

KG
11365
291

N 8

Observations with E. Equatorial
(Original)
Vol. 8

1866 Oct 22 to Jan 19

Sold by THOMAS GROOM & Co., Stationers, India Building, 82 State Street, Boston.

KG 11365.291



KG 11365.291



Micrometer Screw Oct. 22 1866

Observer - L. W. Telescope West of Stand. Micrometer head to the right -
 wire a - micrometer wire placed first to the right and then to the left
 so that the difference of readings gives diameter of wire and
 the mean gives position of middle

no	right	left	diff	mean
1	0.280	0.168	.112	.224
2	0.279	0.166	.113	.2225
3	0.268	0.170	.098	.219
4	0.279	0.168	.111	.2235
5	0.276	0.169	.107	.2225
				mean .2223

Some overbend after two so that the
 light is at the object glass.
 right was too close

wire b

no	right	left	diff	mean
1	5.335	5.233	.102	.284
2	5.343	5.236	.107	.2895
3	.334	.235	.099	.2845
4	.338	.235	.103	.2865
5	.335	.232	.101	.2825
				5.2854 mean

wire c

no	right	left	diff	mean
1	45.317	45.227	.090	
	322	.222	.100	
	318	.232	.086	
	318	.238	.080	
	322	.237	.085	

wire d

no	right	left	diff	mean
1	24.346	24.238	.108	
2	343	.242	.101	
3	342	.237	.105	
4	340	.235	.105	
5	341	.238	.109	

wire e

no	right	left	diff	mean
1	25.332	25.236	.096	
2	330	.242	.088	
3	335	.244	.091	
4	336	.243	.093	
5	338	.235	.103	

illumination stronger for this set

Power 4.04 used in all the above observations
 Position revolution always employed

Oct 22

1866-

Micrometer screw

a	b	a	b
0.430	5.494	5.495	10.558
1.45	506	502	553
408	510	485	558
443	499	485	584
0.4315	5.5022	5.4917	5582
dist	5.0707	5.0665	

thermometer 69

Oct. 23

Oct. 23

a	b	a	b	a	b	a	b
10.545	15.607	15.557	20.626	57.035	56.089	56.105	61.154
543	605	565	20.625	032	085	110	160
556	609	575	20.632	029	089	102	164
550	609	575	.630	032	095	098	158
538	595	572	637	029	092	104	152
10.5464	6050						

a	b	a	b	a	b	a	b
20.645	25.699	25.690	30.752	60.591	65.642	60.400	65.463
.632	25.701	.686	758	575	646	.415	475
.636	.702	702	763	585	643	408	475
.646	.696	705	759	576	653	409	469
20.640	25.696	692	753	577	645	408	472

a	b	a	b	a	b
30.768	35.881	35.843	40.906	5.490	10.546
.775	831	.854	907	485	546
.769	832	.843	896	486	545
.778	826	852	910	490	542
778	830	845	902	482	540

a	b	a	b
40.915	45.982	45.978	51.032
908	.971	.976	51.035
922	.974	.988	042
915	.987	968	041
910	.988	.970	031

Ther 69.5

21^h 10^m

Oct 23 Tuesday
Seeing magnificent.

Jupiter J W

Through the middle of the upper belt there is a bright line broken presenting the appearance of a string of beads, extending entirely across the planet, and a similar one on the lower belt not so complete. There is another belt above these two middle ones, about $1\frac{1}{2}$ times the distance between the two above the upper one. There are also several ~~the~~ narrow belts or stripes below the lower one.

Seeing not so good as at first.

Micrometer screwed in more firmly

Meridian star for zero point

79 55

259 55

260 8

260 10

Power no 4.

illumination of wires poor.

Power no 1.

260 19

mean

260 8

260 3

best.

"

"

"

better

Finder adjusted.

δ Cygni

We could see no companion

I felt tolerably confident of a faint close companion sp.

Reading

110°

rough setting by verniers outside. without illumination.

GMS

Turned to supposed region of planet (89) but the star suspected
Oct 21 was still in place.

Oct 23 Tuesday

 $\Sigma 2410$

$77^{\circ} 45'$
 $76 \quad 5$
 $76 \quad 45$

J W

difficult to get good definition.
 thought to be too small

} Power of 401

23^h 0^m

$75 \quad 30$
 Mean $76 \quad 31$
 9 MS
 $73 \quad 2$
 $70 \quad 58$

Power of 315

Mean $72 \quad 0$
 Mean of all $75 \quad 0$

Companion follows

o Draconis
 23^h 30^m

J W.

$189^{\circ} 30'$
 $10 \quad 32$
 $190 \quad 30$
 $190 \quad 17$

49.38	49.24	48.90
52.613	52.49	52.11
3.233	3.25	3.21

Observer thought he saw a star between them a little above the line joining the two, but could not assure himself of it afterward. Shifting the eyepiece from side to side did not affect it.

Neither W nor S could see the companion.
 π Cephei

94 Aquarii J W
 0^h 30^m

$184 \quad 35$
 $184 \quad 0$
 $184 \quad 36$
 $184 \quad 30$
 $184 \quad 20$
 mean $184 \quad 24$

very good measure

Star for zero point 9 Ms 79° 50'

54
44
44

76

52.115	52.915	53.075	53.01	g.m.s.	52.842	52.895
53.413	53.265	51.70	51.74		51.543	51.550
1.298	1.351	1.375	1.27		1.299	1.345

Arg 2 + 9° No 62 and Aucionia JW

Transits over three wires
Position circle 170° 8'

Planet follows.

by Chron. 236 $\Delta\delta$

1	32	15	18.46
	34	0	.55
	35	0	.57
	36	20	.50
	37	30	.575

Planet north.

Coric. 53.25
.26
.26

mean

1 35 1 18.53

53.26

$$\Delta\delta = +34.73$$

Arg. 2 + 0° No 204 and Nysa JW

Transits over three wires.

by Chron 236

2	20	0	51.58
	23	10	51.475
	26	40	51.475
	28	35	51.435

Planet north.

53.60 +2.02
53.53 +2.055
53.35 +1.875
53.356 +1.921 $\Delta\delta$

Transit of Arg. 2 No 2, 35 18.5

Nysa

35 56.0

& Arg. 2 No 209

36 42.5

Arg. 2 No 205 is missing.

Oct 24 Wednesday

Power of 2000. Therm 56.5

d - 51.975	c - 50.972	50.976	49.982	49.981	48.991
d + 51.926	c + 50.922	50.926	49.928	922	930
Backlash .049	.050	.055	.054	.059	.061

Power of 1561

49.000	47.999	48.000	46.998	47.010	46.010
48.931	47.930	47.930	46.939	46.940	45.951
Backlash .069	.069	.070	.059	.070	.059

Wires much dimmer with power of 1243

Returned to 1561

	~~46.009~~					
	+	-	Backlash	+	-	Backlash
R	45.980	46.050	070	44.990	45.053	063
L	910	980	070	919	984	065
	070	070		071	069	

Diameter of wire

44.985	052	067	989	920	060	071
916	983	067	43.989	926	[981]	065
069	069		069	079		
43.915	981	066	918	984	066	
842	909	067	850	914	064	
073	072		068	070		
42.915	982	067	41.920	990	070	
848	913	065	855	922	067	
067	069		065	068		
41.920	989	069	40.922	992	070	
851	918	067	859	923	064	
069	071		063	069		

Therm 57.3

Oct 24 Wednesday
Seeing poor.

β Capricorni for zero point 9 M S $79^{\circ} 45'$

JW $79^{\circ} 52'$

β Capricorni & Thibbe. JW. Pos. circle $79^{\circ} 52'$
by chron. 236
22 28 50 $\Delta\delta = ec$. Planet south.
31 30 31.06 Coinc. with c (β Capricorni on wire e)
31.54 better than first estimate.
 $\Delta\delta$ not greater than would be given by this
33 50 31.30 31.38

Pos. circle $79^{\circ} 52'$

Transits over three wires, on chronograph.

