## LETTER TO THE EDITOR.

### Cost of the National Transcontinental Railway.

Sir,—I notice in the daily press, under the heading of "Bonded Indebtedness and Annual Interest Charges of Canadian Roads," an item for the National Transcontinental Railway as follows:—

"Line, Moncton to Winnipeg, being constructed by Dominion Government

"Estimated cost guaranteed by Dominion Government, $234,000,000."

The cost of the National Transcontinental Railway for constructing and equipping the road, outside of rolling stock, from Moncton to Winnipeg, will not far exceed $150,000,000. Major R. W. Leonard, Commissioner, and Mr. Gordon Grant, Chief Engineer, estimate this cost to be somewhere around $150,000,000. An item appeared in another Montreal paper as follows:—

"Ottawa, February 19.—The National Transcontinental Railway and its cost is dealt with in an interim report of the Commissioner, Major Leonard, for the nine months of the fiscal year ended December 31. It was tabled in the House last night.

"The total outlay in the nine months was $10,314,994, and up to the end of the calendar year the aggregate was $140,567,147. This is exclusive of interest on capital.

"Track-laying was completed on the eastern section on November 17. There are 1,803 miles of main line, 20 of double track, and 407 of sidings. Steel bridges are 95 per cent. completed.

"The rest of the report deals with contracts awarded during the year for buildings, equipment and supplies."

This proves that my statement is correct, as any competent railway engineer knows that it should not take more than $10,000,000 to $20,000,000 to complete the road, ready to operate in an efficient manner. Any engineer connected with the Headquarters Staff of the National Transcontinental Railway at Ottawa, will affirm that the cost of construction of this road will not be over $160,000,000, and that according to the National Transcontinental Act, the Grand Trunk Pacific will only have to pay interest on the actual cost of the road, which will not exceed $160,000,000.

My reason for drawing your attention to this matter is that I don't think it fair to the credit of Canada and the engineers who were connected with the National Transcontinental Railway, to advertise, not only in Canada but in Europe, that the Grand Trunk Pacific will have to pay interest on the amount of $234,000,000 when the cost of the road will not exceed $160,000,000. The cost is divided approximately as follows:—

| | |
|---|---|
| Grading | $105,000,000 |
| Bridges | 10,000,000 |
| Shops and terminals | 10,000,000 |
| Engine houses, stations and other buildings | 10,000,000 |
| Salaries, wages and administration expenses | 10,000,000 |
| Other items | 10,000,000 |
| | $155,000,000 |

Yours truly,

H. Victor Brayley, A.M.Can.Soc.C.E.

Montreal, Que., March 5th, 1914.

## A METHOD OF DETERMINING THE AREA OF CROSS-SECTIONS.

By C. D. Norton,

IN the computation of earthwork quantities, the most troublesome detail is the finding of the area of the various cross-sections. On railway construction a 3-level section is generally used, the area of which is found by the following well-known rule:—

Multiply the extreme horizontal width by ½ the centre height, also multiply ¼ the width of the roadway by the sum of the 2 side depths; the sum of the two products is the area required.

If, however, the cross-section contains 4 or more readings, the figure cannot always be divided into soluble triangles, and its area is best found by the following method, which has the advantage that the only figures used, are those recorded in the field book, reducing thereby the chances of error to a minimum. It is also simple and easily checked.

Cross-sections are almost invariably obtained by measuring horizontal distances and vertical elevations, each angular change being noted by a fraction, in which the numerator is a vertical elevation, and the denominator a horizontal distance. As these measurements refer to a base line and a datum at right angles to it, they can be correctly termed *rectangular co-ordinates.*

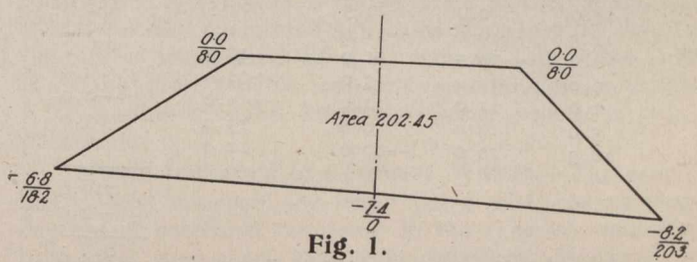


Fig. 1.

A rule to find the area of a figure platted by rectangular co-ordinates can be formulated as follows:—Designate the vertical ordinates as numerators, those above the point of origin being plus, and those below being minus; designate the horizontal ordinates as denominators, those to the right being plus and those to the left, minus. Multiply each numerator by the algebraic difference of alternate denominators. One-half the del. sum of the products will be the area required. If the measurements are taken in feet the result will be in square feet, if in metres the result will be in square metres. The terms may be taken clockwise or not, as may be desired, but in either case a regular order must be observed from start to finish, and strict attention given to the algebraic signs.

To apply the foregoing to earth cross-sections the rule can be worded as follows: Designate cuts and distances to the right as plus, fills and distances to the left as minus. Multiply each numerator by the algebraic difference of alternate denominators, one-half the del. sum of the products will be the area of the figure.

As it is often necessary that calculations be made by men whose knowledge of mathematics is limited the rule can be best understood by following a series of examples.

**Example I. (Fig. 1).**

| Fills. | Alternate Distances. | | Differences. | Products. |
|---|---|---|---|---|
| —6.8 | — 8.0 | 0.0 | — 8.0 | 54.4 |
| —7.4 | —18.2 | 20.3 | —38.5 | 284.9 |
| —8.2 | 0.0 | 8.0 | — 8.0 | 65.6 |
| | | | | 404.9 |

One-half of 404.9 = 202.45 = Area.