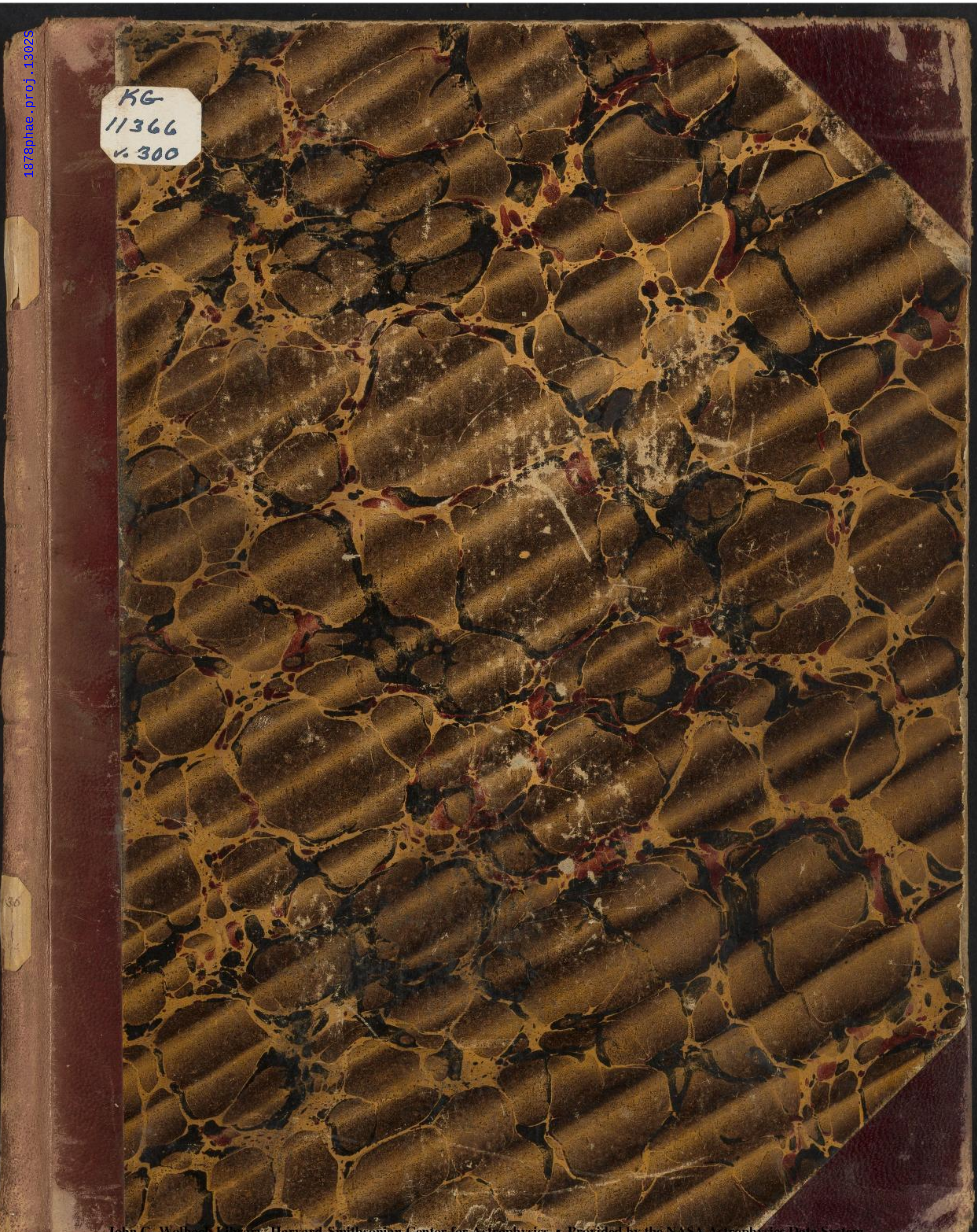
KG
11366
v. 300



R 47

Reduction of photometric observations in this book, so far as previously made in the book, checked by Miss Saunders, Oct., 1878. List of errata found by her pasted below.

Changes made

Page	h	m			
3	7	28		12 Can. Ven.	
4	7	38		zero	
10	9	55	& 10 2	η Lyrae	
14	8	11		zero	
23	10	11		β Lyrae	
26	9	27		Const. I.	
43	10	23		Jupiter	
49	8	12	+ 8 40	ε Drac. & ε Boot.	
54	10	24		zero	
61	8	50		zero	
63	9	57		zero	
66	8	55		zero	
74	7	23		Phot. M. (chimney)	
75	41	6	+ 44 21	Eclipse	
79	9	47		α Lyrae	
81	7	13		σ Cor. A C	
87	7	57		η Herc.	
94	8	18	& 8 23	β Delph.	
95	26	37		Eclipse	
96	33	23		Zero	
106	8	47		α Aquilae	
107	9	20		Jupiter	
109				Focus Phot. M.	
111	7	45		γ Equulei	
120	8	34		β Lyrae	
133	6	33		21 Sagitt.	
134	7	16	+ 7 20	Phot. M.	
138	9	37	+ 10 5	ε Peg. & α Cygn.	
142	9	5		α Urs. Min.	
143	9	40		Zero.	
148	6	25		zero.	
160	8	38		9 magn. star	
178	8	12		Jupiter II IV.	
180	6	23	+ 6 29	Jupiter's satellites & zero	
183	8	34		11 magn. star	
184	9	0		γ Andr.	Phot. O
185	9	25	+ 9	"	— " — "
187	10	3		β Cygni	" "
188	10	16		zero	" "
189	6	37		Zero	
192	7	49		Zero	Phot. K.
194	25	31		Eclipse	

Don't understand

Page	
8	Focus settings
16	Eclipse
18 + 19	— " —
45 + 46	— " —
55 – 59	Const. I. etc.
70 – 72	Phot. M.
97	Transits
100 + 101	— " —
124 + 125	Phot. M.
154	Transits
157 – 159	Phot. M. & transits
167 – 169	Transits
172 + 173	— " —

30
Aug 29th 1878 Phot. II
α Canum Venat.

7 20 121.0 39.0 U obs 90° 5''
160.0
305.0 32.0
337.0
923.0 71.0
461.5 35.5
230.75 17.75

7 25 32.8 34.5 U. obs. 250° 5''
67.3
217.1 30.5
247.6
564.8 65.0
282.4 32.5
141.2 16.25

7 28 32.9 37.0 P. obs. 250° 5''
69.9
214.8 32.8
247.6
565.2 ~~67.8~~ 69.8
282.6 ~~38.9~~ 34.90
141.3 ~~19.45~~ 17.45

P. obs. 100° 5''

7 30 127.0 28.7
155.7
305.3 ~~34.7~~ 33.7
339.0
927.0 62.4
463.5 31.2
231.75 15.6

Aug 30, 187~~7~~8

α Canum Venat. 5 inches aperture

7	35	124.5 156.8	32.3	P.obs. 100° 5"
		304.9 335.7	30.8	
		921.9	63.1	
		460.95	31.55	
		230.47	15.78	
7	38	30.7 69.4	38.7	P.obs 250° 5"
		211.7 246.5	34.8	
		558.3	73.5	
		27~~8~~9.15	36.75	
		1 39.~~0~~58	18.38	
7	40	37.7 68.3	30.6	U.obs. 250° 5"
		216.6 248.8	32.2	
		571.4	62.8	
		285.70	31.4	
		142.85	15.70	
7	44	120.6 155.8	35.2	U.obs 100° 5"
		305.7 339.3	33.6	Seeing 4, 3, 7 U.
		921.4	68.8	
		460.70	34.4	
		230.35	17.2	

Aug 30, 1878

ξ Ursæ Minoris. 5 inches aperture.

7 49	25.8	46.0	P. obs. 160° 5″
	71.8		
	202.2	54.4	
	256.6		
	556.4	100.4	
	278.2	50.2	
	139.1	25.1	
7 53	114.4	55.6	P. obs. 350° 5″
	170.0		
	301.4	41.7	
	343.1		
	928.9	97.3	Seeing 6, 5, 8. P.
	464.45	48.65	
	232.23	24.32	
7 59	117.7	51.5	U obs 350.5
	169.3		
	300.7	41.5	
	342.2		
	929.8	93.0	
	464.9	46.5	
	232.45	23.25	
8 01	26.5	46.1	U obs. 190° 5″
	72.6		
	213.2		
	250.2	37.0	Stars very much agitated.
	562.5	83.1	
	281.25	41.55	
	140.63	20.77	

Aug 30, 1878

η Draconis

8 11 51.8 7.2 P. obs. 340° 3"
59.0
227.0 8.7
235.7 Images perfectly steady.
573.5 15.9
286.75 7.95
143.38 3.97

8 17 138.4 8.7 P. obs. 100° 3"
147.1
317.4 10.1
327.5 Seeing 6, 8, 8 P
930.4 18.8
465.20 9.4
232.60 4.7

8 23 139.2 7.2 U obs 130° 3"
146.4
319.9 6.0
325.9
931.4 13.2
465.7 6.6
232.85 3.3

8 28 50.0 6.6 U obs 310° 3"
56.6
229.7 6.9
236.6
572.9 13.5
286.45 6.75
143.22 3.38

Aug 30, 1878

ε Bootis

8 36	124.6 164.3	39.7	P. obs.	220° ~~140~~ 3"
	300.7 345.3	44.6		
	934.9	84.3		
	467.45	42.15		
	233.73	21.08		
8 40	39.0 71.8	32.8	P. obs.	350° 3"
	215.8 252.7	36.9		
	579.3	69.7		
	289.65	34.85		
	144.83	17.42		
8 47	37.9 70.4	32.5	U obs.	355.° 34"
	218.9 252.2	33.3		
	579.4	65.8		
	289.7	32.90		
	144.85	16.45		
8 50	127.9 160.5	32.6	U obs	200° 3"
	308.3 344.5	36.2		
	941.2	68.8		
	470.6	34.4		
	235.30	17.2		

Aug. 30, 1878

Focus Readings on ε Bootis

9 0

P. ob.

		270°	90°	ϕ Index to right		
✓	2	2.09		60 ϕ ~~Vernier~~		270° Image
		~~2.06~~	2.06	0	4	90 "
	11	2.22				270 "
		~~2.05~~	2.05	1	14	90 "
8	11	2.00				270 "
		~~2.08~~	2.08	2	16	90 "
4	1	2.12				270 "
		~~2.03~~	2.03	3	34	90 "
4	1	2.12				270 "
	26		2.10	5	54	90 "
		2.110 ±.052	2.064	±.028		

U. ob.

		90°		
U obs.	3	1.93		
			1.93	4
	0	1.96		
			1.96	1
	4	1.92		
			2.01	4
	2	1.98		
			1.98	1
	7	2.03		
			1.97	0
	16 032	1.964 -.032	1.970 - .020	

On the last four readings, the definition was quite poor

Aug. 30, 1878

	β Lyrae		P. obs.
9 38	39.3	22.9	190° 5"
	62.2		
	218.1	26.5	
	244.6		
	564.2	49.4	
	282.1	24.70	
	141.05	12.35	
9 42	126.0	25.1	P. obs. 20° 5"
	151.1		
	309.0	24.3	
	333.3		
	919.4	49.4	
	459.70	24.7	
	229.85	12.35	
9 44	125.3	28.9	U. obs. 20° 5"
	154.2		
	307.5	27.2	
	334.7		
	921.7	56.1	
	460.85	28.05	
	230.42	14.03	
9 48	38.5	24.7	U. obs. 190 5"
	63.2		
	216.1	24.5	
	240.6		
	558.4	49.2	
	279.2	24.60	
	139.60	12.30	

Aug. 30, 1878

η ~~[illegible]~~ Lyrae

9 52 42.1 16.1 P. obs. 340° 5"
58.2
223.2 18.6
241.8
565.3 34.7
282.65 17.35
141.32 8.67

9 55 132.2 17.2 P. obs. 110° 5"
149.4
313.5 16.2
329.7
924.8 ~~2~~3.4 Seeing 6 7.8
462.4 3 1X.70 6
231.2 ~~5.85~~ 8.35

9 58 131.5 18.2 U obs 100° 5"
149.7
311.5 18.7
330.2
922.9 36.9
461.45 18.45
230.72 9.23

10, 2 42.9 14.8 U obs 315° 5"
57.6
223.4 17.8
241.2
565.2 37.6 2
282.6 ~~15.8~~ 16.3
141.3 ~~7.90~~ 8.15

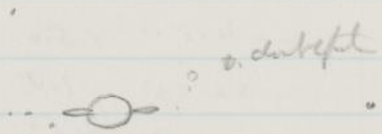
Aug 31st 1878.

Cleared at 8.30 looked at Jupiter to observe ~~occultation~~ transit of I, but II was too difficult for comparison. II looked much brighter than I. ? effect of Jupiter. Observed passage onto disk.
Of [illegible] cont not seen.

9 28 Japetus P. obs

1.17
1.28
1.21
1.40
1.43

1.49
1.298



Too hazy for further observation Sat & Japetus
~~4~~ 4,6,7

Sept 1st 1878

7 07 45.2 15.0 η Lyrae Robs 70° 5'
60.2
224.6 15.2
239.8
569.8 30.2
284.9 15.1
142.45 7.55

7 10 136.1 13.2 250° 5'
149.3
313.4 16.8
330.2
929.0 30.0
464.5 15.0
232.25 7.5

7 14 β Cygni
126.4 33.2 30° 5'
159.6
300.0
340.0 40.0
926.0 73.2
463.0 36.6
231.5 18.3

7 16 30.6 38.3 280°.5"
66.9
213.3 37.6
250.9
563.7 75.9
281.85 37.95
140.92 ~~19.22~~
18.97

Sept. 1, 1878

β Cygni as before (ap 5'')

210.5

7 24 23.6
73.6 50.0
212.4
250.2 39.8
559.8 87.8
279.9 43.96
139.95 21.95

7 28 123.4 40.5 30° 5''
163.9
298.6
343.9 45.3
929.8 85.8
464.9 42.90
232.45 21.45

η Lyrae 5'' ap.

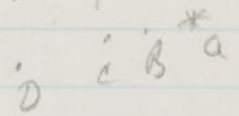
7 35 134.6 16.2 210.5°
150.8
311.3
329.2 17.9
925.9 34.1
462.95 17.05
231.48 8.53

7 38 43.9 18.1 40° 5''
62.0
223.6
239.3 15.7
568.8 33.8
284.4 16.90
142.2 8.45

Sept. 1, 1878

δ Ursae Minoris

8 9 497 5.5 228 5
552
228 9
233.8 4.9
567.6 10.4
283.8 5.2
141.9 2.60
8 11 139.7 5.7 30° 5'
145.4
318.1 5.5
323.6
926.8 11.2
463.~~8~~4 5.6
231.~~95~~ .70 2.8 BD [illegible]
[illegible] 14 138.8



143.4 4.6
317.7 4.6
322.3
922.2
461.1
230.55 2.30 BD.
8 19 53.8 5.5
48.3
228.5 3.0
231.5 8.5
562.1 4.25
281.05 2.12
140.52

Sept. 1, 1878

8 20 1386 4.3
1429
317.6 4.7
322.3
921.4 9.0
460.7 4.5
230.35 2.25

8 45 α Cass.
Clouds 90° 5"

Comp.
7, 3451 Read 394.
19 56 8 + 36.5 9 12 0 ~~605~~
57 8 9 13 0
59 8.5 15 36. 15

Comp. C.M.T. Sept 1d 9h 29m 59s

Jupiter's Satt I Reap. F 3451.

limit of vision

20 - 8 - 46 - 48.
8 - 59 - 41
C.M.T.
5 9 12 9 - 13 - 47 .458 10 24 46
9 - 26 - 51
9 - 34 - 42.

20 9
10 44
19 25

18 1,261
13 - ~~56~~ - 29 29 first seen reflected before
14 - 5 - 42 38
14 - 15 - 51 48
14 - 25 - 85 - 58
14 - 36 - 96 This is 90m no sheet. 30 09
14 - 47 - 100 20
15 - 1 - 114 34
13 15 - 13 = 184 46
slight Cloud
15 - 38 - 181 31 11
15 - 51 - 240. 24
16 - 4 - 231 40
16 - 24 - 220 57
16 - 45 - 262 32 18
17 - 6 - 291 39
5 17 - 21 - 344 54
17 - 42 - 315 33 15
18 - 14 - 310 47 39
18 - 26 - 298. 59
18 - 46 - 382 34 19

152
3304

The most satisfactory set yet obtained

6 18
23 41
29 59

Sept. 1, 1878

Stopwatch 6 3 = 20 20 0
" started at 20 13 57

Hazy

20 — 23 — 50 — 344
24 — 8 325
5 324
305
270 — Cloud
68
3.136

9 59 Jupiter
1.65
1.54
1.57
1.48
1.68
2.92
1.584

Computed C.M.T. Sept 1, 10 39 10

Jupiter Satellite IV. Reappearance

Compared with Sat. I.

21. 15. 45. too late ~~3~~31 6

21 16 ~~4~~ 3 66.3 27

~~16~~ 23 37.6 47

47. 65.3 32 11

17 10. 35.4 Cloud 34

2115
10.44
10 31

37. 69.9 33 1

57 31.8. 21

16 18 18 16. 73.6 40

37. 28.8 34 1

52. 75.2 16

19 19 4. 26.9 ~~28~~ 27

26. 79.6 Haze ~~50~~ 49

2½ 20 20 13. 25.3 Cloud. Jupiter disappear 35 ~~37~~ 36 →

22 22 33. 84.7 37 ~~57~~ 55

41. 22.7 62.0 36 ~~5~~ 3

23 2. 84.3 ~~26~~ 4

15. 19.8 64.5 ~~2~~ 3 ~~9~~ 7.

50. 86.1 67.1 ~~39m 12s 37 13~~

24 6. 19.0 39m 28s. 29

10 15 0 16. 86.7 66.9 39m 38s. 39

24 38 30. 19.8 39m 52s. 53

40 00 44. 85.2 21 01 10 505 52.52 38 40m 6s 7

668 66.875 33.42

40 25 60. 2.2 18.4 40m 22s

24. 89.3 Haze 682 40m 46s

26 1. 21.1 41m 22s.

24 40 15 2 26 41 87 27 07 29 23. 84.7 66.7 149 67.45 33.72 41m 44s.

