouth of Bond's Brook, and a little below the Augusta Dam, the route ascends in the valley of the Kennebec, coasting along the slopes of the river hills, and occasionally traversing long and narrow tracts of intervale land nearly to the mouth of the Sebasticook: the direction towards Bangor, being quite as appropriate, and the sinuosities far less frequent, than those of any other route having the slightest claim to feasibility. For the distance of nearly four miles from Augusta, a natural birm is presented on the easterly bank of the river, sufficiently elevated, and with very few obstructions to the passage of a Rail Road. In this distance several ravines are to be crossed, the most considerable of which is that of Ellis' Brook, one mile above the city. Through the fifth mile, the river bank is less favorable, being more abrupt, and in a few places probably requiring side walls for the support of the road. The ground then becomes more favorable quite to the ravine of Seven Mile Brook, which must be crossed by a bridge and embankments about 100 yards long.

A little above the mouth of Seven Mile Brook, there is an insulated knob, on the immediate margin of the river, which renders the passage along the shore somewhat cir-

cuitous, as well as difficult, on account of the abruptness of its slopes. These difficulties may be avoided by a straight cut, perhaps 20 feet deep in places, and about 200 yards long in rear of the knob.

The next two miles are attended by an alternation of slopes and flats of rather easy passage, when we arrive at the hill, midway of this subdivision, on which stands the Old Meeting-house in Vassalborough. The river washes the immediate base of this hill for the distance of nearly a mile. Its slopes towards the river are abrupt and may in places require side-walling. The direction of the route upon them will be favorable, and generally free from curvatures.

The ground again becomes rather favorable till we arrive near Getchel's Corner, when a very uneven aspect is presented, for a distance of about three-fourths of a mile, extending to the Rapids called the Six Mile Falls. The river hills, though abrupt and broken on this part of the route, are apparently void of rock, and the cuttings and fillings required in the road formation, although frequent and in places extensive, will not prove very costly. Near the foot of the Six Mile Falls, is a cove-like sinuosity formed by a recess of the river hills, which must be traversed by a causeway, about sixty rods long, and eight to twelve feet high.

In a distance of three miles above the Six Mile Falls, we reach the lower township line of Winslow. The birm on the shore throughout this distance is generally very narrow, frequently intersected by ravines, and occasionally precluded by the near approach of the hill slopes to the margin of the river. The road formation on this part of the route will not be difficult.

Three and a half miles farther, carries us to the end of this subdivision in the valley of the Seabasticook; through which the principal obstructions to be met with, are the ravines of Taylor's, Carter's, Wood's, and Hayden's Brooks, all of which are small, together with occasional embankments of moderate height, which will be required in order to place the road beyond the reach of freshets.

The gradations on this subdivision need not exceed 12 or

15 feet per mile, and the curvatures may readily be limited to a radius of 1000 feet.

2d. FROM WINSLOW VILLAGE TO THE BOG SUMMIT *in the North Easterly corner of Etna—embracing a distance of thirty-two miles.*

Having pursued a favorable locality, above the reach of high freshets, and gradually deflecting from the immediate valley of the Kennebec at a point a little below the village church, till it enters within that of the Sebacicook, a few hundred yards above the Winslow bridge, the route ascends in the latter about half a mile and crosses the river last mentioned, on a bridge 50 or 60 yards long, and about 30 feet high, the bridge site being so situated with respect to a bend of the river, that the route of the road will incur no considerable curvature in its transit across the river, or in its extension above and below the bridge.

From this point the route ascends in the immediate valley of the Sebacicook, along its North-westerly shore, passing much of the way on hard intervale land elevated above the reach of freshets; and occasionally on sloping ground connected with the river hills.

In its passage through the village of Clinton, where it traverses the narrows connected with the Falls of the Sebacicook, it must occasionally encounter the abrupt slopes of the river hills, where cuttings in rock may here and there be required in order to maintain a course as free from curvatures as practicable, which ought always to be the aim, in the passage of all ascents or descents. The gradations required on this part of the route for the distance of a mile or more, will be about 30 feet per mile.