Pos. circle 79 52
22 54 0 $\Delta\delta = ec$.
56 20 9.27 Coinc. with c Comp. star on wire d
10.06
 $\Delta\delta = ad + 0.79$

Oct 24 Wednesday

Arg. Z. + 9° No 62 & Ausonia Jw

Planet ~~precedes~~^{north} Pos. circles 259 50

By chron	236			Coine.	48	
0	7	40	30.885	20.54	+ 10.345	very good
	9	45	30.884	20.67	.104	" "
	12	35	30.86	20.62	.24	
0	10	0			+ 10.246	
					266	

~~4x cos S~~ Planet
precedes
Coine.

0	17	35	18.00	40.68	
	19	20	18.00	67	
	20	0	17.98	69	
0	18	58	17.99	40.68	- 22.69

		4x cos S	Coine.	Coine.	48	Coine.	
31	20	25.49	40.70	40.4	36.26	63.77	Planet
32	10	25.54	40.68	40.35	36.14	63.77	S.p.
33	12	25.48	40.68	41.0	36.09	63.79	
34	23	25.37		42.8	36.07		
35	12	25.37		43.40	36.04		
				44.0	36.04		

Thisbe and star g. Oct 25 Thursday G. M. S.
Seeing very poor.
Planet south.

Pos. circle		79° 50'	
by chron 236			Coinc
22	12 40	60.91	65.12
	14 10	90	10
	15 50	83	07
	16 50	87	09
		60.88	65.10

21	50	45.19	67.48	Planet precedes.
23	0	52	43	
24	15	69	46	
25	15	73	47	
26	10	62		
27	10	77		

β Capricorni	22	35 14.8	2 26.7	$\Delta\delta$	$+0.40$
g		37 41.5			

22	39 58.8	2 26.7	$\Delta\delta = +0.40$
42	25.5		

22	45 39.5	2 26.5	
48	6.0		

22	50 54.5	2 26.8	$\Delta\delta = +0.69$
53	21.3		

Mean $+2^m 26.7$ $+0.50$

Ausonia 8 Arg Z. no 62 few GMS

by Arm 236

0	1	0	57.23	coin	42.18
		~~8.20~~	~~57.26~~		42.03
					42.03
					42.01
8 ^m	20 ^s		57.26		41.69
±					41.70
12.	00		57.14		41.55
					41.56

Planet south.

R.I. 2nd min first obs don't count
observed 5 wires -
2 over 4 wires -

Planet precedes

Nysa and Arg Z. +0° No 199

G. M. S

		Δ arc 5	coin
0	41 5	22.60	42.23
	42 48	22.63	42.26
	42 25	22.55	42.24
	42 50	22.54	
	43 30	22.44	

Planet precedes

Planet south. 45 coin.

0	48 50	41.09	63.73
	49 35	41.04	63.73
	50 17	41.07	63.71
	50 50	41.07	63.
	51 40	41.02	

Oct 27 Saturday

Turned on ζ Aquarii. Seeing very bad. Double images, more conspicuous, however with low power than with high.

Arg. Z. + 9° No ⁵⁵ ~~Alt~~ and Ausonia. J. W.
 Pos. circle $259^\circ 50'$
 Planet sf.

Chron. 236

1 1 50

51.60

[50.16]

 $\Delta\delta$ ~~1.44~~ Illum. floor

22

23

50.22

-1.38

5 35

51.79

50.23

-1.56

7 10

51.86

50.60

-1.26

9 40

51.95

50.48

-1.47

11 0

51.98

50.49

-1.57

-1.45

r 16 20

29.86

Com'c with b/

21.78

 $\Delta \alpha \cos \delta$
be - 8.08

star on e

~~14 20~~~~29.77~~

21.58

" " 8.21

20 35

29.79

21.74

" " 8.44

22 40

30.18

22.29

" " 8.49

25 10

30.78

22.27

" " 8.52

29 40

30.79

be - 8.35

Oct 28 Sunday

Emission of λ Geminorum. 9 M S with W. Equatorial.

By Chron. 236 0 54 12.2 star first seen.

(Uncertain whether it was not out of the field at the real moment of emission.)

Jusonia & Arg + 9° No 55 9 M S

169° 50'	1	48 45	7.03	31.89	$\Delta \alpha \cos \delta$
		49 40	7.01	.95	
		51 0	6.81	.92	
			<u>6.95</u>	<u>31.92</u>	
					- 24.97

259° 50'	1	57 0	35.27	66.86	$\Delta \delta$
		58 35	35.06	.85	
		59 40	35.20	.88	
		0 30	35.10		
		1 20	35.07		
			<u>35.14</u>	<u>66.86</u>	- 31.72
					$\Delta \alpha \cos \delta$

169° 50'	2	9 45	52.73	78.27	
		10 35	67	25	
		11 20	62	26	
			<u>52.67</u>	<u>78.26</u>	
					- 25.59

Oct 31 Wednesday

Neb h 2075. Rather faint; unequally bright J.W.
in different parts, edges not very well defined; ^{mostly} following
part the brightest. Power no 1.

h 2178 Faint round, did not seem to J.W. at all
resolvable; a sparkling look to G.M.S.

Powers 1 & 2.

h 2099 Double star seen. Also a single star in the middle.
Another afterward seen. Both imbedded in the nebula. Nebula
appears hollowed out on the side toward the double star. J.W.

Nebula appears oval to G.M.S. Cannot be sure whether the
two bright points in it are stars or concentrated nebula.

0^h 40^m Both observers saw a wing to the nebula on the (apparently)
upper side.

The Two stars in the nebula

102 20

J.W. fainter one precedes.

Double star

~~faint~~

344 0

companion south.

Second measure of stars in neb

102 5

53.91

One wire on the two stars in neb.

48.37

" " " bright component
of double stars

Power no 3.

diameters.

Neptune for pos. circs $259^{\circ}50'$ 61.15 J W
 Power no 3. 60.855
 $\hline 0.295$

Power no. 2 61.15 G. M. S
 60.860
 $\hline .29$

76 M & 193 H 1 No 385 & 386 of J. F. W. Herschel's catalogue
 for 1860.

Both observers agreed that the southern one was the
 brighter. The two nebulae appear in contact. Dark
 'sky' afterward seen between by J. W.

P XXIII 100. Companion of 7.5 mag. star not visible. W & S.

Neb 44 h. Very faint & diffuse. No nucleus visible. W & S.

Turned on. Uranus. Seeing too bad for measures.

Nov 1. Thursday

Lat. 2362

349

89

J W

23^h 45^m 213° 30' not satisfactory, star unsteady
 212 0 " "
 213 25 " "
 215 15 " "

Cannot measure the distance

SMS
 210 40
 0 15 210 30
 210 54

	66.53	66.34	
	66.57	.35	Stars indistinct, especially companion.
mean	66.55	66.34	
	0.21		

66 beta W M D. °
 1 15 ~~20 30~~ 119° 30'

	G. M. S.	dist.	
63.185	Position 120° 47'	49.63	48.06
61.38	121 33	49.63	48.07
1.805	121 42	49.645	48.08
	mean 121 21	49.635	48.063
		1.572	

Seems pretty fair

Planetary nebula h 2241
 Direction of major axis.

318 15 without illum. J W

North following side is evidently brightest. SMS. Confirmed by J W.

Direction of major axis.
 312 5 SMS.

Seems not so well defined at edges as before. Less bright in the centre as at the edges. J. W.

Direction of satellite (wires a little outside the nebula) J.W.

106 45

106 30

106 15

Direction of major axis WMD

333 30

" " " S.M.S.

302 30

} Power No 3

cone
54.97 49.70 } dist of satellite G.M.S.
54.96 49.76
55.08 49.73

Angle of Position 315°
measure of minor axis G.M.S.

cone
55.76 53.46 } with half aperture
55.78 53.46
56.15 53.48
56.28
56.27

major axis cone

49.45 46.73
49.57 46.69
46

neb. much fainter

Septentrion ~~star~~ Main star R.A. 169° N. 9. W. 169°
Power No. 3 distant about 20" from or left

Position Circle set to 169° 50' for diameter 7 G.M.S.

