IX. *Corrections to the reductions of Lieutenant* FOSTER'S *Observations on Atmospherical Refractions at Port Bowen; with Addenda to the Table of Magnetic Intensities at the same place. By Lieutenant* HENRY FOSTER, *R. N. F. R. S.*

Read March 22, 1827.

I HASTEN to acquaint the Royal Society with an error I have inadvertently committed in my observations on Atmospherical Refractions at Port Bowen, published in Part IV. of the Philosophical Transactions for 1826. The error alluded to arises from my having used an erroneous value of the divisions on the long level of the repeating circle, with which the observations were made. For the detection of this error, I am indebted to Captain KATER, who recently having had occasion to use the same instrument, found the value of each division of the level to be more than ten seconds in arc, of which he very kindly informed me, knowing that I had considered them as equal to single seconds only; and at the same time he wished me to acquaint him, if any accident had happened to the instrument, by which the level might have been changed. I knew that no accident had befallen the instrument, and that the level was the same which I had used; I therefore immediately proceeded to town, and in Captain KATER'S presence ascertained the value of each division of the level to be 10″.9.

In order to explain the source of the error into which I have fallen, I must state, that on receiving the repeating

circle in question, I was given to understand that the value of each division of the level was equal to one second in arc :— and as this instrument was the same that had been employed by Captain SABINE, in his experiments on the pendulum, I took no steps to examine this point for myself, for it never once occurred to me that there could exist a doubt on the subject.

The following, however, are the corrected Tables, which are similarly numbered with those they are intended to be substituted for, in pages 220 and 223 of Part IV. of the Philosophical Transactions, for 1826.

Table VII. page 220, Philosophical Transactions, Part IV. 1826.

Observations for determining the apparent altitude of Arcturus at the time of setting, by Lieutenant FOSTER'S *upper* telescope.

The corresponding observations for refraction are contained in Tables VIII. and IX. pages 221 and 222 in Part IV. for 1826.

1825. Day.	Time.	No. of Obs.	Mean Reading of the Four Verniers.	Corrections for Index.	Corrections for Level.	Apparent Altitude.	Barometer at Temp. + 48°.	Temp. Fah.t	Winds True.	Weather.	Remarks.
							Inches.				
Feb. 18th	At 10h A. M.	16	238 34 17,5	+ 10	+ 3 13,47	7 35 8,69	29,540	—26	ESE Lt.	Fine and Clear.	
—— *19	11 A. M.	12	147 31 2,5	—	+ 1 13,57	7 35 10,12	29,610	—29	Easterly	Hazy, with slight Snow.	
—— 20	10 A. M.	12	56 28 2,5	—	+ 0 49,05	7 35 10,92	29,626	—35	Calm	Clear and Fine	Thin haze near
—— 21	9 A. M.	6	190 55 57,5	—	+ 0 54,50	7 35 11,75		—40	Calm	Weather.	the horizon.
	to	6	325 23 57,5	—	+ 0 10,90	7 35 17,18	29,460				Hazy near the
	1½ P. M.	6	99 52 6,25	—	+ 0 2,72	7 35 18,09		—36			horizon.
Mar. 4	10 A. M.	16	238 34 10,25	0,0	+ 2 38,05	7 35 11,98	29,600	—31	Calm	Clear and Fine.	

Mean to be used in Table VIII. 7 35 12,68 *instead* of 7 35 18,43
Micrometrical Measure as before + 1 49,82

Altitude to be used in Table IX. = 7 37 2,50 *instead* of 7 37 8,14

* The principal vernier was not reset to zero after the observations on the 18th, but the readings were continued in the subsequent observations, except on March 4th, when the principal vernier was reset to zero.

Table X. page 223; Part IV. for 1826.

Observations for determining the apparent altitude of α Aquilæ at the time of setting, by Lieutenant FOSTER'S *upper* telescope

The corresponding observations for refraction are contained in Tables XI and XII; pages 224 and 225 in Part IV. for 1826.

1825. Day.	Time.	No. of Obs.	Mean readings of four Verniers.	Correction for Index.	Correction for Level.	Apparent zenith distance.	Apparent Altitude deduced from the apparent zenith distance in the ratio of the No. of observations.	Bar. at Temp. + 48°.	Temp. Fah.	Winds true.	Remarks.
			° ′ ″	°	′ ″	° ′ ″	° ′ ″	Inches.	°		
th Jan. 27	at 11h A. M.	8	323 7 57,5	0,0	+ 0 10,9	85 23 31,05	4 36 22,10	29,970	— 29,5	.....	Occasionally squally.
——	1½ P. M.	14	* 78 38 30	—	+ 1 29,92	85 23 43,03					
Feb. 8	11 A. M.	8	323 8 20	0,0	— 0 5,45	85 23 31,82	4 36 22,02	29,455	— 22,5	North, moderate	
—	2 P. M.	8	* 286 18 5	—	+ 0 8,17	85 23 44,15					
9	10 A. M.	8	323 8 1,25	0,0	+ 0 32,7	85 23 34,24	4 36 19,17	29,701	— 35,7	Calm, fine and clear	
—	1 P. M.	14	* 115 32 16,25	—	+ 0 24,52	85 23 45,77					
10	10½ A. M.	6	* 152 21 51,25	—	+ 0 35,42	85 23 44,44	4 36 20,43	30,100	— 35,5	Calm	
—	1½ P. M.	6	* 304 43 41,25	—	— 0 21,80	85 23 34,70					
15	11 A. M.	12	* 304 43 8,75	—	+ 0 27,25	85 23 38,0	4 36 22,00	29,600	— 33	Cloudy overcast weather.	
28	11 A. M.	6	* 152 22 1,25	—	— 0 38,15	85 23 33,85	4 36 25,19	29,992	— 21	N. E. light, clear, & fine.	
—	1½ P. M.	6	* 304 43 25	—	+ 0 10,9	85 23 35,77					

Mean to be used in Table XI..... = ° 4 ′ 36 ″ 21,82, *instead* of ° 4 ′ 36 ″ 23,08
Micrometrical measure between Telescopes as before + 3 8,42

Altitude to be used in Table XII..... = 4 39 30,24, *instead* of 4 39 31,50

* The principal vernier not reset to zero, and the observations are continued from the preceding reading.

P. S. It is to be regretted, that the observations by Lieutenant Ross, given at the end of the Paper alluded to, must now be wholly rejected; in consequence of the original observations involving the erroneous datum dependent upon the level, having been left on board the Fury at the time of her loss.

The extremely low temperature of the atmosphere, in

which the Observations by Capt. PARRY and myself for the Amount of Refraction at Port Bowen were made, renders it important that the identical thermometer employed should be preserved; I therefore beg to present it to the Society for their acceptance: it was prepared with every possible care by Mr. DANIELL, for the occasion, and is a spirit thermometer, having an ivory scale, graduated from 110° degrees below zero to 94° above, of FAHRENHEIT:—It has also divisions according to REAUMUR's scale.

I avail myself of this opportunity of noticing an omission in the Table of Abstracted Intensities, page 125 of Part IV. of the Philosophical Transactions, for 1826; in which, the means of the times of vibration of the horizontal magnetic needle only are given. The actual intensities would exhibit the law of variation much better than the times, and as I have detected some numerical errors in the Table alluded to, it would be better to recompute the whole, and convert the times into proportional intensities by squaring the reciprocals of the times, and multiplying those squares by 10,000,000,000, in order to render the results all integral. It is now however too late for such recomputation, and all that remains is to put the reader on his guard against the errors alluded to.

HENRY FOSTER.

H. M. S. Hecla, Deptford,
March 15, 1827.