Having passed the Falls, the route again enters a more practicable part of the river valley, and continues quite as favorable as that below the Falls, to Hunter's mills, ten miles from the mouth of the river.

At Hunter's mills, commences an extensive bend or detour of the river, seven or eight miles in circuit, embracing an elevated tract of land called Brown's Hill, which is entirely surrounded, partially by the bed of the river, and residually by flats intervening between the Hill, and

another eminence called Snake-root Ridge. Leaving the valley of the river at Hunter's mills, the route takes a direction, on favorable ground, towards these flats ; passes in the rear of Brown's Hill, and again enters the valley of the Seabasticook about five miles from the mills. Or, instead of approaching the river at the point just indicated, the route may be continued upward in a direction nearly parallel to the river, from Brown's Hill, through McKenney's meadow, and on a flat surface, till it reaches a small stream called Power's brook, down the valley, or rather flats, of which it passes to the immediate valley of the Seabasticook, some distance above the mouth of Twenty Five Mile stream.

In either of the directions just mentioned, rough ground is to be expected, in connexion with a series of low ridges and swells situated between the flats and the river valley ; but no very deep or extensive cuttings, or gradations greater than 30 feet per mile are to be apprehended.

The route may then be conducted along the immediate valley of the river, encountering abrupt and rugged slopes in a few places, which must be passed by means of a bench, formed either by side-walling or excavations on steep hill sides, till it arrives at the head of a series of rapids, the uppermost of which is called the Thirty Mile Rips.

The valley of the river then becomes much broader and more favorable for the route, till we arrive within half a mile of Eel Weir Rips, where the river must be crossed on a bridge and embankments 150 or 200 yards long, and high enough to clear the river freshets. The object of crossing the river at or near this point, is, not only to avoid the passage of a deep and extensive swamp, situated on the North side of the river a little above the Eel Weir Rips, called Knob's Bog, but to pursue a more favorable course for the further extension of the road upward.

Having crossed the river, the route proceeds upward about three and a half miles on ground for the most part favorable, though rough and uneven in places, in a direction to cross a remarkable ridge called Peottoma Ridge or *Horse Back*, at the distance of about three-fourths mile inland from Peottoma Point. The passage of this ridge

will probably require a cut about 35 feet deep, and 150, perhaps 200 yards long, in sand, gravel, and pebbles.

From Peottoma Ridge the route proceeds upward on the flats, and within the valley of the South branch of the Seabasticook about three and a half miles farther, to East Rips in Chandlerville, alternately passing over "hard and soft" lands, the former somewhat more elevated, and the latter requiring embankments or causeways of moderate height, to keep the road above the reach of inundations.

At the East Rips, is a remarkable pass, situated to the South of the main channel of the river, but communicating with its valley both above and below the Rips, and affording a more direct and easy passage for the Rail Road. Considerable cutting and filling will be required on this part of the route, in order to keep the gradations within proper limits, and avoid curvatures too abrupt.

Having passed the East Rips, the route ascends in the valley, or rather along the flats on the south side of the stream, to those of Martin's Stream, and thence on similar ground to Ferguson's Brook. Through most of the distance between four and five miles from the Rips to the Brook, the flats are broad and subject to periodical inundations to the depth of two or three feet, above which the road surface must be raised by means of causeways similar to those suggested in reference to the flats of the Cathance. The flats on this part of the Seabasticook, however, afford a more stable and firm substratum for the road, than those of the Cathance.

From the mouth of Ferguson's Brook the route ascends in its valley, two or three miles, most of the way on flats, to the Bog Summit. About midway of this distance the valley is much contracted in width, being nearly intercepted by a sandy ridge, called the Horse Back, across which the route must pass, by a deep cut of moderate extent, in order to avoid a considerable curvature of short radius, which must otherwise be incurred. The only water fall to be met with on the Brook, is said to occur at this place, where a head and fall sufficient for the purposes of a small mill in a wet season, is with difficulty attained.