53.54 53.03
53.32 53.31
220 280

Nov. 2. Friday

~~Sept 10~~ 10 G.M.S.
 4^h 10^m M.T. Therm no 1 in ^w alcove 48.8
 2 " " 50.7

Bond at observer 55.2
 Power of 1561.

	Wire a		b		c		d		e	
	+	-								
R	50.023	50.088	55.084	146	74.109	152	75.104	150	100.109	127
A	025	090	090	147	106	151	110	150	108	125
	021	086	087	144	110	152	107	144	108	127
	024	088	082	146	106	148	106	148	106	126
I	023	084	084	143	105	152	109	147	107	128
Mean										
L	49.961	50.030	025	090	050	096	044	088	049	070
	962	029	026	090	050	099	044	090	047	070
	962	033	027	090	050	098	043	085	048	071
	960	033	028	090	050	092	046	086	048	070
	966	031	027	089	050	097	043	089	050	070

M.T. 4 47 Bond 54.2
 No 1 49.4
 2 51.9

α Aquilae for zero point on wire a at 50 rev. as above.
 Clamp vernier

79 59 259 51
 53 46 better measure

on wire b at 52 rev. (diaphragm moved a little.)

56 51
 51 45
 54 47
 50 45

Nov. 2, Friday

23^h 5^m Nebula 92 Messier 14^h 12^m +43° 14'

Double nucleus. f w, s M.S., w M.D.
 Appears of spiral structure f w.

D XXII 219

23^h 40^m

276 40

277 45

f w.

278 30

277 40 best

277 30

277 30

mean

277 36

Star blurred & unsteady.

50.995

51.03

.01

largest possible measure. 51.08

51.012

Dist = 0.349

50.67

645

668

67

50.663

94 Aquarii f w

5 20

4 48

5 20

5 8

5 15

mean .5 10

50.25

21

28 poor; images very much blurred

29

29

24

50.265

Cone.

48.96

.94

.95

.96

48.9521.313

1.297

P XXIII 69 J W

Coinc. same as for last star

269 40	49.45	48.99
270 30	.48	95
268 45	.51	
270 35	.50	
270 40	.50	
270 40	.49	
mean 270 8	49.49	Dist = 0.522

~~can almost admit 4.~~

W M D

269 40	~~48.45~~	48.24	48.145
	~~47.52~~	47.52	same.
	0.625	0.72	0.625

38 Piscium S.M. S.

293.15	53.02	52.52	Fainter star, South preceding
293 3	52.99	52.53	
293 46	53.05	52.54	
294 43	52.91	52.53	
294 30	52.99		
mean 294.19	53.006	52.530	
	0.476		

W M D

53.055	"
53.00	
53.077	

0.547

5 Piscium

G.M.S.

Fainter star following
colour of fainter star decided
by yellow, larger, light green.

286.44	52.54	50.11
286 17	52.55	50.09
286 14	52.50	50.11
286 28	52.55	
286 14	52.49	
mean 286 23	52.526	50.103

2.423

66 beti.

G.M.S.

Fainter star. South, preceding.

299 48	54.38	56.03
300 38	54.43	56.02
301 28	54.37	56.01
300 09	54.38	
300 49	54.37	
mean 300 32	54.386	56.020

1.634

γ beti.

G.M.S.

Fainter star preceding.

242 22	51.49	51.80	Seeing not very good.
242 2	51.46	51.79	
242 44	51.47	51.79	
243 25	51.49	51.79	
244 0	51.49		
mean 242 55	51.480	51.793	

0.313

Σ 125. J.W.

2^h 40^m

350 45	Companion north.	56.15	58.47
350 15		15	46
350 15		15	.46
351 15	better than the last.	10	
350 30		16	
<u>350 36</u>		<u>56.144</u>	<u>58.463</u>

Obs no. with power no. 3.

η Cassiopeae J.W.

224 15

3^h 5^m

222 30

223 45

225 15 measure interrupted by clouds.

Nov. 5 - Monday -

V. M. S.

Meifu XXII 340

Batrix

star precedes and is south 1st. m.p.

74.09	Conc.	79.61	night 2	Conc.
74.32	36.11	41.77		41.77
	36.03	41.77		41.79
	35.99	37.84		41.76
	36.00			
	36.07			

Σ 142

Nov 8 Thursday

3^h 15^m Therm. in W. Alcove 45.5

" "E" 50.4

" in observing chair 56.7

Power of 1561. 9 U.S. lbs.

d

c

	+	-		+	-
R	40.960	41.023	063	39.960	40.020
L	888	40.947	059	893	39.954
	39.952	40.020	068	38.952	39.021
	883	39.942	059	883	38.947
	38.964	39.030		37.963	38.032
	886	38.949		890	37.951
	37.963	38.027		36.961	37.030
	882	37.949		892	36.953
	36.973	37.030		35.980	36.042
	898	36.965		907	35.968
	35.976	36.039		34.975	35.043
	905	964		911	34.971

Therm in chair 54.4

Obsns discontinued a short time

4 25^m Therm in chair 53.8

34.969	35.026	33.965	34.032
890	34.950	893	954

4^h 50^m No 1 47.0

2 51.8

at observer 53.5

S M S. Power no 1.

Clamp vernier other 349 45

Transits of ϵ Delphini Pos. circle $169^{\circ} 50'$ Stellar focus 27.95
over e d c b a.

No illumination. Dark wires on bright sky

5 15 at observer 52.7

Gas lighted for illum. Obsns. recommenced. Seeing good.

30 " " 52.5

on both sides.

Obsns. discontinued. Gas left burning

40

" recommenced ~~Here at~~

Therm at observer 52.1

5 50 " " 52.0

No 1 46.9

Wire c at 34 rev. as left at the
end of last obsns.

2 52.0

No 4 outside 53.1

Nov 9 Friday

3^h 40^m No 1 49.4

2 51.8

Examination of screw resumed.

at obs. 57.9

c		d	
L	R	L	R
-		-	
+	0	+	
32.921	32.980	32.924	32.978
32.861	32.911	32.854	32.920
31.920	31.980	31.920	31.980
31.865	31.920	31.860	31.915
30.921	30.984	30.910	30.972
30.868	30.920	30.851	30.910
29.912	29.976	29.912	29.975
29.860	29.910	29.853	29.914

28.916 28.979
28.858 28.917

28.928 28.989
28.865 28.930

diaphragm moved
and put back
approximated

27.933 27.997
27.877 27.940

27.936 27.990
27.871 27.938

26.935 26.997
26.878 26.937

26.934 26.995
26.872 26.931

25.938 25.997
25.878 25.936

25.930 25.992
25.872 25.933

24.936 24.996
24.876 24.938

24.927 24.991
24.870 24.931

23.931 24.000
23.873 23.939

23.930 23.998
23.872 23.940

"

22.939 23.008
22.881 22.943

22.951 23.018
22.899 22.960

21.956 22.016
21.899 21.960

21.950 22.017
21.892 21.954

20.950 21.020
20.894 20.956

20.950 21.013
20.892 20.954

19.950 20.018
19.893 19.959

19.968 20.036
19.914 19.976

18.972 19.040
18.921 18.981

18.978 19.044
18.922 18.978

17.984 18.046
17.927 17.991

17.983 18.046
17.921 17.988

16.984 17.047
16.929 16.990

16.980 17.054
16.930 16.994

15.987 16.050
15.937 16.003

diaphragm cannot be moved farther

5h 45^m Makog.
Therm. at observer 53.6

No 1 50.0
2 52.1

Nov 10 Saturday

W XXII 466 & Beatus Jw. | 169° 50' Pos. circle

Planet south preceding.

by chron 236

23 6 50

20.77 42.82

 $\Delta \alpha \cos \delta$

- 22.05

Planet very faint, wires
barely illuminated.

9 10

21.58 73

10 0

55

11 30

56

15 0

9.19

42.85

 $\Delta \delta$
- 33.45

40

62

82

16 30

52

835

17 10

18

18 15

40

9.38

42.83

23 30 0

21.91

Better measure. 33 30

22.72

 Σ 2934J. W. Seeing very good
Could not separate it. A good deal of haze.

Obsns. prevented by clouds.

Nov 12 Monday

Pos. circle $169^{\circ} 50'$

~~29~~ Arg -0° no 154. Nysa & -0° no 156. J w.
Transits on chronograph.

	by Chron 236		Coinc.	Planet south
	2 25 20	19.80	34.41	
Comp. with	27 50	79	44	
-0° no 154	29 20	65	44	
		19.75	34.43	-14.68

	34 30	19.31	34.04	-14.73
--	-------	-------	-------	--------

Comp. with	40 30	Planet on a	Coinc with d	Planet ~~south~~
-0° no 156	44 10	35.71	31.26	-(ad + 4.45)
	47 50	35.71	31.42	" " 4.29
		35.91	31.51	(" " 4.40)

Transits on chronographs as before.
~~at~~

Transits ^{no 613} Arg $Z + 12^{\circ}$ & Melete SMS

at time of check	44.79	47.01	Planet south
in the	66	06	
"	67	06	
"	53	03	
"	64	02	
	44.66	47.04	-2.38

Transits. Planet follows.

Nov 13 Tuesday
 other vernier of pos. circle adjusted to agree with clamp vernier
 Examination of screw for backlash $4^h 0^m$ No 1 48.5 Obs. 9 M.S.
 2 "

Power of 1561. Obs on wire a.

R		L	
+	-	+	-
16.130	188	15.191	249
136	189	13.973	033
		133	191
		920	980
087	130		
084	133		

R		L	
-	+	-	+
115	13.170	.982	12.040
058	13.123	.931	11.983
057	047	051	057
071	10.126	021	9.077
027	071	971	028
044	055	050	049
041	099	089	.141
000	7.053	042	6.101
041	046	047	040
030	090	061	.021
3.992	4.048	022	3.080
038	042	039	041
070	.126	047	.105
030	1.085	013	0.068
040	044	034	037

Meteors 2 Arg. Z +12° No. 613 JW

Transits on Chronograph.

by Chron 236

6 13 10 63.08

14 15

17 0

63.29

19 15

55

20 10

46

21 15

75

22 10

51

6 19 58

63.51

Planet south on wire ^{be}
76.04

04 Conc. with e

06

be

76.05

— 12.54

Transits by GMS.

73.

About 20 Meteors observed between 11 & 12, radiating generally from the constellation Leo which however was then below the horizon. Some were of ~~considerable~~ ^{brilliance} equal to stars of the first magnitude; ~~several~~ ^{one or two} of four or five of these crossed ^{across} the whole heavens with unusual velocity, leaving trails lasting for a few seconds. One observed later left ~~quite~~ ^{quite} a persistent trail lasting for some two minutes. This passed over a comparatively small arc with less velocity. Two at least rose slowly from the eastern horizon like Roman candles, attaining their greatest brilliancy just before disappearing. From 12 to about 1 45 the meteors seen were recorded on the chronograph, one observer watching the portion of the heavens within about ~~30~~ ⁴⁰° of Leo; and during the latter part of the time another ~~was~~ ^{observed} the western portion of the sky. 54 were recorded, all of which are believed to be distinct as the eastern observer does not think ~~those~~ ^{those} which he saw were seen by the other, or that he saw those recorded by the western. The meteors during this period averaged less brilliant than those previously seen, and after this they became fainter and fewer. Almost all the meteors observed ^{which had any appreciable length of path} passed from east to west, generally with ^{unusual} ~~considerable~~ velocity. They averaged about equal to stars of the 4th magnitude. The time of flight estimated by JW not to exceed two seconds except in the case of two or three. Generally less than one second.

Nov 17 Saturday

Pulk. Cat. 536

Not separable. W. & S. Power of 600. Star unsteady;
seeing otherwise good.

P XXII 219	277 30	J W	Power of 315 (No 3)
	278 50		
Oh 30 ^m	277 15	34.45	Conc.
	277 45	47	34.01
	277 10	47	03
	277 50		03
		mean 34.463	34.023
mean	278 3	0.440	Star unsteady

 Σ 2925

J W

Oh 45 ^m	164 15		Star unsteady
	164 30	44.80	conc.
	166 45	87	45.50
	165 30	84	51
	163 45	79	53
		78	52
mean	164 57	84	45.515
		44.820	0.695

Meteor seen by J W from ~~9^h 8^m 55^s~~
 centre of W Balcony of dome at 9 8 15 Frodsham 8421.

Corr. to Frodsham = + 18°

over chimney of west wing, moving vertically downwards. Burst just over chimney. Length
 of path 1 or 2 degrees. About as bright as Venus.

Σ 28.95

1^h 30^m

Meteor of 8.5 mag. crossed the field. 9 w.

145 45
146 15
146 20
145 15
145 10
145 45

68.22
24
23
21
68.225

come.

~~67.47~~
56
57
56
55
67.560

Seeing rather poor
star somewhat
swelled.

Σ 2934

Σ 2760

Cannot separate. J. W.

127 30
126 45
126 5
126 40
125 50
mean 126 34

40.05
07
03
08
10
40.066

come.

38.98
39.05
03
00
03
39.018

Disks of stars
becoming much
larger.

ls. M. S.

Σ ~~2408~~ 125-

Sid time 2^h 25-

171° 34'
171 48
171 50
172 1
171 13

Comp. m

53.05
.06
.03
.01
53.10

come.

50.42
.43
.42
.41

Σ 142

2^h 34^m

205° 52'
207 29
206 32
206 12
206 28

dist

53.44
53.41
53.40
53.39
53.39

come.

51.39
51.40
51.39
51.36
51.37

following star a
little brighter

Nov. 17. Saturday.

84. bet.	H. M. S	Comp. n.p.	56.81	come	Telescopic mirror
	208° 13'			36.34	11 th mag.
	208° 50'		56.85	34	
	208° 53'		80	33	
	204 24'		82	32	
	206 23'		80	31	
				322	

circle reads
 95. bet. $\wedge$ about 157° roughly estimate 9 MS
 179 JW

Σ 3

Σ. 523.	68° 45'	53° 26'	come.	Seeing poorer
H. M. S	69 28	27	52.96	than when begun
	70 13	26	98	in this star
Sid. 3 2 5 ^m	68 15	25	97	
Time -	68 29	25	96	

Len of Position 80° 3' 259° 58' clamp turned
 80 0' 259 55- "
 79 58 259 53 "

Nov 19 Monday
 Verniers of position circle adjusted to read the same. Zero point
 changed somewhat. G.M.S.

Nov 20 Tuesday

3^h 0^m M.T.

Therm no 1.

50.0

2.

51.0

9 M.S.

" Bond at observer

55.5

Power of 1561.

Obs no. on wire c.

	L	R				
-	82.669	730	83.813	873	84.812	876
+	592	658	743	810	741	807
	077	072	070	063	071	069
	85.905	967	86.932	87.000	87.783	848
	843	910	880	942	719	782
	062	057	052	058	064	066
	88.785	850	89.761	830	90.767	831
	720	788	697	767	700	770
	065	062	064	063	067	061
	91.773	838	92.694	759	93.689	758
	711	774	636	696	623	688
	062	064	064	063	066	070
	94.790	855	95.752	818	96.757	820
	729	796	693	762	694	766
	061	059	059	056	063	054
	97.765	830	98.779	840	99.890	951
	700	772	719	783	839	905
	065	058	060	057	051	046

~~100.8~~

100.833	899	101.806	873	102.857	920
780	850	750	821	812	882
053	049	056	052	045	038

102.228	302	101.162	239	100.211	280
197	272	130	200	174	247
031	030	032	039	037	033

99.210	286
177	250
033	036

Moved to 85 rev. and returned

95.218	284	94.184	257	93.282	359
178	250	145	210	241	316
090	034	039	047	041	043

Wire d

50.587	661	51.089	164
496	568	010	089
091	093	079	075

Wire c

40.059	135	39.554	633	39.321	400
39.984	060	472	545	252	327
075	075	082	088	069	073

39.100	174	38.666	747	37.966	040
024	100	585	660	889	967
076	074	081	087	077	073

4^h 0^m

Bond 56.7

Nov 21 Wednesday

1866.

