(58) *Irregularity of the Screw.*—It is desirable to know whether this change in the value of revolution is regularly progressive, or whether it is subject to sudden changes. To learn this, advantage was taken of the fact that the distance of the pair of wires in collimator A, and of the close pair of wires moved by the micrometer, are together nearly equal to a revolution of the latter. Consequently, turning the telescope on that collimator when its double wires are horizontal, we have a measure of a constant space by setting first the upper micrometer wire on the lower image of the collimator wire, and then the lower micrometer wire on the upper image. The measures were commenced, as nearly as practicable, at an even revolution, and therefore ended nearly at the beginning of the next revolution. The measures were made on three different dates, and three measures of each revolution made on each date. But the measures were not always continued through the entire range of the screw. About 30 revolutions they were prevented by the interference of the fixed horizontal wires of the reticule.

Commencement of measure.	End of measure.	Measure.			Residuals of cor. arc.	No. of dates.
		Rev.	Arc.	Cor. arc.		
r.	r.	r.	″	″	″	
17.7	18.7	0.984	15.06	14.97	+ 0.12	1
18.7	19.7	.984	15.06	14.97	+ 0.12	1
19.6	20.6	.972	14.86	14.80	− 0.05	1
20.0	21.0	.986	15.09	15.02	+ 0.17	3
20.5	21.5	.980	15.00	14.93	+ 0.08	4
21.0	22.0	.971	14.86	14.79	− 0.06	4
22.0	23.0	.976	14.94	14.88	+ 0.03	4
23.0	24.0	.972	14.88	14.83	− 0.02	3
24.0	25.0	.973	14.89	14.85	0.00	3
25.0	26.0	.965	14.77	14.73	− 0.12	3
26.0	27.0	.972	14.86	14.85	0.00	3
27.0	28.0	.965	14.77	14.75	− 0.10	3
28.0	29.0	.964	14.76	14.75	− 0.10	3
31.0	32.0	.970	14.85	14.86	+ 0.01	2
32.0	33.0	.968	14.82	14.83	− 0.02	2
33.0	34.0	.975	14.92	14.94	+ 0.09	1
34.0	35.0	.961	14.71	14.74	− 0.11	1
35.0	36.0	.965	14.77	14.81	− 0.04	1
36.0	37.0	.966	14.79	14.83	− 0.02	1

Of the three columns headed "Measure," the first gives the measures in revolutions of a micrometer; in the second these revolutions are turned into arc, using 1 rev. = 15″.303 ; in the third they are corrected for progressive change in the value of the revolution. The residuals show the excesses of the individual corrected measures over the mean value 14″.85. I conceive that they proceed mainly from the accidental errors of reading and temporary derangements of the motion of the screw by dust, displacement of the oil, and other causes, and that the screw itself may be regarded as sensibly regular.

(59) *R. A. Micrometer.*—The value of a revolution of this micrometer seems to be exactly the same as that of the other. Wide measures give 15″.300. Owing to its limited use, no special investigation of its movement has been entered upon.

(60) *Flexure of the Circles.*—The work of determining separately the flexure of the different parts of each circle was commenced in 1866, January 19. But after taking one series of readings, it was found that the axes of several of the microscopes deviated quite sensibly from the perpendicular to the face of the circle; some deviating as much as 40′. To adjust them with entire accuracy appeared to be a difficult and troublesome operation; but a kind of T-square was made by which they could be set without an error exceeding 5′, and they were adjusted by it on April 7. The set of readings previously made were not used.

The following are the details of the operations by which the definitive values of the flexure coefficients were obtained: