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KG
11365
180

H.26

Equatorial. Vol. VI.

1858

March 18th to July 13th

Sold by T. Groom & Co., Stationers, India Building, 82 State St., Boston.



KG 11365180

KG 11365, 180



March 18 1858 Little Comt.

*(a) Aug 2332 No 56 *(b) No. 57 page 247

G. P. B. obs. Alt. records

north preceding star (a)

			Diff Sec		Zero of position		
(236)	8	7	4	26.4	49.92	Zero = 56.00	EC 8 56 00
(a)	*	7	5	34.0	56.00		236 8 56 47.0
					6.08		47.0
	8	7	7	49.8	64.89	Diff =	5.86
(a)	*	7	8	58.8	59.03	mean	5.97 At 7. 5. 8.2

			AR		1 st wire		2 ^d wire
	8	7	10	27.0 - 38.5	11.5	-1	11.5 Mean -1 11.5
(a)	*	7	11	38.5 - 50.0			
(b)	*		11	54.5 - 67.0			

					1 st wire		2 ^d wire
	8	7	12	38.4 - 48.0	11.6	-1	11.2 mean -1 11.4
(a)	*						
(b)	*	7	13	50.0 - 59.2	11.3985		At 7. 11. 37.97 (236) mean of 8 - * = -1 11.45
			14	6.5 - 16.0			$\Delta \alpha = -1 11.45$

$$2 \sin P' - 2 \sin P = 5 \sin \delta \sin P$$

$$2 \sin \frac{1}{2}(P' - P) \cos \frac{1}{2}(P' + P) = 5 \sin \delta \sin P$$

Cambridge

			Diff Sec
	8	7	16
(a)	*		4.0

$$41.53 \text{ Diff} = 5.58$$

$$33.95$$

	8	7	18
(a)	*		19.0

$$41.42 \text{ Diff} = 4.63$$

(a)	*				36.79	mean	5.10	At 7	17	11.5
-----	---	--	--	--	-------	------	------	------	----	------

(b)	*				26.00		5.97	7	6	8.2
-----	---	--	--	--	-------	--	------	---	---	-----

236 =	7	11	38.0				11.07	23	19.7
-------	---	----	------	--	--	--	-------	----	------

	7	11	00.76	23	43	1.11 mean
--	---	----	-------	----	----	-----------

	23	43	47.85			26.74
--	----	----	-------	--	--	-------

	7	27	12.91	23	43	47.85
--	---	----	-------	----	----	-------

	1	73.26				1.1
--	---	-------	--	--	--	-----

Camb m.s.t

	7	25	59.65
--	---	----	-------

$$\Delta \delta = +54.2$$

The correction for refraction has been eliminated by observing the comet and star at the same altitude.

March 18 1858

Lutescent.

* (a) Arg 2332 N 56 * (b) N. 57 page 247

G. P. B. obs. Alt. records

8 north preceding star (a)

Diff Sec
 (236) 8 7 4 26.4 49.92 Zero of position $90^{\circ} 30'$
 (a) * 7 5 34.0 56.00 Zero = 56.00 EC 8 56 00
 6.08 236 8 56 47.0
 47.0
 9.76
 6.08 236 par = 37.24
 8 7 7 49.8 64.89 Diff = 5.86
 (a) * 7 8 58.8 59.03 mean 57.97 At 7. 5. 8.2

AR
 8 7 10 27.0 - 38.5 1st wire 1st 11.5 2nd wire 2nd 11.5 Mean -1 11.5
 (a) * 7 11 38.5 - 50.0
 (b) * 11 54.5 - 67.0
 8 7 12 38.4 - 48. 8 - * (a) - 1 11.6 - 1 11.2 mean - 1 11.4
 (a) * At 7. 11. 37.97 (236) mean of 8 - * = - 1 11.45
 (b) * 7 13 50.0 - 59.2 7 11 39.85 $\Delta \alpha = - 1 11.45$
 14 6.5 - 16.0 1.88

Diff Sec
 8 7 16 4.0
 (a) *

41.55 Diff = 0.00
 33.95

8 7 18 19.0
 (a) *
 (b) *

41.42 Diff = 4.63
 36.79 mean 5.10 At 7 17 11.5
 26.00 5.97 7 6 8.2
 11.07 23 19.7
 5.53 At 7 11 39.85
 1.1
 $\Delta \delta = + 5 4.2$

236 = 7 11 38.0
 37.24
 7 11 00.76 23 43 1.1 mean
 23 43 47.85 46.74
 7 27 12.91 23 43 47.85
 1 73.26
 Comb m.s.t. 7 25 59.65

The correction for refraction has been eliminated by observing the comet and star at the same altitude.

Justus Cornet.

G. P. B. obs. AM. records

8 north preceding star (a)

(236) δ Δ 26.4 49.92 Zero of position $90^\circ 30'$
 (a) * Δ 34.0 56.00 Zero = 56.00 EC $8\ 56\ 00$
 6.08 $236\ 8\ 56\ 47.0$
 47.0
 9.76
 $236\ \text{par} = 37.24$
 δ Δ 49.8 64.89 Δ 5.86
 (a) * Δ 58.8 59.03 Δ 5.97 Δ 7.5 8.2

ϕ 7 10 27.0 - 38.5 ϕ - * ϕ - 1st wire 11.5 - 1st wire 11.5 Mean - 1st 11.5
 (a) * 7 11 38.5 - 50.0
 (b) * 11 54.5 - 67.0
 ϕ 7 12 38.4 - 48. ϕ - * (a) - 1st wire 11.6 - 1st wire 11.2 mean - 1st 11.4
 (a) * At 7 " 11 " 37.97 (286) mean of ϕ - * = - 1st 11.45
 (b) * 7 13 50.0 - 59.2 7 11 39.85 $\Delta \alpha = - 1$ 11.45
 14 6.5 - 16.0 1.88

$\delta \quad \gamma \quad \text{diff} \quad \text{acc}$
 16 4.0
 (a) *
 $\delta \quad \gamma \quad 18 \quad 19.0$
 (a) *
 (b) *
 $236 = \gamma \quad 11 \quad 38.0$
 $\begin{array}{r} \gamma \quad 11 \quad 37.24 \\ 23 \quad 43 \quad 47.85 \\ \gamma \quad 27 \quad 12.91 \\ 1 \quad 33.26 \\ \hline \gamma \quad 25 \quad 59.65 \end{array}$
 Comb m.s.t.

$41.53 \text{ diff} = 5.58$
 33.95
 $41.42 \text{ diff} = 4.63$
 $36.79 \text{ mem} \quad 5.10 \quad \text{At } \gamma \quad 17 \quad 11.5$
 $26.00 \quad 5.97 \quad \gamma \quad 6 \quad 8.2$
 $11.07 \quad 23 \quad 19.7$
 $5.53 \quad \text{At } \gamma \quad 11 \quad 39.85$
 1.1
 $\Delta \sigma = +5.42$

480

Comet I. 1858.

* (a) of March 18 Arg. zone 332. No 56

Tabular AR 3 59 28.76 Dec - 23 51 50.5 δ - 24 δ - δ + 9.16

k + 2.01 + 10.6 d

+ .09 $\times$ - .02 - 0.00 + 2.1

mean place 1850.3 59 30.77 Dec - 23 52 03.2

precession + 20.47 + 1 20.42

m place 1858.0 3 59 51.24 Dec - 23 50 42.78

+ 0.24 - 3.07

app place (a) 3 59 51.48 Dec - 23 50 45.85

 δ - * - 1 11.45 + 54.2 δ s AR 3^h 58^m 40^s.03 Dec = -23° 49' 51".6At 7^h 25^m 59.7 Camb m.s.t. March 18th 1858

Examined

Reduction to apparent place of star (a) of March 18.

$$\begin{aligned}
 \log \cos \delta & 1.30222 \\
 \sin \alpha & 9.93697 \\
 \tan \delta & 9.64587n \\
 & 0.88506n \\
 & -7.6747 \\
 & 46.0591 \\
 15 \overline{) 38.3844} \\
 \mu & = +2.5590 \\
 & \underline{8} \\
 & +20.4720
 \end{aligned}$$

$$\begin{aligned}
 \text{same } & 1.30222 \\
 \cos & 9.70060 \\
 & 1.00282
 \end{aligned}$$

$$\mu' = +10.053$$

$$80.424 = 1''.20.42$$

$$\begin{aligned}
 f & = +13.20 & g & = +11.07 & G & = 301.13 & h & = +18.76 & H & = 272.3 & l & = -8.13 \\
 \alpha & = 59.58 & & & & & & & & & 59.58 \\
 G+\alpha & = 1.11 & & & & & & & & & H+\alpha = 332.01
 \end{aligned}$$

$$\begin{aligned}
 \log g & = 1.04415 \\
 \sin(G+\alpha) & = 8.31495 \\
 \tan \delta & = 9.64550 \\
 & 9.00460 + 0.101
 \end{aligned}$$

$$\begin{aligned}
 & 1.04415 \\
 \cos & 9.99991 \\
 & 1.04406 + 11.07
 \end{aligned}$$

$$\begin{aligned}
 \log h & 1.27323 \\
 \sin(H+\alpha) & 9.67137n \\
 \sec \delta & 0.03876 \\
 & 0.98336n - 9.62 \\
 & -9.52 \\
 & +13.20 \\
 15 \overline{) 3.68} \\
 \Delta \alpha & = +0.245
 \end{aligned}$$

$$\begin{aligned}
 & 1.27323 \\
 \cos & 9.94600 \\
 \sin & 9.60674n \\
 & 0.82597n - 6.90 \\
 & 9.91009n \\
 \cos \delta & 9.96124 \\
 & 0.87133n - 7.44 \\
 & -14.14 \\
 & +11.07 \\
 \Delta \delta & = -3.07
 \end{aligned}$$

March 18 1858 Orion

G. B. B. obs.

mag. Scale
16 a_1'' 8.25 precedes B''' $5\frac{1}{2}$ beats of 236.

There are other stars preceding but they are beyond the limit $1'' 30''$.

There are a great many very small stars in the region about C''' and D''' for one or two fields.

16-17	d_1'''	7.15	follows D'''	8.0 beats
17	d_2'''	6.33	"	D''' 12.5 "
15	d'''	6.10	"	D''' 15.3 "
16-17	f_1'''	9.30	"	F''' 2.5 "
17	f_2'''	9.10	"	F''' 3.0 "
15-16	g_1'''	1.30	"	G''' 16.0 "
17-18	g_2'''	7.00	"	G''' 32.0 " (take no notice of these marks)
16-17	i_1'''	8.15	"	I''' 34.5 "
16	i_3'''	2.00	"	I''' 6.0

!! K''' follows I''' by 10 beats precisely and should read 3.02
17 k_1''' follows I''' 13.0 beats and is $10''$ south of I'''

16-17	k_2'''	4.10	"	I''' 22.0 "
17	l_1'''	6.00	"	I''' 25.0 "
16	l_2'''	1.10	"	L''' 4.0 "
14	m_1'''	0.50	"	I''' 32.0 "
17	m_2'''	1.30	"	I''' 42.5 "

n_{-2}''' X''' is 14 mag.

16 n_{-1}''' n_1''' 6.30 follows X''' n_{-2}''' 2.0 "

$0'' 12-13$ mag

13 n_1''' n_2''' 3.42 follows X''' n_{-2}''' 5.0 "

16 n_1''' n_3''' - 0.10 same X''' as n_{-2}''' X'''

Another star follows n_1''' by 4 beats and is $10''$ north of it
16 n_2''' n_5''' follows X''' by 6.5 beats) both in same X''' as $0''$
15 n_4''' n_1''' " n_{-2}''' X''' 9.0 " due?
16 o_1''' " O''' 0.5 " $5''$ south of o_2'''
14 o_2''' 0.40 " O''' 4.0 "
16 o_3''' 8.40 " O''' 9.5 "
15-16 o_4''' 8.05 " O''' 22.5 "

n_3''' There is a star of 17 mag following X''' 7.5 beats and $1''$ south of $0''$

Note - 1863 Jan. 28 The star designated as X''' is a different star not in the Catalogue n_2''' is X'''

March 18 1858 Orion

mag		Scale		hels
16	9 ^{'''}	7.30	follows 2 ^{'''}	20.5 of 236
14/15	9 ^{'''}	7.00	" 2 ^{'''}	24.5
16-17	9 ^{'''}	8.00	" 2 ^{'''}	38.0

486

March 19 Oc of Pleiades

Star of 10th mag near N limb of Moon 1' South of true N236 6^h 34. 56.3 - 4 beats5th mag No 19 of Mr Paine's List 236 = 6. 38 35.7 - 4 beats

6th No 21 " " 6. 45. 39.8 - 4

Star of 10th - 11th As centre 47 40.7 - 4

10th 3' S As cent 52 10.4 - 4

Star of 7th 55 59.5 - 4

236 7^u 15^u 30.0
1678 7^u 27^u 19.4

EC 7 57 00.0
236 7 57 50.0

236 7^u 54 00.0
1678 8^u 5 42.8

Star of 10-11 7^u 10^u 10.5 by 1678. Obsd by G.P.B.
But recorded by H.P.7

* 7^u 48^u 236 7^u 2^u 6.2

* 11^u 2^u 5^u of Luch 236 = 7^u 5 37.0 - 20

* 10^u 1^u 5^u of Luch 236 = 7^u 5 37.0 - 16 beats

Star of 11th 3' S of N 2 sub

236 - 7. 8. 28.0 - 4 beat

Star of 9th 8' S of N 2 sub

236 - 7. 31 52.5 - 4

Star of 8th 5' N of S 2 sub

34 03.6 - 4

The next two stars are of
 9th 8th mag 10' N of S 2 sub = c = b
 and 9-10 13 " " This is double
 a = Comp. proc. of 11th mag n.p. 10"

a lost
 b 9-10
 c 9/8th

7. 39 31.5 - 4
 7. 40 55.5 - 4

86
 236

$$\begin{array}{r}
 236 = 8.19 \quad 00.0 \\
 198 = 8.31 \quad 7.8 \\
 \hline
 12 \quad 7.8
 \end{array}$$

$$\begin{array}{r}
 236 = 8.21 \quad 00.0 \\
 198 = 8.33 \quad 7.4 \\
 \hline
 12 \quad 7.4
 \end{array}$$

$$\begin{array}{r}
 8 \quad 19 \quad 00.00 \\
 23 \quad 47 \quad 41.00 \\
 \hline
 8 \quad 18 \quad 19.00 \\
 23 \quad 47 \quad 44.41 \\
 \hline
 8 \quad 30 \quad 34.59 \\
 \hline
 1 \quad 23.65 \\
 8 \quad 29 \quad 10.94 \\
 8 \quad 31 \quad 7.80 \\
 198 \text{ fast} \quad 1 \quad 56.86
 \end{array}$$

Dec. Pleiades March 19th 1858
 198

6 50 57.5 * very bright (5.4) - v. green
 - 50 0.5 - x bright (5.6) v. g.
 7 4 30.5 * small (6.2) p. g.
 - 8 19.0 * bright (6) v. g.
 14 25.0 * bright (6) v. g.
 17 55.0 * faint (7) v. g.
 20 46.5 * v. faint (8) p. g.
 44 6.0 * faint (7) p. g.
 46 16.5 * bright (6) v. g.
 51 44.0 * faint (6.5) p. g.
 53 7.5 * bright (6) v. g.
 8 26 25.0 * red (6) v. g.

magnitudes merely estimated

Occultation of Pleiades March 19. 1858 obs by G. P. B.