~~57966~~ Observer J. W.

Screw

+	19.737	19.660
-	19.860	736
	.073	.076
	~~12~~	~~12~~
-	20.731	- 20.805
	656	737
	.075	.068
-	20.759	20.826
+	692	+ 764
	.067	.062
	21.758	21.830
	.692	758
	.066	.072
	21.767	21.835
	.698	764
	.069	.071
	22.766	22.833
	~~692~~	765
	.076	.068

Thermometer

50.0

Nov 21 Wednesday

(89) & W XXI 387 J W

Transits of Chronograph Pos. circle $170^{\circ} 20'$
by chron 236

1	10 ^m 50	32.60	39.14	
	11.1	38	14	Planet south
	11.4	38	13.5	
	12.2	47	14.5	
	12.6	66		
	13.0	44		
	13.5	52		
		32.493	39.140	

Transits on chronograph.

P XXI 219	39.60	G.M.S	
	.18	39.525	not the least
	0.42	39.145	confidence in
		0.380	the measure

Seeing very fair.

Nov. 22 Thursday

Sesno

I	R	L.W
- 49.986	50.063	Power 800
+ 49.916	49.991	
.070	.072	
		1
- 50.991	51.062	
+ 50.916	50.982	
.073	.080	
- 50.532	50.608	
+ 50.454	50.523	
.078	.085	
		2
51.530	51.610	
51.451	51.524	
.079	.086	
- 51.613	51.687	
+ 51.535	51.602	
80	.083	3
- 52.614	52.685	
52.532	52.598	
.082	.087	
51.610	51.683	
.533	51.601	Power 15-61
.077	.082	first wires not
		4 touched since 3' obs.
52.619	52.684	
52.532	52.598	
.087	.087	

Thermometer 45° 0'

Nov 25 1866 Sunday

zero of Position $80^{\circ} 52'$ Y.M.S.
 260.51

$80^{\circ} 29'$ $80^{\circ} 47'$ bet
 260.28 260.46

Position circle 260 46

Antiope? & W XXIII 1104 J W
 by Chron. 236

0	56.4	48.46	30 35-	Planet south
	58.6	48.52	33	

1	0.0	56
	0.8	50

meteor about 10 mag.

0	58.0	48.510	30.340	-18.170
---	------	--------	--------	---------

Transits on Chronograph.

1	15.8	47.09	28.99
	17.5	25	29.04
	19.4	18	28.97

1	17.6	47.173	29.000	-18.173
---	------	--------	--------	---------

Occultation of 1. Cancer J.W.

Imm. lost from waviness of moon's limb & faintness of star
 Em. poorly observed; probably 1st late.

Turned on Mars, & Gemmorum, Sirius, & the nebula of Orion.

Seeing poor.
 Companion of Sirius not visible.

Six stars seen in the trapezium.

1866 Nov 26 Monday

Antiope and (supposed Antiope of last night = h.) J W			
Chron. 236	Pos. 260° 45'	Come ~~236~~	
0 49.4	48.55	29.37	Planet south
51.3	48.07	46	
53.8	48.42	40	by clouds
57.7	48.00		
59.0	47.95		
mean 0 54.2	48.198	29.390	$\Delta \delta = -18.808$

~~9.0~~	~~41.41~~
1 14.4	43.10
16.2	42.80
17.5	42.72
21.7	42.60
~~17.4~~	~~42.805~~
1 25.0	42.70
25.5	42.73
mean 1 20.0	42.775

29.390

 $\Delta \alpha \cos \delta = 18.415$

+13.385

P III 98

2 ^h 10 ^m	290 15	40.67	41.365
	290 15	70	.37
	290 45	67	.34
	290 45	69.5	34
	290 40	70	
mean	290 32	40.687	41.354

95 Beti Jw 324° companion sp.

Uncertain whether really seen at all.

42 Orionis GMS 316° companion s. not seen J.W.
3h 5m.

4. Orionis separated easily J.W. seeing not good images double

Angle	$23^\circ 52' 15''$	G.M.S	Power No 3
	253 42		
	23.9 7	dist	43.753
	257 13		43.644
	$258^\circ 10'$	dist	.109 more estimate
	256.53		

4^h 20^m W ∇ 520 GMS 263° elongation suspected
Distance certainly $< 1''$; can hardly be
greater than $0''.6$ (Power no 3)

Jw 280° saw it separated with power of 600
but could not measure direction satisfactorily

GMS 271 with power of 600

~~400 420 450~~

hal 10567 JW

4^h 45^m

Power of 401

223°

222°

GMS could not separate it

Σ 836

DMS 129° Companion south prec.
 principal Star quite red.

Nov 27 Tuesday

Antiope and W XXIII 1104
 by chron. 236

J W
 $\Delta \alpha \cos \delta$

Planet precedes

0 ^h 27.6	30.32	59.80
28.9	40	80
29.7	35	80
~~30.5~~	~~51~~	
31.2	37	
31.7	37	
	~~348~~	
	30.362	59.800

$\Delta \delta$

— 29.438

~~38.5~~	~~42.49~~
40.0	68
40.5	73
40.8	69
44.0	91
44.7	79
45.7	84
47.5	67

conc. same as for following measures of $\Delta \alpha \cos \delta$

Telescopic meteor

$\Delta \alpha \cos \delta$

49.2	31	60.44
50.5	06	42
51.4	25	46
52.2	02	43
	05	~~44~~
	31.095	60.438

— 29.343

Nov 30 Friday

Dec. 1. Saturday

E Arctis	152	20	51.07	~~51.07~~
	151	45	50.855	
	153	45	.215	
	152	45		
	152	10	51.01	
	152	33	50.835	
			.175	

0^h 45^m

J W

Power no 4

Seeing not good enough for no. 5.

Tel. meteor about 10 mag.

Measure^{of distance} not considered as worth anything

Wires on the stars

U. M. S. Wires out on the stars

.496	.460	.470
.392	.364	.364
.104	.096	.106

Position 138° 15'

No use too mistakenly
Double image prevails throughout but
worse at the last.chron 236 Antiope and unknown comp. star "i." about 9th mag.

Pos.

350° 45'

Δ α cos δ

J W

Planet precedes

22 ^m .5	27.86	45.43
23 ^m .2	.71	44
24.0	.64	43
25.0	.87	
26.8	.70	
1 24.30	27.756	45.433

-17.677

Pos 80 45

1 33.3	57.04	34.35
33.9	56.90	53
34.8	.91	54
35.4	.65	
35.8	.70	
35.9	.80	
34.85		

Planet north

1	40	24
1	42	48
1	44	8

Nov 27 Tuesday

Stellar focus adjusted.

Rizzi III 98

S. N. S

Dist

Come

293° 43'

comp. p.

41.65-

42.29

293. 13'

41.62

27

292 50

41.64

27

294 19

41.60

26

294 19

41.57

26

41.61

41.60

95 beti JW

Power no 3

127°

Companion s. p. not certain that the companion was seen

Power no 4

143

337

S. N. S Not certain that he saw anything

84 beti

JW

209° 3'

15.48

14.99

2h 45m

204 45

49

15.01

203 30

51

01

203 45

56

00

203 30

54

54

54

54

4' 2"
15.47 too small.

Nov 27 Tuesday

Z 323

250 45

JW

36.87

36.57

251 30

84

56

251 30

86

55

3^h 15^m

250 20

251 15

39 Eridani G. M. S. Cant see it at all - clouds.

Dec 1. Saturday

Meteo and Arg Z +11° No 592 JW

mon. 236

h	40 ^m .4	34.61	~~29.20~~
	41.2	60	29.92
	41.8	73	86
	42.3	70	80
	42.6	80	82
	42.8	74	29.83
	43.2	64	
2	47.04	34.689	29.846
	48.5		
2	~~47.5~~	47.20	48.32
	48.0	14	27
	48.4	22	30
	48.8	09	27
	51.3	12	30
2	49.60	47.154	
2	56.3	33.53	29.25
	56.8	20	23
	57.3	14	
		33.29	29.24

Comp. star on e
Coinc. with b.

$$\Delta \alpha \cos \delta = be - 4.843$$

planet precedes.

