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SEVENTEENTH LEGISLATURE.

No. 22. **HOUSE.**

REPORT

OF

JAMES HALL, ENGINEER,

ON THE

PORTLAND, SACO, AND PORTSMOUTH RAIL ROAD ROUTE.

GENTLEMEN:—Having completed the survey for a Rail-Road from Portsmouth to Portland, taken in pursuance of my engagements with you, I now have the pleasure of submitting for your attention the following Report and Estimates, accompanied by the plans, as the result of my labor. In my estimates, I have had in view the fact, that this road is to be a continuation of that now in progress from Boston eastward, forming another link in the chain of communication between the West and East, which, it is to be hoped, the enterprize of our State will ere long extend to its eastern borders.

From this consideration, I deem it important that a road should be constructed, that will afford the greatest facilities to the business and travel, coming from the West, and which will advantageously compare with that road.

Attended by Moses Emery, Esq., one of your Committee, I first made a reconnoissance of the general features of the country, between the two termini, in order to make the most favorable location, with the least expense of time. This occupied my attention for one week. I then returned to Portsmouth, with my Assistants, and commenced the survey at Piscataqua river, on the northwesterly side of the bridge, in Kittery. The route from this point passes over a ridge of land, adjoining the river, and over the easterly part of Spinney's Cove, and thence, crossing a low summit of twenty-six feet, two and a quarter miles to Spruce Creek, which will require a bridge of four hundred and fifty feet in length. Thence the route passes along ascending ground, one mile, to a summit of thirty feet, and then on uneven descending ground, one and three-quarter miles, to Savage's Mill Creek, which I propose to cross, by a bridge four hundred feet long, near its confluence with York river. The country to this place is composed of clay and trap-rock, in ledges of considerable extent, and its surface is undulating.

From Savage's Mill Creek the line passes York

river, requiring a bridge of eight hundred feet in length, and proceeds over broken ground, and along the slope of Cider Hill, one and a half miles, to a summit of twenty-five feet. Thence over ground nearly level, one mile, where it encounters a ridge of land fifty-eight feet above the level of the sea, extending from Agamenticus Mountain to Cape Neddock. In ascending this summit, the line crosses the stage road from Portland to Portsmouth, and continues on the southerly side of the road, one mile, which it there re-crosses and proceeds through a swampy piece of land three-quarters of a mile; and descending into a valley one-third of a mile, passes Chase's brook twenty rods west of Freeman's tavern in York ;—whence it traverses a valley, and the northwesterly side of Pine Hill, on ascending ground, two miles, to a summit ninety feet above the sea. Descending from this summit, the line crosses Josiah's brook and the stage road, and passes between Maxwell's tavern and Ogemquit bay in Wells, two and one-third miles. The country from York river to Ogemquit bay is made up of sand, gravel, clay, trap-rock, and granite ;—the gravel resting on rock, and the rock in some places swelling into large hills. The granite is of inferior quality. The swamps are composed of vegetable deposite, two to three feet deep, resting on white sand and rock.

From Ogemquit bay the line pursues a straight

course, east of the stage road, five miles, over plain land, slightly ascending and intersected by ravines and small streams, running into the sea. The soil is principally sand and of easy excavation.

Here the line curves easterly over ground nearly level, one and a third miles, and crosses the road near the new meeting-house in Wells. Thence it continues on a straight line six and one-quarter miles to Sherburn meeting-house in the town of Kennebunk Port, crossing in this distance Little river, Branch river, which divides Wells and Kennebunk, Mousem river, about half a mile west of Kennebunk village, and Kennebunk river. Thence the line pursues a more easterly direction one and three-quarter miles in the town of Biddeford, over rough and ascending ground, to the highest point of land on the route between Portsmouth and Portland, which is one hundred and thirty-five feet above the level of the ocean. From this summit the line extends on one course, on descending ground, three miles, to within the distance of one mile from Saco river. From this point, I have surveyed two routes. The first, crossing Saco river three-fourths of a mile above the village, proceeds on the northerly side of the stage road, and passing about one hundred rods west of Donald's tavern in Scarboro', and across the head of the salt-marsh, and by the easterly slope of Scottoway hill ; and then takes one course to Fore river, opposite the city of Port-

land, which it enters on the westerly side of Bramhall's hill. The whole distance from Portsmouth to Portland by this route is forty-seven and a half miles.