Sum of all the
Observations
No 8

1855

chron 236.

236 feet

Sidereal Time

Camb m. s. t.

* 10 may	6 ^h	34 ^m	54.3	chron 236	40.65	6 ^h	34 ^m	13.65	6 ^h	45 ^m	22.65	22.15	L
* 5 may	6	38	33.7	"	"	6	37	53.05	6	49	1.45	1.00	3
* 6 may	6	45	37.8	"	"	6	44	57.12	6	56	4.36	4.05	?
* 10 "	6	46	58.7	"	"	6	46	18.02	6	57	25.04	25.04	
* 10 "	6	52	8.4	"	40.70	6	51	27.70	7	2	33.88	33.77	2
* 7 "	6	55	57.5	"	"	6	55	16.80	7	6	22.35	22.36	3
* 10-11 "	7	10	10.5	chron 1078	1.27.81	-	-	-	7	8	42.69	42.69	1
* 7-8 "	7	2	6.2	" 236	40.72	7	1	25.48	7	12	30.02	28.66	3
* 11 may	7	5	27.0	"	"	7	4	46.27	7	15	50.26	50.26	1
* 10 "	7	5	29.0	"	"	7	4	48.27	7	15	52.26	55.21	2
* 11 "	7	8	26.0	"	"	7	7	45.26	7	18	48.76	49.20	2
* 9 "	7	31	50.5	"	40.80	7	31	9.70	7	42	9.37	9.26	2
* 8 "	7	34	01.6	"	"	7	33	20.80	7	44	20.11	19.89	3
* 9-10 "	7	39	29.5	"	"	7	38	48.67	7	49	47.09	47.12	2
* 8-9 "	7	40	53.5	"	40.83	7	40	12.67	7	51	10.86	10.75	2
Sum						8	24	28.15	28.15				1

Occultations of March 19 obs by R. J. P. chron 198

may	198 feet			Camb m. s. t.
* 5	6	50	57.5	1 56.84
* 5-6	6	58	0.5	6 56 3.66
* 1-7	7	4	30.5	7 2 33.66
* 6	7	8	19.0	7 6 22.16
* 6	7	14	25.0	7 12 28.16
* 7	7	17	55.0	7 15 58.16
* 8	7	20	46.5	7 18 49.65
* 7	7	44	6.0	7 42 9.15
* 6	7	46	16.5	7 44 19.65
* 6 1/2	7	51	42.0	7 49 47.14
* 6	7	53	7.5	7 51 10.65
* 6	8	26	25.0	8 24 28.15

No. of Observations

Occultations of March 19. 1858, obs by H.P.G. chron 1678

				1678 feet		Cant m.s. t	
22.15	Chron 1678 =	6 ^h 50 ^m 28.8	1 ^m 27.87	6 ^h 49 ^m 00.93			
1.00	3	6 57 32.0	1 27.86	6 56 41.14			
4.05	3	7 7 50.4	1 27.82	7 6 22.58			
25.04	1	7 13 55.6	1 27.80	7 12 27.80			
33.77	2	7 45 49.6	1 27.70	7 44 19.90			
22.36	3	7 52 49.2	1 27.68	7 51 21.52 ? 11.52 ?			
42.69	1						
28.66	3						
50.26	1	236 = 7 15 30.0	236 = 7 54.00				
55.21	2	40.72	40.86				
49.20	2	7 14 49.28	7 53 19.14				
9.26	2	23 47 44.41	23 47 44.41				
9.89	3	7 27 04.87	8 5 34.73				
17.12	2	1 13 24	1 19.55				
10.75	2	7 25 51.63	8 4 15.18				
28.15	1 1678	7 27 19.40	1678 8 5 42.80				
	1678 feet	1 27.77	1678 feet 1 27.62				

To test above results the error of 198 may be found independently from the following comparison

	March 18/19 ^h	19/20 ^h	rate of 198 - 0.4	
MTC	20.47.00.0	19.38.00.0	MTC just on 19 ^h Pk + 1.52.6	
198	20 47. 4.4	19.38. 3.7	Rate + 0.3	
MTC	+ 1.52.5			
	20 45 07.5			
198 feet	+ 1.56.9			
cor rate	- 0.9			
	+ 1.56.85			

confirming Mr. Hall's results.

March 19 1858 Orion G. P. B obs.

mag	$U'' = t_1''$	scale	1.30	follows T'''	15.0	beats of 236
15-16	u'''			" U'''	1.5	" 20" south of U'''
16	v_1'''	1.50		" V'''	11.0	"
	$W''' = 12$	mag.				
16-17	v_2'''			follows V'''	26.0	" 40" north W'''
15	w_1'''			follows W'''	4.0	" 25" north W'''
14-15	w_2'''	8.40		" W'''	21.5	"

Bad definition.

$$\begin{array}{r}
 V + 0 \quad 59.52 \\
 \hline
 1 \quad 0 \quad 59.02
 \end{array}$$

Revised on March 20,

$$\begin{array}{r}
 W''' = +1 \quad 15.60 \\
 \hline
 10.75 \\
 \hline
 1 \quad 26.35
 \end{array}$$

Orion. March 20 1858 G. P. B. obs.
Magnitudes.

L^{'''} is brighter than d of Graph. (S, most star,) and is less
than the following star of Graph.

M^{'''} is brighter than C, fainter than A (of first zone).

A^{'''} = 11 mag
B^{'''} = 11 "
C^{'''} = 9 "
D^{'''} = 10-11
E^{'''} = 11
F^{'''} = 12
G^{'''} = 12
H^{'''} = 9-10
I^{'''} = 9-10
K^{'''} = 13
L^{'''} = 8-9
M^{'''} = 11
N^{'''} = 13-14
O^{'''} = 12
P^{'''} = 12-13
Q^{'''} = 10-11
R^{'''} = 12
S^{'''} = 7-8
T^{'''} = 11-12
U^{'''} = 12
V^{'''} = 7
W^{'''} = 13

March 20 1858 Orion

order of magnitudes

L''' much the brightest but fainter than S'''

I''' G''' H'''

D''' M''' B''' ~~E'''~~ ~~A'''~~

E''' A'''

G'''

F'''

O''' P'''

N''' ~~smaller~~ smaller than P''' K'''

A new group.

O''' is a little less than I''' but I''' less than F'''

$P''' = W'''$ not quite, but $N''' = W'''$

Order of brightness

V''' S''' nearly equal, but V''' brighter
 F''' U''' R''' I''' O'''

$I''' = B$ of first zone.

$D''' <$ decidedly than A of first zone
but $D''' >$ than G of 1st zone

$B''' <$ G of 1st zone

$E''' >$ G of 1st zone

S''' is as bright as following star of Trap.

A pretty good night with some moonlight

The foregoing Completes the examinations of
the Stars in Orion 20' in dia on either side of θ

496

For Zuckers comes on March 23

13 55. B. AC. AR 4 15 37 Dec - 26 3 57.
 " " 4 12 29 " - 26 18

236 7 2 00
 50

7 1 10
 4 15 22
 2 45 33

7 3 0
 50
 7 2 10
 2 45 56
 4 16 14

Comparison of stars.

e = 13 55. B. AC. AR

Diff. got on Spring Gov

*d 236 = 7 19 48 0.39 Sp. Gov. EC = 7 18 44.9 - 49.3 Diff 1st min 1^m 8.1
 *e 20 56 10.15 Diff Dec = 9 36 19 53.0 - 57.3 2 18.0

B B. B. B. Scale

*d 236 = 7 22 22 0.12 7 21 19.8 - 24.2 Diff 1st min 1 7.9
 *e 7 23 21 9.48 9 36 22 27.7 - 32.1 2 12.9

a star of 9 may follows e

33' north of it

Diff Dec 9' 36"

Diff AR = 1^m 8.00

*c = 9 may

B. B. B. B. Scale

*c 236 = 7 27 45 3 29 EC 7 26 41.6 - 46.1 Diff 1st min 0 48.0
 *d 7 28 33 8.12 4 43 27 29.6 - 34.0 2 47.9

*c 7 29 24 1 46 28 19.8 - 24.0 Diff 1st min 0 48.0
 *d 7 30 11 6.28 4 42 29 7.8 - 12.2 2 46.2

Diff Dec 4' 42.5"

Diff AR = 0^m 48.02From d to e = 1^m 8.00

From d to e = 9' 36.0"

From c to d = 48.02

" c to d = 4 42.5"

From e to c = 1^m 56.02

" e to c = 14' 18.5"

For correction of refraction see 2 pages forward

Comet I 1858

(continuation)

Inter-comet March 23 1858

D D.		13 ⁵		EC slow 9 ³ .48	
D compared with *C		D south preceding *C		236 fast 54 ³ .02	
chron 236					
D	7	36	21 - 34	EC = 7	35 17.9 - 30.4 diff 1 st wire 15.4
*C		37	37 - last		36 33.3 - 46.3 2 15.9
				Mean 15.65	
D					
*	7	38	14 - 26.5	7	37 11.3 - 23.2 diff 1 st wire 14.7
	7	39	29.5 42.5		38 26.0 - 39.1 2 15.9
				Mean 15.30	
EC = 7 ⁴		36	21.2	diff AR = 15.47	

236	D	7	41 42.5	38.87	diff = 0.22
*				39.09	
D	7	44	14.0	40.42	diff = 0.85
*				41.27	1.07
D south of star.				Mean = 0.53	
236 =	7 ⁴	42 ^m	58.25	diff = 5.19	
Side Diff =	7 ⁴	42	04.23	5.19	
D and *C compared in APR on spring eqs, D ³ after obs.				Δδ = 6.04	

another over single wire D D D

Apr 23

7

EC =

7

46 3.6 - 15.8 diff^{1st} wire 15.4

*C

47 19.0 - 29.7 2 13.9

Mean 14.15

D

EC =

7

51 40.2 diff 14.50

*C

7

52 34.7

EC =

7

48 55.15 Mean 14.32

7

36 21.20 15.47

EC =

7

42 38.17 Δα = 14.89

Side Diff

7

42 47.65

7

42 42.3

43.42

$$\Delta \alpha = -1^m 14.89 = \delta - *C$$

$$\Delta \delta = -6''.04 = \delta - *C$$

$$\text{Sidl Time} = 7^h 42^m 47.65$$

$$0 \dots 3.30.6$$

$$7 \quad 39 \quad 17.0$$

$$1 \quad 15.2$$

$$\Delta \alpha = -1^m 14.89 = D - *C$$

$$\Delta \delta = -6.04 = D - *C$$

$$\text{Side Time} = 7^4 42^m 47.65$$

$$0 \dots 3 \dots 30.6$$

$$7 \dots 39 \dots 17.0$$

$$1 \dots 15.2$$

M.S. 7. 7.. 38.. 01.8 March 23 1858

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Reduction of * e of March 23 to apparent place.
 $\alpha = 1355$ of B.A.C.

$$\text{mean place } 1850.0 \quad AR = 4 \quad 15 \quad 17.77 \quad NPD = 116 \quad 3 \quad 7.8$$

$$+ 2.483 \times 8 \quad + 19.86, - 8.84 \times 8 = - 1 \quad 10.7$$

$$\text{mean place } 1858.0 \quad AR = 4 \quad 15 \quad 37.63 \quad NPD = 116 \quad 3 \quad 57.1$$

$$\begin{array}{rcl} \log a & = & 8.5151 \\ A & \underline{1.2725n} & \\ 9.7876n & - & 0.62 \quad 613 \end{array} \quad \begin{array}{rcl} a' & 9.8945n & \\ A' & \underline{1.2725n} & \\ 1.1670 & + & 14.69 \end{array}$$

$$\begin{array}{rcl} \log b & = & 8.8236 \\ B & \underline{0.0409n} & \\ 8.8645n & - & 0.073 \end{array} \quad \begin{array}{rcl} b' & 9.2877 & \\ & \underline{0.0409n} & \\ 9.3286n & - & 0.21 \end{array}$$

$$\begin{array}{rcl} \log c & = & 0.3950 \\ C & \underline{9.4733} & \\ 9.8683 & + & 0.74 \quad 38 \end{array} \quad \begin{array}{rcl} c' & 0.9468n & \\ & \underline{9.4733} & \\ 0.4201n & - & 2.63 \end{array}$$

$$\begin{array}{rcl} \log d & = & 8.1583n \\ D & \underline{0.9758n} & \\ 9.1341 & + & 0.74 \quad 17 \end{array} \quad \begin{array}{rcl} d' & 9.9530 & \\ & \underline{0.9758n} & \\ 0.9288n & - & 8.49 \\ & & - 11.33 \\ & & + 14.69 \\ & & + 3.36 \end{array}$$

$$AR = 4 \quad 15 \quad 37.63 \quad NPD = 116 \quad 3 \quad 57.1$$

$$+ 0.29 \quad + 3.4$$

$$\text{app } AR = 4 \quad 15 \quad 37.92 \quad 116 \quad 4 \quad 00.5$$

$$- 3 \quad 11.23 \quad - 14 \quad 30.8$$

$$AR = 4 \quad 12 \quad 26.69 \quad - 26 \quad 18 \quad 31.3$$

Count I 1858.