The difficulties anticipated from the over-flowings of the

extensive flats of this subdivision which are situated between Eel Weir Rips, and the Bog Summit, and especially between the East Rips and Fergusson's Brook, may be measurably, if not effectually obviated, by widening and deepening the channel of the river, at each of the Rips above mentioned, which may be done at an expense quite inconsiderable when compared with the advantages that would result from such an operation, not only in favor of the contemplated enterprise, but to the benefit of the land holders, whose meadows would thus be reclaimed and rendered exceedingly productive.

With respect to the ascents, descents, and curvatures on this entire subdivision, they may all be kept within due bounds. The gradations will probably nowhere exceed thirty feet per mile, and in a few instances only will it be necessary to reach that limit. The course of the route will be even less devious from a right line, than that of the Seabastcook which is the index to this part of the track.

The contemplated Rail Road from Portland to Bangor, connects with great facility, and very favorably in all respects, with that projected from Belfast to Quebec, at two points, on this subdivision.

Regarding the route as extending from Portland to Quebec by the valley of Kennebec river, the connexion will be as follows, viz: Pursuing the route already described through Augusta to Winslow, it will cross the Seabastcook about 300 yards above the Winslow bridge, a bridge about 75 yards long and 35 feet high being required for this purpose. The point of crossing the river here contemplated, is a little above the mouth of Siccar's Brook, where the route strikes upon favorable ground for entering the ravine of the brook, without incurring a curvature too abrupt.

The route then ascends in the ravine of Siccar's Brook about 400 yards to the road leading from Waterville to Clinton and will require much side-cutting in beds of slate, as also considerable embankment between the bridge-site and the entrance of the ravine, in order to render the curvatures and gradations sufficiently gentle. From the Waterville road, it ascends in the same valley which becomes

much broader, and affords a more easy and direct passage for the road. Flats and low ridges occur on the residue of the route to Morrison's Corner, where it becomes coincident with the route surveyed for the Belfast and Quebec Rail Road. The country on this part of the route presents generally the aspect of an extensive plain, but its uniformity is here and there interrupted by swells and ridges of moderate height, in no instance probably requiring a cutting or filling more than eight or ten feet deep. The greatest inequalities of this character that present themselves, are to be found in the neighborhood of the point of junction, this point being at the distance of about ten miles from Winslow village.

Regarding the route as extending from Bangor to Quebec by the valley of the Kennebec, a connexion equally as favorable and even more obvious is to be had, as follows, viz: Pursuing the route hereafter to be described, from Bangor to the Bog Summit, and thence by the subdivision last considered, to the flats connected with McKenney's Meadow in the rear of Brown's Hill, the route comes into coincidence with the Belfast and Quebec Rail Road, and pursues the same track for the distance of two or three miles.

In reference to the connexions here contemplated, and to the feasibility of a route from Portland and Bangor, respectively, to Quebec, and relying on the best information I have been able to obtain, both from observation and inquiry, with respect to the features and general aspect of the country between those three points, I feel inclined to hazard the opinion that the routes herein considered, if extended by the valley of the Kennebec to the city of Quebec, will prove more eligible, and by reason of their greater freedom from ascents and descents, virtually if not actually shorter than any other routes that can be found between the same points.

3d. FROM THE BOG SUMMIT TO BANGOR—*embracing a distance of twenty-four miles.*

The circumstance which has induced the name given to this summit, is an extensive bog which occurs on the high-

est grounds traversed by the route, and situated between the waters of the Kennebec and Penobscot rivers. The surface of the Bog is spongy and soft, and in many places indicates a substratum of the consistency of a quagmire. It contains a small pond, the surface of which rises nearly to a level of the bog. The main road from Newport to Bangor crosses the bog near its Western margin, and to all appearance, in its present flight, is furnished with a foundation sufficiently firm and unyielding. The contemplated Rail Road may probably be conducted through the bog so near its margin, that a foundation equally as secure, may be obtained for it at a moderate expense.