Planet south

Star on e

Coinc. with c

$$\Delta \delta = ce +$$

$$\Delta \alpha \cos \delta = be - 4.05$$

Dec. 2. Sunday

Search for meteoric body of Nov. 13, 1866, between
and α
8

Star observed last night found not to be Antiope.

Telescope moves easier in declination than ever before.

Cape of Good Hope Catal. 3432

JW

121 15

229 0

131 30

132 0

130 15

130 48

Power no 2

47.36

28

41

47.350

48.28

28

28

48.280

6.930

Too faint for more measures of distance

Neptune

(Probable) Satellite distinctly seen by JW & GMS in nf quadrant.

Power no. 3.

JW

50.34

conc. 48.48

44

mean 48.467

1.873

Wires on stars.

Position circle $47^{\circ} 30'$ Wires at right angles to ^{line of the} stars.

1866 Dec 2. Sunday

Neptune J V

2^h 45^m

26.41
28.06
1.35

at the distance of satellite
Wire as far on other side of planet
Better measured than the first.

⊙

26.58
28.12
1.54

" " "

First better be rejected. if discrepant
i.e. it was not on same
in the same way

Position
137 45

3^h 6^m

139° 4' G.M.S.
139 21
137 0
137 52 not so good

57 18 come
57 33 53.66
57.255- 53.62
53.655- .62
3 570 64
1.782 53 655-

Satellite in the middle

⊙

⊙

74.90
74.86
74.85-
74.87
76.383
1.573

come
76.38
38
39
76.383

Satellite better seen than at any time
Planet in the middle

Uranus. Jw.

2.
3.
4.

No 1.	Position	238 0	4 ^h 20 ^m
2.	"	137 26	4 ^h 25 ^m
3.	"	112 45	4 30 ^m
No 1		271 0	4 35

Observer believes this to be the true no 1,
no. 4 not seen at the last.

G. M. S.

4^h 45^m

No. 2 139° 48'
No. 3 115° 13'

No. 4 appears at sight. observer believed to not
be a ghost.

No 2 ~~and~~ Position 51.15-

4^h 57^m Dist- 49.83
49.78
49.96

~~by placing~~ wind perpendicular
winds on the stars -

Come -
54.26
54.28
54.30

No. 3 90 + angle of position 26° 42'

5^h 3^m

Dist- 51.21

Come
54.28
54.27

5^h 3^m

51.06
51.08

winds on the stars.

No 2 Jw

50.16

5^h 13^m
14^m

No 3

51.57

5^h 18^m

mean 50.15

54.28

54.26

54.25

Dist. 4.113

54.263

54.47
.69
51.61
51.585

5 20

Same Come.

No 2 JW

50.34

20.

Same
Comp.

00

00

Turned on Mars. Seeing poorer than before. Limb
 unsteady. No remarkable features except relative brightness of
 limb compared with centre. The circumference ^{has} always appeared
 white and much brighter than the central portion.
 Turned on Sirius. No companion visible.

Dec 3. Monday

22^h 30^m

Neptune. No satellite visible.

0^h 0

"

"

"

Double star 0^h 47^m right asc. by chron. 236

+ 2° 34' declination

wires parallel

perpendicular to line of stars.

0^h 30^m

114 50

24 35

113 0

24 15

114 30

24 50

115 30

25 30

115 30

26 30

mean 114 40

26 0

mean 25 17

L. M. S.

48.09

48.075

.01 00 00

47.95

.945

91 92 93

.14

.130

.10 .08 .07

Time
0^h 48^m

Dissection 90 + 21° 3'

120° 2'

21 45

116 15

Seeing getting

24.35

116 58

worse

30.32

120 25. Seen a little better

114 28

1 15 255

Transit of Neptune

1 22 22.2

" " star.

star north of Neptune ~~was~~ about $\frac{4}{10}$ of the field of
power no 4.

No satellite of Neptune certainly visible. J. W. saw a faint point near

Monday Dec 3 1866

persistent than the rest in the sf. quadrant. about 70° from the position of last night.

η Tauri Z 412

Not distinctly separable. Position 210° suspected by J.W.

Aperture reduced. by frostboard cap but star still single.
Elongation not so decided as before

η Orionis

Double image.

Direction $83^\circ 31'$
 $79^\circ 15''$
 $80^\circ 28'$
 $78^\circ 28'$
 $76^\circ 30'$
 $79^\circ 38'$
 $81^\circ 17'$
 $261^\circ 17'$

G.M.S

No use to measure any more * no longer double.

$90 + 357^\circ 30'$
 $353^\circ 8'$

Persistent double image

Z 942

Clouds prevented observation.

Dec 5 Wednesday

Neptune JW Position of satellite without illum. 136°

GMS " " " " 125°

22h 50^m

Satellite s.p.

with illum. wires parallel to line JW 142°

Satellite thus



by chron 236

$90 + 56^\circ 30'$

22h 58^m

wire about $\frac{1}{2}$ radius

of planet on opposite

side of centre from satellite

Dist. 50.14

53.43

3.29

$$\text{Dist} = 1.645 - \frac{1}{2} \text{ radius of planet}$$

$90 + 47^\circ 45'$

23h 4^m

49.95

same as before 53.40

3.45

wire on centre of planet.

23h 9^m

$90 + 51^\circ 5'$

49.68

same as before 53.41

3.73

23h 14^m

$90 + 47^\circ 20'$

49.94

same as before 53.44

3.50

wire c used for
coinc.

Dec. 5 Wednesday

Wire ~~is~~ used for conic. $23^h 23^m$ $90 + 41^\circ 50'$

Observer thought the measure of distance small
gave special attention to the angle.
This measure of distance to be rejected. Conic.

~~48.92~~
~~51.88~~
~~2.96~~
~~51.88~~
~~51.90~~

$23^h 23^m$ $90 + 41.50$ 48.92 51.88
 2.97
 1.48 51.90

Haze.

23 34

Measure of diameter
in direction of satellite.

51.595
 51.865

23 39

$90^\circ + 42^\circ 15'$ 48.17 51.89
Observer thought the measure large.

G M S

 $1^h 11^m 13^s$ $90 + 50^\circ 35'$ 48.33

Conic

 46.50

1.83

Planet in mid-
wires ~~is~~ bestial
on retina $1^h 20^m$ $90 49^\circ 56'$

52

~~47.83~~

1.904

22 30

 $50 9'$

52

~~47.62~~

1.694

25

 $48 25$

52

~~47.83~~

1.904

28

 $47 40$

52

~~47.74~~

1.814

 $1^h 21^m 3$ $90 + 49^\circ 25'$ 9.146 1.829

mean

Conic. 50.94

92

92

93

92

50.926

J W

 $35^h 35^m 90 + 49^\circ 45'$ $47.45 \quad 50.965$
 3.505

1 55-

 $90 + 50^\circ 10'$

9. M.S

53.12

4.68

Circles

51.34

51.33

51.33

58

49 30

53.33

2.

lines horizontal
in retina

All obs. so far with power no 3.

Double star of Dec. 2. $0^h 47^m + 2^\circ 37'$

Seeing not good enough to measure it. J W

Returned to Neptune. Disc. vague. Seeing much worse
than before. J W $\Sigma 942$ J W $105^\circ 20'$

104 30

 $3^h 25^m$

105 35

104 30

104 50

mean 104 57

Stars each about 10 mag.
only lower lamp~~109 30~~

3 30

 $90 + 22 \quad 30$
 $21 \quad 45$

both lamps.