1858 March 23rd 7^h 38^m 1.8

Examined

$$\begin{array}{rcl}
 AR & (*)c - *e & = -1^m \ 56.02 \\
 & \text{corr. refract} & - 0.32 \\
 & & -1 \ 56.34 \\
 & \Delta \alpha & -1 \ 14.89 \\
 \delta - * & & -3 \ 11.23
 \end{array}$$

$$\begin{array}{rcl}
 Dec & (*)c - (*)e & = -14' \ 18.5'' \\
 & & - 6.25'' \\
 & & -14 \ 24.75'' \\
 & \Delta \delta & - \ 6.64'' \\
 \delta - * & & -14 \ 30.79''
 \end{array}$$

For March 26. Juttle's comet.
 δ AR = $4^h 20^m 53$ δ Dec = $-27^{\circ} 43.1$

6. mag * 1471 B.A.C. AR = $4^h 38^m 33.6$ Dec = $27^{\circ} 50' 24.5$

a = 9 mag * Arg 2.950, No 31 AR = $4^h 22^m 13.7$ Dec = $27^{\circ} 40' 33.5$

No 33 another star in Arg of 9th mag following a $2^m 46.3$ and $5' 23.8$ south

another " " " " " " " $7^m 30.87$ and $6' 06.5$ south

7 20 00
 4 22 14
 2 57 46

180 00
 27 41
 152 19

7 24 4
 7 31 4

180
 152 74
 27 26

* 7

7 55 55
 3 33 00
 4 22

comet could not be found by mistake in place

Coma II 1858

2nd April $\frac{1}{15}$ $\frac{1}{15}$ AR = $21^h 56^m 3$ Dec = $-1^{\circ} 19' 30''$

(5 $\frac{1}{2}$ mag) star 7685, B.A.C. 32 Aquarii AR = $21^h 57^m 29$ Dec = $-1^{\circ} 35' 28$
(cloudy)

April 29/30 $\frac{1}{15}$ AR = $23^h 18^m 1$ Dec = $+0^{\circ} 3'$

may (8) * in W. 2. 392 AR 23 19 39 Dec = $+0^{\circ} 20' 46$

45896	Lalande	$\frac{1}{15}$ $\frac{1}{15}$ K	Piscis	23	19	35,	+	0	28	38
45966	"	follows K	7 (may)			19 $\frac{3}{5}$ -	0	8	12	seconds
45802	"	7 (may)		23	16	18.7	-	0	37	32

80	17	18	00	8 AR	23 ^h	35.5-	89	42	48
236	17	21	20.8	"	0°	25.4	0	17	12

(6 May) * 8281. AR $23^h 42^m 11.0^s$ R. pre * $4^m 40^s$
 Dec $0^\circ 17' 12.8''$ " $8' N \gamma$ *

Star $\alpha = 10^{\text{th}}$ mag is 3' S of center

Der Geb- Signal is double

* free. Count

Ends with Break

Box 236

$$236 = 18^h \cdot 22^m$$

18, 27 40 5.5 beats a free p

28 10 6.0

28 50 6.2

29 25 6.7

30 00 70 .. bin of a

$$16 \quad 28 \quad 37 \text{ diff} = 6, 28 = 3.14$$

183 10.37 1675

18 25 26.63 4.815

18 16 6.68

18 20 46.655 $\Delta\alpha = +2.407$

18 22 00 215.40

3 10.22 4.31

18 18 49.63 $\Delta \rho = +211.09$

at 18^h 20^m 46^s Sid. Time 2 40 26.06

2 41 1280 46.54

15 39 33.855 2 41 12.80

2 33.916

15 36 59.939

Camb. M. 7.

Zero

56.32

56.34

56.30

56.33

34, 79

21.54

Sta 6 of 11/12 follows a ⁵ 15.7

a 34.50

6 41.75

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

				EC show 10.43	
* a	18	39	25.2	8.48	= 6.236 fang EC 3 20.80
		42	27.2	2.47	236 fang sid. 3 10.37
		44	52.7	2.16	10
		45	38.2	6.28	6 π

a² 18 " 48" 17.0 ? whether the * very faint
54 15.5

Spr. Gro. EC = * 18 15 22.9 diff = 1.8
24.7

* 18 15 36.6
38.4 " 1.8

* 18 16 12.9
14.5 " 1.6

* 18 16 25.9
27.4 " 1.5

EC feet of Sid. 3,
18 15 56.25 Mean 6.7
- 10.43
18 16 6.68

(Dr. Wincke.) Comet II. 1858 May $2\frac{2}{3}$ 1858

* a. Harvard College lanes, Zones 24 & 25 No. 14

$$\begin{array}{r} \text{* is M. AR, 1852.0} = 23^h 35^m 39.91 \text{ Dec} = +0^\circ 17' 33.05 \\ \text{Proce} \quad \quad \quad + 18.42 \quad \quad \quad + 1' 59.67 \end{array}$$

$$\text{Mean Place 1858.0} \quad 23 \quad 35 \quad 58.33 \quad + 0 \quad 19 \quad 32.72$$

$$\text{Red to app. Place} \quad \quad \quad + 0.40 \quad \quad \quad + 1.01$$

$$\text{apparent place} \quad 23 \quad 35 \quad 58.73 \quad + 0 \quad 19 \quad 33.73$$

$$\begin{array}{r} \Delta \alpha \quad \quad \quad + 2.41 \quad \Delta \delta \quad \quad \quad + 3 \quad 31.09 \\ \text{P's AR (app)} \quad 23 \quad 36 \quad 01.14 \text{ Dec} = +0 \quad 23 \quad 04.82 \end{array}$$

Examined

$$\text{At } 15^h \quad 36^m \quad 59.9 \text{ Camb m. s. t.}$$

$$\text{Proce in AR} + 3.070$$

$$\text{Proce in Dec} + 19.945$$

$$\begin{array}{r} 6 \\ + 18.420 \end{array}$$

$$\begin{array}{r} 6 \\ + 119.670 \end{array}$$

Reduction of * a to apparent place

$$f = +18.35 \quad g = +11.94 \quad G = 312^\circ 00' \quad h = +19.55 \quad \mathcal{H} = 224^\circ 48' \quad i = -5.92$$

$$a = 354^\circ 00'$$

$$a = 354^\circ 00'$$

$$G+a = 30600$$

$$\mathcal{H}+a = 21848$$

$$\log g = 1.07700$$

$$\text{same } 1.07700$$

$$\sin(G+a) = 9.90796n \quad \text{cs}$$

$$9.76922$$

$$\log \delta = 7.75476$$

$$0.84622 + 7.018$$

$$8.73972n - 0.055$$

$$\log h = 1.29115$$

same

$$1.29115$$

$$\sin(\mathcal{H}+a) = 9.79699n \quad \text{cs}$$

cs

$$9.89173n$$

$$\sin \delta = 0.00001 + 18.295$$

sin

$$7.75476$$

$$1.08815^n + 12.250$$

$$8.93764^n \quad 0.082$$

$$15.76045$$

$$+ 0.403$$

$$\log i = 0.77232n$$

$$\cos \delta = 9.99998 + 0.934$$

$$0.77230n - 5.917$$

$$+ 1.044$$

May 3rd 1858 New CometDiscovered May 2nd 10 PM By H. P. Tuttle. at Obs. of H. C.236 13^h.20^m

18 beats

13^h.25^m

40.22

5 of * m = 11^h

$$\begin{array}{r} \text{Zero} \quad 56.33 \\ 16.11 \end{array}$$

13 36

15.5 beats

18 prec. m

13 30

16.0

13 30

15.0

$$\begin{array}{r} 15.0 \\ \text{huh} \\ 15.5 = 7.75 \end{array}$$

13 34

42.86

13 37

43.42

13 40

44.02

13^h.51^m

68.83 = 43.83

$$\begin{array}{r} \text{Zero} \quad 56.33 \\ 12.50 \\ 16.11 \\ 3.61 \end{array}$$

13 43

10 beats

Zero

44

10 "

56.36

45

9 "

26

49

7 "

Use 56.33

* m = 10^h mag

215° 10'

236 = 13.56.18

Dec = +35° 10'

H. next

4 0 30

236

+ 3 12

13 53 06

m R

9 52 36

Dec + 35° 10'

a = 14.00 10 = * 8^h

1' N of m

within 5' of 10" S of a

288

in Dec 1.3×10^5 hlyR increases 13^s hly
 $\Delta \alpha + 4.5^m$ Daily
 $\Delta \delta + 0.5$ "

←

 $12^h \times 12^m = 10^2$ $12^h \times$ 1
6

Diff AR

Diff $\times 12^2$ Dec

At 236 = $13^h 20^m$ ϕ hrc (m) 18.0
 $13^h 30^m$ " 15.5
 $13^h 30^m$ " 16.0
 $13^h 36^m$ 15.0
 At 236 = $13^h 27.30$ $16.125 = 8.062$

$13^h 25^m$ 40.22
 $13^h 34^m$ 42.86
 $13^h 37^m$ 43.42
 $13^h 40^m$ 44.02
 $13^h 51^m$ 43.83
 $13^h 37.40$ 42.87

 56.33 $13^h 46^m$ 27 $13^h 19^m$

At 236 = $13^h 43^m$ ϕ hrc (m) 10
 44 10
 45 9
 49 7
 At 236 = $13^h 45.15$ $9 = 4.50$

 $13^h 27.30$ At 236 = $13^h 36.22.5$ $13^h 37.40.0$ $1^h 17.5$ $\Delta \alpha'' = -6.281$ Motion in AR for $1^m = +.29$ Motion in Dec in one hour $+0.88''$ 97 $\Delta \delta' = -133.0$ at 236 = $13^h 36.22.50$ 236^h $3^h 12.48$ $13^h 33.10.02$ $2^h 45.9.36$ $10^h 48.00.66$ $1^h 46.16$ $10^h 46^m 14.50$ $2^h 44.22.62$ 46.74 $2^h 45.9.36$

bamb m.s.t

Comet III 1858 *Comet observations of May 3, 1858*

AR of $\star(0)$ of May 4. =		$9^h 52^m 51.98^s$	Dec = +	$35^\circ 19' 18.4''$
$\star(m)$ of May 3, pre (0)		45.40	and south	$10 30.0$
X 1858.0	AR of $\star(m)$ (10 mag) =	$9 52 06.58$	Dec = +	$35 8 48.4$
	Red of $\star(m)$ =	$+ 2.11$		$+ 0 04.0$
	apparent AR of $\star(m)$ =	$9 52 08.69$	Dec = +	$35 8 52.4$
	$\delta - \star(m)$ =	6.28	$\delta - \star =$	$- 2 13.0$
	185 AR =	$9^h 52^m 02.41^s$	δ 's Dec = +	$35.. 6 39.4$

1858. May 3. $10^h 46^m 14.5^s$ m.s.t.

examined

Reduction of *bm of May 3. to apparent place

$$f = +18''.48 \quad g = +11.96$$

$$G = 312^{\circ} 13'$$

$$h = +19''.37 \quad \mathcal{H} = 223''.57$$

$$\alpha = 147^{\circ} 47'$$

$$\alpha = 147^{\circ} 47'$$

$$G + \alpha = 460''.00$$

$$\mathcal{H} + \alpha = 371^{\circ} 44'$$

$$\log g = 1.07773$$

$$\text{same} = 1.07773$$

$$\sin(G + \alpha) = 9.99335$$

$$\cos = 9.23967^m$$

$$\log \delta = 9.84759$$

$$0.31740^m - 2''.077$$

$$0.91867 + 8''.292$$

$$\log h = 1.29159$$

$$\text{same} = 1.29159$$

$$\sin(\mathcal{H} + \alpha) = 9.30826$$

$$\cos = 9.99083$$

$$\sin \delta = 0.08741$$

$$\sin = 9.76017$$

$$0.68726 + 4''.867$$

$$1.04259 + 11''.030$$

$$18.480$$

$$15) 31''.639 \quad \log i = 0.77085^m$$

$$+ 2.109 \quad \cos \delta = 9.91239$$

$$0.68344^m - 4''.824$$

$$9.5202$$

$$\begin{array}{r} 1 \quad 4 \quad 35 \quad 6 \quad 40 \\ 9.50''58 \quad 5 \quad 8 \end{array}$$

$$+ 35 \quad 11 \quad 48$$

$$- 6.901$$

$$+ 4''.029$$

$$4) 11$$

$$2.75$$

$$9.4630 + 34.40$$

$$\begin{array}{r} 1 \quad 4 \quad 5 \end{array}$$

$$9.4724 \quad 34.35$$

$$\begin{array}{r} 2 \quad 54 \quad 14 \end{array}$$

$$9.4430 \quad 34.49$$

1858.0 May 2 10^hMay 2nd 10^h p R 9^h 47^m 30^s
Dec + 34^h 35^m

1658 May 4th

$$\begin{aligned} EC &= \\ 206 &= \end{aligned}$$

$$\begin{array}{r} 156 \\ 30 \\ 28 \\ \hline 254 \end{array}$$

$$\begin{array}{r} -17.0 \\ 33 \\ \hline 51.0 \\ 51.0 \\ \hline 561.0 \end{array} \quad \begin{array}{r} +3.52 \\ 33 \\ \hline 105.6 \\ 105.6 \\ \hline 116.16 \end{array}$$

$$\begin{array}{r} -9' 21'' \\ 35 \ 10 \\ \hline 35 \ 19 \ 21 \end{array} \quad \begin{array}{r} 1'' 56.2 \\ 9 \ 52 \ 36 \\ \hline 9'' 50 \ 39.8 \end{array}$$

m(*) for B.2.

$$\text{Dec} + 33 \ 19 \ 21 \text{ AR } 9'' 50 \ 39.8$$

North of * X.

236 = 11	38 ^m 47 ^s	diff sec	85.88	Sum of wires	56.20
	38 22		86.00		56.13
	40 21		86.45		56.15
236 = 11	38 30.00		86.11		56.13
236 fast	3 14.41		56.15		56.15
sid time = 11	35 15.59		29.96		29.96
	42 56.66		29.96		300.4 = 5' 00.4
	7 41.07		29.96		7.7 X 0.88 = 6.78

Motion in sec in 1^m = +0.88

$$7.7 \times 0.88 = 6.78$$

North of * X

AR got on the Gov. by 236

Readings from sheet

236 = 11	43 45.5	EC = 11	40 19.3	0 34.1
* (X)	44 19.5	*	40 53.4	

B d d

11	44 53.5?	11	41 26.5	0 34.5
* (X)	45 27.3	*	42 1.0	

B d d

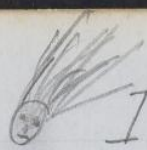
lost	18.5	11	42 18.0	0 34.1
*	11 46 36.8	*	42 52.1	0 34.1
* (X)	47 10.5	*	43 10.5	0 33.7
		*	43 44.2	

* (X)	48 10.0	11	44 9.8	0 34.0
		*	44 43.8	
B d d	48 37.0	11	45 10.8	0 33.7
		*	45 44.5	

Mean diff AR = 11
at EC = 11

May 4

Comet continued



III 1858

// 236 12 3 0.5

*(X) missed

// 12 3 54.0

*(X) 4 24.5

B&C No 3439 = y.

* (X) is 20' south of * (y) and prec * (y) 11^s.