39. 100 Cloudy 42m 0.

53.83 357

621 31
10655
53.28

357
6714
3357

6714
357

15 29
23 41
39 10

Sept. 1, 1878.

Continued

113	30	49	85.4	1026 51.30	68.2	46m	9s
30 56	31	4	17.2		34	46	24
46 17		16	88.4		73.2	46	36
148		32	15.2	20 73 50.18		46	52
31 37		45	19.0		74.3 ?	47	5
46 58		55	14.7		73 75 36.88	47	15
	32	9	89.7		72.9	47	29
133		23	76.2	20 80 2.00		47	43
32 33 54		43	86.0		69.3	48	3
47		58	16.7 Haze		71.2 35.55	48	18

10

+152 2 20

46m

517.9
517.9

57.9
71.58

probably should be 89.0

40.5

35.79

~~40~~ 1 ~~44~~

5

57.2
40.7
60.8
(not used) (54.7) Cloud
41.0

16.5
20.4
3.6
19.8
363
18.15
9.08

Limit of Visibility

1997
9985
49.92

Band 394

11 8 0.0
9
11 10 00
9 45.5
54 27
15 18

F 3457

21
21h 52 27
17
54 27

57.2
60.8
118.0
59.0
37.7
96.7
21.3
10.65

40.7
37.4
41.0
119.1
37.7
48.35

Sept. 2, 1878.

α Cassiopeiæ — P. obs, 90° 8" — A out of field

7 53
47.8 5.1
52.9
229.4 4.8
234.2
564.3 9.9
282.15 4.45
141.07 2.22

Curious nebula-like appearance near the companion, supposed to be due to reflection in the tube.

7 55
138.2 6.4
144.6
317.3 6.2
323.5
923.6 12.6
461.8 6.3
230.90 3.15

P. obs, 260° 8"

7 58
138.0 7.8
145.8
316.6 7.6
324.2
924.6 15.4
462.3 7.7
231.15 3.85

U obs 250° 8"

8 04
47.6 5.2
52.8
227.8 6.6
234.6
562.8 11.8
281.4 5.9
140.70 2.95

U obs, 90° 8"

Sept. 2, 1878

*

Aperture 15 inches.

β Cygni S. obs.

8 28 115.5 52.0 Images 0° 5"
167.5
295.4 53.3 Seen through clouds.
348.7
927.1 105.3
463.55 52.65
231.78 26.33

S. obs.
34.3 35.5 Images 160° 5"
69.8
213.0 39.4
8 45 252.4
569.5 74.9
284.75 37.45
142.37 18.72

At long intervals through & between clouds.

8 48 34.4 36.0 U. obs. 100° 6"
70.4
211.2 42.0
253.2
569.2 78.0
284.6 39.0
142.30 19.50

8 51 120.5 46.5 U. obs. 300° 6"
166.0
300.7 42.2
342.9
930.1 87.7
465.05 43.85
232.52 21.92

Sept. 2, 1878

β Cygni

Aperture 5 inches

S. obs, 100° 5"

9 10
33.0 36.1
69.1
211.6 40.3
251.9
565.6 76.4
282.8 38.2
141.40 19.10

9 15 S. obs. 290° 5"
117.0 47.0
164.0
301.8 42.2
344.0
926.8 89.2
463.4 44.60
231.70 22.30

9 21 U. obs. 300° 7"
118.7 42.4
161.1
302.8 40.1
342.9
925.5 82.5
462.75 41.25
231.38 20.63

9 25 U. obs. 140° 5"
28.2 49.0
77.2
213.6 37.2
250.8
569.8 86.2
284.9 43.1
142.45 21.55

Clouds.

Sept. 2, 1878

β Lyrae

10 8	149.4	16.6	U. obs. 10° 5"
	132.8		
	312.9	19.5	
	332.4		
	927.5	36.1	
	463.75	18.05	
	231.88	9.02	
10 11	41.6	18.4	U. obs. 190° 5"
	60.0		
	222.3	18.9	
	241.2		
	565.1	37.~~5~~3	
	282.55	18.~~7~~65	
	141.27	9.3~~8~~2	

Seeing 4, 7, 5 (S.)

1878 Sept 8. W. Eq. tube strapped to E. Eq.

7 15 α β Lyrae S obs. 270° 5" a out of field

~~34.1~~
24.1
51.8 27.7
193.2 39.7
232.9

S obs. 270° 10"

7 25
121.0 51.0
172.0
299.8 53.6
353.4

Entered in this book by mistake.
copied at once into R 46, 18

1878. Sept. 6. 1878

α Cassiopeiae. P. obs.

8 30 144.0 100° 10″
6.0
150.0
322.4
5.8
328.2
944.6 11.8
472.3 5.9
236.15 2.95

P. obs.
8 32 53.1 280° 10″
6.1
59.2
233.2
5.6
238.8
584.3 11.7
292.15 5.85
146.07 2.93

8 39 53.4 5.2 U obs 270° 5″
58.6
233.3
5.7
239.0
584.3 10.9
292.15 5.45
146.07 2.72

8 42 143.4 U obs 100° 5″
6.9
150.3
321.7
6.9
328.6
944.0 13.8
472.0 6.9
236.0 3.45

Sept. 6, 1878

Experiments with photometer M. Jupiter's satellites
P. obs.

	Increasing	Decreasing
	5.0	9.0
	5.9	10.9
	11.1	16.1
	17.2	24.8
Image to left	27.1	31.2

Constant; Photometer I
Hole R 3 & Jupiter
P. obs.

9 23 0.95
1.01
1.17
1.17
1.12

5 4 2
1.084

9 27 .85 U. obs.
.94
1.02
.80
.82

~~3~~.43
4 .~~6~~86
8

Sept. 6, 1878

9 29 S. obs.

.86 rej. Just not a hole

1.31
1.43
1.33
1.54
1.45

206
1.412

Japetus

9 46 P. obs.

.96 } rej.
1.91 }
Image probably obscured by telescope

.95
.81
.89
.86
.82

.866

9 52 S. obs.

63
.56
.52
.58
.57

36
.572

Sept. 6, 1878

957 Jupiter Uds

.91
.83
.91
.99
.90

$.90\overset{4}{8}$

Seeing 5,5,2 P.
5,5,5 S.
6,4,4 W.
Mean 5,5,4

Sept 7. 1878.

~~O. dis. tried Meth.~~ M. a Jupiter & α Ursae Mi

Pos circle. 354.4 inc.

757.9	+1.5		
6.4	0		
7.1	+7		75".636 ±.092
5.3	−11		75.602 ±.154
5.1	13		74.986 ±.084
31.8	46	±".092	74.898 ±.158
75636			21.118 488
	dec.		75.279 .122
755.0	−10		35.407
4.3	−17		39.872
7.8	+18		19".936
4.9	−11	±".154	
8.1	+21		
36.1	77		Av Dev. = ".122
75.602			P.E 1 ob. = ".1

Circle 11.6	inc.		110686
49.5	−4		55.343 = 2do.
9.9	±0		
8.2	−17		
9.8	−1		
51.9	+20		
49.3	42	.084	
74986	084		
48.3	~~+13~~	−7	
8.5	~~+15~~	−5	
1.0		+2.0	
6.2		−2.8	
0.9		−1.9	
46.9 898		79	.158

Sept. 7, 1878

34$''$.5 by scale

352.8 inc.

353.3 dec

163
354.07

354°.4
354.4 inc.

355.8 dec

384.0 4°.0
323.1 3°.1

8 37

Clouds.

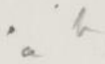
Photometer I. Object supposed to be Iapetus, following Saturn

9 56 1.03 P. obs. a
1.01 Japetus
0.92
1.04
1.03
1.00$\overset{3}{6}$

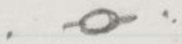
b

9 59 0.77 P. obs. Object following that just observed
0.61
0.52 Hyperion
0.57
0.51
291
.584

Sept. 7, 1878



10 03 b Sats



.37
.52
.39
.38
.50

218
.436

Hyperion

10 11 a S ats

Japetus.

.70
.77
.73
.70
.70

.72

Interval Saturn, a & b by estimate

Sat.	a	ab	
0	15.6	5.0	4.7
0	16.0	4.5	4.4
0	16.0	4.0	
	15.9	4.52	

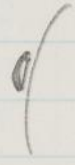
Seeing 4, 6, 4 (P.)

Sept 8, 1878. Occ. of Jupiter I.

P obs.   8 4 0 s   Contact
P rec.

7 50   one half gone
9 0   seen as projection on planets limb
9 40   still seen
10 10   gone

Satellite appeared flattened against limb of planet. Dark line [illegible] between of satellite and planet
Watch 300 fast.



Looked at 21 Sagittarii but not seen.

Tried Phot. Mag. images poor.

Tried spectrum of α Androm. for Phot. 6

Sept. 8, 1878

α Androm. Pols

9 17	144.6	1.3	70° 10''
	145.9		
	322.8	1.2	
	324.0		
	937.3		
	468.65	1.25	
	234.33	.62	
9 24	54.4	.8	Pols 270° 10''
	55.2		images do not
	233.7	.5	disappear
	234.3		
	577.6	1.3	and apparently in any
	288.8	.65	
	144.4	.33	
9 41	53.8	1.6	270° 10'' light cut
	55.4		off.
	234.3	1.4	
	235.7		
	579.2	0	
	289.6	1.5	
	144.80	.75	
9 47	254		Same. Phot I 15 ap
	244		
	279		
	2.90		
	2.16		
	283		
	2.566		

Sept. 8, 1878

α Androm. 5" ap.

9 55 .91
.93
.99
.92
.92
.17
.934

α Cass.

10 05 2.96
2.23
2.00
2.15
2.24
1.58
2.316

Set at 2.96 range much too tight.

10 16 52.8 4.6 α Cass. 90° 10"
57.4 A out of field
233.2
237.4 4?

580.8 8.8
290.4 4.4
145.20 2.2

10 21 142.1 7.0 P. obs. 20° 5"
149.1 A out of field
321.0 6.3
327.3

939.5 13.3
469.75 6.65
234.875 3.33

Sept. 8, 1878

10 23 142.4 6.5 S obs. 20° 8"

148.9

321.0 5.4

326.4

938.7 11.9

469.35 5.95

234.67 2.975

10 31 53.2 5.3 S obs 20° 5"

58.5

231.8 5.6

237.4

580.9 10.9

290.45 5.45

145.23 2.72

Transits by stopwatch of Saturn and object supposed to be Iapetus

10 42 18.6 18.6

36.8 18.2 P. obs.

55.4 18.6

18.5

Position angle from this satellite of a fainter one perhaps, Hyperion 240° 2′ north

Photometer I. Object presumed to be Iapetus. P. obs.

10 48 1.13

1.01

1.11

1.11

1.52

88

1.176

Found pencils not coincident; reset; images much better.

Iapetus Sept. 8, 1878

10 51 1.17 P. obs.
1.13
1.11
1.14
1.25

60
1.160

10 53 .84 S. obs.
.93
.80
.70
.89

4.16
.832

Comparison of time-pieces

7.3451	22	12	11	22	13	11
B.394	11	0	0	11	1	0

1 345
23 41
11 25 17
12 11
37 28

22	52	17.5	53	17.5
11	40	0.	41	0.
	39	45.5		
		33.		

Sept. 8, 1878

Jup. I Reap. Sats.

11 15 abt. limit visib. of Phot. I –

.43
.39
.39
.39
.42

52
.404

Com. 24 56

22	37	28.5	reap.		24	57.5	1
		33.0	.40		25	2	6
	37	46.0	.54			15	
	38	7	.78			36	
	38	18.	1.00			47	
		34.5	1.07		26	3.5	
		54.0	1.30			23.	
	39.	15.5	1.6^{2}0			44.5	
		37.	2.31		27	6	
31	40	8	2.30			37	
		34	2.26	2.308	28	3	
	40	54	2.32			23	
	41	25	2.35			54	
		42	2.57		29	11	
	42	02	2.38	2.548		31	
		21	2.76			50	
		48	2.51		30	17	
	43	18	2.52			47	
			274				

Seeing 6, 6, 7, (P.)
1, 1, Same (S.)

1878 Sept. 9.

Frod,
~~Bond~~ 3451 Bond 394
$18^h\ 44^m\ 33^s.5$ = 7 29 0

Jupiter's Satellites Phot.II, P. obs.

18 40 30 I Sat. seen at edge.
49 half off

Sat I passing off disk while its shadow and Sat IV are seen on the disk. The latter appears as a dark spot.

18 52 30 Separation thought to have taken place but thin clouds interfered.

Image of Sat. I placed upon its shadow and compared with disk surrounding. Phot. II

P. obs.

19 3 45 12.2 rej. r Index to right

19 6 8 ~~13.0~~ 13.0 < Shadow disappears
104.3
86.1 ~~92.3~~
190.4
~~92.4~~
9 27 282.8 90.2
590.5 176.3
295.25 88.15
147.63 44.08

P. obs.

11 15 7.7 < Shadow disappears
48 105.0
82.8
12 38 187.8 Shadow on upper edge of lower belt.
13 30 282.3
582.8 85.4
291.4 168.2
145.70 84.1
42.05
v. Seeing bad.

Sept. 9, 1878

Same

3451

19 15 49   9.2   P. obs.
103.4 } 105.2
107.0 }   ~~85.8~~ 87.6
192.8   [illegible]
18 } 2 48   277.0   92.2
19 }
584.2   179.8
292.1   89.9
146.05   44.95   P. obs.

25 14   11.0
108.2   83.8
192.0
27 5   268.2   102.8
579.4   186.6
289.70   93.3
144.85   46.65

29 11   3.7   P. ob.
105.2   82.4
187.6
31-4   271.9   91.8
568.4   174.2
284.2   87.1
142.10   43.55

34-28   15.4   P. obs.
101.2
193.2   92.0   Seeing very poor
19 38 22   275.6   Spots scarcely seen.
585.4   99.8
292.70   191.8
146.35   95.90
47.95

Sept. 9, 1878

Chron.
F. 3451

19h 40m 23s 1.0 P. obs.
110.0 Seeing better
180.4 70.4
42 22 291.2 Spot close to edge.
582.6 69.8
291.30 140.2
145.65 70.1
35.05
43 10 2.0 P. obs.
110.0
188.8 78.8
44 58 274.2 Spot almost gone.
575.0 87.8
287.50 166.6
143.75 41.65

Comparison of satellites I & IV, (IV on disk of Jupiter)
50 14 20.1
89.9 79.8 < Jupiter & IV disappear (at about 50°)
197.3
52 8 270.2 72.9
577.5 152.7
288.75 76.35
144.37 38.17

Mean time 8h 50m Jupiter & hole R 3 ; Photometer 9.
P. obs.
1.35
1.15
1.22
1.15
1.14
1.202

Sept. 9, 1878

8 55 1.20 S. obs.
1.52
1.63
1.48
1.57
1.480

9 0 1.45 U. obs.
1.56
1.29
1.40
1.40
1.420

α Andr. 15" ap.
9 15 3.62 P. obs.
2.82
3.08
2.82
308
542
3.084

9 22 3.08 S. obs.
293
2.84
3.25
2.91
501
3.002

Sept. 9, 1878

α Andromedae   Aperture 5 inches.

9 31   1.46   S. obs.
1.17
1.22   Clouds at times.
1.38
1.31
1.54
1.308

9 39   1.12   P. obs.
1.10
0.98
0.99
0.97
5.16
1.032

α Cassiop.   Aperture 5 inches.

9 45   3.03   P. obs.
2.64
2.53
3.30
3.03
4.53
2.906

9 48   3.20   S obs.
3.84
3.82
4.29
4.01
4.16
3.832

15 inches aperture
Companion too bright to measure
P. & S.

Sept. 9, 1878

Iapetus. S. obs.

10 16 .83
.58
.65
.63
.60
329
.658

10 19 .77 P. obs.
.76
.73
.72
.75
23
.746

10 23 .85 U. obs.
.89
.89
.79
.94
~~3~~36
4
.~~67~~2
.872

Seeing
7, 3, 6 (P.)
6, 6, 4 (S.)
7, 4, 5.

Sept 10, 1878.

	β Cygni		P obs
7 40	127.0	39.6	140° 5"
	166.6		
	306.3	38.4	
	344.7		
	944.6	78.0	
	472.30	39.0	
	236.15	19.50	
7 42	36.6	40.1	330° 5"
	76.7		
	214.8	41.5	
	256.3		
	584.4	81.6	
	292.2	40.8	
	146.10	20.4	

3451 394

402 10.00 19 10 34.5 = 7 - 51 - 0^s
50 44.5

Jupiter III P. obs.

3451
19 15 0 Satellite seen on reappearance of Jupiter from clouds
Appears to the eye ~~without photometer~~ fainter that satellite I (one image in photometer extinguished)

Sept. 10, 1878

I & III

P. obs.

0 Index to right

19 23 22 12.2 78.0

~~23 22~~ 90.2 106.2 ~~8h 15m~~

4 196.4 84.2 23 58, 8h 4m 60

40 8'

4 6

24 34 280.6 91.6

579.4 162.2 197.8

98.9

289.7

144.85 40.55 49.45

P. obs.

25 10 15.8 82.5 < III disappears

98.3 8h 18m

96.9

4 195.2 85.4

26 8 280.6 5m 430

95.2

192.1 57.7

25 35 0 589.9 167.9 96.05 147.7

40 8 294.95 147.47 29232

5 43 147.47 41.97 48.02 144.85 146.16

29532 146.2

147.66

~~147.7~~ ~~adopted~~ P. obs. 49.4 – 98.9

48.0 – 96.0

27 24 13.0 45.3 32.3 13.0 44.7 89.4

clouds 12.8 44.9 89.8

32 58 12.8 45.1 197.6 49.9 99.8

6 clouds 105.0 42.7 85.4

187.6 39.4 78.8

42 20 197.6 49.9 poor 1082 39.5 79.0

40 4 47 41 105.0 42.7 1K6.2 13.0

54 187.6 39.9 12.8

48 7 108.2 38.5 197.6

105.0

Clouds 187.6

108.2

Sept. 10, 1878

		44	44.5
394 =	11	45	0
39m 31.50 3457 =	23	5	13.0

Reappearance of Jupiter III
III & I

P. obs.

23	22	16				0h 1m 45.0	Satellite seen.
		26	259.8	20.3		55	
29	22	41	212.3	27.2	47.5	2m 10	clock stops; Seeing very from 2, ~~4~~ 3, 2 P.
	24	13	195.3	44.2		3 41	
		41	276.0	36.5 ~~63.5~~	80.7	4 9	
	25	29	19.8	39.7	76.2	4 57	
		46	93.4	33.9	73.6	5 14	
28	26	2	12.8	46.7	90.6	5 30	clouds
	28	26	104.3	44.8	91.5	7 54	
		47	10.7	48.8	93.6	8 15	
	29	1	103.2	43.7	92.5	8 29	I disappears
		26	16.9	42.6	86.3	8 54	

clouds.