Upon surveying this line, I found on further enquiry and examination of the country, that a route, probably more favorable, might be substituted for that part of the line extending from Biddeford to Portland, about one and a half miles southeasterly of that first surveyed. I consequently commenced a second survey at Biddeford ; and passing over descending ground to Saco river, I propose to cross the river at Spring's Island, connecting it with the western shore by a bridge of two hundred and fifty feet, and with the eastern shore by one of four hundred feet in length. Thence the line passes near the village of Saco and extends one mile to a summit ; then on one course eight miles, crossing the road leading to Portland near Goosepan brook; thence over land mostly pine plain and nearly level, with a slight descent to the marsh in Scarborough, which is one mile in extent ;—here the line takes the course of a valley over ground slightly ascending to the southerly side of Scarborough old meeting-house ; whence it turns more northerly and continues along a low land flat or valley to Fore river, opposite Portland, which it must cross by a bridge two thousand eight hundred feet in length, to the easterly side of Bramhall's hill. From the line the land is

favorable to take a direction, entering Portland either on its eastern or western side. The whole distance on this route is forty-eight miles ; half a mile farther than that first surveyed. The superior advantages afforded by this line to the village of Saco, which is an important point, giving to its inhabitants, by its near approach, easy access to the road for their business ; the saving of expense in crossing the river, and the better general location of the road from Saco to Portland render it decidedly preferable to the other. I therefore have made the estimates for the eastern route, and have delineated that one only on the plan.

The face of the country from Ogemquit bay to Portland, may be considered very favorable for the road formation. The soil is principally sand, with some clay. The low land flat, between Scarboro' marshes and Portland, consists of vegetable mould, one to two feet in depth, with a substratum of white sand. In Saco, near the river, are ledges of trap-rock, and in Biddeford large masses of granite of the finest quality.

The gradations from Portsmouth to Portland may be concisely stated as follows, viz :—$21\frac{17}{100}$ miles ascent, averaging $20\frac{40}{100}$ feet per mile; $24\frac{24}{100}$ miles descent, averaging $17\frac{83}{100}$ feet per mile, and not in any case exceeding thirty-five feet per mile; and $2\frac{59}{100}$ miles level. Forty miles of the route are disposed in straight lines; the remaining eight miles consist of

curvatures, which may be turned on radii of from two thousand to ten thousand feet.

The following is the estimated cost for the grading, masonry, and bridging, for a double track, and the laying down of one track with turnouts; the gradations and superstructure to be similar to those of the Boston and Providence road:

SECTION 1st.—*Extending to York River; distance 5½ miles; 25,236 cubic yards excavation at 25 cts.* . .	$6,309 00	
113,120 cubic yards embankment at 18 cts., . . .	20,361 60	
30,892 cubic yards rock excavation at $1	30,892 00	
Bridges and crossings for roads,	1,225 00	
Bridge at Spruce Creek .	1,800 00	
Bridge at Savage's mill creek,	1,000 00	
Masonry for Culverts, .	240 00	
Grubbing and clearing, .	400 00	
Trench walls or rubble stone,	4,330 00	
One track of rails, laying down and finishing the road at $7000 per mile, . . .	38,500 00	
		$105,057 60
SECTION 2d.—*From York River to the summit on the easterly side of Pine Hill—Distance 7¼ miles.*		
110,960 cubic yards of excavation at 22 cts. . .	24,411 20	
184,2224 cubic yards of embankment at 20 cts. . .	36,844 80	

9,072 cubic yards of rock excavation, at $1, . .	9,072 00	
Bridges and crossings for roads,	1,800 00	
Bridge over York river, .	5,000 00	
" " Chase's brook,	1,172 00	
Culverts, . . .	400 00	
Grubbing and clearing, .	1,190 00	
Trench walls or rubble stone,	4,200 00	
One track of rails, laying down and finishing road, at $7,000 per mile,	50,750 00	
		$134,840 00

SECTION 3d.—*From Pine Hill to village in Wells—distance 7¼ miles.*

80,560 cub. yds. excavation at 18c.	$14,500 80	
172,552 " " embankment at 20c.	34,510 40	
14,000 " " rock excavation at $1, . . .	14,000 00	
Bridges and crossings for roads,	2,000 00	
Bridge over Josiah's river,	1,250 00	
" " Salt Marsh, .	800 00	
" " Treadwell's brook	1,000 00	
Masonry for culverts, .	1,540 00	
Grubbing and clearing, .	150 00	
Rails, and finishing road at $7000 per mile, . .	50,750 00	
		$120,501 20