$\Delta\alpha = -0^m$	$34^s.016$	at EC =	11^h	42^m	$45^s.82$	2	48	19.18
$\Delta\delta = +5'$	$00''40$	EC slow			<u>10.84</u>			<u>26.74</u>
		sid time =	11	42	56.66	2	49	57.92
			2	49	57.92			
			8	03	50.74			
					<u>1</u>			<u>27.45-</u>
		band m.s.t	8	5-2	23.29			

* (y) No 3439 B.A.C.

$$\begin{array}{r} 3.56 \\ 8 \\ \hline 28.48 \end{array}$$

$$10682$$

$$117.98$$

$$\text{APR} = 9 \quad 56 \quad 37.47$$

$$28.48$$

$$+ (y) \quad 9 \quad 57 \quad 25.95$$

$$11$$

$$* (X) \quad 9 \quad 57 \quad 15$$

$$30$$

diff APR

$$9 \quad 56 \quad 45$$

May 3

$$9 \quad 52 \quad 36$$

Motion

$$+4 \quad 9$$

$$\begin{array}{r} 17.23 \\ 8 \\ \hline 137.84 \end{array}$$

$$34 \quad 16 \quad 10.6$$

$$2 \quad 17.8$$

$$54 \quad 18 \quad 28.4$$

$$* (y) \quad 35 \quad 41 \quad 31.6$$

$$20 \quad 00$$

$$* (X) \quad 35 \quad 21 \quad 31.6$$

$$+5$$

$$35 \quad 26$$

May 3

$$35 \quad 10$$

$$\text{Motion} = +16$$

Comet continued

May 4, 1858

513

* (a) of May 3. precedes X. of May 4 $1^m 15^s$ * (a) is $12'$ south of X.

Determination of comparison stars of May 3

AR. by AR. from 236

AR on Spr. Cro.

Diffs

mag	236	1 st wire	noted	Scale	Diffs	Readings from sheet	Prior 2 nd wire	Means
10 (m)*	12	39	43.2	$0' 17''$	10' 30" (m)	EC = 12 56 16.8 - 22.0	$0^m 45.6$ $0^m 45.3$	$0^m 45.45^s$
9 (l)*	13	0	28.5	10 13	10	57 2.4 - 7.3		
					8 18		$3^m 56.3$ $3^m 57$	3 56.5
(a)*	13	3	34.2	$1' 55''$	(a)	13 00 8.0 - 13.0		

Repeated

(m)*	13	4	39.1	$0' 01''$	(m)	13 1 12.8 - 17.7	$1^m 48.1$ $1^m 47$	1 47.5
					10 30		$0^m 45.4$ $0^m 45.3$	0 45.35
(l)*	13	5	24.5	10.71	8 19	(l) 13 1 58.2 - 63.0		
(a)*	13	8	30.3	2.12	(a)	13 5 4.1 - 9.0	$3^m 59$ $3^m 60$	3 59.5

B B B

a* with X (4) Date

(o)*	13	11	27.2	$3' 21''$	(o)	13 8 1.0 - 5.8	$4^m 23.0$ $4^m 23.1$	4 23.05
(X)*	13	15	50.2	$6' 48''$	(X)	13 12 24.0 - 28.9		

D B

* (m) precedes * (o) $0^m 45.40$ and is $10' 30.0''$ south of it

* (o) precedes * (a) 3 5.80 and is 8 18.5 north of it.

* (o) precedes * (X) 4 23.05 and is 3 27.0 south of it.

Comparison Stars of May 3rd and 4th

* (0) B. 2. 491. Tab. AR = $9^h 51^m 27.10^s$. Tab. Dec = $+35^\circ 27' 21.6''$
 $k = -0 \quad 33.19$ $d = -0 \quad 9.2?$
 $\delta - \phi, k' = +0 \quad 0.06$ $\delta - \phi, d' = -0 \quad 0.6$
 $\frac{\delta - \phi}{100} AR = 9 \quad 50 \quad 53.97$ $\frac{100}{Dec} = +35 \quad 27 \quad 11.8$
 (33 years) Precession and Sec var = $+1 \quad 58.21$ $-9 \quad 21.0$
 M AR 1858.0 = $9 \quad 52 \quad 52.18$ Dec = $+35 \quad 17 \quad 50.8$
 Will not page

* (0) B. 2. 499 Tab. AR = $9^h 51^m 30.41^s$ Tab. Dec = $+35^\circ 27' 8.2''$
 $k = -0 \quad 36.37$ $d = +1 \quad 24.5$
 $\delta - \phi, k' = +0 \quad 0.06$ $\delta - \phi = -0 \quad 0.5$
 $\frac{\delta - \phi}{100} AR = 9 \quad 50 \quad 54.10$ $\frac{100}{Dec} = +35 \quad 28 \quad 32.2$
 $\frac{1 \quad 58.21}{9. \quad 52 \quad 52.31}$ / mean 33 years. $\frac{9 \quad 18.7}{35 \quad 19 \quad 13.5}$

* (y) B. 2. 491 Tab. AR = $9^h 56^m 2.03^s$ Tab. Dec = $+35^\circ 49' 41.0''$
 $k = - \quad 33.12$ $d = -0 \quad 8.98$
 $\delta - \phi, k' = + \quad 0.02$ $\delta - \phi, d' = -0 \quad 0.16$
 $\frac{\delta - \phi}{100} AR = 9 \quad 55 \quad 28.93$ $\frac{100}{Dec} = +35 \quad 49 \quad 31.86$

* (y) B. 2. 499 Tab. AR = $9^h 56^m 4.80^s$ Tab. Dec = $+35^\circ 49' 33.2''$
 $k = - \quad 36.30$ $d = +1 \quad 25.9$
 $\delta - \phi, k' = + \quad 0.02$ $\delta - \phi, d' = -0 \quad 0.2$
 $\frac{\delta - \phi}{100} AR = 9 \quad 55 \quad 28.52$ $\frac{100}{Dec}$

Plan of 0
 No 491 = $9 \quad 52 \quad 52.18$
 AR of * (0) by B. 2. 491 & 499. mean $9 \quad 52 \quad 52.24$ 499 $9. \quad 52 \quad 52.31$
 by obs. (0) precedes (X) $4 \quad 23.05$ H.C. $9 \quad 52 \quad 51.44$
 AR of (X) $9 \quad 57 \quad 15.29$ 593
 B Lalande AR of (X) $9 \quad 57 \quad 14.49$ $9. \quad 52 \quad 51.98$
 Mean AR of (X) $9 \quad 57 \quad 15.09$ $4 \quad 23.05$
 Adopted for X 1858.0 $9. \quad 57 \quad 15.03$

Comparison Stars of May 3rd and 4th Precession.

for * (0)	constant log. = 1.30222	same = 1.30222
	$\sin \alpha = 9.72753$	$\cos \alpha = 9.92711n$
	$\tan \delta = 9.85252$	1.22933n
	0.88227	prec 1850.0 - 16.956
	nom = + 7.6255	+ .017
	46.0391	1844.0 16.939
	15) 53.6846	
1850.0	$\mu = +3^{\circ} 57' 89''$	$\mu' = -16^{\circ} 9' 35''$ 1850.0
for 17 years	sec var = +0.0031	sec. var 9 years + 0.024
	+ 3.5828	prec -16.932 in 1841
	33	33
	10.7464	50.796
	10.7464	50.796
1.58.21	+118.2064	-558.756
		9.18.7

The reduction α of B.Z. 491 appears wrong. or it refers to the
Eq. of 1830.0? perhaps on declination R Dec

For this Zone	B.A.C 3375 - $\delta = -9^{\circ} 7'$	$9^{\circ} 45'' + 35^{\circ} 41'$
	" 3429 - $\delta = -7.6$	9 57 35 44
	" 3446 - $\delta = -6.3$	9 59 35 58
	23.6	

Cor. of Dec. reading of Zone to Dec for 1830.0	-7.9	
Dec. reading for 0 Zone 491	+35. 27. 21.6	
Dec. of 0 1830.0 about.	+35. 27. 13.7	nearly
17.0 x 28 = prec. for 28 years	= -7 56.3	
Dec. 0 1858.0	+35. 19 19.4	
$\alpha - 0$	+3 27.0	
Dec of } By Zone 491	+35 22. 46.4	
of H.C. place of α	499	
35 19. 20.3	35 22 43.5	
B.Z. 35 19 16.4	By H.C. No 19661	
Dec 35 19. 18.4	35 22 47.3	
	Adopted Dec of α +35. 22. 45.4	
	R " 9 57 15.09	1858.0

Adopted Dec. 0 1858.0 = +35. 19. 18.4
R " = 9. 52. 198

* (X) of May 4. Lalandi 19661.

$$1800.0 \text{ AR} = 9^{\text{h}} 53^{\text{m}} 47.84^{\text{s}} \quad \text{N.P.D} = 54^{\circ} 20' 36.4''$$

$$\begin{array}{r} \text{sec var} - 0.03 \\ + 3.572 \\ \hline .009 \\ + 3.563 \\ \hline 58 \\ 28.504 \\ 17815 \\ \hline 206.654 \end{array}$$

$$\begin{array}{r} + 0.25 \\ + 17.094 \\ \hline .084 \\ + 17.178 \\ \hline 58 \\ 137424 \\ 85890 \\ \hline 996.324 \end{array}$$

$$\begin{array}{r} 9 \quad 53 \quad 47.84 \\ + 3 \quad 26.65 \\ \hline 1858.0 \text{ AR} = 9^{\text{h}} 57^{\text{m}} 14.49^{\text{s}} \quad \left\{ \begin{array}{l} \text{N.P.D} = 54 \quad 37 \quad 12.7 \\ \text{Dec} = +35 \quad 22 \quad 47.3 \end{array} \right. \\ 0 - x \quad 4 \quad 23.05 \\ 0 \quad 9 \quad 52 \quad 51.44 \end{array}$$

$$\begin{array}{r} 1858.0 \text{ AR of } * (X) = 9^{\text{h}} 57^{\text{m}} 15.03^{\text{s}} \quad \text{Dec} = +35^{\circ} 22' 45.4'' \\ \text{Red to app place} = +0 \quad 2.14 \quad \text{Red} = +0 \quad 03.9 \\ \text{app AR of } * (X) = 9 \quad 57 \quad 17.23 \quad \text{Dec} = +35 \quad 22 \quad 49.3 \\ \text{to } * (X) = -0 \quad 34.02 \quad \text{to } * = +5 \quad 00.4 \\ \text{to AR app.} = 9.56.43.21 \quad \text{to Dec} = +35.27.49.7 \end{array}$$

$$1858 \text{ May } 4^{\text{d}} 8^{\text{h}} 52^{\text{m}} 23.3^{\text{s}} \quad 30 \text{ in Dec} \quad 5 \text{ in R.}$$

The place of x depends on H.C. α has also been derived from $\alpha = 13.2 \quad 491 \quad 2499$.

Examined The position is uncertain by perhaps $\pm 5''$ & therefore the dis. of wr. to app. eq. of α & x has not been noticed.

Reduction of * (X) of May 4. to apparent place

$$f = 18.62 \quad g = +11.99 \quad G = 312.29 \quad h = +19.61 \quad H = 223.2 \quad i = -5.78$$

$$\alpha = 149.19 \quad \alpha = 149.19$$

$$G + \alpha = 461.48 \quad H + \alpha = 372.21$$

$$\log g = 1.07882 \quad \text{same} = 1.07882$$

$$\sin(G + \alpha) = 9.99072 \quad \cos = 9.31068$$

$$\tan \delta = 9.85133 \quad 0.38950 - 2.452$$

$$0.92087 + 8.334$$

$$\log h = 1.29248 \quad \text{same} = 1.29248$$

$$\sin(H + \alpha) = 9.33018 \quad \cos = 9.98983$$

$$\tan \delta = 9.08866 \quad \sin \delta = 9.76266$$

$$0.71132 + 5.144 \quad 1.04497 + 11.091$$

$$18.620$$

$$15) 32.098 \quad \cos \delta = 9.91134$$

$$+ 2.139 \quad \log i = 0.76193 - 4.713$$

$$0.67327 - 7.165$$

$$+ 3.926$$

$$3.57 \quad 1.4.3 \quad 17.1$$

$$\begin{array}{r} 20 \\ 714 \\ \hline 71 \\ 64.3 \end{array} \quad \begin{array}{r} 9 \quad 56.43.2 \\ 9 \quad 55.38.9 \end{array} \quad \begin{array}{r} 342 \\ 34 \\ \hline 308 \\ 35.27.50 \\ 35 \quad 32 \quad 58 \end{array}$$

$$\begin{array}{r} 9.56.43 \\ 2 \quad 54 \\ \hline 9 \quad 53 \quad 49 \end{array} \quad \begin{array}{r} 35.27.50 \\ 14 \\ \hline 35 \quad 42 \end{array} \quad \begin{array}{r} 3.6 \\ 1.8 \\ \hline 5.4 \\ 13 \\ 3.15 \\ 15.6 \\ 3.54 \end{array}$$

Tuttle's 2nd Comet. III May 12 1858

∴ north preceding * (a) 9 mag. 2nd of position 90.30

$$\begin{array}{r}
 236 = 13^h \ 40^m \ 5^s \\
 \quad \quad \quad 41 \ 9 \\
 13 \ 40 \ 37 \\
 \hline
 \text{diff den} \\
 26.30 \\
 26.31 \\
 26.30 \\
 \hline
 57.00 \\
 30.70
 \end{array}$$

Comet is still very faint - but perhaps a little brighter than on the 4th

AR got on Spring Eve. 6 below 10.47

$$\begin{array}{r}
 \text{EC} = 13^h \ 38^m \ 53.6^s \\
 * (a) \quad \quad \quad 38 \ 65.0 \ 11.4
 \end{array}$$

$$\begin{array}{r}
 13 \ 39 \ 17.8 \\
 * (a) \quad \quad \quad 39 \ 30.0 \ 12.2
 \end{array}$$

$$\begin{array}{r}
 13 \ 39 \ 49.7 \\
 * (a) \quad \quad \quad 39 \ 61.0 \ 11.3
 \end{array}$$

$$\begin{array}{r}
 13 \ 40 \ 13.7 \\
 * (a) \quad \quad \quad 40 \ 25.3 \ 11.6
 \end{array}$$

$$\begin{array}{r}
 13 \ 40 \ 42.0 \\
 * (a) \quad \quad \quad 40 \ 52.8 \ 10.8
 \end{array}$$

$$\begin{array}{r}
 13 \ 41 \ 6.9 \\
 * (a) \quad \quad \quad 41 \ 17.4 \ 10.5
 \end{array}$$

$$\begin{array}{r}
 13 \ 41 \ 37.0 \\
 * (a) \quad \quad \quad 41 \ 46.6 \ 9.6
 \end{array}$$

$$\begin{array}{r}
 13 \ 42 \ 0.3 \\
 * \quad \quad \quad 42 \ 10.9 \ 10.6^s
 \end{array}$$

$$\text{EC} = 13 \ 40 \ 27.6 \ 11.0 \text{ by 8 comparisons.}$$

$$\text{EC slow} \quad \quad \quad 10.47$$

$$\begin{array}{r}
 \text{sid } \gamma = 13 \ 40 \ 38.07 \\
 \quad \quad \quad 41 \ 09.7 \\
 \hline
 30.6
 \end{array}$$

$$13 \ 40 \ 37 \ \text{diff den}$$

$$12 \ 49 \ 13$$

$$236 = 13 \ 44 \ 55 \ \text{Mer} \ 30.70$$

$$3 \ 45.7 \ 60$$

$$\text{sid } \gamma = 13 \ 41 \ 09.7 \ 30.6$$

$$\text{Motion in den } 31.6 \ 0.0$$

$$30.6$$

$$\Delta \alpha = -11.0^s$$

$$\Delta \delta = +301.0''$$

$$\text{at sid } \gamma: 13^h \ 40^m \ 38.07$$

$$3 \ 20 \ 38.37$$

$$10 \ 19 \ 59.70$$

$$1 \ 41.57$$

$$\text{band m.s.t } 10 \ 18 \ 18.13$$

$$3 \ 19 \ 51.63$$

$$46.74$$

$$3 \ 20 \ 38.37$$

May 12 1858

519

10^h 40^m * (x) 1' 40" north of * (a) $u = 9^2$

* (x) 13 12 42.