26	37	49	107.0	47.5		17 15

clouds

43	9	15.8	93.6		
	22	109.4			23m
	33	9.3	97.1		
	45	106.4		1409 60.25	1907 95.35 47.67
44	6	12.5	96.5	I disappears	
	22	109.0			24m
	41	12.4			
	57	105.2	92.2		
		239.1 119.55 59.77	188.7 94.35 47.17		

Sept. 10. 1878.

Limit of Visibility with I.

39.1 42.3
81.4
12h25m 34.4 46.4
80.8

235.7 88.7
117.85 1
58.92 22.17

60.25 60.25
59.77 59.77
60.01 58.92
58.92 178.95
59.46 59.65

adopted Zero = 59.5

Became entirely clear in the S.W. ~~clear~~ after these observations

8 10 76 11 39 39
23 41 23 41

34 7 12 3 20

Sept 12. 1878

Phot K

α Persei ρ Persei P. obs.

7 35 112.1 83.8

195.9

296.4 73.5

369.9

974.3 157.3 cloud over α

487.15 78.65

243.58 39.33

Phot H.

7 52 ε Draconis P. obs, 1500 3″

47.1 26.3

73.4

227.4 28.6

256.0

603.9 54.9

301.95 27.45

150.97 13.72

8 7 131.2 29.8 P. obs, 3000 3″

161.0

315.3 31.1

346.4 60.9

953.9 30.45

476.95 15.23

238.47

Sept. 11, 1878

ε Draconis

8 05	135.0	27.6	S obs 260° 5"
	162.6		
	317.9	26.2	
	344.1		
	959.6	53.8	
	479.80	26.90	
	239.90	13.45	
8 12	44.1	28.7	S obs 135° 5"
	72.8		
	222.7	28.4	
	251.1		
	590.7	.1	
	295.35	28.55	
	147.67	14.2~~3~~ 7	

ε Bootis

			S. obs 350° 4"
8 33	47.2	34.3	
	81.5		
	226.9	31.3	
	258.2		
	613.8	65.6	
	306.90	32.80	
	153.45	16.40	
8 40	127.2	45.0	S. obs. 220° 4
	172.2		
	311.~~6~~5	~~4~~9.7 3	
	351.2		
	962.1	~~4~~4.7 8	
	481.05	~~47.35~~ 42.35	
	240.53	~~23.67~~ 21.17	

Sept. 11, 1898

~~α h α Persei. Phot. K.~~

8 45 ~~142.0 25.4 P. obs.~~

~~167.4~~

~~322.0~~

Copied into

~~347.3~~

46; 30

Stormy clouds.

9 10 β Lyrae S obs 200° 5"

abandoned A out of field

Object glass dewed

Seeing 5, 3, 4 (S.)

Sept 17th 1878.

	α Can Venat.		Sobs	
8 22	39.0	34.0	270° 4"	
	73.0			
	220.6	33.5		
	254.1			
	586.7	67.5		
	293.35	33.75		
	146.67	16.87	S. obs. 110° 4"	
28	126.4	36.1		
	162.5			
	311.3	33.7		
	345.0			
	945.2	69.8		
	472.6	34.9		
	236.30	17.45		
8 41	α Can. Ven.		5 inches aperture	
	130.2		S. obs, 110° 5"	Almost invisible
	160.6	30.4		
	314.9	26.4		
	341.3			
	947.0	56.8		
	473.5	28.4		
	236.75	14.2		
8 46	41.0	31.0	S. obs. 270° 5"	
	72.0			
	220.4	31.3		
	251.7			
	585.1	62.3		
	292.55	31.15		
	146.27	15.~~75~~57		

Sept. 14, 1878

ζ Urs. Maj. 5 inches aperture

8 58 29.5 S. obs. 40° 5"
83.2 53.7
216.9
267.1 50.2
596.7 103.9
298.35 51.95
149.18 25.97

9 3 125.2 S. obs. 180° 5"
173.5 48.3
302.3 51.5
353.8
954.8 99.8
477.4 49.90
238.70 24.95

15" aperture

9 10 123.1 S. obs. 180° 5"
174.6 51.5
304.8 49.9
354.7
957.2 101.4
478.60 50.70
239.30 25.35

9 14 29.8 45° 5"
85.0 55.2
210.1 52.9
263.0
587.9 108.1
293.95 54.05
146.97 27.03

Sept. 14, 1878

29.7
4.2
34.5
33.

Satelite Japetus

Photometer I. Iapetus

9 45 0.54 S. obs.
0.66
0.60
0.63
0.64
7
0.614

9 52 0.77 P. obs.
0.80
0.66
0.72
0.65
10
0.72

70° 4°

Sept. 14, 1878

α Androm. S obs. A out of field

10 10 56.3 56.0 < 0.8 70° 4"
56.7 |
56.9 56.8 No decided disappearance
55.8
234.7 < 1.3
236.0

583.5 2.1
291.75 1.05
145.88 0.53

10 16 145.9 2.3 S obs 230° 4"
148.2
324.4 1.6
326.0

944.5 3.9
472.25 1.95
236.12 0.97

10 24 146.7 2.0 P obs. 290° 4"
148.7
323.2 1.5
324.7
943.3 3.5
476.65 1.75
1
~~238.33~~ 0.87
235.82

10 27 55.9 0.5 P obs. 70° 4"
56.4 No disappearance
235.8 0.0
235.8
235.9 0.1
235.8
6
5839.5 0.20
291.95
145.97

Seeing 4, 2, 3 (S.)
5, 6, 3 (P.)

Sept. 15 1878

Photometer of Sky

3	25	3,93	0.0	S. obs.
		3,24*	0.5	
		2,21	1.0	
		1,34	2.0	
		0.33	5,0	
		0,96	3,0	19.84
		1,03	2,5	19.84 1.65 19.80
		0.69	3.5	
		0,54	4,0	
		1,48	1,5	
		0,39	4,5	
		2,70		

* Second reading seems large, but on examination later, the reading 3,24 appeared more nearly correct than 2.24, so that the record is probably right.

P. obs.

3.50	0.0	
.34	4.5	
1.28	1.5	
.42	4.0	16.61
.62	3.5	
.93	2.5	
.72	3.0	
.27	5.0	
1.03	2.0	
1.85	1.0	
2.33	0.5	
3.32	0.0	

Sept. 15, 1878

Object-glass out.

4 12 Field of chief telescope [S. obs.
bluer than before as compared
with field of prism.

4.00	0.0	
3.05	0,5	
2,52	1,0	
1.57	2.0	
0,29	5,0	
0,82	3,0	20.51
1,11	2,5	
0.62	3.5	
0.49	4,0	
1,52	1.5	
0.40	4.5	
4,12	0.0	

P obs.

4.54	0.0	
.32	4.5	
1.50	~~4~~ 1.5	
.52	6.0	
~~1.64~~ .60	3.5 ~~6.0~~	18.76
.93	2.5	
.71	3.0	
.27	3.0	
1.14	2.0	
1.98	1.0	
2.47	0.5	
3.78	0.0	

Measurement of thickness of flint glass lens.
at edge
1.80 cms.
1.80

Concavity
0.67 cms.
0.66 cms.

Other side very slightly concave.

Sept. 15 1878

Crown glass lens.

Thickness ~~at edge~~ in the centre

Measured with callipers by G B Clark ~~[illegible]~~ 2.90 cms. S — read callipers by scale
2.89 P — " —

Thickness at edge 1.48 cms P.
By callipers 1.50 C
1.50 S

Object glass cleaned and replaced.

	Photometer I.	Sky.	
5 20	4.25	0.0	S. obs.
	2.65	0.5	
	2.19	1.0	
	1.27	2.0	19.81
	0.35	5.0	
	0.84	3.0	
	1.13	2.5	
	0.54	3.5	
	0.50	4.0	
	1.77	1.5	
	0.40	4.5	
	3.92	0.0	

Sept. 15 1878

P ds

3.47	0.0	
.37	4.5	
1.34	1.5	
.43	4.0	17.06
.53	3.5	
.76	2.5	
.65	3.0	
.29	5.0	
1.09	2.0	
1.84	1.0	
2.62	0.5	
3.70	0.0	

Sept. 15, 1878

7.00 Tried Phot. I with direct vision prism on β Cygni. 5 in aperture

Tried Phot. II on Jupiter, α Aquilae, β Cap. &c

β Cygni   P. Ang

8 07   37.4   36.7   Images 150° 5"
74.1
210.0
259.3   49.3   ~~28° Images 20° 5"~~
580.8   86.0
43.0
21.5   ~~9~~
290.40
145.20

~~η Lyrae~~ β Cygni ~~Images~~

8.10   345.0   Images 20° 5"
125.9   42.3
168.2
309.8   35.2
948.9   77.5
474.45   38.75
237.23   19.38

η Lyrae   Rdgs.   Images 150° Distance 6"

8.17   139.9   13.3
153.2
320.9   13.9
334.8   13.6
948.8
474.4   6.80
237.20

8.21   47.9   17.5   Images 360° Distance 6"
65.4
227.0   21.2
248.2   38.7
588.5   19.35
294.25
147.13   9.67   Very faint

Sept. 15, 1878

Obs. η Lyrae

8 33	46.5	20.7	300° 6"
	67.2		
	225.4	27.5	
	252.9		
	592.0	48.2	
	296.0	24.1	
	148.0	12.05	
8 43	136.9	18.6	90° 5"
	155.5		
	318.6	16.4	
	335.0		
	946.0	35.0	
	473.0	17.5	
	23.650	8.75	

β Cygni

8 50	127.8	38.7	90° 5"
	166.5		
	303.8	42.3	
	346.1		
	944.2 ~~943.9~~	81.0	
	472.1 ~~471.95~~	40.5	
	236.05 ~~235.97~~	20.25	
8 55	37.1	39.5	290° 5"
	78.6		
	212.9	45.0	
	257.9		
	588.5	84.5	
	294.25	42.25	
	147.12	21.12	

Sept. 15, 1878

Photometer I

α Lyrae 5 inches aperture

9 11 0.52 P. obs

0.45

0.44

0.43

0.45

. 29

.458

9 15 .46 S obs.

.43

.40

.40

.44

.13

.426

α Androm.

9 29 .97 S. obs.

1.09

1.07

1.08

1.09

.30

1.06

Sept. 15, 1878

15 inches aperture, Jap at 34

24
34
58

Japetus. Schr.

9 43 .61
.63
.60
.53
.58
.45
.590

9 47 .69 P. obs.
.75
.67
.65
.66
.42
.684

Photometer H. β Pisc. Austr.
P. obs. 260° 5''

9 55 135.8
159.8 24.0
314.4
339.7 25.3
949.7 49.3
474.85 24.65
237.42 12.32

9 57 48.0 P. obs. 100° 5''
69.0 21.0
228.2 20.8
249.0 41.8
59~~3~~4.2
~~296.6~~ 20.9
297.1
~~148.30~~ 10.45
148.55

Sept. 15, 1878

9 59 45.9 24.7 Sdbx 100° 5u
70.6
225.4 24.4
249.8
591.7 49.1
295.85 24.55
147.93 12.27
10 2 134.4 26.8 Sdbx 250° 5u
161.2
315.0 24.6
339.6
950.2 51.4
475.10 25.70
237.55 12.85

Seeing P. 4, 6, 4
S. 4, 4, 4.

Sept 16, 1878.

ε Draconis

S. obs.

270° 3"

8 28 131.4

161.8 30.4

318.0 26.8

344.8

956.0 57.2

478.0 28.6

239.00 14.30

S. obs.

135° 3"

8 33 42.2 34.8

77.0

219.6 36.8

256.4

595.2 71.6

297.6 35.8

148.80 17.90

U. obs.

Too poor seeing.

☽ Sept. 16, 1878

η Lyra S. obs. 90° 5''

8 45
136.8
158.2 21.4
316.9
338.6 21.7

950.5 43.1
475.25 21.55
237.62 10.77

S. obs. 290° 5''

8 49
50.1
66.8 16.7
228.7
246.8 18.1

592.4 34.8
296.2 17.4
148.10 8.70

U. obs. 280° 6''

8 55
48.7
67.4 18.7
226.2
246.9 20.7

589.2 39.4
29~~9~~4.6 19.7
14~~9.80~~7.30 9.85

U. obs. 90° 5''

8 57
138.0
154.6 16.6
317.8
337.1 19.3

947.5 35.9
473.75 17.95
236.88 8.98

Sept. 16 1878

η Lyrae 5 inches aperture

9	4	139.6	16.2	U. obs. 90° 5"
		155.8		
		318.4	17.0	
		335.4		
		949.2	33.2	
		474.6	16.6	
		237.30	8.30	
9	7	224.9	19.0	U. obs. 280° 5"
		243.9		
		49.3	18.3	
		67.6		
		585.7	37.3	
		292.85	18.65	
		146.42	9.33	S. obs.
9	12	48.5	19.5	280° 4"
		68.0		
		224.0	20.5	
		244.5		
		585.0	40.0	
		292.5	20.0	
		146.25	10.00	
9	16	137.7	17.0	S. obs. 90° 5"
		154.7		
		317.4	17.4	
		334.8		
		944.6	34.4	
		472.3	17.2	
		236.15	8.60	

Sept. 16, 1878

α Cassiopeiæ Phot. I. 5 inches aperture

9 35 3.47 S. obs.

3.16

3.42

3.32

2.88

1.25

3.25

9 43 2.98 U. obs.

2.94

2.63

2.96

2.75

4.26

2.8~~44~~52

Japetus 15 inches aperture

10 0 .58 S. obs.

.63

.52

.60

.66

.49

.598

10 07 .71 U obs

.65

.73

.73

.76

.08

.706

Sept. 16, 1878

10 10 .73 P. obs.

.79
.69
.78
.73
22
.744

Seeing estimated Sept. 17 by P.	4, 6, 6.
" S.	5, 3, 4.
Mean	4, 5, 5.

Sept 17, 1878. Comparison of rack with pinion of Mod M.

Rack	Pinion	O	C	O-C		
5.0	48.7					
10.	98.6	-14	-14		+2	+3
20	198.6	14	13	-1	+1	+2
30	298.5	15	12	3	-1	0
40	398.7	13	11	2		-1
50	498.7	13	10	3	-1	0
60	598.7	13	9	4	-2	-1
70	698.8	12	8	4	-2	-1
80	798.9	11	7	4	-2	-1
90	899.0	10	6	4	-2	-1
100	999.2	8	5	3	-1	0
110	1099.2	8	4	4	-2	-1
120	1199.7	3	3	0	+2	+3
130	1299.7	3	2	1	+1	+2
140	1399.8	2	1	1	+1	+2
150	1500.0	0	0	0	+2	+3
160	1600.3	+3	1	+2	+4	
				34		

Variation throughout length.

Sept. 17, 1878

Variations in
Parts of one turn
inappreciable = .″013

5.0	4,9.8.7	0
1	5,0.8.7	
2	18.8	+1
3	28.9	+2
4	38.7	
5	48.9	+2
6	59.0	+3
7	68.4	−3
8	78.6	−1
9	88.6	−1
6.0	98.7	
	8.0	013
	.7	

Σ errors setting with lens, ~~scale~~ Vernier, rack per ten teeth = .013″

	inc	dec,		
5.5.0	54.8.8	54.8.8	−1	−1
	88	88	−1	−1
	89	89		
	91	90	+2	+1
	9.0	9.0	+1	+1
	46	45	5	4
	48.92±.010	48.90±.08	10	08
	.10	.08		

Back lash
inappreciable
= ″002
Error setting also
inappreciable
= .″01

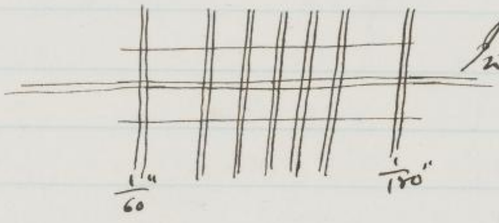
4.″892 ± .″010 4.″890 ± .″008

Sept. 17, 1898

Diameter of field of Phot M.

Field of Compound microscope = 1 cm = 300" = 5'

" " eyepiece = 2 cms



Interval double lines $\frac{1}{12}$ ins

" component " $\frac{1}{120}$ ins.

Sept 17, 1878 15 ms.

β Cygni U obs. 200° 5"

7 01 39.5 36.7
78.2
217.8 36.8
254.6
588.1 73.5
294.05 36.75
147.02 18.38

7 03 123.8 49.3 U obs. 45° 5"
173.1
306.2 42.4
348.6
951.7 91.7
475.85 45.85
237.93 22.92

ε Draconis P. obs. 120° 3"

7 13 133.9 28.2
162.1
315.6 28.0
343.6
955.2 .7
477.60 28.1
238.80 14.05

7 15 41.5 31.7 P. obs. 260° 2"
73.2
221.1 31.8
252.9
588.7 63.5
294.35 31.75
147.17 15.88

Sept. 19, 1878

Phot. M.

7 23	59.6~~37~~	+29	P. obs.
	59.34	0	
	59.21	−14	
	59.38	+ 3	
	59.17	−19	
	173	71 65	
	~~59.386~~		
	59.346	± ~~.142~~ .130	
7 28	59.70	7	M. obs.
	.58	5	
	.77	14	
	.57	12	
	.57	6	
		44	
	59.626	± .088	

Comparison of time-pieces

B 394	7	34	0	7	35	0	
7.3451	19	21	17.5	19	22	17½	
			44.5		34	44.5	
					12	27	

Started [illegible] at 19h 26m

Sept. 17, 1878

Reappearance of Jupiter I

12 = 2
19 37 1.5 1st seen I & III Phot H S. obs. 49 25.5
11 130.4 38.6 < III disappears 35
25 169.0 49
40 118.3 53.3 50 4
52 171.6 16
38 8 114.5 68.6 32
25 183.1 49
42 103.9 81.1 51 6
39 0 185.0 24
15 104.5 87.3 39
33 191.8 57
52 100.3 92.9 52 16
40 8 193.2 32
23 98.0 93.7 47
35 191.7 58
52 105.1 86.5 53 16
41 6 193.6 30

8
18 22
6127.351 9 1.10
m. J. 176 ~~6781.9~~ ~~4.5.57~~
53 04 40 44 6861.9 ~~413032~~ 45.85 45.55 91.7
1469.8 4 45.85
5884
14710
43 0 108.8 87.8
30 196.6
44 1 105.0 86.2
21 191.2
601.76 174.0
150.25 87.0
40 43.5
56 06 43 43

III too far gone to continue observation.

