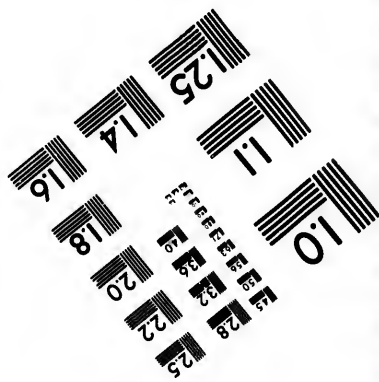


A resolution test chart featuring various patterns of horizontal and vertical lines of increasing frequency. Each pattern is accompanied by a numerical value indicating its resolution. The values include 1.0, 1.1, 1.25, 1.4, 1.6, 1.8, 2.0, 2.2, 2.5, 2.8, 3.2, 3.6, 4.0, 4.5, 5.0, 5.6, 6.3, 7.1, 8.0, 9.0, 10, 11.2, 12.5, 14, 16, 18, 20, 22.5, 25, 28, 32, 36, 40, 45, 50, 56, 63, 71, 80, 90, 100, 112, 125, 140, 160, 180, 200, 225, 250, 280, 320, 360, 400, 450, 500, 560, 630, 710, 800, 900, 1000, 1120, 1250, 1400, 1600, 1800, 2000, 2250, 2500, 2800, 3200, 3600, 4000, 4500, 5000, 5600, 6300, 7100, 8000, 9000, 10000.

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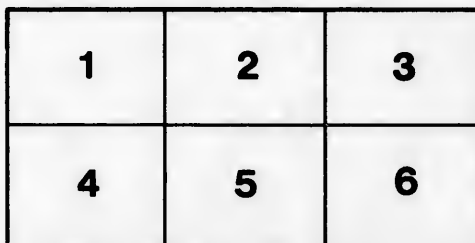
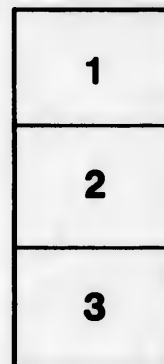
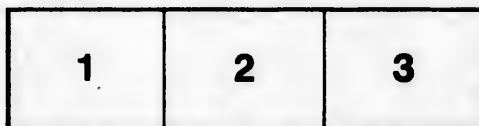
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PROVINCE HOUSE

SURVEY OF INTERIOR ROUTE FROM ANNAPOLIS
TO YARMOUTH.

CORRESPONDENCE.

Railway Office, Halifax, 7th May, 1869.

GENTLEMEN,—

I have now to inform you that the plans and profiles of the survey of the line of railway from Annapolis to Yarmouth are now ready, that Mr. Schreiber has prepared a report and an approximate estimate of the cost of proposed line of Railway, and that the disbursements made on account of this survey, &c., amount in all to \$2176.95.

The plans and profiles of the survey are now in my office, in this city, and may be inspected at any time. I enclose herewith copies of Mr. Schreiber's report, approximate estimate, and statement of expenditure, the amount of which should be paid him as soon as possible.

I shall be happy to hand over the plans and profiles at any time, together with the vouchers for expenditure, which Mr. Schreiber has placed in my hands.

I have the honor to be, Gentlemen,

Your obedient servant,

SANDFORD FLEMING.

J. K. RYERSON, Esq., M.P.P.,

W. H. TOWNSEND, Esq., M.P.P.

Halifax, 30th April, 1869.

DEAR SIR,—

Early in December last, I, by your instructions, made a tour of the country between Annapolis and Yarmouth, to take observations preparatory to instituting a survey of the proposed extension of the Windsor and Annapolis railway to Yarmouth. On my return to Halifax, I reported that in my opinion, the best location for the proposed railway would be to the south of the Hessian line and Mumford roads, east of the Tusket road, passing lake Wentworth and Geizer's lake through Hebron's corners to Yarmouth, that the country was rougher than you had led me to suppose, but that I thought a fair line might be had. On the 17th of the same month you further

