In view of the fact that as shown above, by using the "Tachéomêtre auto-réducteur": 1. No corrections are required owing to any want of parallelism of the optical axis to the horizon indicated by the sensitive telescope level, whatever may be the distance, rod to tacheometer, provided we use the mean of two readings, one of which is taken with the telescope in the crect position and the level in the direct one, and the other with the telescope in the inverted position with the level reversed. 2. Horizontal distances can be measured with extreme facility, within the error limits of 0.06 foot and 0.12 foot per 100 feet, respectively, by taking advantage of the

relations:  $R = \overline{ab} = 100 \ ab$  and  $R = \overline{bc} = 200 \ bc$ , it is clear:  $0.01 \qquad \overline{0.005}$ 

(a.) That in any case only corrections for curvature and refraction need be applied, and these only when the difference between the fore and back sights exceeds say 3 or 4 feet.

(b.) That when the computations of such corrections by means of the automatieally determined horizontal distances, tacheometer to rod, have to be made only for such small distances as the differences in length between fore and back sights approximately equalized by pacing with the aid of a passometer—preferably one with stem attachment for setting the needles to zero at will—they become extremely easy and simple, in fact so simple, that the results sought can readily be deduced from an attentive inspection of the factors involved and entered at once in the level book without any figuring whatsoever being requisite. For, in such case, the corrections in question may be calculated mentally with more than sufficient accuracy for all purposes, at the uniform rate of 0.000002 foot of rod interval per foot of horizontal distance, as shown in green on the sample pages of the proposed tacheometer book.

Now an approximation to equality in the lengths of the fore and back sights quite sufficient for the purpose intended can, as a rule, be readily secured, by leaving the disposition of the rod stations, as just explained, entirely in the rodmen's hands, without there being any absolute necessity for the whole staff to lose a portion of their time in endeavouring to more closely equalize the intervals between the rod and the instrument by means of stadia measurements, than can be done by the rodmen left to themselves: a ceremony which must often provemuch mcce tedious to the observer than he anticipates, chiefly on account of his signals to the rodmen to move their rods being wrongly interpreted by them, for want of attention on their part, or for other reasons.

The ordinary corrections for eurvature, refraction, inclination, &c., which according to the geodesic methods now followed, have to  $\vdash$  applied to all readings without exception, will thus be required only in special cases, viz.: when the rough ground or other difficulties encountered, absolutely preclude the practical equalization of the back and fore sights or the reading of the rod scale without the use of the sliding targets, or would cause unwarranted loss of time and a corresponding increase in the expense.

In order that precision levelling operations may be carried on expeditiously and economically in the manner proposed, it appears desirable that at least three intelligent and attentive rodmen be employed. tw th or sta sh ge

tal sei de, by thi dis ab en en op as op as of can ve

fro cie de an res us res co

Th ho ag sci no tra the ed

po

bal a,