* (a) 46 56

236 feet of EC 3^m 55.8

236 feet of EC 3 45.3

diff. dec.

236 = 13	48	11	26.30
	50	13	26.29
13	49	13	26.38
13			57.00
			30.70

236 = 13	52	4.5
* (a)	52	13.5 9.0

	38.0
* (a)	46.8 8.8

May 13, A.M. about 8^h 30^m m.t.
 EC 23 49 00
 236 23 52 57.2
 3 57.2

Zero of wires.

57.04	} by M.
56.965	
56.998	
57.00	

	3.48
-18.6	1.16
620	+1 ^m 56
10' 20"	

a in 1825 10^h 39^m 4^s
 Dec + 37° 51'

L 1800 10^h 37 40
 + 38 00

* a

236 = 13^h 58^m 59.2

fast 3 20

13 55 39

3 14 40

R 10 41 00

$\mathcal{H} = 3^h 14^m 40^s$
 Dec = + 217° 41'
 Dec = + 37° 41'

~~$$\begin{array}{r} 10 \quad 40 \quad 45.3 \\ \hline \quad 30.3 \\ \hline 10 \quad 40 \quad 15.0 \\ \quad + 1 \quad 52.9 \\ \hline 10 \quad 42 \quad 07.9 \end{array}$$~~

$$\begin{array}{r} 10 \quad 38 \quad 58.8 \\ \quad \quad \quad - 30.3 \\ \hline 10 \quad 38 \quad 28.5 \\ \quad \quad \quad 1 \quad 52.9 \\ \hline 10 \quad 40 \quad 18 \quad 4 \end{array}$$

$$\begin{array}{r} 37 \quad 00 \quad 36 \\ + 44 \\ \hline 37 \quad 01 \quad 18 \\ - 10 \quad 26 \\ \hline 36 \quad 50 \quad 54 \end{array}$$

$$\begin{array}{r} 38 \quad 28 \quad 44 \\ \quad \quad 44 \\ \hline 38 \quad 29 \quad 28 \\ - 10 \quad 24 \\ \hline 38 \quad 19 \quad 04 \end{array}$$

$$\begin{array}{r} 342 \\ 93 \\ \hline 1026 \\ 1026 \\ \hline 11286 \end{array}$$

$$\begin{array}{r} 18.9 \\ 33 \\ \hline 567 \\ 567 \\ \hline 623.7 \end{array}$$

$$\begin{array}{r}
 + 7 \quad 52 \\
 \hline
 52 \quad 9 \quad 36 \\
 \hline
 1825 \quad 52 \quad 17 \quad 28 = 37 \quad 42 \quad 32 \\
 \quad \quad \quad 16 \quad 24 \\
 \hline
 1858 \quad 52 \quad 27 \quad 52 \\
 = 37 \quad 32 \quad 08
 \end{array}$$

$$\begin{array}{r} 1858 \quad 52 \quad 27 \quad 52 \\ = 37 \quad 32 \quad 08 \end{array}$$

$$\begin{array}{r} 342 \\ 855 \\ 1 \text{ n } 25.5 \\ \hline 40 \quad 11.2 \\ 41 - 36.7 \\ 1 \quad 52.9 \end{array}$$

1858 10. 43 29.6

18.9
47.25

Islands 20865 = 6 = 9² May

1858.0 R 10.43.29.6^s
Dec +37.32.08"

$$a \quad 10^4 \cdot 39^m \cdot 43^s$$

$$+ 37^{\circ} 39' 33''$$

May 4.2. 1858 comet III.

* (a) in center of field

236 =	14	52	46.5	H =	4 ^h	8 ^m	52 ^s
		3	45.3	Dec =	217°	33'	20"
14	49	032			+ 37	33	20
1	8	52.0		Inst corr		+ 6	13
10	40	11.2		Dec 1858.0 +	37	39	33
Inst corr		-	28.5				
AR 1858.0	10	39	42.7				

a star of 5th mag in center of field

236 =	14	57	52.3	H =	4 ^h	8 ^m	17 ^s
		3	45.3	Dec	214°	52'	30"
14	34	07.0			34	52	35
4	8	17.0			34	58	18
10	45	50.0		Inst corr.		+ 6'	13"
AR 1858.0	10	45	21.50				
Inst corr.		-	28.5				

Bel C 37 28 10^h 44^m 54.45^s

			+ 26.97
1858.0	10	45	21.46

3.371
8
+ 26.968

1850.0	34	58	40.0	+ 19.00
		+ 2	32.0	8
1858.0	35	1	12.0	152.00

*b Lalonde 20865

not correct
 1800.0 AR 10 40 11.21
 P_{me} + 3 18.71
 1858.0 AR 10 43 29.92
 Red to app. place + 2.30

app. AR 10 43 32.22
 * (a) from * (b) 3 44.20
 AR of (a) 10 39 48.02
 $\Delta \alpha$ - 11.0

Is app. AR = 10^h 39^m 37.02^s
 on May 12^d 10^h 18^m 18.1^s

P_{me} - AR + 3.424

See var + 0.067

29

.063

14

.203

3.424

.002

3.426

58

27 408

17 130

19 8.708

N.P.D. = 52 9 35.9

P_{me} + 18 16.3

N.P.D. 52 27 52.2

See = + 37 32 7.8

Red to app. place + 2.4

See + 37 32 10.2

* (a) north of * (b) 7 30.5

See of (a) + 37 39 40.7

$\Delta \delta$ + 5 1.0

See = + 37 44 41.7

Camb. m. s. t.

P_{me} in N.P.D. + 18.855

See var + 0.158

29

1422

316

4.582

18.855

.046

18.901

58

15 1 208

9 4 5 05

60) 1096.258 (18

60

49 6

480

16

Red of * b Salma 20865) to apparent place for May 12

$$f = +19''.70 \quad g = +12''.20 \quad B = 314^\circ 39' \quad h = +19''.82 \quad \delta = +13^\circ 44' \quad i = -5''.02$$

$$\alpha = 160 \ 52.5 \quad \alpha = 160 \ 52.5$$

$$(B+\alpha) = 115 \ 31.5 \quad (H+\alpha) = 1437.5 \quad 16.30$$

$$\begin{array}{r} g \quad \cdot \quad 1.08636 \\ \sin(B+\alpha) = 9.95540 \\ \tan \delta \quad 9.88553 \\ 0.92729 + 8''.458 \end{array}$$

$$\begin{array}{r} \text{by } h \quad 1.29710 \\ \sin(H+\alpha) \quad 9.40224 \quad 4533 \\ \text{red} \quad 0.10074 \\ 0.80008 + 6.211 \quad 7''.10 \\ 6512 \quad 19.70 \\ 15) 24.469 \quad (35.76 \\ + 2.298 \\ 2.35 \end{array}$$

$$\begin{array}{r} 1.08636 \\ \sin \quad 9.63438n \\ 0.72074n - 5''.257 \end{array}$$

$$\begin{array}{r} 1.29710 \\ \cos \quad 9.98570 \quad 17 \\ \sin \delta \quad 9.78480 \\ 1.06760 + 11''.684 \quad 57 \\ 36 \end{array}$$

$$\begin{array}{r} \cos \delta \quad 9.89926 \\ i \quad 0.70070n \\ 0.59996n - 3.981 \\ - 9.238 \\ + 2''.446 \\ 33 \end{array}$$

May 13. 1858

Comet. III

G. P. B. obs.

* (a) of May 12.

AR got on the line, record lost.

Fin wire,
 * (a) 236 = 12^h 15^m 33.2^s Scale 8.27
 * (b) lat. 20865 19 17.5 0.51

diff AR
 3^m 44.3

diff line
 7' 30"

B.

* (a) 236 = 12 30 42.8? 9.07

3 44.0

7 31

* (b) 268 1.26 then

3^m 44.2

7' 30.5"

D. B.

* 3 2 3 48.19
 46.74

K in centre of field (exact)

3 2 4 34.93

236 = 13 00

23.2

H =

2

11

16

W

236 feet

3

49.0

Sec =

217

53

30

12 56 34.2

12 56

34.2

3 24 34.93

2 11

16.0

9 31 59.27

AR = 10 45

18.2

Sec + 37

53

30

1 33.71

Inst corr

- 28.5

Inst corr

+ 6

13

9 30 25.56

AR

10 44

49.7

Sec + 37

59

43

At Camb m.s.t May 13, 9^h 30^m 25.6

June 3, 1858 + 16

525

Comet III. 1858.

 δ AR $12^h 37^m .1$ δ Dec $+ 36^\circ 40'$

Salade	23755	12^h	34^m	27.33	N.P.D.	53°	$8'$	5.1	mag (6)
Dec			$+ 2$	49.30			$+ 19$	10.1	
1858	12	37	16.63		N.P.D.	53	27	15.2	
					Dec	$+ 36$	32	44.8	

another * 7.8 mag following 23755 41.5
and south $7' 30''$

Students from the College.

June 7. 1858

 δ AR $= 12^h 55^m .0$ δ Dec $= + 35^\circ 14'$
N.P.D. 54 46

* (3) mag B.A.C. 4384. AR $= 12^h 59^m 5.96$ N.P.D. $= 53^\circ 26' 23.5$
Dec $+ 36 33 36.5$

	12	30	3.51		54	20	30.0
(9 mag)		2	45.88			18	55.6
24203 Salade	12	52	49.4	N.P.D.	54	39	45.6
				Dec	$+ 35$	20	14.4

* of 8 mag following 39^S and $25' 42.5$ north of 24203

Searched for comet but could not find it.

June 8 1858

Calypso (53)

$$(53)'s AR = 11^h 57^m 36^s \quad Dec = + 5^{\circ} 44'$$

4021. B.A.C of 7 may precedes about 11^m and is nearly in the same Dec about $2'$ south

$$22711 \text{ Salade 7 may, } AR = 11^h 58^m 30^s \quad Dec = + 6^{\circ} 9' 3''$$

$$22678 \text{ Salade 7 may } AR = 11^h 56^m 58^s \quad Dec = + 5^{\circ} 43' 28''$$

A = 22678 Salade

- X * 10 may = a precedes A $4^s 8^s$ and north $3'$
 X * 11 may = b precedes A 0^s and north $6'$
 X * 12, 13 c " A 0^s " south of b $40''$
 c brighter than b
 X * 15 may d follows A 4^s same Dec as c
 * 12 may e follows A $17^s 9'$ north of d
 X * 11, 12 may f " A $23^s 10' 30''$ north of d
 X * 13 may g " A $18^s 3'$ north of d
 (1) X * 14 may h " A $24^s 1'$ south of g
 * 12 may i " A $27^s 5'$ south of d

- (1) * 14 may h follows A $28^s 1'$ north of d

- (1) There is another * a little fainter, preceding h and is $30''$ south of it.

- * k 11 may 52^s following A and $4'$ north of it
 * l 11 may 13^s following k and $1'$ north of it
 * m 11 may AR same as l $3'$ north of l
 * n 10, 11 may 32^s following k and $2'$ south of k
 * o 12 may 2^s preceding n and $20''$ north

- (1) June 10 h not seen & was probably Calypso. as the fainter star near it was recognised G.P.B.

June 10 1858

Calypso. ③

Calypso 14 mag = 2

12 = 9

$$\begin{array}{r} 26^s \\ 30 \\ \hline 30 \\ 1^m 26 \end{array}$$

8'

$$\begin{array}{r} 1 \ 30 \\ \hline 6' \ 30 \end{array}$$

south of A

$$\begin{array}{r} 14 \ 37 \ 27.0 \\ \hline 1 \ 26. \end{array}$$

$$14 \ 38 \ 53$$

$$\begin{array}{r} 14 \ 83 \ 50.5 \\ \hline 1 \ 26.0 \end{array}$$

$$14 \ 35 \ 16.5$$

$$46 \ 49.0$$

$$\begin{array}{r} 1 \ 26.0 \\ \hline 48 \ 15.0 \end{array}$$

$$236 = 15^h \ 3^m \ 42^s, \quad x \text{ north of } y, \quad x = 70^\circ 42'$$

$$y = 73, 95 = *12 \text{ mag}$$

Zero of position of wires $90^\circ 30'$

Zero of wires

$$56^\circ 40'$$

$$56, 48$$

$$56, 40$$

$$56, 45$$

$$15 \ 6 \ 00 \quad x = 70^\circ 36'$$

$$74, 13$$

x is supposed to be Calypso.

$$15 \ 9 \ 52.8$$

x precedes y about 18^s
 y follows about $1^m 44^s$ and $7'$ south of it

Clouds very annoying - finally prevented obs. in
 R & the certain identification of the planet

528
Comet III, 1858

This Comet discovered by me, on the 2^d of *May, and found to be such by its movement; on the 3^d, was nowhere in Europe seen. It was, at the time of its discovery, near the breast of Leo Minor; and the faintest Comet I ever saw. I think it was somewhat brighter about the 20th than at the time of its discovery. The last time I saw it was with the Comet Seeke on the 14th of May, and then with difficulty. The moon and cloudy weather prevented me from seeing it again. The Elements were computed by Hall, Gaffond, & Watson. The latter previous are in No 114 of the Astronomical Journal

H. P. I.

* At the Observatory of Harmond College.