Occultation of III

47 20 III wholly gone

Sept. 17, 1878

Comparison of Timepieces

7.3451 19 57 23.5
B 394 8 10 0
44.5
12 21.

Photometer H

α Andromedae Aperture 15 inches

8 21 56.2 U. obs. 90° 5"
57.7 1.5 A out of field
234.9 1.5
236.4

585.2
292.6 0.75
146.30

8 27 145.6 U. obs. 270° 5"
148.0 2.4
325.2 2.0
327.2
946.0
473.0 2.2
236.5 1.10

Photometer I, Sept. 19, 1878

Japetus S. obs.

8 53 0.55
.58
.52
.58
.58
.562

8 59 0.81 P. obs.
.70
.71
.74
.72
.736

9 4 0.83 U. obs.
.75
.74
.76
.68
.752

U. looked for Mimas
but did not see it

Photometer H Sept. 17, 1878

β Piscis Aus.

9 18	1389	20.0	α in field Uobs. 270° 6"
	158.9		
	316.2	22.8	
	339.0		
	953.0	42.8	
	476.50	21.40	
	238.25	10.70	
9 22	49.5	21.1	U. obs. 100° 6"
	70.6		
	227.8	22.0	
	249.8		
	597.7	43.1	
	298.85	21.5	
	149.42	10.75	
9 24	51.0	18.0	S. obs. 100° 6"
	69.0		
	229.2	17.4	
	246.6		
	595.8	35.4	
	297.90	17.7	
	148.95	8.85	
9 30	137.9	23.4	S. obs. 270° 6"
	161.3		
	316.9	26.3	
	343.2		
	959.3	49.7	
	479.65	24.85	
	239.82	12.43	

Sept. 17, 1878. Photometer I

α Lyrae Aperture 15 inches.
P. obs.

9 42 1.07
1.34
1.18
1.00
1.42

1.196

Aperture 5 inches.
P. obs.

9 47 0.54
.51
.53
.46
.52

~~0.533~~ 2

Sum 2.56
Mean 0.512

Seeing (S.) 4, 5, 5.

1878. Sept. 18. aB.

σ coronæ P. obs. 80° 3"

A & B

6 57 30.6 59.1
89.7
211.1 64.1
275.2
606.6 123.2
303.3 61.60
151.65 30.80
114.0 P. obs 220° 3"
6 58 185.5 71.5
297.1 73.2
10.3
606.9 144.7
303.45 72.35
151.72 36.18
7 0 117.0 66.5 U obs 210 3"
1835
3.8 64.9
298.9
603.2 131.4
301.6 65.70
150.80 32.85
7 3 ~~21.2~~ U obs 90° 3"
23.4 [illegible]
96.4 73.0
206.5
276.4 70.3
603.1 143.3
301.55 71.65
150.77 ~~35~~ 35.83

Sept. 18, 1878

σ Coronae, AC. 60" 90°

7 10	139.6	14.7	U. obs. 30° 5"
	154.3		a out of field
	319.1	13.5	
	332.6		
	945.6	28.2	
	472.80	14.1	
	236.40	7.05	
7 13	49.2	13.5 3	U. obs. 340° 5"
	62.5		
	230.1	13.3	
	243.4		
	585.2	~~26.8~~	
	292.6	13.~~4~~3	
	146.30	~~6.70~~ 6.65	
7 18	52.6	9.4	P. obs. 330° 5"
	62.0		
	230.6	10.4	
	241.0		
	586.2	19.8	
	293.1	9.90	
	146.55	4.95	
7 20	142.4	10.6	P. obs. 100° 5"
	153.0		
	320.3	10.9	
	331.2		
	946.9	21.5	
	473.45	10.75	
	236.72	5.38	

Sept. 18, 1878

α Lyrae P. obs. Phot. I.

7 41 1.51
1.78
1.52
1.45
1.60
1.572

at 100 and 110 compar much brighter P., U Rosm.

7 46 ~~1.40~~ reject U obs.
1.56
1.79
1.87
1.51
1.55
1.656

8 8 1.52 S. obs.
1.30
1.22
1.23
1.43
1.340

Sept. 18, 1878

Photometer H
β Lyrae

8 16 45.1 U. obs. 200° 4"
67.2 22.1 A out of field
224.3
247.6 23.3
584.2 45.4
292.1 22.70
146.05 11.35

8 19 133.9 U. obs. 30° 4"
157.5 23.6
316.6
339.2 22.6
947.2 46.2
473.60 23.1
236.80 - 11.55

8 26 135.8 S. obs. 20° 4"
159.0 23.2 Image of reduced star
best in focus
314.9 20.1
335.0
944.7 43.3
472.35 21.65
236.17 10.83

8 30 45.2 24.8 S. obs. 180° 5"
70.0 Image of companion
best in focus.
224.0 28.0
252.0
591.2 52.8
295.6 26.40
147.80 13.20

Sept. 18, 1878

η Herculis B.

9 01 3.42 U obs.
2.62
3.57
2.69
3.43
567
3.134

9 03 1.16 η Herculis. C U. obs.
1.22
1.10
1.06
1.16
1.140

9 09 1.41 η Herculis C P. obs.
1.23
1.25
1.38
1.12
1.278

η Herculis B P. obs.

9 12 2.96
2.99
3.13
4.01
2.97
3.212

Sept 18, 1878

Long search by P & U for Mimas. Suspected by both observers with the usual eyepiece of Phot. I but not certainly seen. Not even suspected with Achromatic eyepiece.

Mimas certainly fainter than —
.60 U.
.79 P.
or it would have been seen.

Japetus

10 5 .59 P. obs
.63
.65
.64
.71
.644

10 13 .73 S. obs.
.65
.68
.78
.76
.720

10 16 .83 U. obs.
.85
.69
.69
.73
.758

Seeing P. 6,7,7.
U. 8,8,8.

Sept. 19. 1878.

Σ. Eq.

~~β Lyrae P H~~ 42 Her.
~~α Cor. AB Pll H~~ β Delphini
~~" ac Pll H~~ δ Equulei
α Urs. Min. 15" Pll I
5" Pll I
η Her. B P I
" C P I
Mimas. I
Japetus I
α Ursae Min. H

β Lyrae 340° 5"

6 19 135.8 23.9 Pobs
159.7 a out of field
317.5 23.5
341.0
954.0 7.4
477.0 23.7
238.50 11.85

~~[illegible]~~ Pobs 200° 8"
6 21 47.0 24.0
71.0
225.8 24.9
250.7
594.5 8.9
297.25 24.45
148.62 12.22

Sept. 19, 1878

β Capricorni C — C out of field

7 39 — 2.03 — P. obs. B in field
1.79
1.63
1.67
1.48
1.720

U find star in diff focus.
U obs.

7 47 — 1.61
1.68
1.70 — B in field
1.81
1.59
1.678

η Herculis C — P. obs.

7 57 — 1.50
1.48
1.26
1.52
1.41
1.~~5~~434

η Herculis B — P. obs.

8. 0 — 3.48
3.62
3.69
3.94
3.40
3.626

Sept. 19, 1878

42 Herculis Aperture 5 inches.

U. obs.

Companion as bright as artificial star

S. obs.

Star not measurable.

Aperture 5 inches.

β Delphini

8 58 3.02 P ~~S~~. obs.

2.18

2.74

2.29

2.37

2.520

2 9 5 β Ursa Maj = β Cyg. U − .2

1 δ " P − .1

β Delphini S obs

9 6 2.31

1.96

2.82

2.22

2.41

2.344

3 9 17 β Urs. Maj = η Cygni = γ Lyrae. S obs.

4 9 19 β Aurigae = ζ Cephei P. obs

Sept. 19, 1878

δ Equulei Aperture 5 inches

9 18 4.64 U. obs.

4.59

4.75

4.56

5.14

4.736

5 9 22 λ Draconis = δ Delphini U = ξ Cygni P

6 22 δ Ursæ Minoris = ξ Cygni

δ Equulei S. obs.

9 25 4.82

3.84

4.35

3.93

5.00

4.388

7 9 34 ο Ursæ Majoris = ξ Cygni P

8 9 50 β Pisc. Austr. = star between φ & χ Persei. S obs.

This star seems to be 4 Persei; No. 314 of printed merid. phot. catalogue.

Sept. 19, 1878

Mimas

Not seen by S., U., or P.

9 54 Japetus U. obs.

.97

.92

1.00

.98

.90

27

.954

.78

10 2 Mimas not brighter than .78 U

Japetus .89 S obs

.78

.93

.87

.76

.846

Mimas would be seen if brighter than .61 S.

10 8 Japetus P. obs.

.90

.92

.85

.86

.83

.872

Mimas fainter than .85 P.

9 10 10 α Tauri = η Pegasi S. obs.

Seeing (S.) 7, 7, 8.

Sept. 20, 1878.

α Aquilæ

6 53 2.20 U. obs.
2.47
2.24
2.36
2.55
2.364

P. obs.

6 59 2.55
2.31
2.79
2.58
2.74
2.594

Sept. 20, 1878

(Probably γ Aquilae
Sept 23d 1878
E.C.P.)

β Aquilae d

7 5 P. obs.

2.15
2.16
2.30
2.13
2.80

$2.3\overset{0}{\cancel{8}}8$

d U. obs.

7 9

1.60 B Angle 270° dist 50"
1.34 d 290′ " 120"
204
2.06
1.62

1.732

10 7 30 α Aurigae = β Ursae Minoris P.
11 " = α Ursae Min. U
12 7 43 α Scorpii = α Cygni U

21 Sagittarii

7 35 48.4 P. obs.

too poor seeing

δ Equulei Aperture 5 inches

7 53 3.03 P. obs.

3.00

2.88

3.11

2.63

4.65

2.930

u obs

4.54

3.71

4.31

3.72

3.98

4.092

13 7 59 δ Aurigae = δ Ursae Minoris, P. obs.

14 8 17 β Urs. Maj. = γ Cygni S. obs.

Sept. 20, 1878

β Delphini   Aperture 5 inches

8 18   2.10   U. obs.

2.16

2.57

1.86

3.16

2.3~~46~~
58

8 23   2.36   S. obs.

1.99

2.03

2.06   "

2.09

~~2.086~~
2.106

15 8 24 α Canum Venat. = γ Ursæ Min. U

16 30 β Aurigæ = κ Cassiopeiæ U

17 40 α Piscis Austr. = α Andromedæ U

18 50 β Aurigæ = η Cephei

Hyperion at 17.5 secs and S. 1
16.1

Mimas not seen by S, U, or P.

Sept. 20. 1878.

Jupiter.

Glare by reflection from interior surfaces of lens reaches satellite IV

Limit of Visibility of Satellite III

P. obs.

9	23	243.8	11.6
		232.2	
		244.3	11.3
		233.0	11.4
		232.9	10.4
9	24	243.3	
		233.8	9.8
		243.6	10.1

9533
47665
238.32

9536
4768
238.40

66 9
238.36

9
5.7

10.5
3 1.
10.77
5.71

Set at 233.0

9	3	44
	23	41
9	27	25

Ch. 1.

P. obs.

Zelo = 237.66
237.7

58.2
183.0

21 ~~16~~ 26 16	26	6	First seen ~~241.2~~		
20		10	233.0	11.0	4.7
33		23	244.0 241.2	13.7	6.3
48		38	230.3	17.6	7.4
59		49	247.9	22.5	10.2
11	27	1	225.4	26.2	12.3
23		13	251.6	~~29.0~~ 31.0	13.9
37		27	220.6	35.7	17.1
52		41	256.3	40.8	18.6
02		52	215.5	47.9	22.2
20	28	9	263.4	51.1	25.7
36		25	212.3	53.7	25.4
54		43	266.0	58.0	28.7 Satellite III doubled
15	29	4	208.0	57.7	29.7
27		16	265.7	57.5	28.0
42		31	208.2	61.5	29.5
57		46	269.7		32.0

220.5
60 2.6
57.6

16/602.6
48
37.7 122
112
237.66 106
76
100

Sept. 20, 1878

237.7

30 13.5

21 29 59 203.8 67.0 33.9 101.9 101.9

9 30 26.5 30 12 270.8 67.4 33.1 50.95 50.9

135.4 67.7

67.70 220.5

[illegible] 26 203.4 67.2

14 2 41 270.6 66.4 132.1 947.3

20 50 57 204.2 64.9 66.05 473.65

30 33.02 236.83

31 04 31 18 269.1 62.3

33 206.8 62.8

48 269.6 59.9 124.3 957.3

10 3 1 20 0 22 3 32 3 209.7 61.5 31.07 478.65

31 56 239.32

32 1 0 19 271.2 63.2

36 208.0 60.4 124.5

54 268.4 62.8 31.12 951.7

1 50 1 20 30 33 23 205.6 64.1 475.85

33 08 238.92

37 269.7 7

33 22 952.2

31.74

Fr. 3451 21 40 32 add 12.5 at 21 40

12. 21 37

B. 394 9 41 0 11 21 31

44.5

As usual satellite was suspected before the first signal. Definition bad during series III appearing double part of the time

19 10 4 α Tauri = α Cephei

20 10 10 υ Urs. Maj = o' Cygni S. obs,

21 10 15 γ Bootis = ξ Cygni S. obs

Transits of stars following Saturn

10 5 Sat. Satl. for obj. 1½ north Titan Hyp. 1½ n.

~~follow~~

10 6 45 " " " " " "

Transits by chronograph U. obs.

From my 10 13

3' 9 10
11 14
2' 14 14
3' 13 14
1' 12 12
9 } 14 14
12 } 15 14
9 ~~13~~ 15 15
8 15 16
6 14 14
9 15 16
—15 } 15
13 } [illegible] 14.
4 } 14
3 } 13
8 } 15
8 15
14 11 15 half way.
14
11 14 15
12 15
0 Sat.

Sept. 20, 1878

10 31 Hyperion and * P obs

.65
.65
.56
.62
.56

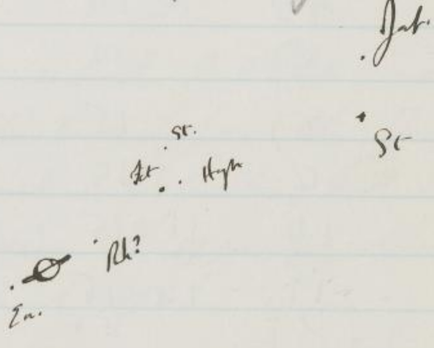
.608

10 34 .43 Hyperion U obs
.38 * decidedly brighter
.40
.43
.39

.406

Position Satn Japetus Star
0 34.0 37.8

Upper object probably Japetus following Satn 37.8



Sept. 20, 1878

Japetus. U obs

10 41 .88
.92
.96
.84
1.00
0.920

10 43 .93 P. obs.
.89
.98
.96
.89
.930

Chronograph Sheet. Stars near Saturn

m	s		m	s	
15	43.3		24	18.6	
	46.3	3.0		35.6	17.0
	49.2	5.9	25	8.4	49.8
	53.4	10.1		23.3	1 4.7
	58.6	15.3		28.5	9.9
16	1.0 ?	17.7		37.2	18.6
17	7.6			41.0	22.4
	10.6	3.0		45.2	26.6
	13.8	6.2		50.6	32.0
	17.4	9.8		53.3	34.7
	23.2	15.6		55.7	37.1
	25.3 ?	17.7		56.5	37.9
	37.6		26	0.5	41.9
	40.5	2.9		2.0	43.4
	43.4	5.8		7.7	49.1
	47.5	9.9		12.4	53.8
	52.9	15.3		34.2	2 15.6
	55.3	17.7			
18	19.8	~~2.8~~			
	22.6	2.8			
	25.6	5.8			
	29.6	9.8			
	34.9	15.1			
	37.4	17.6			

Saturn					Mean
Rhea?	3.0	3.0	2.9	2.8	2.9
*n	5.9	6.2	5.8	5.8	5.9
Titan	10.1	9.8	9.9	9.8	9.9
Hyp.	15.3	15.6	15.3	15.1	15.3
*n	17.7	17.7	17.7	17.6	17.7

			Mean R.A.	Dec.	Mag.
29	37.6		0	3′	9
	49.3	9.7	9.7	11	14
	56.6	17.0	17.0	2	14
30	28.9	49.3	49.5	3	13
	43.5	1 4.2	1 4.4	1	12
	49.3	9.7	9.8	9 12	14 15
	57.5	17.9	18.2	9	15
31	2.3	22.7	22.5	8	16
	5.8	26.2	26.4	6	14
	11.5	31.9	31.9	9	15
	15.2	35.6	35.1		
	16.8	37.2	37.1	5 13 8	15 14 14
	21.0	41.4	37.9 41.6	3 8	13 15
	22.5	42.9	43.1	8	15
	28.7	49.1	49.1 51.3	14 14	15
	33.0	53.4	53.6	11	15
	47.0	2 7.4	2 7.4	12	15
	54.4	2 14.8	15.2	0	Sat.
	13.4	33.8			

1878 Sept. 22

α Urs. Min. Photometer I

6 51 4.04 P. obs.
4.02
4.40
4.70
3.75
.91
4.182

S obs.

12 6 55 α Aurigae = δ Cygni S.

S obs. α Urs. Min.

6 58 3.18 reject as rope appears to have cut off light from [illegible]
3.53
4.93
5.88
4.32
1.84
4.368

7 05 4.65
4.92
5.69
5.41
5.29
.96
5.192

13 7 12 ε Aurigae — λ Ursae Min. 7

Sept. 22, 1878

α Ursae Minoris 5" aperture

7 12 4.16 ref. S obs.