3 35

109 30

109 30

110 45

109 35

112 30

107 15

107 2

 $3^h 40^m$
~~one lamp put out~~
only lower lamp

Dec 5 Wednesday 1866

111 45

113 15

111 30

The other lamp alone.

3h 50m

46.255

253

21

22

Conc

45.86

88

89

Uranus GMS

3
14 12

No 1 90 + 108 28

52.20

4h 15m

poorer measure 110 40

9

107 0

52.23

21.7

52.215



wires thus.

Conc 49 32

30

32

33

49.318

No 2

4h 26

28

31

direct

90 + 142.3'

90 + 142 8

143 25

53r 72

con 50 29

53r 99

con 50.27

53.96

con 50.33

con 50.31

con 50.30

53.890

50.300

3.590

Planet in middle
wires horizontal

Wednesday Dec. 5-

1866.

No. 3	36 ^m	direction 90 + 125° 20'	44.00	Coinc 47.53	line on Sat.
4 ^h	38 ^m	125 32	44.07	47.52	Sats all in s.f. quad.
	39	125 44	43.89	154	
			43.987	47.530	3.543

Diameter - direction of No 3 wires 260° 45-

50.541	Coinc 49.983
50.507	.930
50.504	.960
50.620	.970
50.587	.960
50.550	49.960
50.620	
50.561	49.960

these observations have all been made with Power No. 2-

0.601

No 2 - wires directly on the stars

4 ^h 54 ^m	direction 90 + 142° 31'	48.21
	142 17	48.19
		48.20

Coinc.	51 45
51 45	
3.24	

Lampes lighted on both sides throughout all the observations

No 1 4 ^h 58 ^m	90 + 115° 30'	48.67
5 0	117 31	48.74
		48.705

51.44	
51.42	
51.44	
51.44	2.735

5 ^h 11 ^m	JW No 1	90 + 110°	without illum.
13 ^m	2	90 + 140	" "
5 ^h 15 ^m 2		90° + 131° 0	with "
21.7		121° 15'	

GMS.

Mars [^] Superior brilliancy of limb very marked. Spot darker than the rest on preceding part of central portion, a little north

J W

Bright spots on limb, line joining them $174^{\circ} 20'$



Dark spots in middle. Seeing not good enough to justify drawing.
largest dark spot near northern side, preceding.

Sirius. Companion $216^{\circ} 30'$ ^{s.f.} GMS very doubtful.
" " $87^{\circ} 15'$ ^{n.f.} J W plain as possible.
85 0

Doubtful afterward if not a ghost.
Not visible.

Distance from memory less than 1 rev.

Dec 7 Friday

21^h 55^m α Aquarii for zero of pos. S.M.S. Clamp other
80 36 260 35

mic. head below.

obsns. on mic. wire at 52 rev.
uncertain direction of rot (52.12)

52.36 80.39 260 38

52.38 80 35 260 34

mic head above

qu. if not 74 50.⁸⁶~~74~~ 260 44 80 40

50.72 260 39 80 35

50.71

193

182

0

375

Mean of all

(260° or 80°) 37.5

Obsns. with fuser no 1.

Telescope E.

Friday Dec 7 1866

3	57	3.02	54.24	wires the same
3	59	3.53	60.81	wires on stars.

Coinc. 57.23

27

24

26

~~26~~
26

illum. bad.

observations all made
with power No. 4.

No 1

4^h 13^mdirection
89° 18'

4 15

88 4

4^h 17

178° 40'

61.35
4.09

19

179 7'

61.47
4.21

22

179 17

52.55
4.71Coincidence as
above wires horizontal on retina
wires prop on
retina

wires on stars

"

Planet in middle

Coincidence changed here

25

180 47

52.72

4.55

time

57.10

57.10

57.07

57.11

57.10

Wires Horizontal
on retina

Planet in middle

Friday Dec 7 1866

Remarks

No 2

#

G.M. 6

4 29 139° - 35'

Wires on stars
Parallel

30 138 17

Go
come

Perpendicular on return

33 90+ 49 13 53.96 57.12

Wires on stars

35 51 7 53.97

37 52 45 60.61

Planet in the middle

39 51 0 60.91

Mars G.M. 3



Dark in centre as before, colour deeper red; yellow on the limb. ^{North} pole, ^{most} brilliant portion of disc. and dark spot immediately above it on line joining poles. Position of line joining poles 184° 32'



a yellow
b greenish white clouds
c white

G.M. 5 Breadth of bright ring of limb about $\frac{1}{6}$ to $\frac{1}{5}$ that of planet North polar zone same breadth but more brilliant and quite well defined.

Powers no 5 and 6 tried but seeing poorer.



Sirius. After long watching J W thought he saw the
companion. ^{with power 4} but could not afterwards be sure of it.
Seeing not so good as before.
S M S could not see it.

Dec 10 Monday

Observations prevented by clouds until after 10 $\frac{1}{2}$ o'clock

Turned on Wranms at 11. Seeing not good.

Wranms G. M. S. observer

Time	Sat. No 1	Nearly North
4 ^h 27 ^m	90 + 263° 57'	60.74
29	261 17	60.44
32	260 0	60.71

Satellite in middle
seen only occasionally
Sat. nearly north.

No. 2 nearly parallel

Sat. in middle

Time	Sat. No 2	Distance	Coincidence	Remarks
4 35	90 + 348° 13'	58.61		
37	350 7	58.08	51.42	51.34
38	349 55	58.33	42	34
41	349 20	58.19	41	34

with bright
wires as usual

dark wires
on disc. of planet

Dist. meas. of distance
The ^{first} of the two sets
for coincidence should be like

No 3. nearly South.

Time	Sat. No 3	Distance	Coincidence	Remarks
4 49	sent see it			
51	90 + 88° 30'	56.42	51.36	
54	82 22	56.31	51.33	Bright wires
56	80 5	48.53	51.32	as usual
58	80 50	48.66	.33	

Sat. in middle -

very poor measure

Planet in middle

Dec 11 Tuesday

by Chron 236

G.M.S. Immersion of γ Aquarii

0 49 31.3 $\pm$ 0.1
well observed
Power no 3.

Emersion " " "

1 40 7.5 $\pm$ 0.5
Power no 1.

Moon's limb very wavy and star faint;
first distinctly seen at 1^h 40^m 9^s.

G.M.S. Neptune's Satellite.

Satellite South preceding. faint.

Wires thus  { 3^h 3 25-
5- 44
7 24
10 10

angle 5^h 2 48 screw 48.32
5-4 2 48.24
5-2 30 53.04
5-3 20 53.08

observations made with power 4.

half wgt. 13.45

Satellite very faint in last obsn.

5-2. 29 52.99

coinc. 51.40

Wires horizontal on retina throughout.

51.36
51.38
38
35-

Dec 13

Dec. 13. Wednesday.

visitors until 8 o'clock

turne on Neptune. Satellite not seen with either arm 1 2 3
or 4

Dec 12 Wednesday

0^h 50^m Neptune G.M.S.

Examined for some 7 minutes with power no. 4
 but satellite not seen. Seeing poor.
 Chron 236 Disc. indistinct.

G.M.S. { 7th Mag star a little north. 2 22 14.1 $\pm$ 0.1
 Power no 4. { BAC 7620 2 24 43.5 $\pm$ 0.3 moon's limb not visible
 on account of clouds.

3^h 10^m L.W. Uranus. No Satellite seen. ~~at~~ Certainly although there
 were no clouds.