June 17 1857

Examined the diaphragms of the Tube of the Great Refractor to see whether the whole aperture of the object glass was effective. Found that $\frac{1}{8}$ in on all sides was obstructed & on removal of object glass found that the paper casing & the uppermost diaphragm had started from the tube near the object glass. These were removed & by careful experiment it was found that only about 0.02×2 of the diameter was interrupted excepting an arc of about 30° which gave a shorter radius. By diminishing it by from 0.01 to 0.08 more. The part of the circumference thus interrupted was marked on the cell with a character $\sqrt{\quad}$ on its outer face. We propose to fit to the telescope all apparatus for closing the aperture to any required amount

by means of a straight edge valve to be rotated through any required angle by means of a handle with a graduated circle ~~from~~ extending from the object glass.

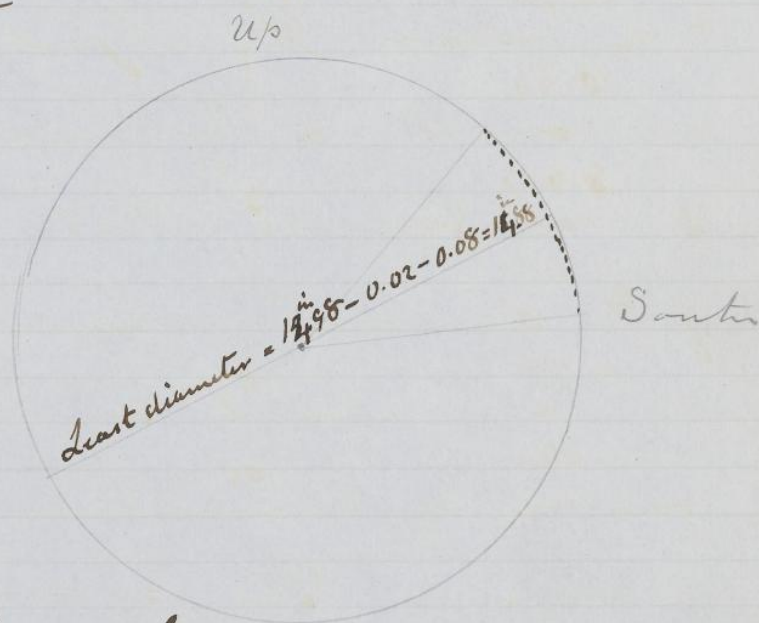
This valve should be so placed that it commences to interrupt the aperture at the point $\vee$ where the outline of the diaphragm is defective

Telescope pointed at

S. E. horizon

The diameter of open aperture of the object glass was found to be 14.98 and therefore

allowing for intrusion of the diaphragm $14.98 - 0.04 = 14.94$ is the effective aperture. For I think that from the way the experiments were made that 0.04 is rather too large a correction for general outlines of diaphragms



but would be about right if we include the slight ~~distortion~~ irregularity noticed above.

If the value is made to cut off first the imperfect outline. the irregularity will rarely occasion any trouble even in the most exact comparisons.

Ap.	Area
ⁱⁿ 14.94	$\frac{1}{1}$
10.56	$\frac{1}{2}$
8.625	$\frac{1}{3}$
7.470	$\frac{1}{4}$
4.724	$\frac{1}{10}$
1.494	$\frac{1}{100}$

14.940	1.0000
9.449	0.4000
4.724	0.1000
1.494	0.0100

Place for June 28. Camb mt 9^h AR = $12^h 9^{m} 52^s$ Dec = $+4^\circ 13'$
N. P. ob = $85^\circ 47'$

8 8

$+24.520$ $+160.08$
N.P.D. = 85° $51'$ $5''$

$$NP_{\Delta} = 85^{\circ} 53' 45.1''$$

Scale
7' 6"

Dec 9
Dec plant

$B-a = 3.30^5$
 R B 12 13 8.5
 R a 12 9 38 5
 Plant 12 9 52 0
 13.5

* (a)

c is 45" north of (a)
d " 45 " " g (a)

mg

12	* (a)	15	59	28.0
14	* (c)		59	37.6
15	* (d)		59	45.0

(a)	16	0	1.0
(c)			10.8
(d)			17.7

(a)	16	0	31.4
(c)			41.0
(d)			48.4

(a)	16	0	59.7
(c)		1	9.5-
(d)			86.3

(a)	16	1	27.4
(c)			37.5-
(d)			44.8

mg
* 15 1' north of (a) * g 14 mg 4' south of (a)

June 28th

Calypso

225

(X) 16 4 25.6

(A) 4 46.8

g ~~57.8~~

g 16 5- 13.0

a 5- 20.5-

g follows x 3.2

C 17 12 14.6

a + 24.8

C 17 13 2.0

a 17.0

June 28 1858 H. P. J.'s Third Comet, discovered
 this evening. $\frac{1}{2}$ ° south preceding a star of 9 mag = α ,
 about 55 hours preceding $\ast(X)$ of 13 May

Same as Donati's as subsequently found to
 be the case

236

	h	m	s
$\frac{1}{2}$	16	15	45.6
$\ast(X)$		16	14.0

Supposed to be Donati's (and found to be so)

$\frac{1}{2}$	16	18	4.0
---------------	----	----	-----

$\frac{1}{2}$	16	19	19.6
$\frac{1}{2}$			35.0

$$\frac{1}{2} - \ast(X) = -46.7$$

$$-46.6$$

$$\ast\alpha \quad 20 \quad 6.5$$

$$-46.6$$

$$x\alpha \quad 21.6$$

$$-47.7 \text{ Ref.}$$

$$\text{Mean} = -46.63 \text{ at } 236 = 16 \quad 20 \quad 23.85$$

$\frac{1}{2}$	16	20	4.0
---------------	----	----	-----

$$-47.70 \quad 16 \quad 37 \quad 14.20$$

$$\text{Mean} = -47.16 \quad 236 = 16 \quad 28 \quad 49.02$$

$\frac{1}{2}$	16	21	13.0
		21	27.6

Ref.

$$\Delta\alpha \quad \frac{0.21}{47.37} \quad 16 \quad 27 \quad 47.50$$

no corr required in $\Delta\alpha$ for distance 1" 1.52

α	21	55.6
α		15.3

	h	m	s	$\Delta\alpha$
236 =	16	24	36.5	13.20
		25	44.0	13.36

S.I.

	h	m	s
	6	25	9.86
			46.74
	6	25	56.60

16	29	19.0
	31	30.5

13.77

13.41

$$236 = 16 \quad 27 \quad 47.5 \quad \text{Mean} = 13.43 = 13.46$$

$$236 \text{ for } 1 \quad 36.5 \quad \text{Zero} \quad 56.45$$

$$S.T. = 16 \quad 26 \quad 11.0$$

$$6 \quad 25 \quad 56.6$$

$$10 \quad 0 \quad 14.4$$

$$1 \quad 38.3$$

$$M.T. \quad 9 \quad 58 \quad 36.1$$

$$\frac{56.45}{43.02} \text{ Camb. m. l. } 9^h \quad 58^m \quad 36.1$$

$$\frac{8.6}{42.16} = \Delta\alpha = -7.01.6$$

$$= \Delta\delta = -7.01.6$$

$$\text{Ref.} \quad 7.04.4$$

$$+0.21 = -47.37$$

Comet from $\ast\alpha$
 (corr. for ref. is omitted)

ρ 3 of star.

June 28 1858

16 34 . 0.5
14.3

$$\delta - *(\alpha) = - 47.9 \\ - 47.2 \\ - 48.0$$

*(\alpha) 16 34 48.4
(\alpha) 35 1.5

$$\text{Mean} = - 47.7 \text{ at } 236 = 16 \quad 37 \quad 14.2$$

~~16 35 40.8~~
16 40 21.0
(X) 40 49.4
2 41 9.0

236 feet of EC 1^m 50.7
EC - 14.2
236 feet of Sid line 1 36.5

236	=	16	41	38.5	
H		7	9	138.0	
		9	32	20.5	
236 feet			1	36.5	
		9	30	44.0	9.. 30.. 24
cor ref				- 25	ref + inter - 44
		9	29	59	9.. 29.. 40
Dec = +26			34	0	26.. 34
			- 6'		ref + cor - 4
		26	28'		26.. 30

157 June 28 10^h 12^m

By circles

R 9^h 30^m 00^s } Better
Dec + 26° 28' } values.

By Interpolation
R 9^h 29^m 30^s
Dec

Place of * \alpha R 9^h 30^m 27^s

Comp. Star \alpha, determined July 19th

gives for place of Comet

June 28th 9^h 58^m 36.1 m.s.t

R 9^h 30^m 01.26

Dec 26° 27' 35.7

July 8, 1858, comp star of June 28th 9

		h	m	^{1st} s	^{2^d} s	^{3^d} s	Secs	diff den	
236	²	16	29	11.8	25.8	53.5	6' 29"	5' 23"	
(7 mag)	A		30	16.2	30.1	58.0	1 06		
132 346	²	16	31	28.0	42.0	9.4	8' 20"	5' 23"	
	A		32	32.2	46.3	14.0	2 57	5' 23.0	² N of A
							Laland's diff	5' 20.8	

* A in center of field

	h	m	s	
236 =	16	34	56.0	
236 fast		2	8.0	
	16	32	48.0	
H	6	58	35.0	Sec + 26° 38'
AR	9	34	13.0	N.P. 63 22
up. N of A	2	32	29	26.. 38
		0	44	26 34 up on
				+ 4

* A is probably of 7th mag.

* A is Laland 18970

* A, Laland 18999 & 19000

* A = 3309 B.A. = 13 Leonis.

Leiff AR	^{1st}	^{2^d}	* A. & AR (1850.0)	^{1st}	^{2^d}	^{3^d}	N.P. 63. 24. 21.3
	1	4.4	Per			+27.76	+ 2. 8. 8
	1	4.3	1858.0	9	33	27.80	63.. 26.. 29.9
	1	4.5					
	1	4.2					
	1	4.3					
	1	4.6					

² prec. A Mean	1	4.38	Photo + 3. 4.70	+ 16. 078
Laland's diff	1	5.10	8	8
			+27. 760	128. 656
				h motion + 1.080
				+128.736

Reduction of * A to apparent place.

$$\begin{array}{rcl} a \log & 8.7763n & \\ A & 0.3603 & \\ & 9.1366n & - 0.1371 \\ & & - 0.905 \end{array}$$

$$\begin{array}{rcl} b \log & 8.6494 & - 1.042 \\ B & 1.3073n & \\ & 9.9567n & \end{array}$$

$$\begin{array}{rcl} c \log & 0.5405 & + 2.086 \\ C & 9.7789 & + 0.218 \\ & 0.3194 & + 2.304 \\ & & - 1.042 \end{array}$$

$$\begin{array}{rcl} d \log & 8.4272n & + 1.262 \\ D & 0.9119n & \\ & 9.3391 & \end{array}$$

$$\begin{array}{rcl} a' \log & 9.0795n & \\ A & 0.3603 & \\ & 9.4398n & - .275 \\ & & - 4.884 \end{array}$$

$$\begin{array}{rcl} b' \log & 9.5547 & 7.278 \\ B & 1.3073n & - 12.437 \\ & 0.8620n & + 9.658 \end{array}$$

$$\text{err} = - 2.779$$

$$\begin{array}{rcl} c' \log & 1.2060 & \\ C & 9.7789 & \\ & 0.9849 & \end{array}$$

$$\begin{array}{rcl} d' \log & 9.7769 & \\ D & 0.9119n & \\ & 0.6888n & \end{array}$$

* (A) AR 1858.0	9 ^h 33 ^m 27. ^s 80	N.P.D. 63	26	30.0
red to app place for 28	+ 1.26		-	2.8
app AR of A	9 33 29.06	N.P.D. of A	63	26 27.2
A - α_2	+ 1 5.10		+ 5	20.8
app. AR of (α_2)	9 32 23.96	app N.P.D. of (α_2)	63	21 06.4
		but + 26	38	53.6

This place of the star does not agree with that of α which has $1^m 57^s$ lep R and is $2'$ ~~North~~ South

ceding α and ~~probably~~ There is a little star of the 13^{th} mag. - (x), $19^{\circ} 52'$ prec-
~~Revised~~ $\Delta \alpha = 19^{\circ} 52'$ by 3 deg.

α should be $3^m 2^s$ prec A and $3'$ N of A

Arcturus

Jun 29. 1858.

Experimenting with the Clamp and Clock of
the Equatorial G.P.B.

	^h	^m	^s	Scale	
236 = 11	35	56.5		4' 30"	Transits of Arcturus over divisions of scale from left to right with Clock attached.
	38	21.0		3 30	
	40	46.3		2 30	
	43	4.0		1 30	

In moving the tangent screw of the clock-work it was found
that 12 ^{beats} of the clock were required for the telescope to become sta-
tionary.

Pendulum of driving clock lengthened, 20 turns of screw

236 = 11	49	55.0	55 27"
	59	00.0	5 7
	9	5.	

^m	
2.4	60
9.1	20"
0.8	20

At first starting the driving clock carried
the telescope too fast so that Arcturus appeared to
move from left to right (apparent) 3' of Scale in
7^m 18^s $3 \times 60 = 180''$ $7 \times 60 = 420 + 12 = 432''$

$$\begin{array}{r} 180 \overline{) 432} \quad (2 \\ \underline{360} \\ 72 \end{array}$$

Jun 29. 1858

Equatorial Clock.

236 = 12 ^h	23 ^m	24.0 ^s	Scale.	
	34	20.0	5 4"	
	11 ^m		5 9	
	1		- 5"	
			+ 25"	}

by = 22 rev. of nut

22^r change 275" in 11^m

$$\frac{5}{275} \times 22^r = \frac{1}{55} 22 = \frac{20}{50}$$

Finally pendulum shortened by 0.2
 & disregarding refraction changes should be
 nearly adjusted-

$r = 1$ turn of nut on pendulum

in 1^m Sid. $r(5-0) = +25.0$ motion of Arcturus on micr scale
 $r(5-20) = +2.2$ "
 $r(5-22) = -0.5$ "

~~$25.5 = 22r$~~

$r = 1.16$

$22r = 25.5$

$20r = 22.8$

$2r = 2.7$

$44r = 51.0$

1.16 sec. Arc of Arcturus = 1.23^h
 in 1^m Sid $\frac{1}{15}$
 in 15^m " $1.23 \times 15 = 1.23$

Or 1 turn of nut. changes rate by 1.23 in 15^m

"

$4.92 \quad 1^h$

"

$118.1 \quad 24^h$

June 30. 1858. Celestial Photography.

Jun 30. 1858

Celestial Photography.