2.42

2.61

2.13

2.85

2.08

2.09

2.418

24 7 15 α Aurigae = α Ursae Min. P.

1.83 S obs. α Ursae Min

2.07

1.94

1.75

1.82

4.41

1.882

7 35 3.32 δ ✗ Equulei

3.82 P obs.

2.73

3.76

3.56

2.19

3.438

25 7 40 β Aurigae = β Ursae Min. P.

Sept. 22, 1878

β Delphini

7 54 1.76 P obs

1.52

1.73

1.83

1.69

3.55

1.780

26 8 0 α Aurigae = α Aquilae, P.

27 " " β Aurigae = δ Ursae Min P.

28 8 05 γ Equulei 15cm Ap. P obs.

2.78

2.65

2.80

2.84

2.75

3.82

2.764

8 12 3.26 S obs.

2.99

2.79

2.41

3.23

4.68

2.936

8 17 Pleiades south ~~of Tauri = δ Ursae Min~~ P.

17 ~~β Aurigae = o² Cygni~~ P.

Sept 22, 1878

β Aquilae

8 24 0.56 P. obs.
0.50
0.57
2.30 } reject; uncertainty as to number of revolutions.

8 28 2,86 P. obs.
2,83
2,51
2,27
2,29
2.76
2.552

Artif. star still seen at 440
5 obs β Aquilae

8 36 2,61
2,52
2,26
2,36
2,45
2.20
2.440

28 8 43 β Aurigae = ε Cass. P
29 δ Aurigae = π Cephei P

Sept. 22, 1878

α Aquilae S. obs.

8 47 1.53
1.33
1.40
1.57
1.37
2.14
[illegible] 1.428

30 8 49 α Bootis = α Aquilae P obs
31 50 α Can Venat = ξ Draconis P obs

α Aquilae
8 52 1.54 P. obs
1.48
1.10 · B apparently partly behind prism
1.30
1.27
1.69
1.338

Looked at ε Pegasi; companion at 307° not seen
32 8 59 α Bootis = α Cygni. P obs
33 α Can Venat = o. Cygni P obs

Transits by stopwatch

Saturn	0.0
Hyperion	12.7
Iapetus	40.0
Star	42.3

Sept. 22 1878

Iapetus

9 16 0.83 P. obs.
0.75
0.75
0.80
0.70
3.83
0.766

Sch.

9 20 .73
.57
.62
.65
.58
.315
~~.626~~
.630

31 9 18 α Can. Ven. = δ Ursae Min. P
α Bootis gem.

α Arietis. Companion suspected nearly north, distance 15".

9 26 α Arietis P. obs.
1.60
1.49
1.47
1.47
1.45
7.48
1.496

Sept. 22, 1878

α Arietis S. Ad.

9 28 1.51
1.71
1.44
1 30
1.32
2.28
1.456

Looked for Neptune; chart apparently wrong.

Seeing (P.) 7, 5, 3
(S.) 8, 4, 3.

Sept 23, 1878. Phot. m.

Focus Eyepiece

4.84
.91
.84
.85
5.00
44~~5~~4
~~4.890~~
4.888

Set at 4.890

Focus on large tube.

0.20
.18
.27
.03
.12
80
.16

Set at .160

Zero Phot. 354.0

614 Compan easily seen.
615 lines diff to see

Sept. 23, 1878

α Ursæ Minoris Phot. I

6 28 5.25 P. obs.

4.85

4.60

4.61

5.03

4.868

6 55 δ Delphini = o. Cygni P. obs.

6 55 δ Delphini = o. Cygni S. obs

μ Sagittarii

6 58 3.64 U. obs. 260° 15″

3.04

3.83

3.46

4.76

3.746

7 00 γ Delphini = δ Draconis P. obs

S. obs

5.20

3.73

3.66

3.43

3.72

3.948

7 13 α Andromedæ = δ Cyg P. obs

7 15 〃 = γ 〃 U. obs

Sept. 23, 1878

21 Sagittarii P. obs.

7 18 134.6 35.0 From A 0° 2"
169.6 " B 230 2"
315.6 35.7
351.3
971.1 7
485.55 35.35
242.77 17.68

7 22 55.2 20.1 Seeing worse P. obs.
75.3
228.7 25.3
254.0
613.2 45.4
306.6 22.70
153.30 11.35

7 45 Σ Antiqua = Σ Ursa Min
γ Equulei U obs.
4.76
4.96
4.50
4.85
4.69

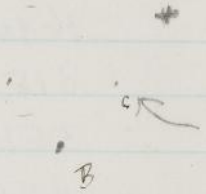
4.~~6~~52
7

Sept. 23, 1878

ε Pegasi

7 55 1.48 P. obs.
1.18
1.38
1.38
1.41

1.366



8 02 1.52 U obs.
1.38
1.27
1.26
1.24

1.334

β Aquilae close comp. P. obs.

8 4 3.42
2.91
2.84
2.48
2.44

2.818

8 10 1.88 U obs.
1.60
1.81
1.76
1.79

1.768

8 14 η Bootis = β Cygni S. obs.

Sept. 23, 1878

8 34 α Canum = β Aquilae U
35 β Ursae Maj. = δ Cygni U
38 λ Draconis = β Aquilae U
α Delphini E (pos. angle 300°)
8 35 1.49 S. obs.
1.65
1.45
1.41
1.32
1.464

8 40 α Delphini D (pos. angle 270°)
2.50 S. obs.
2.73
2.45
3.22
3.08
2.796

8 46 α Bootis = α Cygni (
48 α " = α Aquilae U
ε " = ε Cygni U
49 α Canum = δ^2 Cygni P
54 α Bootis = α Ursae Minoris +.3 P
56 β Aurigae = ρ Cassiopeiae U
α Bootis = β Ursae Minoris U

Sept. 23, 1878

α Delphini ~~B~~ C (pos. angle 150°)
S. ~~S.~~ obs.

8 50
2.90
2.84
270
2.49
2.38
2.662

9 01
234 C ~~B~~ U obs
2.30
1.94
229
216
2.206

9 00 α Boötis = γ Ursae Min. β
" α Can. Ven. = δ " " β

9 07
245 D ~~C~~ U obs
292
309
215
247
2.616

9 14 α Can Venat = γ Ursae Mini β

Sept. 23, 1878

E. U obs.

9 12 1.20
1,42
1.61
1,43
1.55
1.442

St. Watch P. obs.
16s Hyperion?
37 Japetus

9 25 Japetus
2.06 P. obs.
1.97 - - - - - - Observation No. 20,000!
1.93
2.00
2.07
2.010

9 29 2.22 U. obs.
2.24
2.14
2.19
2.39
2.236

Sept. 23, 1878

Satellite of Neptune. Comparison star α Arietis.

10	4	0.68	Achromatic eye-piece. P. obs.
		0.58	
		0.72	
		0.78	
		0.58	
		0.668	
10	20	0.69	Achr. eyepiece U. obs.
		0.72	
		0.60	
		0.70	
		0.70	
		0.682	
10	23	Not seen	S. obs.

1878 Sept. 25.

Photometer I

ε Cygni   Companion p 321° s 37"   B (?)

6 53   1.76   U. obs.

2.05

1.56

1.36

1.72

1.690

6.56   0.93   U. obs. Companion p 260° s 100"   C (?)

0.91

0.95

0.87

0.79

0.890

7 0   1.02   S. obs.   p 260° s 100"   C?

1.01

1.08

0.78

0.79

0.936

7 9   2.23   S. obs.   p 321° s 37°   B?

2.17

1.86

1.85

1.94

2.010

Sept. 25, 1878

κ Pegasi U. obs
two bright

α Delphini U 270° c brighter of three
C U. obs three

7 49
3.79
4.19
4.64
4.39
4.48
4.298

7 58 1.57 U. obs 300° D
1.64
1.38
1.40
1.30
1.446

8 3 P. obs 270° C
4.31
4.36
4.32
4.22
3.85
4.212

Sept. 25, 1878

α Delphini 300°

8 6 1.69 P. obs D

1.73

1.84

1.91

1.76

1.786

8 10 1.68 P. obs 150° B

1.62

1.62

2.09

1.97

3.98

1.796

8 14 β Aurigae = ζ Cygni S. obs.

8 16 ο Persei = δ Urs. Min. S. obs.

α Delphini

8 17 1.72 U. obs, 150° B

1.66

2.08

1.90

2.01

4.37

1.874

8 32 β Ursae Majoris = ε Cygni U

α Canum Venat. ι Herculis U

Sept. 25, 1878

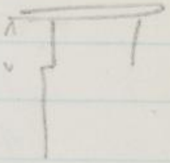
β Lyrae S. obs. Photometer H

8 34 135.1 180° 4"
159.0 2~~4~~3.9 A out of field
312.6 24.3
336.9

943.6 48.2
471.8 24.~~6~~1
235.9 12.~~3~~05

8 37 41.4 26.8 S. obs. 10° 4"
68.3 A out of field
221.7 27.3
249.0
580.3 54.1
290.15 27.05
145.07 13.53

Errors of Phot. M. 4 obs.



.64
.59
.52
.78
.75

.656

8 44 α Bootis = α Cygni S. obs.
8 59 α Bootis = β Draconis S. obs.
9 10 α Bootis = α Cor. Bor. = η Draconis S obs.
9 15 β Urs. Maj = δ Cygni S. obs.

Photometer I

β Capricorni, A; C.

9 18 1,45 P. obs.

1,59

1,58

1,72

1.41

1.550

9 24 1,39 Sch

1,67

1,18

1,25

1,40

1.378

9 26 β Ursae Maj = δ Cygni. P.
9 30 κ Draconis = o² Cygni P.

Object east of Saturn thought to be Mimas; seen with great difficulty, by glimpses only. P. obs.

9 45 0,89

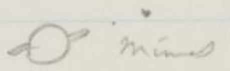
0,89

0,84

0,73

0,79

0,828



Mimas a little below line
from ansa in Rhea and
a little less than half
distance of ~~[illegible]~~ Rhea.

9 38 β Aurigae = β Pegasi U. obs.
9 38 β Tauri = ζ Pegasi U. obs.

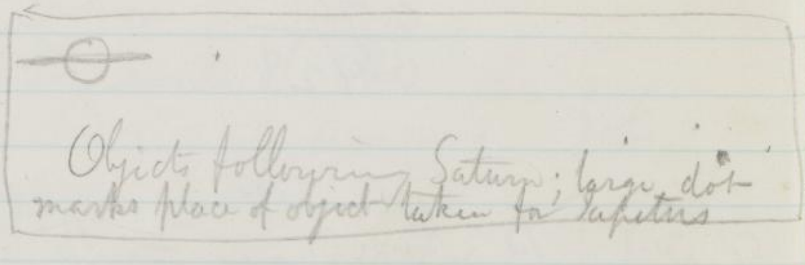
Sept. 25, 1878

Confirmed by R, who gives it a little below line connecting Rhea and ansa and .4 distance from latter to Rhea

10 03 .64 U obs. 1/3 ansa to Rhea
.75 below if anything
.71
.73
.76
9
.718

Japetus
St watch 2d time
. ● 28^5
36 35.4 probably Japetus
40.5

10 20 1.30 S. obs.
1.21
1.06 3 to 3½ diameters ~~behind the~~ n of Saturn
0,83
0.80
1.040



Objects following Saturn; large dot marks place of object taken for Japetus

Sept. 25, 1878

Japetus

10 28 0.85 P. obs.

0.85

0.88

0.86

0.77

0.842

Reflected image still visible at 0.37.

Japetus

10 33 0.97 U. obs.

0.73

0.96

0.84

0.87

0.874

Seeing 8, 7, 7 P.

8, 7, 7 U.

7, 4, 4 S.

Sept 27, 1878.

4 O.H. Transits of α Ursae Min to determine interval of fringes on Phot. M.

Focus of ~~fringe~~ eyepiece 4.9 main tube
" " telescope 0.4 + 7.63

Zero of Nicol 355° Set at 40°

Set Pos. Circle at 220°
Eyepiece Index at 94°
Rack at 0.5.00
H.A. = 3h 5m C.S.T. = 4.17 by T. 34.57
Dec = 89.0
fringes between lines

A	16h	19	7	~~1 21 15~~ 1 23.5	21	15	1 22	2	8
		20	30.5	1 20.5	22	37	1 22	2	6.5
		21	51.	1 21.5	23	59	1 19.5	2	8.
		23	13.5	1 20.5	25	18.5	1 21.5	2	5.5
		24	34		26	40		2	6.
				860			850		340
				1 21.5			1 21.2	2	6.8
									~~44.275~~ 44.26

Scl.	"	div.
126.8	44.26	5.0
133.1	45.87	105.0
260.0	90.97	155.0
1	85.80	149.05
	85.80	14900
	57.20	117.05
		130
		91.0

.54395
.17609
8.36786
1.63214

42.87

= 34990.5
35

I / 42.87 ×15

1265
6325
7
44.275

1331
6555
7
45.885

259.9
12995
7.7
90.965

~~42.87~~
45.816
9096
75

44.275
45.885
90965
90160

Rack at 105.00

	1	32	19	1 22	34	30	1 22.5	2 11.0
	2	33	41	1 19.5	35	52.5		2 11.5
B	3	35	15	1 20.5	37	16	1 23.5	2 14.5
	4	36	22.0		38	37.5	1 21.5	2 15.0
	5	37	47.	1 25.0	40	05	1 23.0	2 13.5
				70			105	15.5
				21.7			1 22.6	2 13.1
								~~45.585~~ 45.87

Rack at 155.00 Pointer above in [illegible]

	1	48	13.5	1 20.0	52	31	1 21.0	4 17.5
	2	49	33.5	1 21.0	53	57	1 22.5	4 18.5
C	3	50	54.5	1 21.5	55	14.5	1 22.5	4 20.0
	4	52	16.	1 21.0	56	37	1 23.0	4 21.0
	5	53	37		58	0		4 23.0
				83.5			90	4 20.0

91.00
90.975

2 6.8
2 13.1
4 19.9 = 4 20.0

A + B 1 div. = .9013
A + C 1 div. = .9016
mean of weights .9015

Settings of image to interval 1–4
4 40 ~~149.30~~ subject believed to be recorded wrong
148.89
148.92
149.07
148.99
149.40
45.27
149.054

clouds
falling
continued for cloud

Sept. 27, 1878

Uranus 2 to 5

149.04
9.33
8.68
8.44
9.52

.01 149.002 94.

5

3 - 5

117.11
7.21
7.30
6.72
6.93

.27

117.054 62

~~58527~~

165

Position of Eyepiece Index pass to images

93°.1
93.0
93.1
93.2
93.4

8

93.16

∴ add 43°.16 to reading of Mid index

6.30 α Ursae Min. 5" ap. Phot. I
P obs.

1.92
1.66
1.76
1.71
1.64

3.69
1.738

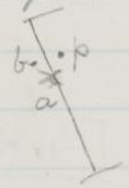
21 Sagit examined by U but seeing too poor to show companion τ

μ Sagittarii Comp. at 270°
7 05 U obs.

3.31
3.76
4.00
3.58
3.82

3.694

A partly in field.



b = star
p = prism star

7 10 P. obs.

3.59
5.06
3.44
4.78
3.85

4.144

7 22 ε Aurigae .2 fainter than δ Ursae Min

Sept. 27, 1878

Mimas

7 25 Suspected by U Seeing very poor
Saturn low

Not seen P.

7 35 Faint object near Mim. Hall = ? [illegible] Mimas.
seen by glimpses

κ Pegasi P
too bright

ξ Pegasi , B

7 55 S. obs.

4.13
3.88
3.83
3.87
4.29
4.000

see reject for reason given below

U. obs.

8 0 [4.40] rej. sec. artif. star partly cut off by mounting of telescope

3.49
3.18
3.54
4.08
3.46
3.550

Sept. 27, 1878

ξ Pegasi, B.

8 13 3.64 S. obs.

3.29

3.32

3.24

3.66

3.430

8 23 β Aurigæ = ζ Cygni U.

24 β Arietis = ζ Cygni U.

30 δ Persei = δ Cygni U

γ " = " U

8 35± α Arietis

1.37 S obs

1.52

1.29

1.63

1.39

1.440

8 40± α Arietis U obs

1.66

1.48

1.74

1.43

1.59

1.580

Sept. 27, 1878

8 45 R and U focussed on Saturn, Mimas not seen,

Japetus. 34.4 . 2 or 3 dia North.

1280 foll. 8' 370 . *, 450 p 115

8 53 Japetus image very steady U obs.

1.02
.95
.78
.91
.86

.904

8 59 0.80 P. obs.
.76
.69
.81
.79

.770

Japetus 32.8
Fainter star below same Rt as Japetus
Faint star $1^m 2^s.8$

Sept. 27, 1878

Stars north of Saturn.

	Transits	St. Watch	Dec.			U. obs
	Saturn	$0^s.0$	0.			
	Jup +	) 35.0	2'		2	
			5		5	
		53	7		9	
1		05	8		8	
		40	5		5	
		9.5	(5 9 11)	br.	11	
		15	5 ~~2~~		5	
1		41	2	v ft.		
2		13.	7	bright.		
		16.5	7			
		21.3	8			

α Aurigae P. obs.