directed me to organize a staff of Engineers and take the field as early as possible, after receiving a written guarantee for the payment of \$2000 towards defraying the expenses of the survey. On the 26th the document came to hand, I forthwith commenced to make the necessary arrangements for starting the survey, experiencing great difficulty in securing the services of competent assistants; however, after a little delay, I made most satisfactory arrangements, and early in January I started for the field, having as you desired, first communicated with the Yarmouth gentlemen, to ascertain what was really wanted. The reply was—"We want you to survey the line, where in your judgment it would most benefit the country, and be the least costly to build." I then explained my views, which were approved. I therefore at once commenced operations on the line described to you after my first visit to the district, and on the 7th of January, W. G. Thompson, in charge of a party, took the field at Sissiboo, to operate upon the section towards Yarmouth. On the 21st of the same month, Walter G. Bellairs took another party into the field at the same point, to make up the section towards Annapolis. Through their energy and activity the field work was completed on the 24th of the following month. Rigid economy having been exercised throughout in conducting the survey, nevertheless the expenditure had exceeded the amount of the guarantee, owing to the following reasons:—The line being much longer than was anticipated, and passing through the woods the greater part of the distance, and the country between Sissiboo and Clementsport proving very rough, heavy, and intricate, from these various causes the time absorbed in seeking out favorable ground was much greater than if the country had been, as you were evidently led to believe, of a level, easy character. Inasmuch however, as it appeared to be your wish to have the plans so far advanced and the profile of the traverse plotted, so as to make the drawings intelligible, I have done so, and from these the general character of the country can be readily understood. The gradient and curvature is by no means objectionable, no grades necessarily being of greater severity than 70 feet to the mile, and no curve of a less radius than 1000 feet. The cost of construction would be very moderate, and by no means excessive, the bridging being very light, and the general character of the work easy. In obedience to your instructions, I have prepared an approximate estimate of the cost of construction and equipment of the road, which, while ample and sufficient, appears very favorable and satisfactory. I now beg to hand it to you with all the plans and profiles, for the unfinished state of which I have made explanation.

For all expenses and disbursements connected with the survey, I hold vouchers amounting to \$2176.95, which I now enclose, and trusting to the services performed meeting your approval,

I am, dear sir,

Yours truly,

(Signed)

COLLINGWOOD SCHREIBER.

SANDFORD FLEMING, Esq., }
Civil Engineer.

	Mode of Measurement	Quantity.	Rate.	\$	cts.
Common Excavation.....	Cubic yards	1,910,000	0.28	\$ 534,800	00
Rock do.	" "	200,000	1.25	250,000	00
Excavation in Founds.	" "	20,000	0.50	10,000	00
Clearing.....	Aeres.....	900	18.00	16,200	00
Grubbing.....	"	50	100.00	5,000	00
Fencing.....	Rods.....	51,800	0.70	36,260	00
Culvert Masonry.....	Cubic yards	21,000	7.00	147,700	00
Bridging.....	"			40,000	00
Cattle Guards, &c.....	"			4,000	00
Ties.....	Each.....	186,600	0.18	33,588	00
Ballasting (3000 per mile).....	Cubic yards	242,200	0.50	121,100	00
Rails (48 lbs. per yard).....	Tons.....	6,400	52.00	332,800	00
Joints (16 lbs. each).....	Each.....	49,150	1.00	49,150	00
Spikes (8 ounces each).....	Tons.....	175	80.00	14,000	00
Track laying.....	Miles.....	84½	350.00	29,662	50
Stations and wharf.....	"			40,250	00
Engineering.....	"			44,000	00
Add 10 per cent. for contingencies....	"			\$1,708,510	50
Total cost of construction.....	"			170,851	05
Equipment.....	"			\$1,879,361	55
Rolling stock (\$5000 per mile).....	"			242,250	00
Total cost of road equipment.....	"			\$2,121,611	55
Equalling a rate per mile for constr'n.	"			23,273	82
rolling stock	"			3,000	00
Total cost of road per mile.....	"			\$20,273	82

In computing the quantity of earthwork and masonry, I have taken an average mile and estimated pro rate earthwork 24,000 cubic yards, and masonry 250 cubic yards per mile,

Halifax, 30th April, 1869.

Halifax, N. S., December 4th, 1868.

DEAR SIR,—

Referring to my letter of the 2nd instant, Mr. Savary, M. P., informs me that the difficulties to be met with between Annapolis and Weymouth will likely prove more formidable than I had reason to believe when I saw you. I have also received a letter from Mr. Curry of the Annapolis railway, in which he states that Mr. Cambie will not be at liberty for about a month. As the survey, at least between the

points indicated, appears likely to prove of a difficult nature, I considered it of importance to secure the services of an engineer in every way competent to carry it out satisfactorily, and who was favorably known to the government at Ottawa, the more so as it would be impossible for me to give the survey my personal supervision. In this I am glad to say I have succeeded,—I have at this moment seen Mr. Collingwood Schreiber, who some time ago resigned his position on the Intercolonial railway as my principal assistant, and I have induced him to take the burden of the Yarmouth survey upon his shoulders. He has consented, provided it will not occupy his time more than two or perhaps three months. He leaves this on Monday to begin a reconnaissance of the country.

Yours truly,

(Signed) SANDFORD FLEMING.