From the Bog Summit, the route descends in the valley of a stream tributary to the Sowadabscook, passing Carter's and Parker's Ponds, the former, one and one-fourth, and the latter, three and one-fourth miles from the Summit, through both of which the Sowadabscook has its course. On arriving near Parker's Pond, the route leaves the immediate valley of the stream and pursues a more direct course through a favorable valley separated from that of the stream and pond, by an insulated ridge. Through the distance above mentioned, the valley is supposed favorable with the exception of a few miry or soft places, and the descent very inconsiderable.

It again enters the valley of the Sowadabscook which becomes narrower and has a more rapid descent, for about one and a half miles, in which distance there is an aggregate fall in the stream of between 30 and 40 feet, affording sites for two mills. The valley then becomes broader and more favorable and the stream less rapid in the next mile, which carries us to the village of Carmel. On this part of the route, occasional cuttings on hill-sides, and across the ends of protruding ridges will be incurred, but the gradations may without much difficulty, be limited to 30 feet per mile, and the curvatures to a radius of 1000 feet on the entire distance from the Summit to Carmel village.

From Carmel village, the route descends very gradually, and by gentle curves in the valley of the Sowadabscook, passing the mouth of Kinsley's Stream a short distance

below the village, and arriving at the Cross about four miles and a half below the same. Throughout this distance the route is considerably circuitous, the course at first bring about E. S. E. and afterwards about N. E. persevering in the latter direction till it reaches the Cross. The uplands and hills approach the stream so nearly on both sides, that its valley is rendered narrow, and the route confined within a short distance from the stream, and compelled to follow its general course.

From the Cross to Bangor, two routes are presented, viz: a route passing northwardly of Hermon Hill, and thence in an easterly direction to Hatch's Mills on the Kenduskeag, three miles above Bangor, where it crosses this stream and takes a southeasterly direction to the Park, a tract of 12 acres within the city, and belonging to the Corporation of Bangor.

The other route passes southwardly of Hermon Hill continuing in the valley and upon the flats of the Sowadabscook in which are situated Hugh's Pond, and extensive swamps and pools connected with it, till it approaches the mouth of the Bog Stream, where it enters upon the flats of this stream, and traverses an extensive swamp called the Big Bog, through which Bog Stream has its course, and afterwards unites with the route just designated, at Hatch's Mills.

The distance by both of these routes is probably about the same ; but the ground traversed by the former is unquestionably more favorable in all respects, for the purpose in view, than that which must unavoidably be crossed by the latter. Accordingly the northerly route is to be preferred.

Accordingly the route leaves the valley of the Sowadabscook at the Cross, and enters that of the Kenduskeag, the ground being favorable for such a transition. It proceeds thence for a considerable distance on hard-land flats near the northeasterly base of Hermon Hill, and then takes a pretty direct course towards Hatch's Mills, passing most of the way on a flat or waving surface ; but occasionally encountering low ridges or swells, through which a passage must be opened for the road by cuts of a moderate depth. The flat lands are thought to be sufficiently

firm for the support of the road. The hills by which the valley of the Kenduskeag is bounded on the west, may be easily passed by entering a ravine connected with the flats just mentioned, and leading in a direction for Hatch's Mills.

At this place, (Hatch's Mills,) the Kenduskeag must be crossed by a bridge and embankments 250 or 300 yards long, and about 40 feet high, which will place the road at an elevation of between 90 and 100 feet above tide at Bangor.

Having crossed the Kenduskeag, the route takes a southeasterly direction, and passes over a surface for the most part favorable, but in places rolling and somewhat broken; and in a distance of about two and a half miles, reaches the City Park, where a very favorable junction with the Bangor and Piscataquis Rail Road may easily be formed, and a very spacious and commodious Depot, on a scale commensurate with the vast amount of business likely to centre at this place, and embracing all the ware-houses, car houses, carriage parks, &c. that ought to be had in connexion with such a Depot, may be very conveniently established.

At the Park, our route becomes coincident with that of the Piscataquis or Orono Rail Road, and by pursuing the latter about 350 yards, it arrives at the Depot of that road, within the city of Bangor, and at an elevation of 66 feet above tide.

A connexion with the commercial and other business of the city may be had in common with that about to be established for the Bangor and Piscataquis Rail Road, and by means of such other arrangements as may subserve the interests and convenience of the city corporation and others concerned.