9 22
1.17
1.14
0.94
1.04
1.20
1.098

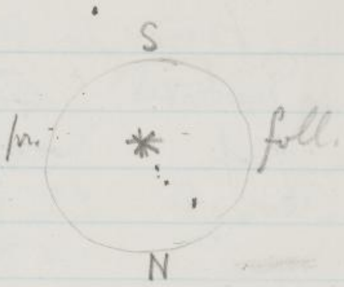
9 26 U. obs.
0.98
.90
1.05
1.00
1.12
1.010

Sept. 27, 1878

η Cephei.

nearest comp.	10°	40"
	10°	60"
	25°	150"

S. hs.

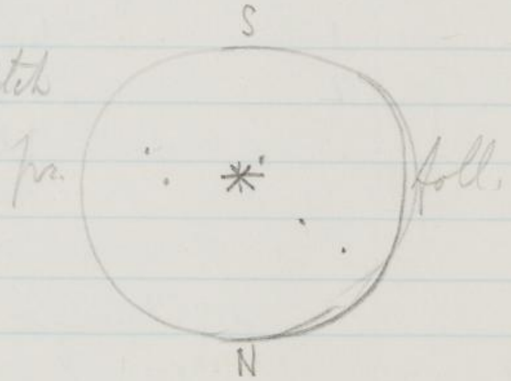


α Lyrae,

two companions 250° 150"

Stars near α Lyrae as in sketch

p 135°	s 43"
p 260°	s 160"
p 280°	s 150"
p 50°	s 130"
p 50°	s 240"



Seeing

P. 6, 5, 3.
U. 7, 3, 3.
S. 8, 6, 7.

Sept 28. 1878. Photometer H

~~[illegible]~~

6 33	117.2	5~~4~~.6 5	P obs 225° 3"
	172.8		
	300.4	55.6	
	356.2		
	946.6	~~1X.4~~ 111.4	
	473.3	~~55.20~~	55.70
	236.65	~~27.60~~	27.85
6 35	40.8	36.3	P. obs. 350° 3"
	75.1		
	225.1		
	256.8	31.7	
	597.8	6.0	
	298.9	33.0	
	149.45	16.50	
6 53	132.9	30.2	
	163.1		
	315.9	28.1	
	344.0		
	955.9	58.3	
	477.95	29.15	
	238.97	14.57	
6 56	46.1	30.2	
	76.3		
	227.0	27.7	
	254.7		
	604.1	57.9	
	302.05	28.95	
	151.02	14.47	

B well seen - but [illegible] diff unmeasurable.

S obs 250° 3"

Images could not be brought close enough; distance AB $1\frac{1}{2}$", Aa 2".

S. obs. 350° 3"

Sept. 28, 1878

21 Sagittarii

7 3 121.6 49.7 225° 3" P. obs.
171.3 Distance Aa same
307.2 44.2 as last sets.
351.4 93.9 Images not well seen.
46.95
951.5 23.48
475.75 Photometer M
237.88

7 13 Shadow of III on Jupiter very distinct

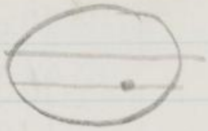
16.4 8~~8~~.0 < last dis
6
7 16 102.4 < shad dis
190.6
287.7 97.1
597.1 ~~185.1~~ 183.1
298.55 ~~92.55~~ 91.55
149.27 ~~46.27~~ 45.77

9.3 96.5
105.8
7 20 184.6 104.6
289.4 201.1
~~6~~5 89.3 100.55
294.65 ~~344.65~~ 50.27
147.32 ~~172.32~~

10.3 93.4
103.7
7 22 184.2 103.6
287.8
586.0 197.00
293.0 98.5
146.50 49.25

Sept. 28, 1878

Edge of Inner belt



Belts
14.6 83.7
98.3
190.6 89.2
279.8 unsatisfactory
583.3
291.65
145.83

Diam Jup Plat M. Def. good
inc dec.
99.10 99.56
63 .33
73 89
99.365 99.445 99.405

pick.
Lat at 40°.0
Repeat
7.32 7.28
6.68 6.60
13.88
7.00 6.94 6.970
99.192
92.222

99.29 99.68
98.42 99.32
197.71 199.00.
98.855 99.500
855
385

Sept. 28, 1878

Adams Dia

96.39
96.80
119
96.595

97.49
97.04
194.53
97.265
96.595
193.860
96.930

96.930
9.562
87.368

99.0
99.2
198.2
99.10

9.17
9.26
43
9.215
9.910
19.125
9.562

β Capric Phot K a E. Equat.

58.3	4.3
62.6	
58.2	4.2
62.4	
240.1	2.7
242.8	
240.0	2.4
242.4	8)13.6
8)1206.8	1.700
150.85	

Comp at 1 50°

33.7	48.0
81.7	
221.9	46.3
268.2	
605.5	94.3
302.75	47.15
151.38	23.57

9 11 α Boötis = o¹ Cygni. P obs

Japetus foll. 33.8 32.0 32.6

Photometer J.

Japetus P obs

9 06 .94
.92
.81
.85
.91
4.43
.886

9 11 0.77 S obs.
.75
.77
.68
.73
3.70
.740

α Aurigae

9 20 1.35 P. obs.
1.14
1.26
1.30
1.39
6.44
1.288

Sept 28, 1878

9 24 S obs

1.10
.93
.97
.79
1.01
4.80
.960

ε Pegasi P obs.

9 37 1.51
1.56
1.51
1.89
1.99
3.46
1.~~4~~692

9 41 1.14 S obs.
1.37
1.30
1.46
1.71
1.98
1.396

α Cygni P obs

10 5 .59
.54
.91
.71
.88
34~~1~~3
.68~~2~~6

Sept. 28, 1878

P. ds.

10 15 7 ε Cygni 260° 100"

94

96

94

98

89

21

.942

< [illegible]

10 22

Seeing (S.) 7, 8, 8,

Sept 19. 1878.
Jupiter II and Shadow.
Photometer H.

11.8 84.0 P. obs. < Rel. dis
95.8
6 28 107.6 42.0 clouds
53.80

12.8 86.4 P. obs.
99.2
6 41 190.8 80.6
271.4
574.2 7.6
287.1 83.5
143.55 41.75
~~8~~ 4 2.7 9.5 Sob < Rel. dis
16.2 85.3
6 49 94.8
104.3
52.15 42.65
~~26.07~~ P obs
26.5 22.5 shadow near
7 03. 106.0 edge seen with
193.6 90.5 difficulty.
284.3
610.6 170.0
305.30 85.0 clouds
152.65 42.5

Sept. 19, 1878

21
7 49 H Sagittarii P obs

38.4 44.2 225° 3

82.6

223.4 33.0

256.4

600.8 77.2

300.40 38.60

150.20 19.30

7 57 43.4 31.1 340.2

74.5

226.2 29.4

255.6

599.7 60.5

299.85 30.25

149.92 15.13

8 18 α Cygni S obs C not seen

Iapetus

8 39 0.94 P. obs.

.91

.96

.82

.87

4.50

.90

Clouds

Sept. 19, 1878

Sobs.

8 42 1.11 Through clouds

begun again

8 52 .79 Sobs.

.75

.91

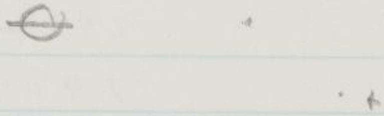
.78

.77

400

.80

Transit Iapetus 32.8 secs.



Star precedes by 5.0 secs.

α Ursae Minoris Sobs

9 05 ± 57.7 ~~4~~.4 60° 5"

63.1 5

243.1 6.1

237.0

600.9 1~~0~~15

~~5.25~~ 5.75

300.45 ~~2.62~~ 2.87

150.22

9 17 146.0 Images 60"

1.5 190° 40"–50"

147.5

326.6 1.4

328.0

948.1 2.9

474.05 1.45

.72

237.03

Sept. 19, 1878

9 23	146.2	3.6	Images 40"
	149.8		225° 20"
	325.4	5.3	
	330.7		
	952.1	8.9	
	476.05	4.45	
	238.02	2.22	18"
9 30	146.3	5.6	270° 5"
	151.9		
	325.0	6.1	
	331.1		
	954.3	11.7	
	477.15	5.85	
	238.57	2.92	
9 35	145.8	7.4	10"
	153.2		350° 8"
	324.7	7.4	
	332.1		
	955.8		
	477.90	3.70	
	238.95		
9 40	145.6		5"
	155.3	9.7	350° 13"
	324.5	9.5	
	334.0		
	959.4		
	47~~8~~9.70	4.80	
	239.~~3~~85		

Sept. 19. 1878

3"

9 51 141.1 20.3 190° 15"
161.4
321.3 16 0
337.3
961.1 36 3
480.55 18 15
240.27 9.07

9 55 145.5 2.5 190° 50"
148.0
323.3 4.7
328.0
944.8 7^2
472.4 1.80
236.20

Photometer I
α Aurigae
10 8 1.49 P. obs.
1.33
1.16
1.38
1.74
2.10
1.420

Sept. 19, 1878

S. Ro.

10 12 146
1.18
1.12
1.16
129

1.21
1.242

Seeing (S.) 5, 7, 6.

Sept. 30, 1878.

4 15 W. Equat. f Cap at 7.53 cms. Dome
darkened W. obs (See book R 46, p. 64).

3.71
3.30
3.07
3.41
3.96

245
3.490

4 20± 4.02 1. obs.
4.11
4.19
3.82
4.29

43
4.086

4 25± Dome light
3.23 P. obs.
3.84
3.29
2.56
3.24

11 6
4 26 3.232

Sept. 30, 1878

Sds

4 33 3.72
3.19
3.30
3.42
3.53

216
3.432

Object-glass out

4 40 3.57 P.ob.
Began again

4 44 4.24
3.80
3.80
4.00
3.82

466
3.932

4 45 3.81 Sds
3.49
3.85
4.28
3.57

400
3.800

Observations somewhat doubtful on account of numerous passing clouds, making frequent changes of tint in one half of the field or the other.

Sept. 30, 1878

Photometer O. {Photometer B with plate of Iceland spar replacing double image prism, and direct vision spectroscope beyond focus}.

γ Andromedae; comparison of red images.

Image of B between two images of A,
Bright image of A in field.

6 23	25.8	P. obs.		Valve length
	53.1	27.3		65
	206.7	27.8		
	234.5			
	520.1	55.1		
	260.05	27.55		
	130.03	13.77		
		Yellow images		60
6 25	26.2	P. obs.		
	51.2	25.0		
	205.6			
	231.6	26.0		
	514.6	51.0		
	257.30	25.50		
	1 ~~3~~ 2 8,65 -	12.75		
		Green images.		65
6 28	20.0	P. obs.		
	59.2	39.2		
	202.7			
	242.8	40.1		
	524.7	79.3		
	262.35	39.65		
	131.17	19.83		

Blue images

6 30 22.3 36.4 P. obs. 50
58.7
204.0 35.5
239.5

524.5 71.9
262.25 35.95
131.12 17.97

Indigo images 45

6 32 58.9 P. obs.
202.6 38.0
240.6
19.9 39.0

522.0 77.0
261.0 38.50
130.50 19.25

P obs Position angle 358°
S obs " " 0°

Photometer I

7 32 ε Cygni Robs. cat. C
1,10
1,28
1,52
1,13
1,33

116
1,232

Sept. 30, 1878

Photometer I

Iapetus

8 6 0.90 P. obs.

0.99

0.86

0.81

.87

443

.886

8 9 .87 S. obs

.75

.87

.74

.73

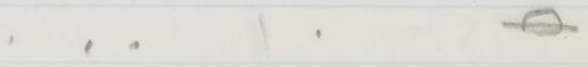
396

.792

Transit Iapetus. 31.0 Star. 44.7

16.0 Transits of object supposed

15.6 to be Hyperion, & Saturn



55
16.0

8 35 β Aurigæ = ε Cygni P

" α Ursæ = o¹ " P

Ursa Mn = o² " P

8 39 α Canum = α Bootis = δ Urs. Min γ (P. ob.) u Cygni β →

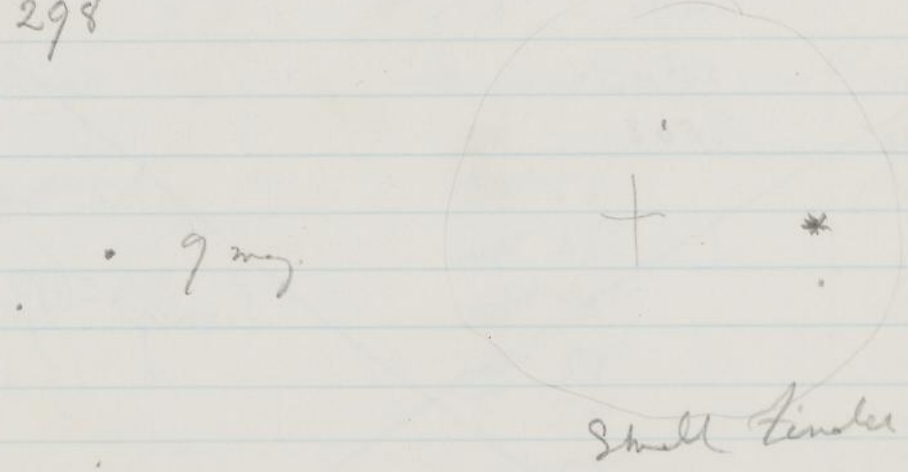
8 45 η Tauri = o² Cygni S. ob.

Sept 30, 1878

Hyperion. Sch.

8 37 0.27
.27
.30
.25
.31
0.280

8 44 .27
.30
.33
.27
.32
0.298



Small finder

Searched for Sat Neptune. Suspected at abt 0°

9 50 β Ursae Maj = δ Cas ρ

Sept 30, 1878

α Cygni }
W C } S obs

10 27 .57
.48
.40
.50
.45

240
.48

10 32 0.60 P. obs.
.48
.46
.53
.47

254
.508

Seeing (P.) 4, 6, 6.
(S.) 7, 6, 8.

Oct 1, 1878.

6 – 7 Mr. Owens brought party to see the moon (1) Capt & Mrs. Olyn, Mrs Hagelman

Iapetus transit 28.4 ⊘

7 12± H.t. & star preceded. estimated $1.^s0$
This northern object thought to be Iapetus, & the other a star.

8 30 β Aurigae = δ Cygni S. obs.

Transits of stars near stationary point of Saturn.

P. obs.

Time	Declinations	Magn.
	39′	
not taken	53′	jk
	~~44~~ 46′	j
not taken	53′	jl
" "	51′	~~k~~ m
	53′	~~m~~ k
	53′	k
	48′	j
	54′	j
	52′	jk
	55′	i
	39′	h
	50′	i

Oct. 1, 1878 P. obs.

α	1879	Magn.	Decl.	Times	Photometer I	
49	0	k	33'	0.0		
	19.6	l	36'	19.6		
	35.2	j	38'	35.2		
49	53.6	j	36'	53.6	1.19	
50	18	k	37'	78.0		
	40	k	37'	104.5	0.81	
50	52 ×	h	39'	112.0	2.24	
51	5	k	25'	125.0	0.98	a ~~little following~~
	26	m	27'	146.0		
	45	m	29'	165.0		
52	8 triple	m	38'	188.0		
	37	j & k	28' & 32'	217.0		
	59	l	31'	239.0		
	18.5	{f j	32' 37'}	258.5		
55	37 6.7	e	43'	397.0		
	49 8	f	26'	409.0		

49	54.7	j	35'	0.0
50	52	h	39'	57.3

50	52	h	39'	0.0
51	6	k	25'	14.0

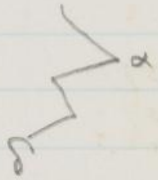
Oct. 1, 1878

Interval between Iapetus and * has widened 2.8

Iapetus. S. obs.

9 15 0.74
.63
.73
.68
.68
0.692

9 15 α Tauri = α Cass. P.
18 β Ursae Minoris = δ Cass
18 α " " α Ursae Min



Iapetus P. obs.

9 20 0.79
.86
.86
.82
.77
0.820

Object preceding Saturn 16ˢ.6, thought to be Hyperion.

Oct. 1, 1898

Hyperion

9 28 0.36 P. obs.
0.35
0.33
0.33
.35

.344

9 30 .28 S. obs
.35
.24
.27
.27

.282

P. probably saw Neptune's satellite p 200° not measured.

ε Ursae Maj = γ Cass P. obs.

α Cygni S. obs

10 28 .57
.54
.56
.74
.60

0.602

Seeing (S.) 6, 6, 7
(P.) 6, 7, 7

Oct 2, 1878

273
Phot. M.
2.3 P. obs.
2.1
1.8
2.0 Σ. N at 40°.0

a at 216°.9 Σ at 17.9
[illegible] P. obs.
5.2
10.1
15.0

Σ 251.9 N at 40°.0
6.1 P. obs.
18.1
18.2

6 45 α Arietis = ε Cygni S. obs.
6 50 η Bootis = δ Cygni S. obs.

Photometer M.
Σ 22.0 N at 60°.0
7 0 Reading of P. 35.50 P. obs.
ξ Urs. Maj. Image B 337.6 increasing
1.0
338.8 decreasing
2
339.3 incr.
7
338.7 decr.
1
20
5
344
338.60 ± 0.5

Oct. 2, 1878.

A at 328.6

E 107.0 N 60.0 P. obs.

7 6 Readings of P. -12 38.74 increasing
+27 39.13 decreasing
1 38.85 incr.
-15 38.71 decr.
55 343
.18 3886

a 348.6 3898 25
107.2 60.0 .83 10
52 19
61 12
294
.735

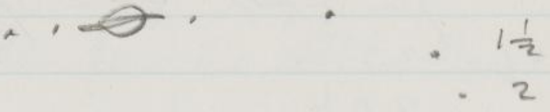
n = ~~382.5~~ 22.5
~~34~~

3825
38.0
Σ 344.5

7 35, Looked at Jupiter for Egress of Sat I
kept Sat II too thick for contacts

Oct. 2, 1878

7 40 Saturn



1.8
3.6 1.8
5.4 1.8
7.3 1.9
7 44 9.4 2.1

Transits Hyp & Sat.
15.7
30.6
46.2

$2^m\ 17^s.5$ time of Saturn's transit across field of large finder.

$4\underline{|\ 137.5}$
34.4   35' = diam.

8 27 ε Ursae Maj = α Ursae Min P.
30 ε Aurigae η Cass.

Oct. 2, 1878

9m Comp star for Saturn. Satell
S obs

8 31 2.55
2.04
2.18
2.14
2.03
2.188

This star called a in Journal

Small star north of last one
S obs
~~No~~ Rather preceding than north.
This star called b in Journal.

8 34 0.87
.62
.68
.58
.58
0.666

8 36 0.70
.54
.53
.59
.65
0.602

P. obs. b

9 magn. star

8 38 2.68
2.79
2.72
3.07
2.83
~~2.798~~
2.818

P. obs. a

Oct. 2, 1878

Transits of two objects, same observed

8 45 0.9 top of p. 159. The northern
1.6 0.7 one proves to be Iapetus
2.8 1.2

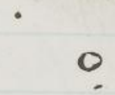
Iapetus
8 47 0.88 P. obs.
0.87
0.85
0.98
0.73
4.31
.862

8 50 0.73 S. obs.
.69
.80
.78
.71
0.742

Looked at Saturn with small micrometer.
9 15 α Tauri = α Andromedae S. obs.
Width of field of photometer H.
Transit Polaris A to apex 1,20
A to B 3,20

Oct. 2, 1878

10 0 Looked at Neptune. Satellite seen by P. fainter object suspected at about ~~half~~ one third the distance pos. angle 150° greater. Pos. angle of satellite 230°, of other object 20°



Seeing (S.) 5, 7, 5.

