

CORRECTION FOR RUNS OF MICROMETERS, 8 IN. TRANSIT THEODOLITE.

In observing for secondary triangulation purposes with the 8 in. micrometer theodolite I have been recording the reading of the parallel wires of the micrometer on both back and forward divisions on the horizontal plate. At the end of each set I have shown the mean runs of each micrometer for the period of observation. These means will vary from time to time according to the changes in temperature. At the present time the error of the B micrometer is about 1 second, and the A micrometer about 2 seconds, the mean being 1.5 seconds. The greatest correction for runs will be half the total error, so that at the present time the correction would be about 0.75 second.

Although the 8 in. theodolite is divided to seconds on the micrometer screw-head, it is difficult to guarantee any single reading to 1 second, so that the correction for run would be beyond the powers of the instrument. By showing the mean runs for each period of observation it can be seen at a glance whether the micrometers are in good adjustment. As long as the mean error is less than 2 seconds (giving the greatest correction less than 1 second) I do not think it should be considered, from a practical point of view.

In case the increase in the mean error of the runs makes it necessary to apply a correction, I here-with give my method of reading, with examples of the application of the correction.

The horizontal plate of the 8 in. theodolite is graduated to 5-minute intervals; the comb in the micrometer gives the extra minutes, and the graduated screw-head the seconds. The micrometers are placed opposite one another at right angles to the telescope, and there is an extra microscope for reading the degrees and minutes, placed close to one side of the telescope. As the microscopes reverse the field of view the degree-figures on the plate and division-lines are engraved upside down, so that on looking through they are seen right side up, the numbers increasing from left to right. In reading the comb of the micrometers the number of notches between the zero-line and the first division on the plate to the left indicate the number of minutes by which the zero-line has passed, providing that the instrument is in adjustment. By turning the graduated screw-head of the micrometer to give an increasing reading, the parallel wires travel from right to left. In observing it has been my practice to bring the parallel wires beyond the division-mark to the right, come carefully back and intersect, note the seconds, then screw on in the same direction until the left-hand division is intersected, and again note the seconds. Both readings are thus taken with the parallel wires working from right to left.

When I first began observing with this instrument I called the first reading the "back" reading and the second one the "forward." This is an error, as, owing to the microscopes reversing the field of view, the numbers on the plate increase from left to right, so that the left-hand division should be called the "back" reading. However, in order to keep the work in the field-book consistent I am still recording as I commenced. The corrections will therefore require a little alteration from the usual rule. In all my observations *b* refers to the right-hand reading, and *f* to the left.

Example I. (See Diagram.)

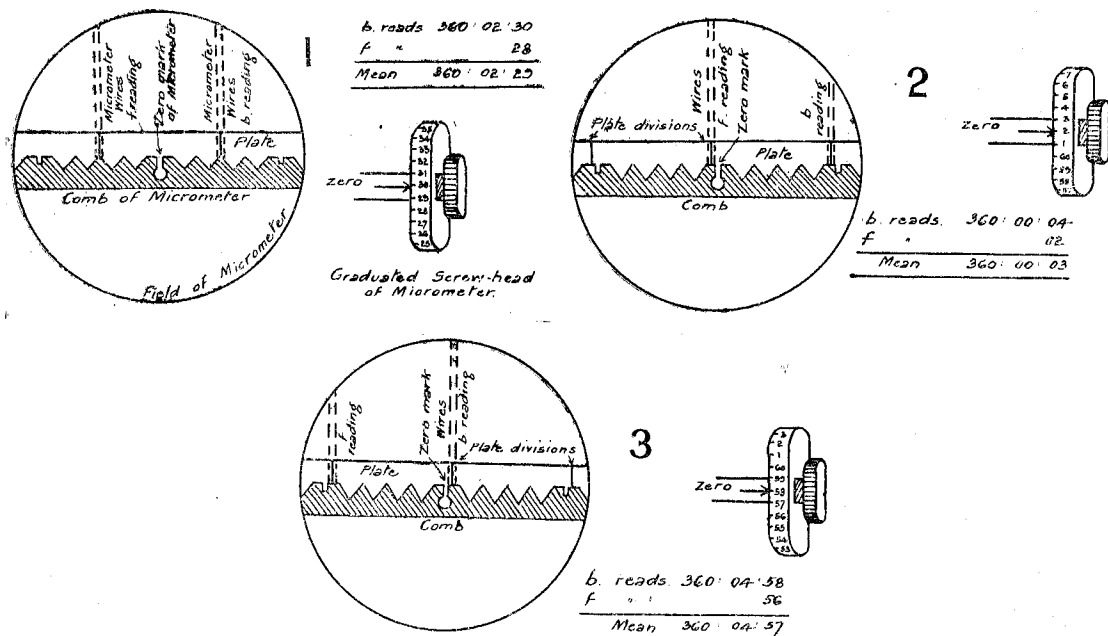
Zero-line coming midway between the divisions on the plate.

Let <i>b</i> read	360° 02' 30"
and <i>f</i> read	28
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Error in run	- 2"

Here the actual reading of the interval, instead of being five complete turns, is 2 seconds short.

As the zero-line is midway between the divisions the correction to each reading will be the same—that is, half the total run. To increase the interval reading, the corrections will be + 1" to the forward figures and - 1" to the back figures (since it is working opposite to the way the divisions on the screw-head are numbered).

Corrected reading = 360° 02' 29", which is equal to the mean reading $\frac{b+f}{2} = 360^\circ 02' 29''$.



DIAGRAMS TO ILLUSTRATE MICROMETER READINGS OF 8 IN. TRANSIT THEODOLITE.