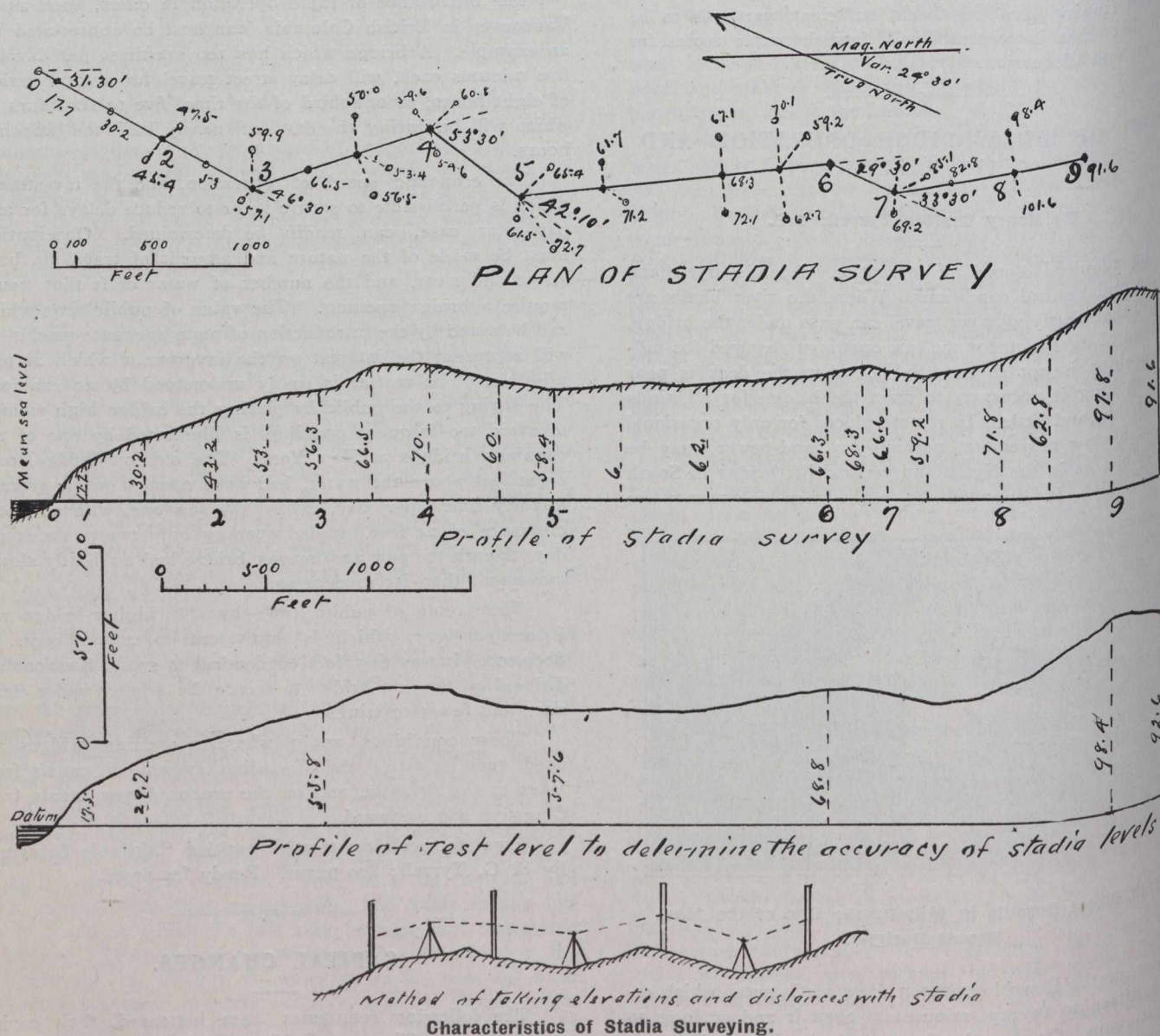


PRELIMINARY RAILWAY SURVEYING BY MEANS OF THE STADIA.

By J. A. Macdonald.*

In the present case the survey was started from mean sea level, that is, a point in the Gulf of St. Lawrence; not that the railway was intended to run to the sea (which it yet may) but in order to obtain a reliable and definite datum. At this point of starting there was quite a bank to the water's edge at mean tide. The transit was set up on the bank above and very carefully levelled. The rod was held at approximately the water's edge when it was judged by cal-

of $211^{\circ}30'$, the distance by rod reading was 3.20, the angle elevation $+2^{\circ}15'$, which equalled a distance of 319 and a difference of level, or elevation, of 12.5 on a point on the tangent. From stat. 2 to stat. 3 the same bearing, S. 31.30° W., was produced, and points taken on either sides of the line to determine the topography. A point on the tangent $211^{\circ}30'$ gave elevation 53. (above sea level). Left, $142^{\circ}00'$; distance, 1.13 (reduced to 109); vertical angle, $+2^{\circ}15'$; difference of level 4.3 and elevation 47.5. Right, $312^{\circ}30'$; distance, 1.10 (reduced to 109); vertical angle $+1^{\circ}10'$; difference of level $+2.2$; elevation, 45.4. A hub, of course, was set at stat. 2. At stat. 3, a lock sight being taken, points were taken on either side before deflecting the angle. A point left $97^{\circ}00'$



Characteristics of Stadia Surveying.

culuation, as well as observation, to be mean tide. The vertical angle to the rod was, as shown in the field book, $-14^{\circ}55'$ and the distance read on the rod .71. These data corrected gave an elevation of 17.7 feet and a distance of 65. The bearing by the compass was N. 31.30° E. This bearing was used. By an observation it was found that the difference between the magnetic bearing and the astronomical bearing was $24^{\circ}30'$, that is, the needle varied $24^{\circ}30'$ west. Both are shown on the plan.

The next sight forward was S. 31.30° W. and an azimuth

gave distance 1.82 and difference of level 3.6; right, $291^{\circ}00'$, 83 for distance and 8' vertical. Another point, right, $328^{\circ}00'$, gave rod reading 1.10 (reduced to 109); vertical angle $1^{\circ}00'$; difference of level, 1.8. A deflection angle of $46^{\circ}30'$ was made and the same procedure gone on with. A form of the field book with notes for the beginning of the survey is appended.

In this way the topography of the country was obtained to great exactness. Only about half the number of men were required on the line than if a regular transit, level and topographic parties were maintained, and equal results were produced, though not so rapidly.

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