Messrs Phillips (St Louis) Wells and Walde came to look through the telescope. Showed them Neptune and Saturn. Messrs W & W confirmed sat. Neptune.

Oct 3, 1878.

Transits of α Ursae Minoris Phot II

5 25 3 3 = 18.3
6 2 17.9
9.6 18.4

18.2 sec.

18.2
429
1638
364
728
78078 | 15

182 | 429
1716 4.245
1040 15
858 2120
1820 424
1 63.6

63.″6 bt critical images

Phot II

Oct. 3, 1878

Frodsham 3451 = 18 38 24.2
394 = 5 48
12 50 24.2 Jupiter I.

F. 3451

18	59	48	First seen	
		56	0,58	
19	00	14	0.93	
		30	0.97	
	0	49	1.38	
	1	07	1.35	
	1	25	1.71	
	1	48	1.54	
	2	09	1.67	
	2	32	1.77	
	2	53	2,34	
	3	20	2,13	Planets move out of field
	3	54	1,59	
	4	41	1.82	
	4	59	2,13	
$6^h 15^m$			1.88	
			2,05	
			2,37	
			2,08	
			1,95	$2.0\overset{3}{6}\overset{3}{6}$
$6^h 17^m$			2.25	
			2,00	
			2.36	
$6\ 18^m$			2,44	
			2,46	
			1.51	
			2.302	

Twilight; seeing bad; image of satellite flaring and difficult to compare with the reflection of Jupiter.

Oct. 3, 1878

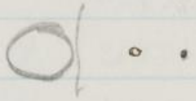
F. 3451	19	15	30.5	19	16	30.5
B. 394	6	25	0	6	26	0

Comp. Jupiter and star foll. P. obs.

6.40 1.08
.96
.96
1.01
1.01
0.2
#1.04

8.6	8.6	Transits.
17.0	8.4	
25.2	8.2	

8.4 s foll.



6 50 0.98 S obs
.84
.86
.73
.85
426
.852

Oct. 3, 1878

Constant of photometer I

Jupiter through hole R 3

7 0 ~~1.24~~ rejected. P. obs. Artificial star large

1.77
1.78
1.82
1.50
1.73

3.60

1.72

7 2 1.71 S. obs.

2.07
1.99
1.90
2.16

4.83

1.966

Star foll. satellite I

4.8
4.8 4.7
9.0 4.0
13.0

4.33

Oct. 3, 1878

Transits of stars near place of T Coronae

DM +26° 2756	36ˢ.5
2759	50.0
2760	67.0
	54.3
	22.5

50.0
24.2
26.2

DM +26° 2761	22′	0ˢ.0			25ˢ.4	52	25.0
l	27′	19.5	k	27′	43.4		44.5
i	15′	22.6	i	16′	47.5		47.6
m	26′	42.5				53	7.5
T Coronae	20′	2.0	m	20′ 18′	27.3		27.0
l	18′	38.0		~~8~~ 18′	3.0	54	3.0
i	29′	8.3		40	33.0		33.3
k	23′		j		51.7		
j	19′	29.3	g		55.3		54.3

The region is nearly south of ε Coronae, which is visible in ~~the~~ small finder.

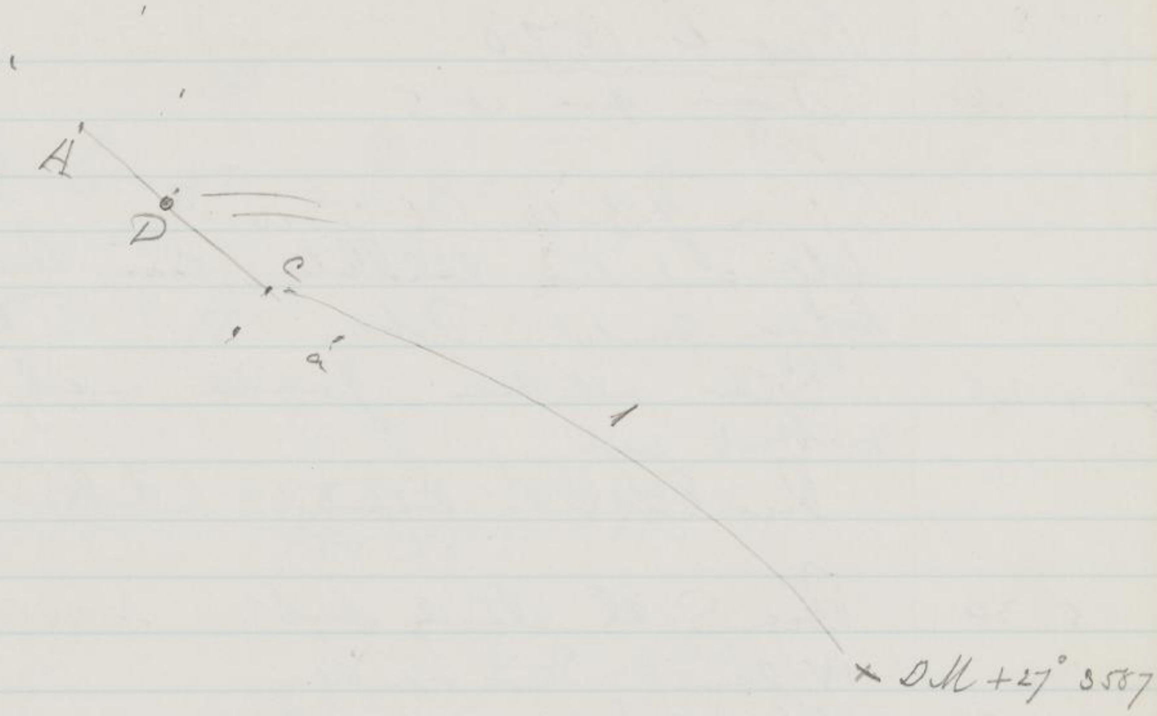
Oct. 3, 1878

Transits of stars ~~in~~ Vulpecula

DM, +26° 3666	51	~~0.0~~	$0^s.0$	$0^s.0$
	58	~~8.0~~		
	60	~~16.0~~	9.5	9.3
	59 }		16 3	16.4
	57 }			
	57		22.	24.0
	58		24	
	56 }		31.3	
	57 }			
Double	59		34	45.0
Group	{ 59 }			
	{ 55 }			
	57		54	55.6
very faint Variable n, 15	58		04	4.8
Double	59		12.0	12.3
	57			
	59		25.2	26.4
not taken	{ 56 }			
	{ 56½ }			
Comp				
	60		34.0	
2 comp n 2^s } fr. s 1^s }	56		48.0	48.0

Bringing DM. +27° 3587 nape of neck of Vulpecula to ~~preceding~~ following edge of field of small finder, a right triangle appears in ~~following~~ preceding edge with right angle ~~following~~ preceding.

Oct 3, 1878



AB .5

AD = .25

9 35 α Tauri = α Cygni (S. obs.)

9 40 β Tauri = β Cas. P
" β Aurigae = " " P

Searched at Neptune satellite [illegible]

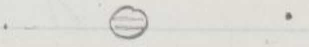
Search for Mimas interrupted by Clouds

Seeing (P.) 7, 5, 5.

β
*

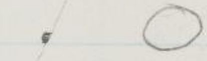
Oct 4, 1878

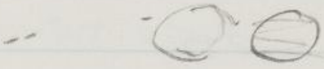
Dome open at 5.



Set on Jupiter. At 5 10 belt and two satellites seen half an hour before sunset! P.obs.

5 25 Star not seen Jupiter easily seen with naked eye

Prec. Satellite suspected to be double 

5 30 Prec. Satl clearly double 

IV seen. Star not seen.

5 32 All sat but IV seen in finder

5 32 Sun setting on half down

35 Sunset gun.

5 43 Star not seen Jupiter out of field Clock & Seeing excellent,

5 53 Star not seen.

5 57 Comp Star at .62 star certainly not brighter than that.

Jupiter IV and II. Sides Photometer H.

7	11	0	178.05	175.3	59.5	62.2	175.3
		39		295.8	65.0	~~115.6~~	180.8
	15	16	.69 764.45	180.8			156.1 178.05
	16	6	382.22	289.2			
		37	191.11	~~36~~1.4	72.2		IVth al
	17	11		115.3	60.5	134.4 67.2 33.60	
		31		175.8			
		56	2)949.6	299.7	59.1	119.6	
	18	18	474.8 237.4	358.8		59.80 29.90	
		44		113.0	63.9		
	19	2		176.9			about half in

.80 log .80 = .903

9.5 11.5

III

178.05
295.8
289.2
1.4
7669

175.3
180.8
289.2
295.8
1.4

178.05
5.0
292.50
181.4
359.45
179.72
292.50
47222
236.11

56.39
112.78

56.39
33.61

175.3
180.8
181.4
7.5
179.16
292.50
471.66
235.83

113.34
56.67
33.33

180
146.45
119.9
26.55

303.5
2999
3.6

236.11
237.40
235.85
19.36
236.45
819

26.55
22.95
49.50
24.75

326.45
303.5
22.95

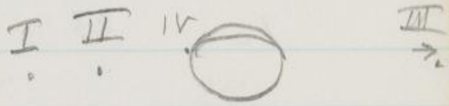
Written Feb. 25, 1879

Oct. 4, 1878

19 48 297.4 58.7
20 18 386.1 122.6
943.4
471.70 61.3
235.85 30.65

---

20 58 119.9 2)183.6
21 48 303.5 91.8
22 40 423.4
211.70



same
Photometer I
Jupiter through hole R 3 for constant.
S. h.

6 45
2.10
1.94
1.95
1.84
2.14
1.994

6 50 P. h.
1.50
1.64
2.00
1.92
2.12
1.836

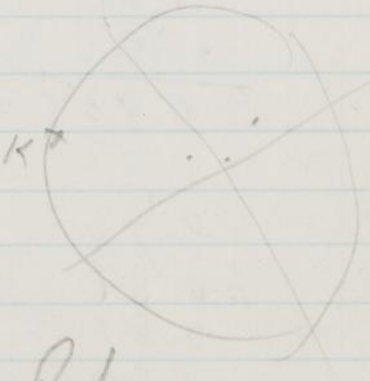
Oct. 4, 1878

Transits of stars in Cassiop.

Magn.	Decl.	Stopwatch		
10	22½	0ˢ.0	0ˢ.0	12
11	22½	13.3	12.5	25
12	23	43.0	41.5	54
13	25½ not taken			
13	29	8 54.5	54.0	6
8½ 13	30 23	3.0	3.5 16	15
12	18 not taken	16.0	14.8	27
Var.?	23	25.0	24.6	37
13	26 not taken			
13	23	36.8	35.0	48
13	26 not taken			
13	28 not taken			
12	24	59.0	57.0 17	10
12	20	6.0	7.2	19
12	26	8.0		21
	25½ 20 29	24.0	22.0	23

Magn.					
13	27'	46^s.3	45.8		58
12	24	6.0	4.6	18	17
11	17	9.0	8.0		20
9	21	17.8	16.8		29
11	18	~~[illegible]~~			
10	20	22.0	20.5		33
10	20½				

Supposed variable has a companion 0½ minutes ~~north~~.

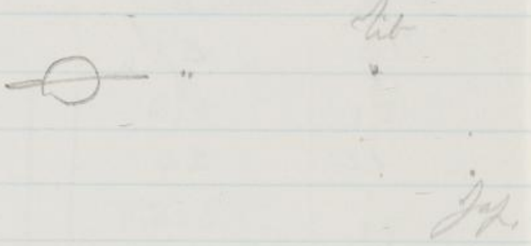


Field of small finder

9 25 β Ursae Majoris = ε δ Cas Pols
9 30 α " " β " "
9 30 β Aurigae δ " "
ε Ursae Maj β "

Neptune's satellite not seen

Oct. 4, 1878



S 0
13.8
20.8

Sat 0
* 13.8 13.6 13.2
9 42 Iap 20.8 21.2 21.0

9 58. 5822 B.A.C. = κ Cass

0.76 Iapetus S. obs.
.82
.81
.84
.96

0.838

9 55 0.74 P. obs.
0.86
0.81
0.80
0.77

398
796

Companion of }
W. 23h 1013 S, Saturn

Oct. 4, 1878

10 0 0.66 P. ob.
.61
.58 } wrong star
.63
.59
307
.614

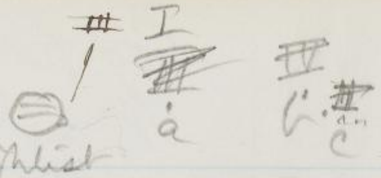
mean t. 23h 48 m

10 4 0.57 P. obs.
.63
.69 } 11 m
.67
.61
17
.634

10 4 .60 S. obs.
.58
.63
.50
.57
0.576

Mimas not seen.

Seeing (P.) 5, 4, 3.
(S.) 5, 4, 3.



Oct 5. 1878.

II & IV ~~Jupiter~~ III half on (b c c brightest) at 5 30

27.2 64.6 II br. 150° 10⁴ ~~5⁴~~

5 40 91.8

207.9 64.7 Comparison of IV, II.

272.6

599.5 129.3 III gone at 5 37

299.75 64.65

149.87 32.32

110.8 76.4 320° 10' ~~5''~~

5 43 187.2

292.8 73.9

6.7

10.3

597.5 75.15

298.75

149.37 37.57

Star easily seen at 5 52

6 04 111.7 71.0

182.7 320° 5''

294.3 71.1

5.4

594.1 71.05

297.05

148.52 35.53

~~at~~

6 07 93.8 69.2 150° 5''

204.4

6

~~296.1~~ 69.9

24.6

274.3 1.1

597.1 69.55

298.55 34.78

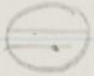
149.28

Oct. 5, 1878

6 15 at I; IV

	114.4	66.2	$160^\circ\ 5^4$
	180.6		
	297.7	62.3	
	0.0		
	592.7	8.5	
	296.35	64.25	
	148.17	32.12 I, IV at.	
6 18	24.4	71.1	$300^\circ\ 5^6$
	95.5		
	204.8	68.5	
	273.3	139.1	
	598.0	69.55	
	299.0		
	149.50	34.78	

6 30 Satl. projected as black spot on lower edge of belt about one fourth way from right limb.
Star 1' above Jupiter



	8.0
8.0	7.5
15.5	8.0
23.5	8.1
31.6	7.8
39.4	

7.88 seconds preceding p limb of Jupiter

Watch in above measurements 2^m fast.
Star 27^s following, 14' north of the first star.

Photometer H Feb. 5, 1878

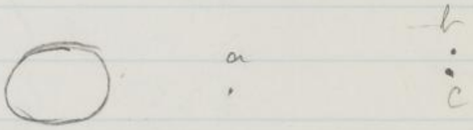
Jupiter's satellites, II, IV

8	8	~~2~~6.3		P. obs. 220° 5"	
		93.6	67.3	Passing clouds	
		207.8			
		272.3	64.5		
		600.0	11.8		
		300.0	65.90		
		150.0	32.95		
8	12	4.0		P. obs. 100° 5"	
		117.6	[illegible]		
		182.4	~~7~~64.8		
		297.0	67.0		131 8
		601.0	~~1.8~~		
		300.5	~~70.90~~		65.90
		150.25	~~35.45~~		32.95

Photometer I

Satellite of Saturn preceding Enceladus a little below ~~plane~~ end of ring and near elongation

Mimas suspected by P.



a = I
c = II
b = IV

Oct. 5, 1878

Jupiter II, IV

180° 5"

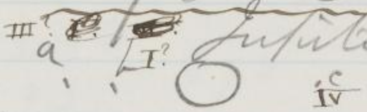
8 50 22.3 65.7
88.0
205.0 68.1
273.1
588.4 13.8
294.2 66.90
147.10 33.45

45° 5"

8 52 112.6 72.7
185.3
297.4 67.6
365.0
960.3 00.3
480.15 90.15
240.07 35.08

Clouds.
Searched again for Mimas

1878 Oct. 6



Jupiter II in transit

Comparison of a and a faint star.
Photometer H.

6 20 45.2 P. obs. 350° 10"
71.7 26.5
225.9
251.2 25.3
594.0 11.8
297.0 25.90
148.50 12.95

6 23 136.0 P. obs. 190° 10"
159.7 23.7
317.7 23.4
341.1
954.5 1.1
477.25 23.55
238.62 ~~1[illegible].78~~ 11.78

6 27 133.0 S obs 190°, 10"
161.0 28.0
316.1
340.8 24.7
950.9 12.9
475.45 26.35
237.73 13.17

6 29 ~~350~~ 350° 10"
44.0
71.5 27.5
225.2 26.4
251.6 13.9
592.3 ~~602.3~~
296.15 ~~301.15~~ 26.95
148.07 ~~150.57~~ 13.47

Saturn Oct. 6, 1878

5 obs. 7.33, Titan obscured by [illegible]

Iapetus 5 obs

7 09 0.66
.60
.57
1.83
.61

Clouds

Cal. of Jap. = 15.20

Jap.

7 33 β Aurigae = δ Ursae Min. [illegible] obs
35 ε Ursae Maj = χ Cass. P obs

7 38 15.2 [illegible] Jap
300

7 50 Jap. P obs

.73
.79
.79
.64
.70
3.65
.730

11 [illegible]

7 57± .68
62
65
61
58
3.14
.628

9m Oct. 6, 1878

8 01 2.21
2.24
2.26
2.32
2.34
1.37
2.274

8 8 η Tauri = κ Cygni S. obs
8 14 α Ursae Maj = β Cass P. obs
8 18 β " " = β Cephei P. obs

Iapetus S obs
8 20 .93
.60
.61
.63
.60
3.31 -
.674 9 m. star. S obs
8 30 2.04
1.82
1.43
1.79
1.86
3.94
1.788

Oct. 6, 1878

11 m Diam S obs

8 34 0.61

.58

.56

.61

.59

2.95

~~.490~~

.590

8 40 ε Aurigae = μ Cephei. S. obs, Both variables.

8 48 ι Aurigae = γ Urs. Min. S. obs.

8 49 β Tauri = o² Cygni. S. obs.