In order to exhibit still more clearly the localities of the route with respect to the civil divisions of the country through which it passes, it may be well to designate them by a reference to the townships, as delineated on Greenleaf's Map of the State of Maine, which are intersected by the route.

Beginning at Portland, the route proceeds along the

"Fore-side" of Falmouth, Cumberland, North Yarmouth, Freeport, and Brunswick. It then enters Topsham, and passes thence near the centre of Bowdoin, to its N. E. corner, and thence along the N. W. side of Richmond and within this township to Gardiner, where it approaches the Kennebec river. In its further progress it passes through Hallowell, Augusta, and Vassalborough, to the mouth of the Sebasticook in Winslow. It then ascends in the valley of this river, passing through Clinton, Clinton Gore, a corner of Pittsfield, and a corner of Burnham, also Chandlerville, the northerly parts of Plymouth and Etna, near the south line of Newport, to the centre of Carmel. From Carmel it passes centrally through Hermon, to Bangor, which it enters about midway of its westerly boundary, and terminates near the lowermost part of the township, in the city of Bangor.

This designation of the route has been deemed the more needful, in consequence of my inability under existing circumstances, to furnish a delineation of the route explanatory of its position with respect to other geographical points, and places.

With respect to "the mode of construction deemed most economical, efficient, and durable," I take leave to refer you to my Report of December, 1835, before cited, a corrected copy of which I herewith transmit for re-perusal, so far as it relates to the subjects in question. The portion here specially cited is contained between pages 17 and 23 inclusive. This portion, together with that before cited may be regarded as appendices to this paper.

With respect to the cost of constructing a Rail Road on the route here recommended and described, in the best lights that a careful and impartial reconnoissance could throw upon the subject, any statements that can be made, in the total absence of all results derived from an Instrumental Survey, upon which alone an estimate of costs can be fairly predicated, must unavoidably be merely conjectural, and of course may be exceedingly vague. Nevertheless, as some statements of the sort are desirable, and even necessary, in order to fix upon a proper limit for the capital stock to be invested in the enterprise, I shall

venture to offer such an estimate, in a summary form, as a careful examination has induced me to believe will exhibit a near approximation to the actual cost of the work when completed.

The estimate I have to offer, will embrace the expense of construction under three general heads, or items, viz : Road Formation, Bridging and Railing, the last of which will comprise, summarily, the cost and laying of the rails and of all the materials connected with them, the road formation being for a double, and the railing for a single track. The distances embraced in each statement of the estimate, will be chosen with a view, to an easy application of an average price per mile, and are to be regarded as collective, rather than local and individual.



ESTIMATED COST OF ROAD FORMATION, *small bridges, culverts, side drains, &c. included, and the surface width of the road being 25 feet.*

12 miles at	\$16,000	per mile,	.	\$192,000
5 " "	15,000	" "	.	75,000
6 " "	14,000	" "	.	84,000
12 " "	12,000	" "	.	144,000
14 " "	10,000	" "	.	140,000
8 " "	9,000	" "	.	72,000
23 " "	8,000	" "	.	184,000
27 " "	7,000	" "	.	189,000
25 " "	6,000	" "	.	150,000
132 Average	\$9,318 18	per mile.		\$1,230,000

ESTIMATED EXTRA ALLOWANCE PROPER TO BE MADE IN ORDER TO COVER THE COST OF BRIDGES REQUIRED ON THE ROUTE, *estimating the whole at an average rate of \$20 per foot, for each foot in length, of all the bridges, and high embankments.*

Bridges, &c. between Portland and			
Brunswick,	7,700 feet at \$20,		\$154,000
Bridge across Androscoggin River,	500 " " "		10,000
Bridges between Topsham & Gardiner,	300 " " "		6,000
Do. " Gardiner and Augusta,	150 " " "		3,000
Bridge at Augusta,	1800 " " "		36,000
Extra for high Abutments and Piers,			14,000
Bridges between Augusta and Bog Summit,			
	1200 feet at \$20,		24,000
Bridges between Bog Summit and Bangor,			
	900 " " "		18,000
Aggregate extra allowance for Bridges,			\$265,000



ESTIMATED COST OF RAILING FOR A SINGLE TRACK.

