If, now, either collimator be affected with any constant cause of error when on one side of the instrument, that cause will act in the opposite direction on the circle reading when the collimator is carried to the other side. By interchanging the collimators we therefore eliminate all constant errors peculiar to them.

The following are the separate results obtained in this way:

	C_o	$C_o - g$	g	Wt.	C'_o	$C'_o - g'$	g'.	Wt.
1865.	"	"	"		"	"	"	
Dec. 29	13.22	13.76	−0.54	2	16.35	15.96	+0.39	2
30	28.34	28.44	−0.10	2	23.61	23.61	0.00	2
1866.								
Jan. 30	22.34	22.48	−0.14	3	52.82	52.78	+0.04	3
Apr. 7	24.87	24.96	−0.09	3	14.32	14.28	+0.04	3
16	19.80	20.00	−0.20	3	12.43	12.32	+0.11	3
17	17.62	17.40	+0.22	3	16.50	16.66	−0.16	3
18	11.62	11.88	−0.26	3	16.44	16.17	+0.27	3

From which results

$$g = -0''.14,$$
$$g' = +0''.09.$$

There must always be a possibility of the nadir determinations being affected with undiscoverable sources of error, depending either upon the habits of the observer, or the disturbing conditions to which the instrument may be subjected, as, for example, the heat of the observer's body. I think it best, therefore, to depend for the final value of g upon the comparison of observations made in reversed positions of the instrument, the effect of the cosine flexure being reversed with the instrument. For the present, therefore, the quantity $-0''.14$ is regarded simply as the reduction of an observed nadir reading of circle A to the mean of the horizontal readings.

(67) In the flexure of the telescope is included the effect of gravity in changing the position of the declination micrometer slide relatively to the fixed plates of the eye-piece. As the telescope turns, the reading of the micrometer for coincidence of the fixed and movable wires is affected with the inequality

$$-0r.0376 \sin Z - 0r.0197 \cos Z,$$

Z being the zenith distance of the telescope counted in such a direction that sin Z is positive when the micrometer head is above the screw, and negative when below it.

The flexures already found being corrected for this inequality, the value of the sine coefficient would be quite small, while that of the cosine coefficient would be increased to $0''.44$.

(68) In observing the sun, the aperture of the telescope is diminished to about three inches by means of a cap weighing 5.3 ounces. It is found, by experiment, that this weight causes a flexure of $-0''.10 \sin Z$. A further flexure correction of

$$+0''.10 \sin Z$$

is therefore required in reducing observations of the sun.