8 54 β Aurigae = γ Cassiopeiae S. obs.

Photometer C

γ Andromedae

Red

~~65.0~~ 65.0

8 52 113.7 P. obs.

143.4 29.7

297.4

321.7 24.3

876.2 54.0

27.0

438.10 13.5

219.05

8 56 114.8 P. obs. Yellow 60.

144.9 30.1

294.2

325.1 30.9

879.0 61.0

439.5 30.5

219.75 15.25

Oct. 6, 1878

8 58	114.5		P. obs. Green 55
	145.3	30.8	
	293.7		
	325.5	31.8	
	879.0	62.6	
	439.5	31.30	
	219.75	15.65	Blue 50
9 0	145.4		
	107.6	37.8	
	294.5		
	323.3	2~~7~~ 8.8	
	870.8	6~~7~~ 6.6	
	435.40	33.~~8~~ 3 0	
	217.70	~~16.90~~ 16.65	
9 11	107.6		Indigo 45 Very difficult
	151.3	43.7	
	292.1		
	329.7	37.6	
	880.7	81.3	
	440.35	40.65	
	220.17	20.33	S obs Red. 65
9 20	117.6	24.6	
	142.2		
	294.7	29.2	
	323.9		
	878.4	53.8	
	439.20	26.90	
	219.60	13.45	

Oct. 6, 1878

9 25 115.9 29.1 Schs Yellow 60
145.0
297.4 26.1
323.5

881.8 55.2
440.90 27.6
220.45 ~~13.88~~ 13.80

9 30 117.3 25.3 Schs Green 5.5
142.6
294.0 31.7
325.7

879.6 57.0
439.80 28.50
219.90 14.25

9 . 1141 28.8 Sch. Blue 50
142.9
296.2 32.0
328.2

881.4 60.8
440.70 30.4
220.35 15.20
~~110.18~~

Oct. 6, 1878

β Cygni Red

20.8 Pobs. 65
9 49 54.2 38.4
203.1 34.1
237.2
520.3 72.5
260.15 36.25
130.07 18.13

9 57 20.4 41.6 Sobs
62.0
202.8 36.9
239.7
524.9 78.5
262.45 39.25
131.23 19.62

9 56 18.6 Pobs. Yellow 60
61.6 43.0
248.9 43.1
195.8
524.9 86.1
262.45 43.05
131.23 21.52

10 0 18.5 46.0 Sobs Color too red
64.5
199.4 39.5
238.9
521.3 85.5
260.65 42.75
130.32 21.38

Oct. 6, 1878

Green. 55

10 3 13.7 P. obs.
65.1 ~~47.4~~
51.4
192.0 52.0
244.0
103.4
514.8 ~~99.4~~ 51.70
257.4 ~~49.70~~ 25.85
128.70 ~~24.85~~

10 5 17.4 45.5 Sch.
62.9
197.8 44.0
241.8
519.9 89.5
259.95 44.75
129.98 22.37

10 9 9.6 62.1 P. obs. Blue
71.7
189.4 59.7
249.1
519.8 121.8
259.90 60.9
129.95 30.45

10 11 359.8 76.2 S. obs.
76.0
184.0 60.2
244.2
864.0 136.4
432.0 68.2
216.0 34.1

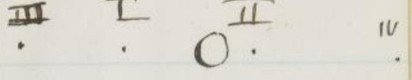
Oct. 6, 1878

Indigo

10	16	4.2		P. obs.
		77.2	73.0	
		181.8		
		255.7	73.9	
		518.9	146.9	
		259.45	73.45	
		129.~~2~~$^{3}_{7}$	36.72	
10	18	357.0		S. obs.
		75.4	78.4	
		183.4	65.6	
		249.0		
		864.8	144.0	
		432.4	72.0	
		216.20	36.0	

Seeing (535 S
464 P

1878, Oct. 8.



1878, Oct. 8.

Phot. II. Jupiter's Satellites.

2 satellites preceding. S. obs.

6 37
17.8 81.8 90° 6"
99.6 Sat. nearer Jupiter disappears Images in line
199.8
281.0 81.2 Jupiter out of field.
598.2 163.0
14955 ~~149.55~~ 40.75

6 41 14.5 Sat. nearer Jupiter disappears 90° 6" S. obs.
104.2 87.4
191.6
289.9 84.6
600.2 172.0
300.1 86.0
150.05 43.00

6 45 103.7 86.6 Sat. farthest from Jupiter disappears 90° 6" U. obs.
190.3
286.2 78.8
365.0
945.2 165.4
472.6 82.7
236.30 41.35

6 48 19.2 80.2 Sat. farthest from Jupiter disappears. 90° 6" U. obs.
99.4
200.1 78.5
278.6
597.3 158.7
298.65 79.35
149.32 39.67

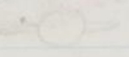
Looked at Saturn with photometer I; clouds.

9 40 β Aurigae = δ Cassiopeiae P.
ξ Ursae Maj. = κ " P.

9 45 Two satellites preceding Saturn; another, seeming fainter, $\frac{1}{3}$ of the way from the ball to the end of the preceding ansa, south of the ring. P. obs.

Oct. 8, 1878

9 45 Satellites of Saturn



Seeing 3, 8, 8 (S.) Jupiter & Saturn
2.9.9 R. Saturn only
4.7.7 U Jupiter only

Japetus not seen

Oct 10, 1878.

Phot M.

5 45 A.S. P.obs

5.40 cms.
5.48
5.22
5.30
5.42

182
5.364 Set at 5.364

7 05 β Aurigae = γ Cephei P.obs

Constant Phot I by Jupiter Hole R 3

7 24 1.47 S. obs.
1.78
1.56
1.66
1.43

1.580

Reflected image not so large as it often appears.

7 31 1.39 U. obs.
1.48
1.64
1.25
1.51

1.454

Oct. 10, 1878

7 39 134 P. obs.
144
129
1.32
118

1.3~~20~~ 14

α − β Persei Phot. K.
42.2 P. obs.
40.6
82.8
7 49 213.7 56.6 Images some distance apart.
270.3
6090 97.2
304.5 48.6
~~204.25~~ 24.3
152.25

α − ρ Persei P. obs.
13.0
82.2
7 52 95.2
200.3 78.8
279.1
587.6 1610
293.80 805
146.90 40.25

α − β Persei P. obs.
31.2
45.2
76.4
7 54 215.3 51.0
266.3
5892 96.2
2946 48.10
147.30 24.05

Oct. 10, 1878

Phot I   Reappearance of Jupiter I

(394) 7 41 0 = (3451) 20 59 28.6

23 41   23 $\overset{2}{3}$6

~~7~~ 40 41   21 ~~23~~ 55 = 3451 time of reappearance

8 – 4-$\overset{2}{8}$2   22

7 41 0

23 $\overset{2}{3}$2

4

Limit of Visibility

,30

,35

,26

,32

,29

.304

Set at ~~,30~~ ~~,25~~ ,30

Oct. 10, 1878

3451

21h

P. obs.

m	s		
22	59	First seen. too late	
23	7	.78	
	18	.74	
	26	.97	
	37	1.04	
	44	1.24	
	55	1.33	
24	5	1.50	
	15	2.27	
	29	1.96	
	43	1.94	
	54	1.93	
25	6	2.23	
	22	1.90	
	31	2.41	8 10~~7~~.9
	40	2.42	~~2.178~~ 2.178
	49	2.31	
	58	2.50	
26	13	2.44	
	20	2.96	1279 2.558
	32	2.57	
	43	2.56	
	58	2.25	
27	11	2.50	
	22	3.13	1339
	35	2.95	2.678
	45	3.02	
	57	3.44	

Estimated brightness .50

Jupiter out of field and satellite covered by [illegible]. Later comparisons difficult owing to ~~[illegible]~~ size of satellite

Sets 25, 5 & 5

Oct. 10, 1878

28	11	3.93	
	22	3.42	1786
	30	4.05	3.572
	41	3.48	
	50	3.55	
	59	3.78	
29	9	3.55	186.5
	19	4.29	3730

394 3451

8 23 0 21 41 35.5

Oct. 10, 1878

Phot. K

α – β Persei P. obs.

40.7 38.6
8 14 79.3
215.7 43.2
258.9
594.6 81.8
40.90
297.30 20.45
148.65

α – ρ Persei P. obs.

24.3 70.5
8 17 94.8
202.3 73.5
275.8
597.2 4.0
298.60 72.0
149.30 36.0

α – β Persei P. obs.

37.6 34.6
8 19 72.2
218.6 38.6
257.2
5856 73.2
2928 36.6
14640 18.3

β – β Persei P. obs.

42.6 31.1
8 21 73.7
220.0 34.0
254.0
5903 5.1
29515 32.55
147.57 16.27

Photometer I.

Oct. 10, 1878

Japetus P. obs

[copied from R 467]

8 32 .88
.90
1.01
.72
.76
.854

8 34 11m Star P. obs
.61
.71
.54
.65
.72
.646

8 42 .47 11 ~~#~~ mag Star U obs
.56
.58
.66
.57
.568

8 40 β Aurigae = δ Cass. -
8 40 β Ursae Min = ~~ε Cass~~ β Cephei
9 30 α Ursae Maj. = β Cassiop

Oct. 10, 1878

Jupiter's U obs.

8 45 1.42
1.28
1.11
1.13
1.18
1.224

Photometer M.

η Persei

9 5 Stellar focus = ~~8~~ F.T. P. ~~8~~. obs.
2.34
2.42
2.52
2.427

Zero of Nicol

		mean
139.8	139.6	139.7
143.7	140.0	142.~~8~~5
		141.2
		45
		~~186.~~2
		96.2

Lines parallel with images
[8.7] Set at 8.6 wrong
7.7
7.6
7.2
7.50

A = ~~159.9~~
= 155.0

Transits with Stop Watch.

Photometer I.

Japetus S. obs.

9 49 .93
.99
.89
.90
.98
.938

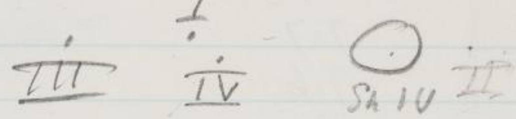
11 magnitude star. S. obs.

10 0 .46
.41
.49
.46
.38
.440

Seeing 4, 7, 3 P.
6, 5, 5 S.
5, 7, 5 U.

Oct 13, 1878

Opened Dome at 5.30



Jupiter III, I P. obs.

5 53 15.2 78.9 90° 5 J out of f
94.1
193.7 80.3 < III dis III br.
274.0 159.2
577 0 79.60
288 5 39.80
144.25

5 56 2.1 P. obs. 90.5
103.8 80.0 J out of foc
183.8 III br.
283.6 78.5
5733 158.5
28665 79.25
143.32 39.63

5 58 6.3 S < I dis 90° 6"
102.8 83.6 J out of focus
186.4
285.2 81.1
580.7 164.7
290.35 82.35
145.18 41.17

6 01 14.8 81.1 P. obs. < III dis 90° 6"
95.9
191.1 82.3
273.4 163.4
5752
287.60 81.7
143.80 40.85

Oct. 13, 1878

I, IV Sobs.

6 5 20.1 <I dis 340° 6"
91.8 71.7 J. out of field
197.2
272.2 75.0
581.3 6.7
29065 73.35
145.33 36.67

6 9 ~~153.6~~ P. obs. 150° 6"
357.2 <IV dis
113.8 67.4
181.2
291.4 65.8
943.6 13.2
471.8 66.6
23590 33.3

6 12 112.8 P. obs. 140° 6"
176.2 63.4
<IV disappears
292.4 67.2
359.6
9410 130.6
4705 65.30
235.25 32.65

6 14 P. obs. 350° 6"
18.0
91.2 73.2
200.4 69.4
269.8
5794 142.6
2897 71.30
144.85 35.65

6 21 α Arietis = γ Draconis Sobs.

Oct. 13, 1878

Photometer J. Constant; Jupiter & hole R 3.

6 22 1.46 P. obs.
1.74
1.88
1.85
2.15
9 08
1.816

6 25 1.71 S obs
1.57
1.50
1.42
1.35
7 55
1.510

6 28 α Aurigae = α Cygni P

Iapetus transit

5.1 5.1 preceding centre Saturn
10.8 5.7
15.5 4.7
20.8 5.3
26.0 5.2
5.20

Jupiter.

6 45 1.31
1.20
1.25
1.21
1.18
615
1.230

6 47 β Ursae Maj = β Cephei P.
50 α " " = γ ~~β~~ Draconis P
11 m. S obs.

.60
.52
.67
.63
.57
299
.598

6 57 1.89 9 m.
1.44
1.69
1.88
2.00
890
1.780

7 5 Hyperion [illegible] at 130

Oct. 13, 1878

Iapetus

7 37
1.17
1.08
1.62
1.15
1.19
1.23
7.44
1.24
~~1488~~

Too bright clearly

The mean of the 6 is ~~[illegible]~~ 1,240
" " " " 5, rejecting third observation, is 1.164

11 mag

7 43
.62
.67
.72
.75
.76
352
.704

9 mag.

7 46
2.85
2.60
2.92
2.58
3.39
1434
2.868

Oct. 13, 1878

Photometer M. 55 Piscium.

P. obs.

7 = 2.50
2.52
25.5

fil at 25.2

E = 8.1
7.2
6.8

7.4

A = 355°.7 Zero

N = 67.8
P = 41.0

A 71°.4
67.7
71.1
69.6

A set at 40.0 E at 112
P 43.89
44.28 increasing
43.93 decr.

Oct. 13, 1878

E at 8h 2m
44.29 decreasing
increasing

A at 300 E at 9h 2m Too hazy to continue

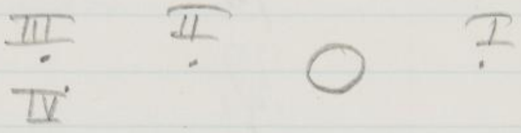
Mimas looked for, not seen. Some haze.

S. ~~464~~ 554
P. 465

Became hazy clouded at 9h 30m

Oct 14, 1878.

Jupiter



III. IV Pcds

6 13 222.2 64.7 330° 5"

86.9

201.2 66.5

267.7

5780 11.2

2890 65.60

144.5 32.80 Pcds. 140° 5"

6 16 111.0 64.3

175.3

291.9 63.7

355.6

9338 80

46690 64.0

2.33.45 32.0

6 51 Iapetus Ucds.

~~2.29~~ out of focus reject

1.20

1.14

1.14

1.04

1.32

1.168

6 ~~48~~ 48 α Aurigae = α Cygni P

48 β " = 51 Cephei P

α Ursae Maj = β Cass P

β " " = β Cephei P

Oct. 14, 1878

11m Uhs

7 0±
.78
.77
.91
.78
.78
.804

Jupiter III IV
Uhs

7 14 89.5
200.2 69.1
269.3 70.2
19.3
5783 139.3
28915 6965
144.57 34.83

~~14~~
90°8'

III, IV, Uhs

7 17 112.6 61.5
174.1
295.2 61.7
356.9
9388 3.2
4694 61.60
30.80

310°.9'

7 30 23470 Contact by R. 3 Jupiter
Uhs
1.45
1.37
1.23
1.27
1.18
1.300

Oct. 14, 1878

Constant by R. 3.

7 32 1.32 P. obs.
1.42
1.82
1.50
1.57
1.526

7 42 Japetus P. obs.
1.27
1.62
1.17
1.37
1.26
1.338

11 m. P. obs.
7 45 .75
.67
.62
.80
.64
.696

Oct. 14, 1878

Mimas U.hs. Certainly seen.

7 51 .71 Eyepiece of Phot. I. Σ 2.05
.64 M 1.65 .40
1.35 .50
.675 Readings are scarcely Rej. 1.15
fair; artificial image reduced to its minimum
and if Mimas after long looking is seen at all
and afterwards the artificial star is seen,
the setting is accepted. The two images are
not seen at the same time.

8 12 β Ursae Majoris = δ Cygni S.

8 10 Mimas P.hs
Glimpsed several times with Phot I eyepiece

8 30 Japetus S.hs.
1.25
1.25
1.20
1.22
1.28
1.240

11 m- S. obs.

8 38 .96
.97
.87
.83
.89
452
.904

β Cygni ₀ Phot. 0 S. obs.

8 55 51.3 Coincidence of Spectra
51.2
50.5
Mean 51.0

Set position circle at 241.0

Red. S. obs.

9 2 12.8 49.5
62.3
198.1 45.0
243.1
5163 94.5
25815 47.25
129.07 23.63

Yellow S. obs.

9 5 17.3 47.5
64.8
197.5 44.7
242.2
5218 92.2
2609 46.1
130.45 23.05

Oct. 14, 1878

β Cygni continued S. obs.

9 9 Green

15.9

68.0 52.1

194.0

244.6 50.6

5225 102.7

26125 51.35 Focus changed

130.63 25.67

Blue

9 13 S. obs.

7.1

86.2 79.1

185.6 68.6

254.2

5331 147.7

26655 73.85

133.28 36.93

9 21 Indigo.

1.4 S. obs.

83.6 82.2 Very faint

181.5

261.4 79.9

5279 2.1

26395 81.05

131.97 40.53

Red

9 34 U. obs.

14.7

59.3 44.6

201.8

239.8 38.0

5156 2.6

2578 41.3

128.90 20.65

Oct. 14, 1878

9 40 Yellow

17.5 U. obs.
63.8 46.3

198.5 44.8
243.3

523.1 11.1
261.55 45.55
130.78 22.77

9 46 15.3 Green. U. obs.
66.0 50.7

192.3 55.9
248.2

521.8 106.6
2609 53.3
130.45 26.65

Focus changed.

Blue U. obs.

9 50 5.2
76.3 71.1

191.4 60.2
251.6

5245 131.3
26225 65.65
131.12 32.83

Indigo

9 54 358.5 U. obs.
76.8 78.3

178.4 83.6
262.0

875.7 1.9
43785 80.95
218.92 40.47

Oct. 14, 1878

Violet

9 59	357.0		U. obs.
	83.4	86.4	
	177.0	80.0	
	257.0		
	874.4	166.4	
	437.20	83.2	
	218.60	41.60	

Looked at Neptune. No satellite seen by S. & U. P. saw an object probably the satellite; p 190°, s 20".

Seeing (S.) 6, 8, 7.
(P.) 6, 7, 6.
(U.) 4, 4, 4.

18
187