Under this head I shall assume, as in the Report before cited, p. 55, &c. \$7,000 as the cost per mile for laying a single track, all things included, and at the same rate in excess, for such turns-out, branches, &c. as are thought to be wanted, the aggregate distance on which they may be required being assumed at eight miles. In further explanation, it may be observed, that the price at which iron for Rails may be had, delivered at American ports, is supposed to be \$50 per ton: Accordingly should the price be higher or lower, a corresponding change should be made in the estimate.

Hence the aggregate length of Rail-track required, Turns-out, &c. included, will be 140 miles at \$7000, \$980,000.

SUMMARY OF THE FOREGOING ESTIMATE.

Aggregate cost of Road Formation, inclusive of small bridges, &c.	\$1,230,000
Aggregate extra allowance for Bridges and high Embankments,	265,000
Aggregate cost of Railing, inclusive of Turns-out, &c.	980,000
Total amount,	<u>\$2,475,000</u>

Hence the aggregate amount required for the construction of a single track Rail Road from Portland to Bangor, exclusive of any allowance for right of way or other contingencies, is two millions, four hundred and seventy-five thousand dollars; which gives, for the average cost per mile on the entire route, eighteen thousand seven hundred and fifty dollars.

With respect to the amount of transports, whether of freights or passengers, likely to pass upon the road, during each annual period of travel, which may be assumed with safety at a minimum rate of two hundred days in each year, I am not sufficiently conversant with the statistics bearing upon this subject, to furnish any conclusive statement. Judging, however, from the apparent amount of travel between the two termini of the road, and comparing it with the excessive changes in the number of passengers that have invariably been produced by the construction of Rail Roads in other parts of the country, the daily number of passengers in each direction, would probably amount to at least three hundred, or six hundred in both directions, in addition to any desirable amount of freights, enough of which would undoubtedly seek conveyance on the road.

Instead of 300 passengers transported daily in each direction; we shall assume 200 as a more certain number, or 400 passengers daily in both directions, and upon this amount of transports alone, predicate a calculation as follows, viz :

The receipts from passengers alone, charging at the very low rate of four cents per mile each for their conveyance, (400 passengers daily) would amount to \$2112

daily ; or \$422,400 annually, or for each annual period of 200 days.

Allowing 25 per cent. or one-fourth of this amount, viz : \$105,600 as an offset against expenditures of all kinds for transportation, repairs, &c. which is believed to be sufficient for these purposes, we have a net annual revenue remaining equal to \$316,800, which is equivalent to an income of 6 per cent. per annum on a capital of \$5,280,000, or nearly 13 per cent. on \$2,475,000, the estimated prime cost of the road.

In conclusion, it may be observed that the amount of annual expenditures as above stated, viz : \$105,600, is not a mere matter of conjecture, but the result of careful computation based upon data derived from actual experience on Rail Roads in this country, ample allowance having been made for contingencies of all kinds ; and that this amount considerably exceeds the known rate of expenditure on account of annual repairs of the road ; repairs and renewals of Locomotive Engines, Passenger Cars ; the superintendence and management of a Rail Road and all its concerns ; also, that the assumptions relating to the cost of road-formation, bridging, &c. cover a larger amount than has generally been expended on the same accounts, in the construction of most of the Rail Roads of the United States.

I have the honor to be, Sir,

Very respectfully, your most ob't serv't,

S. H. LONG, *Lt. Col. Top'l Eng'rs.*

To His Excellency,

ROBERT P. DUNLAP,

Governor of Maine, and

Pres't of the Board of Int'l Improv'ts,

Brunswick, Me.

STATE OF MAINE.

IN SENATE, FEBRUARY 8, 1837.

Ordered, That 1000 copies of the foregoing Report be printed for the use of the Legislature.

(Extract from the Journal.)

Attest, WILLIAM TRAFTON, *Secretary*