Actuans I		Aperture ⁱⁿ 2.5		Duration		D.	B.
Exp	100 ^s	Com. of Exp.	End of Exp.				
		20 = 15 ^s 41 ^m 04.5	42 ^m 44.8	100.3			
5		43 12.8	43 20.0	5.2			
10		43 39.8	43 49.8	10.0			
20		44 9.4	44 30.0	20.6			
60		44 45.0	45 45.3	60.3			
100		46 4.5	47 45.2	100.7			

Signals to
Each open
& close of
exposure
one or two
minutes signal

A single very strong & fine image and no others!

 α Lyrae II Ap. ⁱⁿ 2.5

Exp	100 ^s	E.C. = 15	57 4.9	58 45.2	100.3	B.	B.
5		58 54.8	60.2	5.4			
10		59 9.6	59 19.7	10.1			
20		15 59 34.4	59 54.8	20.4			
60		16 0 4.6	4.9	60.3			
100		16 1 34.6	3 15.2	100.6			

Can see α Lyrae at 20^s

Jan 30. III @ Lyrae 2.5

100 ^s	16 ^h	9	44.5	11	24.8	100.3
2		11	34.5		36.4	1.9
5		11	49.5		54.8	5.3
10		12	4.7		14.6	9.9
12		12	24.8		36.8	12.0
14		12	44.8		58.9	14.1
16		13	9.6		25.6	16.0
18		13	34.8		52.9	18.1
20		14	4.7		24.8	20.1
100		14	35.0		18.2	100.2

Same Plate is to be used for Arcturus

Arcturus III Ap. 2.5

100	16	22	4.8	23	44.8	100.0
30		23	54.5	24	24.5	30.0
40		24	34.5	25	14.8	40.3
50		25	29.8	26	20.0	50.2
60		26	34.3	27	34.9	60.6
100		27	44.4	29	24.4	100.0

At close of last Exposure 236 = 16^h 31^m 20^s

June 30 1858. a Lyra 2.5 Aperture. long dots

Plate III (Continued)

100	29.16	33	49.5	35	29.8	100.3
2		35	41.3		43.3	2.0
5		35	54.7		59.2	4.5
10		36	9.4		19.4	10.0
12		36	29.4		41.8	12.4
14		36	49.4		63.8	14.4
16		37	19.6		35.8	16.2
18		37	44.7		62.7	18.0
20		38	9.6		29.6	20.0
100		38	39.6	40	49.8	100.2
100		40	39.8	42	19.9	100.1

Plate III had a set for a Lyrae another
for Arcturus & a third for a Lyrae

The last two 100" images are the best. But the
ground work of the plate is so irregular that any just
comparison is impossible

June 30. 1858
 IV - a dyre 15th

Com. at 236 16^h 55^m 00^s

B. X 9

~~10~~	20 ^s	E.C. 16 ^h	53 ^m 4.8 ^s	24.6	19.8
~~0.5~~	1		53 34.3	35.7	1.4
~~0.5~~	2		53 44.5	46.8	2.3
~~0.5~~	3		53 54.5	57.7	3.2
	4		54 4.6	8.6	4.0
	5		54 14.7	19.5	4.8
	10		54 29.4	39.4	10.0

IV Arcturus - 15 in Apr

	20 ^s	16	57	34.5	54.8	20.3
	1		58	4.3	5.7	1.4
Look? probably	2		58	14.4	16.7	2.3
Look barely	3		58	24.7	27.5	2.8
	4		58	35.1	39.0	3.9
Look	5		58	49.5	54.6	5.1
	10		59	4.8	[14.2 - 15.8]	[9.4 or 11.0]

550 June 30, 1858

IV α Lyrae 15" in Aperture

20	17 ^h	1 ^m	39.4	59.8	20.4
1		2	4.6	5.6	1.0
2		2	14.3	16.4	2.1
3		2	24.4	27.5	3.1
4		2	34.9	38.9	4.0
5		2	49.3	54.8	5.5
10		3	4.5	14.9	10.4

On Plate IV α Lyrae - Arcturus - α Lyrae

June 30. 18 58

V & Lyra ap. first 15^m, next 2.5^m last 15^m
 Time 17. 50. 0 double dots

15^m

EC = 17^h Moon half hour high

10 ^s	26 ^m	54.5	64.9	10.4
1	27	14.4	15.5	1.1
2	27	24.6	26.8	2.2
3	27	34.2	37.4	3.0
4	27	44.4	48.6	4.2
7	27	59.4	66.6	7.2
10	28	14.5	25.0	10.5

2.5 ^m	100 ^s	EC = 17 ^h	30 ^m	44.8	32 ^m	24.8	100 ^s
	4		32	34.5		38.8	4.3
	8		32	49.5		57.8	8.3
Took sun	12		33	9.8		21.6	11.8
14 ⁹²	16		33	29.6		43.9	14.3
	20		33	59.9		79.9	20.0
	40		34	29.8		70.4	40.6
[200 ²]	100		35	19.8	38 ^m	4.8	100.0

Obs. 5:05 Sp. Gov. without a signal but one was made after it breaks or dots

As far as I can judge the last 1^s image is not essentially better or worse than the first taken on same plate 13^m before -

15 ^m	10	EC = 17 ^h	40 ^m	14.8	24.8	10.0
	1		40	34.2	35.7	1.5
	2		40	44.4	46.4	2.0
	3		40	54.7	57.6	2.9
	4		41	4.6	8.6	4.0
	7		41	14.7	21.7	7.0
	10		41	29.4	40.1	10.7
	10		41	49.7	59.4	9.7

All above on same plate

The plates of June 30 not satisfactory perhaps
we have extended the time of exposure so far that the
surface of plate has been injured. In the expo-
sure of 115 31^m from 1st to last image the
best images were those last taken

1858 July 1

Photography Fine & clear - no
wind of consequenceI Arcturus $15''$

		$EC = 16''$	$10''$	$6.6''$	$26.7''$	S	$D, D.$
*	1 > 20		10	6.6	26.7	20.1	✓
*	1		10	41.6	42.8	1.2	✓
*	2		11	6.3	17.9	1.4	✓
	3		11	16.3	18.4	2.1	✓
	4		11	31.2	34.3	3.1	✓
	5		11	51.4	56.4	5.0	✓
	6		12	11.3	16.4	5.1	✓
	10		12	30.3	36.6	6.3	✓
	15		12	46.4	56.4	10.0	✓
	20		13	6.2	21.3	15.1	✓
			13	31.5	51.7	20.2	✓

* The 1.2 has 50 molecules the 1.4, has 45. The 2.1. has as many as 175. Grain finer than in plates II and III.

I Time of image ≈ 2 & $\lambda.20 =$

This plate this evening was timed four minutes in the bath.

July 1. 1858

II Archimedes 15" aperture -

Not-break.

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J. B.

20	E.C.	16	20	26.3	46.5	20.2
*	1		21	1.3	2.9	1.6 ✓
*	1			16.2	17.4	1.2 ✓
	2			26.2	28.3	2.1 ✓
	3			36.3	39.3	3.0 ✓
	4			46.3	50.3	4.0 ✓
	5	21		56.9	61.4	4.5 ✓
	6	22		11.3	17.5	6.2 ✓
	10			26.4	36.4	10.0 ✓
	15			46.4	61.5	15.1 ✓
	20	23		11.5	31.4	19.9 ✓

Time of 1st image = 0.0195

Plate II timed three minutes in bath

* 1.6. has about 4 times as many molecules as 1.2. The latter has 40 or 50 quite small.

This plate gives better images than Plate I.

III Arcturus. 15" in ap.

B. D. B.

20	E.C.	16	29	21.4	41.5	20.1
1				51.9	52.7	0.8 no image
1		30		1.2	2.2	1.0 ✓ decided image. 35 molecules
2		30		11.4	13.3	1.9 ✓ " " 220 molecules
3				21.2	24.2	3.0 - very strong black at centre-
4				31.3	35.3	4.0 ✓
* 5	+			46.4	51.4	5.5 ? ✓
6		31		1.7	7.4	5.7 ✓
10				16.4	26.3	9.9 ✓
15				36.4	51.4	15.0 ✓
20		32		21.7	21.5	19.8 ✓

Time for image = 0 is 0.582

Plate III timed 2 minutes in bath. a good deal. B. B.
better plate than III and better than II

* The close of circuit was perhaps 1" too early. The actual exposure was more than 5"

5.5.6

July 1, 1858

V

Arcturus ap. 5 in

B. D. B

80	80	80	20	16	43	16.5	44	36.5	80.5
6	4				44	51.3		55.4	4.1 no image
10	6				45	11.3		17.6	6.3 120 molecules
14	8					26.3		34.7	8.4 200 molecules
18	* 10	+				46.4		55.4	9.5 ? black at centre nearly
22	15	25			46	6.7		21.4	14.7
80	80	20	80			31.3		51.3	20.0
	80	80			47	1.5	48	21.8	80.3

Time of image = 0 is 5.8

Plate IV. timed 2 minutes in bath. molecules as in plate III
rather too small -

* Signal for close of circuit 0.5" too early.

20^s Exp of IV = 3.5 of III
80 " = 9.5 "
8.4 " = 1.4 "

Plate V* Arcturus - ap. 5 in

80	80	80	80	16	52	41.4	54	1.8	80.4
4	4	2	3		54	16.5		19.4	2.9
6	6	3	4			26.4		30.4	4.0
8		4	5			41.3		46.4	5.1
10		5	6		5	56.5		62.6	6.1
15		6	± 8		55	11.5		19.5	8.0 120 molecules
20		8	± 10			26.8		36.7	9.9 170 molecules
80		10	* 14			46.6		60.6	14.6 from 2 to 3 times as many as 10
		15	* 20		56	11.6		32.0	20.4
		80	80		56	41.7	58	1.7	80.0

Plate V. timed 2 minutes in bath -

Long B

Time for image $y=0$ is 5.8 not so good a plate as IV

* Molecules very generally developed over whole plate - much more so than on plate IV

† Molecules in 8 to those in 10 are in number as 2 to 3.

Plate V. has finer grain, & more diffuse images than plate IV

July 1, 1858
VI a Lyrae 5th ap.

30 ^s	17 ^s	7 ^m	46.7	16.8	30.1
1		8	26.3	27.4	1.1
2			36.4	38.4	2.0
2 $\frac{1}{2}$	2 $\frac{1}{2}$		46.3	49.0	2.7
4	9		1.3	5.6	4.3
6	9		16.5	22.5	6.0
8			31.4	39.5	8.1
10			46.8	57.0	10.2
15	10		6.4	21.4	15.0
30			31.5	1.7	30.2

no image

very strong - 220 molecules

from 2 to 3 times as many as 4

becoming black

Time of image $y=0$ is 3.8
Plate VI timed 2^m in bath. Resembles plate V. in grain or general appearance -

~~Plate VI timed 2 minutes in bath~~
a Lyrae 5th ap.

VII	20 ^s	8C	17	15	36.6	56.7	=	20.1
	1			16	76.3	17.4	=	1.1
	1				26.5	28.5	=	2.0
	2				36.4	38.2	=	2.0
	3				46.5	49.4	=	2.9
	3		17		1.2	4.4	=	3.2
	4				11.4	15.4	=	4.0
	6				26.4	32.4	=	6.0
	8				41.5	49.4	=	7.9
	12		18		1.4	13.5	=	12.1
	20				21.8	41.7	=	19.9

no image

taken decided image, 75^m

150 m^s

decided centre.

Images less developed than preceding plates
Time of image $y=0$ is 3.8

Plate VII. timed 2 minutes in bath - ^{much} Better looking plate than V or VI, but not as good as IV

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July 1, 1858.

VIII

15 in. Aperture - a Lysa -

B. D. B.

20	17	26	31.4	51.5	20.1 ⁵ ✓	
1		27	1.3	2.6	1.3✓	
1		27	11.3	12.4	1.1✓	
2			21.5	23.3	1.8✓	= 14 ⁵ Exp of plate VII
3			31.2	34.5	3.3✓	
4			46.3	50.3	4.0✓	
5	28		1.4	6.5	5.1✓	
6			16.5	22.5	6.0✓	
10			31.5	41.3	9.8✓	
15			51.6	66.4	14.8✓	
20	29		16.7	37.1	20.4✓	

Plate VIII - timed 2 minutes in Bath - Best grained plate of whole series.

Clouds gathering in the west and approaching the zenith.
 Game up, but a Lysal was quite clear at close of operations

Note - It appears as a general thing that the coarser the grain, the more sensitive the image on the plate. Query - Would it not be better in determining magnitudes, to compare the plates which have the same character of graining?

Our results on June 30 & July 1 do not compare favourably with those of last year

1st The images are diffuse as though out of focus See Note to July 6

2nd The grain is too fine

3rd The time of exposure is much longer to give an image of α Lyrae with 5" than in Aug 6th ¹⁸⁵⁷ when it took finely, small round & decided in 1^s whereas on July 1 1858 it scarcely took in 3^s to 4^s & was much more diffuse when it did take even then.

1858 July 6th

Focus 22.5 as always since July 1858

Photography Fine & clear - ~~main~~

I Acturus

15th

Exp = 20.0	2.0	EC 16	37	25.8	27.7	Exp = 1.9	D. 140 large molecules
0.5	20.0		37	40.9	60.8	1.9	strong image
1.0	0.5		38	10.9	19.7	19.9	
1.5	1.0		38	30.75	31.3	2.8	
2.0	5.0			40.8	41.7	0.85	
3.0	10.0			50.8	55.9	0.9	on the point of taking
10.0	20.0		39	5.8	15.8	5.1	
15.0	2.0			25.9	46.0	10.0	
			39	55.7	57.8	20.1	
						2.1	This is a little stronger than 1 st 2 nd

2nd in Bath

Strong Developer

Mr. Black

afterwards thought there was too much acid in the developer but the grain is coarse & images good - far better than on 30th of June & July 1

II Acturus 15th

2.0	16	46	10.9	12.9	2.0	strong image
20.0			20.8	40.8	20.0	
0.5			50.7	51.2	0.5	No image
1.0	47		0.6	1.8	1.2	possibly an image
5.0			10.5	15.7	5.2	
10.0			25.9	35.9	10.0	
20.0			45.9	66.0	20.1	
2.0	48		15.6	17.8	2.2	100 large molecules
					B. D.	

2nd in Bath

Not quite as good a plate as I, but 2nd images are strong with all the molecules in contact.

Plates I and II, some wind, may shake telescope.

July 6, 1838

Photography.

III. α Lyrae 15ⁱⁿ ap.

Exp	2 ^s .0	E.C. 16	56	20.8	22.8	2 ^s .0	black at centre
	20.0			30.8	50.8	20.0	
	0.5		57	0.8	1.4	0.6	strong image
	1.0			10.8	11.8	1.0	
	5.0			20.9	25.8	4.9	
	10.0			40.8	50.9	10.1	
	20.0		58	0.9	20.9	20.0	
	2.0		58	30.8	32.9	2.1	

IV α Lyrae 5ⁱⁿ ap

Exp	2.0	E.C. 17	5	45.9	47.9	2.0	black at centre
	20.0			55.7	75.9	20.2	
	0.5		6	25.8	26.4	0.6	strong image
	1.0			35.8	36.6	0.8	image ???
	5.0			45.8	50.9	5.1	very strong image
	10.0		7	1.0	10.8	9.8	
	20.0			20.9	41.0	20.1	
	2.0		7	50.6	52.6	2.0	

S.