SECTION 4th.—*From the village in Wells to Kennebunk river—distance 7 miles.*

63,840 cubic yards of excavation at 16 cts. . .	$10,214 40	
204,940 cubic yards of embankment, at 16 cts. .	32,790 40	
Bridges and crossings for roads,	2,000 00	

Bridge over Mousem river,	1,740 00	
" " Kennebunk river,	1,150 00	
Culverts, . . .	1,140 00	
Grubbing and clearing, .	1,000 00	
Trench walls or rubble stone,	2,600 00	
Rails, and finishing road at $7000 per mile, . . .	49,000 00	
		$101,634 80

SECTION 5th.—*From Kennebunk river to Saco river—7¼ miles.*

14,412 cubic yards excavation, at 15 cts. . . .	$2,161 80	
148,752 cubic yards embankment, at 14 cts. . .	20,825 28	
5,920 cubic yards rock excavation at $1, . . .	5,920 00	
Bridges and crossings for roads,	2,100 00	
Culverts, . .	800 00	
Rubble stone, . .	3,900 00	
Grubbing and clearing, .	800 00	
Rails, and finishing the road at $7000 per mile, .	50,750 00	
		$87,257 08

SECTION 6th.—*From Saco river across the Marsh in Scarborough—distance 7 miles.*

78,480 cubic yards of excavation, at 14 cts. . .	10,987 20	
146,128 cubic yards of embankment, at 16 cts. .	23,380 48	
Grubbing and clearing, .	700 00	
Culverts, . .	540 00	
Bridging and crossings for roads,	1,800 00	
Bridge over Saco river,	21,500 00	
Crossing marsh in Scarborough,	22,500 00	

Rubble stone, . .	1,300 00	
Rails, and finishing road at $7000 per mile, . .	49,000 00	
		$131,707 68

SECTION 7th.—*From Scarborough Marsh to Portland—6¾ miles distance.*

48,272 cubic yards of excavation, at 16 cts. . .	$7,722 52	
132,224 cubic yards of embankment, at 16 cts. .	21,155 84	
Grubbing and clearing, .	640 00	
Bridge over Fore river,	19,800 00	
" " Nonesuch river,	700 00	
Bridge and crossings for roads,	1,200 00	
Culverts, . .	250 00	
Rubble stone, . .	1,800 00	
Rails, and finishing road at $7000 per mile, . .	47,250 00	
		$100,519 36
Total amount,		$781,517 72
Cost per mile,		$16,281 61

At the request of some of your Committee, I have made an estimate for a road, graded for a single track, upon which to be placed a superstructure of wood and an iron plate rail, similar to that contemplated in my estimate for the road on the upper route, through Gorham, Alfred, &c. to Sommersworth, which amounts to the gross sum of $503,734 56, or the sum of $10,494 47 per mile. But the policy of adopting a grading for a single track with such a structure, appears to me very questionable, both from considerations of economy,

arising from the inconvenience and costs necessarily attending the repairs of a perishable structure, and the increased expense of hereafter grading the road for a double track, should the business demand it, and also of the relation, as I before observed, this road has to the one already commenced from Boston, and its probable future extension farther East, thus forming one line of intercommunication. It therefore seems desirable that this road should not be exceeded in permanency and excellence by any other on the same line.

To the foregoing estimate, . .	$781,517 72
I would add for land damages and fencing, say,	30,000 00
For Depots and watering stations, .	30,000 00
" four Locomotives and tenders, .	26,000 00
" twenty passenger carriages, .	17,000 00
" thirty burthen cars, . .	10,000 00
" Engineers, and contingencies, .	50,000 00
Aggregate cost, .	$944,517 72

I would only further remark, in conclusion, that the preceding estimates are predicated upon the line of this preliminary survey. In the final location of the road, some part of the expense may possibly be saved, by deviations to more favorable ground, and by crossing Fore river into Portland, at a narrower part than the one delineated on the plan.

Respectfully your ob't serv't,

JAMES HALL.

To ETHER SHEPLEY, Esq. and others,

Com. of the Portsmouth and Portland R. Road Ass.

STATE OF MAINE.

HOUSE OF REPRESENTATIVES,
February 17, 1837.

Read, laid on the table, and one thousand copies ordered o be printed for the use of the Legislature.

(Extract from the Journal.)

Attest: CHARLES WATERHOUSE, Clerk.