and the mean micrometer reading corresponding to the pointing on the next lowest whole hundredth division to: $31{\cdot}0 + 17.2 = 24{\cdot}1$.

Hence, considering: 1st. That, as already explained, the pitch of the micrometer screw is such that by turning its head right or left over one division the prismatic guide rod with knife support is moved up or down through a space equal to the $\frac{1}{100.000}$ part of the radius $r = 1$, of a circle drawn from a point on the axis of rotation of the telescope as a centre in a plane perpendicular to the said axis so as to be tangent to the plane followed by the knife edge. 2nd. That the interval intercepted on the vertical scale by any two lines of sight bears to the interval intercepted on the rod between the same lines, the ratio of ($r = 1$), to R—the horizontal distance from the said axis of rotation to the rod—we have in the present case for the interval i between the intersection of the truly horizontal line of sight with the rod and the hundredth division at 9·15 pointed to from station 49:

$$i = \frac{(25 - 24{\cdot}1 = 0{\cdot}9) \times R}{100{\cdot}000} = \frac{0{\cdot}9 \times 605{\cdot}24}{100{\cdot}000} = 0{\cdot}005447.$$

This space i when added to 9·15 gives for the precise reading of the back sight from station 49 to point No. 8: 9·155447 feet, in place of 9·158 feet the mean of the two heights estimated by the eye, and for the precise collimation from station 49 of series of levels B: 12·264477 feet instead of 12·26763 feet.

It would be interesting to know how a line of levels A 25 miles long or more, run entirely according to the method just described, would compare with a line B run simultaneously with the rod intervals i all estimated by the eye. It is my intention to establish such a comparison at the first opportunity that will present itself.

In the case of a single rodded line of precision levels, it is advisable, although not indispensable, not to remove the tacheometer from a station until the recorder has entered three distinct rod intervals in column 4, and satisfied himself, by comparing them rapidly with each other or with their sum or with their mean, that no material error has been committed; the remaining entries in columns 4 and 5 can be made in the office. When, however, the line of precise levels is double rodded, such as that indicated in the typical pages of field notes given above, this verification of readings on the spot can be made in a more simple manner and the field work correspondingly expedited, viz.: by comparing the difference between the two back sight readings taken from the station occupied with the difference between the two corresponding foresight readings taken from the previous station. For instance, before leaving station 50 we would compare the difference between the back sight readings to points 11 and 10, or 10·612 − 3·657 = 6·955 feet with the difference: 11·830 — 4·876 = 6·954 feet, between the corresponding foresight readings taken on the same points from station 49, and finding the two to agree within 0·001 foot, would conclude that all the operations have been correctly performed.

Furthermore, when such a double rodded line of levels is run exclusively with a view of establishing permanent bench marks and determining the precise elevations of the same in reference to the mean sea level or some other datum plane, together with perhaps some important water or railway levels in a part of the country of