2^m in Beck,
 Fine plate grain coarse

1858 July. 6

Photography

V. Mizar $\alpha\beta = 5^m$

Exp	3.0	20.0	17	18	16.0	35.9	Exp = 19.9
	20.0	100.0			45.9	26.2	100.3
	0.5	10.0	20	35.9	45.9	10.0	strong image
	1.0	20.0		55.9	76.0	20.0	
	5.0	30.0	21	26.0	55.5	29.5	Comp not seen
	10.0	80.0	22	6.0	26.2	80.2	" strong image
	10.0	100.0	23	35.9	16.0	100.1	
	20.0	20.0	25	26.0	46.0	20.0	
	2.0						

Comp. at 100 is like Mizar at 20^s a strong image in both of the 80^s exp. say = Mizar in 15^s
 V in Betel 3^m

VI For Focus 15^m Mizar

Exp =	20	Focus at	17	37	45.8	57.0	11.2
	13.72	22.5		38	6.1	21.0	14.9
	12	21.5		39	25.8	37.8	12.0
	12	20.5		40	25.0	37.0	12.0
	12	23.5		41	25.8	37.8	12.0
	20	22.5		42	10.8	31.0	20.2
	12	22.5		43	17.0	29.0	12.0
B.S. per	12	21.5		44	0.8	12.8	12.0
	12	20.5		45	40.9	52.9	12.0
book Sig. *	12	23.5		46	5.8	18.0	12.2
	62	22.5	17	46	55.6	lost	[12.0]

Comparing the images on this plate VI 23.5 is a very inferior image (no companion) 20.5 is much better but sensibly inferior to 22.5. The best of all is 21.5 which however I deduce from them that the best focus is between 21.5 & 22.5 but a little nearer the former day

Chemical Focus 21.7^d of Tube real
 We have since July 1857 used 22.5 why I do not know

July 6. VII For Focus
Mizar 15th ap.

20 ^s	d
20	22.5
12	22.5
12	20.5
12	21.5
12	23.5
12	22.5
60.	22.5

This was injured & cannot be
employed -

VIII Mizar 15th ap.

20

5

8

no image of comp

10

Comp. visible small good image

12

15

18

20

1858 July 6

Photography

For R. F. B.

20

15

10

8

4

20

Evening clear with breeze from S.W.

A stronger developing agent was used
this evg. than on June 30th & July 1st

N.B. In future until further notice the
reading for Chemical Focus will be 21.7

1858 July 8

Photography

Long Break -

Plate I

Mizar 15ⁱⁿPlates not satisfactory
grain too fine!~~20~~

1.5

20

0.5

1.0

1.5

2.0

20.0

~~20~~ 1.5

Faint image with Comp

just visible

Faint image with Comp

Plate II Mizar - 15ⁱⁿLong Dots -

1.5

20.0

0.5

1.0

1.5

~~2.0~~~~20.0~~

1.5

Only the 20th exposure took, with
comp.

D. B-

567

Plate III Mixer 15 in For Focus

19
-20
21-
-22
23

Exp = ¹⁹12^s Focus at 19.7
 " 12 23.7
 - 12 22.7
 - 12 20.7
 - ~~12~~^s 21.7
 - 30^s 21.7

Plate IV. a Lyrae 15 in

B D B

0.5
 1.0
 10.0
 20.0
 40.0
 * 0.5

Beautiful image
to engrave.

* Exposure uncertain - The slide struck the box - image defaced
 all took well - tolerably coarse grained plate.

Plate V α Lyrae $2\frac{1}{2}$ in

5^s
5_s
60

2

2₁

diam. of image = 15^h 6

10

40

diam = 44^h 60

5

no image

no image

faint image, β perhaps
have taken in 5.5 -

Plate spoiled -

Plate VI α Lyrae 1 in

3^s
30
180
20
40
60
180
30

The plate has a
bad surface & but
2 images can be found
& they very unequal

From this plate it seems that after a very long exposure the images first taken are effaced. For one of the 180° images is very much less than the other which is very black & strong with no diffused light.
I think 100° would give a good image.

July 13, 1858. Donati's Comet

δ 16 43 17.2 chron. 236 feet 2 21.0
 δ 1 18 north of * of 7th mag. = 2

δ 16 43 31.4
 * 43 50.0 18.6

Comet comp. 4 times
 in Dec by scale of 1".18" ref. 0.3
 at 16^h 46^m by 236

δ 16 44 22.8
 * 44 56.2

Mean diff AR at 236 = 16^h 46^m 0.1 = 18.2 ref +0.02

δ 16 46 45.8
 * 47 3.8 18.0

236 feet 2 21.0
 Sid time 16 43 39.1
 7 25 4.98
 7 24 18.24 9 18 34.12
 46.74 1 31.51

δ 16 47 40.2
 * 48 1.2 18.0

7 25 4.98 9 17 2.61 Camb. m.t

Z = * in part of field
 236 = 16 48 16.5
 236 feet 2 21.0
 sid time 16 45 55.5
 H West 7 6 26.0
 AR 9 39 29.5
 Inst corr. & ref - 0 38.0
 AR 9 38 51.5

Dec + 27° 54'
 N.P.D. 62° 06'
 Inst corr + 5' 31"
 N.P.D. 62° 11' 31"

* of 3rd mag in centre of field

236 = 16 51 42.8
 236 feet 2 21.0
 16 49 21.8

H = 7 3 32.0
 AR 9 45 49.8
 n Leonis 9 44 42.0

Dec + 26° 46'
 63 14
 63 49 31

Inst. corr. & ref. - 1 7.8? Inst. corr + 0 5 31 for N.P.D.
 Error of 30?

* 2 of July 13. = 19165 Lelande

Proc in AR = +3.489

in N.P.D. = +16.220

16,306

58

58

130,448

27 912

129 760

81530

174 45

811 00

60 1945,748

60 120 2,362

60 1940,760

15 45.75

+ 3^m 22.36

+ 15' 40.8

15 45.75

1800. AR 9^h 35^m 50.05

N.P.D. 61 55 32.1

61 55 32.10

1858.0 AR 9^h 39^m 12.41

N.P.D. 62 11 12.9

62 11 17.8

Dec. +27 48 47.1

+27 48 42.2

Reduction to app. Plan + 1.28

app. Plan of 2 AR = 9 39 13.69

Dec. +27° 48 49.1

+27 48 44.2

Assumed error 2 } -30.00

Ass. error of 1 wire

Lelande } 9 .. 38 .. 43.69

B = 13.2 349 9 .. 38 .. 42.73

27 .. 48 46.5

Red to app. plan + 1.28

approx

9 .. 38 .. 44.01 approximate

Tab. AR of B 9^h 36^m 16.30

Tab. Dec. +27° .. 57' 41.5

k 31.294

d + 0.27

k' S-D + 0.001

d' S-D - 0.03

1825.0 9 36 47.60

27 57 41.7

Par + 1 54.94

- 8 39.3

9 38 42.54

27 48 42.4

Red to app. plan + 1.28

+ 2.0

app. plan of B 9 38 43.82

27 48 44.4

R-x -18.22

+ 1 18.3

R-R 9 .. 38 25.60

Dec. 27 50 02.7

July 19th 9^h 17^m 29.6

Proc 1800 + 3.489

+ 16.220

(on next page) Dec var -0.006

+ 0.122

1841.0 + 3.483

+ 16.342

33

33

10 449

49 026

10449

49 026

114,939

539,286

$f = + 30''.31$ $g = + 15''.56$ $g = 327^\circ 37'$ $h = + 20''.23$ $H = 160^\circ 22'$ $i = 2''.96$
 $a = \underline{144.53}$ $a = \underline{144.53}$
 472.50 $H + a = 305.15$
 360
 $g + a = 112.50$ $\delta = + 27^\circ 52.1$

$\log q = 1.19201$		1.19201	
$\sin(\delta + \alpha) = 9.96456$		9.58889^m	
$\tan \delta = 9.72326$		$0.78090^m - 6''.038$	
0.87983	$+ 7''.583$		
	$f \quad + 30.31$		
$\log h = 1.30600$	$+ 37.893$	1.30600	
$\sin(H + \alpha) = 9.91203^m$		9.76129	
$\sec \delta = 0.05354$		9.66972	
1.27157^m	$- 18''.688$	$0.73701 + 5''.458$	
	$13) + 19''.205$		
corr. in AA	$+ 1''.28$	$\cos \delta \quad 9.94646$	
		$\log i \quad 0.47129$	
		$0.41775 + 2''.617$	
		$+ 8.075$	
		$- 6.038$	
		$\text{corr. in Dec} \quad + 2''.037$	

$\log p = 0.54270$	$\text{comp } \log 15 = 8.82391$	$\log 15 = 1.17609$
$\therefore p' = 1.21005n$	$\sin 1'' = 4.68558$	$\sin 1'' = 4.68558$
$\sin 1'' = 4.68558$	$\log 2 = 0.30103$	$\therefore n = 1.30222$
$\log \delta = 9.72498$	$\sin \delta = 0.053810$	$\log h = 0.54270$
$6.16331n$	$h' = 1.21005n$	$\sin d = 9.76712$
	$\log 2 = 0.30103$	7.47571
$\text{norm} = -0.0001456$	$5.37550n$	
$+0.0000171$	$\tan \alpha = 9.85807n$	
-0.0001385	5.23357	$+0.00298$

$$\begin{aligned} \text{L.e. var} &= -0,01385 \text{ in AR} \\ &= -0,01385 \\ &= -0,05540 \\ &= -0,6785 = -0,0056 \end{aligned}$$

Bessel Done 349 has a star, ~~ix~~

1858. $AK = 9^h 38^m 42.73$ $Sec + 27^\circ 48' 46.5''$ 9 May = B.

19165. Salandi 9 39 12.41 + 27 48 47.1 8½ May

C Bessel has another star following $1^m 4.26$ and south $2' 32.3''$ 9 May.

" " another preceding $1^m 0.38$ south $6' 51.5''$ 8 May.

A //

9	38	43
		00
9	41	43
		00
6	13	17

Dr.

B. 349	A	9	37	42.3	+ 27. 41, 55.0
	B	9	38	42.7	+ 27 48 46.5
	C	9	39	47.0	+ 27 46 14.2

B was probably the star of comparison on July 13th
 And Salandi's place is 30' too large. For all of Bessel's stars
 were recognised on the evg. of the 15th. But there was
 no star in the place of Salandi's

-574

Obs. on July 15 1858

 17
 24
 31
 36

 1 06
 31
 0 35
 36
 $\mu = 13 \text{ Leonis}$ $\delta u = +26^\circ 44'$

236	=	^h 15	^m 44	^s 59.0
H west		5	57	20.0
~~HH~~		9	47	39.0
ARogster		9	44	42.0
			2	57.0
Error of Chron			2	26
Inst. Cor. & Ref			-0	30
8 * A	15	57	6.5	
9 * B	15	58	7.4	
9 * C		59	11.2	

-0.18	24	22	52
6.32			30
3.58	23	22	
	0	0	

12	27	10.0
	28	45.8
	1	35.8

FROM LETTERS OF PROFESSOR ARGELANDER TO THE EDITOR.

Bonn, 1858 March 12.

I HAVE no time to add more than to announce to you the discovery of a new comet which was found by Dr. WINNECKE on the 8th instant at 14^h. The positions found up to date are the following :

	Bonn M.T.	α	δ
1858 March 8	16 ^h 16 ^m 56 ^s	258° 56' 24.8	-1° 54' 7.3
	16 54 57	58 47.8	54 14.6
11	16 2 35	264 14 17.1	58 39.8
	16 28 21	16 15.2	-1 58 36.6

The two first observations were taken with the ring-micrometer; the two last with the heliometer.

Possibly this information may reach you in season to permit of some observations in the United States.

Bonn, 1858 March 16.

I WRITE this second letter so soon, in order to send you as early as possible the important information that the comet found by Dr. WINNECKE is a periodic one;—the Comet 1819 III, for which ENCKE had formerly found an ellipse of 5.6 years, but without being able to determine the probable uncertainty of this period, on account of the insufficiency and

short duration of the observations. From the observations March 8, 11 and 12, Dr. KRÜGER had determined a system of elements, which much resemble those of that comet; and when WINNECKE consequently tried to represent the present observations by means of the elements of the former comet, he found an almost perfect agreement by putting the perihelion May 1.985 and increasing the inclination by only 6'.8. There has consequently been no difficulty whatever in basing an ephemeris upon these elements, and I copy for you the last portion.

Bonn Mean Midnight.	α	δ	$\log \Delta$	$\log r$
1858 March 25	291° 22'	-2° 5'	9.7333	9.9955
	26 293 24	4		
	27 295 26	4		
	28 297 27	3		
	29 299 27	1	9.7383	9.9785
	30 301 26	2 0		
	31 303 24	1 58		
April 1	305 21	56		
2	307 17	-1 54	9.7494	9.9615

Dr. B. A. GOULD.

Berlin Mon = 16^h 23^m Comby.
A.M. Civil Date

For	α	δ	$\log \Delta$	$\log r$
2	306° 20'			
3	α			
4				
5				
6	313 52	20 55.5	1.17	9.7633
7	315 41	21 2.7	1.15	
8	317 29	21 9.9	1.12	
9	319 16	21 17.1	1.39	
10	321 0	21 24.0	1.36	
11	322 43	21 30.9	1.33	
12	324 24	21 37.6	1.30	
13	326 3	21 44.2	1.27	
14	327 40	21 50.7	1.23	9.8059
15	329 16	21 57.1	1.19	
16	330 50	22 3.3	1.15	
17	332 22	22 9.5	1.11	
18	333 53	22 15.5	1.6	9.8306

Ephemeris of Comet II. 1858.
Berlin O.^h

May 1	As AR	23 ^h 27. ^m 3	Dec of ℓ	+ 0'	10".6
2		32.2			17.8
3		37.5			25.4
4		41.5			32.8
5		46.1			40.8
6		50.6			48.8
7		55.2			57.0
8	23 ^h	59.6		+ 1	04.8

Memorabilia Astronomica 1858 from July-

Return of Dr Peters Comet. Comet of Donati

Elements by Donati & Villarsian exhibit a great
discrepancy - Photography - Magnitudes of Arcturus
as a Lyrae. Eclipse of Sept.