Azelanders Zone + 11°. No. 619 - Stron's Melita G.M.S.
 Position Circle 350° 38'

		$\Delta\alpha$	$\Delta\delta$	Planet South
3 ^h 46 ^m 30 ^s	34.05-	5115	58.49	Mag 11. Comet
58	33.94	33	58.48	72.31
47 23	33.84	57	58.31	.33-
55	34.16	52 30	58.39	.33-
48 22	34.13	55	58.49	.33
		53 35-	58.49	72.32
		53 54	36	
		10	58 45-	

	$\Delta\alpha$	Comet	unchanged throughout
3 ^h 49 ^m 50	33.33	72.38	
4 30	33.29	.35	
58	33.00		
3 56	33.23		
4 31	33.04		

Dec 13 Thursday
Uranus J WSatellite No. 3. S. f.
3^h 22^m
Chron. 26.0
286 2890 + 293° 20'
245 45
294 35
76.38
72.28.26.25.
4x11Not seen distinctly
enough to measure distanceObserver: G. M. S.
3 46^m 2^s 90 + 295° 40' 68.92
47 55 293.42 65.31
52 5 298.25 75.98Wires on stars
Sat. in middle
Planet in middleSat. No 4 n.p.
3 59 45 90 + 335° 16' 76.32 72.25.27.
4 52 18 337.0 81.51
4 4 20 336.40 68.04Planet in middle
Wires on stars
Sat. in middle
Planet in middle

Stellar focus adjusted. by J W

Another n.p. J W

4 17 90 + 312 30 78.02 Sat. in middle

Lat 10567 Neither W nor S could ~~not~~ separate it.

η Orionis GMS 260 12 Star very tremulous, but well separated.

JW 263 15 Too tremulous

Sirius
foc. -

Both observers thought they saw the companion, but seeing

Region of Virginia

• A. Z 1212

follows 41° about 5' north.

1866 Dec 14 Friday 9 MS

21 55 External Therm. No 4 19.3

22 20 ζ Pegasi ~~near~~ for zero pointClamp
80 44Other
260 43

Therm No 1 in W alcove

26.1

2 " E "

27.5

Bond (mahog) in obs chair

37.8

Circle Set at 350 38

Stellar focus 28.1

22^h 28^m ζ Pegasi

Bond 33.5

Transits over c d e b a

1st three without illum.1st Set wire c at 77.622^d Set " c at 77.623^d Set " c at 67.68

Power no 1.

illum. on both sides.

23^h 20^m

No 1 26.0

2 26.7

Bond 27.4

4 outside 18.1

Dec 14 Friday

Set wires at $170^{\circ} 38'$

7^s^a 28^s pre. (need to be done.)

Region of Danae.

Arg. Z 1182

~~16~~ Arg. Z. 1212 and Virginia. J.W.

g. m. s. Δ of evs δ Planet follows. South

4	51.3	78.85
	52.1	74
	52.7	74
	54.3	78

4 ^h	58 40	78.22
	59 14	78.01
5	1 20	77.99
	1 58	77.99
	2.30	77.75
	3 30	77.80

Come -

71.45-

71.41

.45-

142

42

	Δδ
5 9 40	33.21
10 30	33.20
11 2	33.29
16 35	33.30
12 00	33.36

Dr

16 20	65 92
17 00	66 00
17 40	65 99
18 18	66 06
18 45	66 13

71.46

71.45-

Dec 15 Saturday

Danae observed on Chronograph with Arg. Z. 1182 GMS
 Follows Arg Z 1174 91^s, immediately afterward; eye & ear.
 by Chron 236

Imm. of 44 Piscium

3 41 41.2 $\pm$ 0.2 GMS

Em

4 16 30 $\pm$ 1^s

Not seen till it had been out some
 4^o judging from subsequent motion.

4 ^h	50 ^m 5 ^s	$\Delta\alpha$
	50 50	64.70
	51 17	64.62
	51 55	64.77
	52 22	64.80
	52 55	65.00
		64.97

Planet precedes position circle 170 38 G. H. 5

Virginia & Arg Z + 18° No 1209

4	^m	$\Delta\delta$ Planet south/circle
	55 ...	66.91
	56 17	67.08
	56 50	66.91
	57 15	66.86
	58 00	67.04
		39.41
		.43
		.45
		.42
		.40
		39.43

5 ^h	3 ^m 30 ^s	$\Delta\alpha$
	5 55	65.72
	7 20	65.87
		65.89

Bright Spot on dark portion of moon appeared to JW much brighter
 than usual, also larger.

Dec 20 Thursday

S.S. Search for Dargae. Probably found, but too faint to observe in bright moon-light. Star observed Dec 15 still in place. A small star then near it missing. reads 28.1.

11 Orionis

Seeing very poor. Stellar focus cannot be improved; seems to be right. J.W.

C. 350 91
170 34

Ext. temp - 3° (no 4)

47.570

Mic. head to the right. Tel. W.

570

577

Cone with wire b.

586

580

580

578

583

58m

No 1 | 15.0

2 | 8.3

Transits of 11 Orionis over
mic. wire at 57.58 and wire b & wire a.
also at 57.58 " "

564

580

574

591

540

555

568

588

570

47.570

BAC 2189 =

Transits of P VI 203 over ^{mic} wire at 57.58 & b. J.W.

Ext. temp. (no 4) - 4°

by Chron 236

SMS, Immersion of 115 Tauri 7 3 30.0 ± 0.2 } Power no. 1.
Emersion " " " 8 7 57 ± 3^s }

Star not seen till some 12^s out, judging from subsequent motion. Moon's limb very ill defined.

Dec 26 Wednesday
Sat. of Neptune

Chron 236

2^h 6^m

16

12

90 + 52° 15'
53 40
51 43

49.20 (GMS) wires on stars
49.26
49.31

Satellite n. f.

come.

48.03

02

03

02

03

Satellite in middle

50.79

813

49

519

Satellite very faint ($\frac{1}{2}$ wt.)
" " "

2 23

25

35

39

90 + 52 40

50 56

51 16

51 55

42

44

47

52 14

53 17

53 17

46.76

77

90

Planet in middle

come

48.03

04

03

52

53

55

56

59

140 13

141 32

141 52

141 38

141 0

Sat. faint

$\frac{1}{2}$ wt.

Planet 8
satellite between
wires. about
2 w. apart
parallel to
line joining stars.

Satellite seen more distinctly when first looked at than ever before;
but have obscured it more or less during the obsns.

Chron 236

Uranus JW
3^d satellite4^h 30^m

90 + 109 15

45.49

wires on stars
satellite n. p.

Coinc.

42.03

37

111 0

41.58

Coinc.

44.82

39

109 30

41.62

84

80

84

4th Sat

4 44

90 + 142 45

40.79

46

143 0

45

48

143 5

40

50

72

52

75

faint
satellite n. p.

4 Sat.

G. M. S

4 5^h 7^m

90 + 144 32

54 32

Coinc.

49 77

wires on stars

5 2^h 9^m

+ 144 19

54 42

49 77

5 1^h

145 30

54 38

49 83

5 1^h3rd Sat.

81

82

84

82

5 7^m

112 13

53 54

8

113 42

53 22

Clouds prevented further work.

Too faint for another measure
Coinc.
49.85
85

Dec 28 Friday

Jerome & Arg Z +15° No 1051

• 1053

• 1052

• 1051

• a

c. d.

b. e

• A Z 1054

Transits of b c d e & 1052 by JW
" " " " " 1051 " "

1 Transit " a b c d e 1051, 1052, 1053, 1054 by C.M.S.

• c
Arg Z no 1111

b

• a

a north of A.Z 1111	3.5
b " " "	2.5
c south " "	0.5

Dec. 29. Saturday -
 Region of Teroma. All the stars of last night still in place.
 Virginia & Arg. - 1107- P. M. S Planet = δ of last night.

		$\Delta\alpha$	Coine -	
6 ^h	2 ^m 20 ^s	67.28	57.19	as circ 170° 38'
	2 52	67 14	57 18	
	3 10	67 0	57 14	Planet follows
	35-	67 32	57 19	
	4 6	67 03	57 17	

		$\Delta\delta$ Planet north	Coine.	
6	8 32	82.52	Same	260° 38'
	55-	82.70		
	9 15-	82.79		Planet north
	45-	82.58		
	10 2	82.77		
	25-	82.86		
	10 ^m 43 ^s	82.62		

	$\Delta\alpha$	Coine
13. 0	66.46	57.18
13 20	66 31	57.19
40	66 38	57.18
57	66.27	57.17
14 20	66.47	57.14
		6

1866. Dec. 30th Sunday.
 turned on Neptune. Satellite not visible. (303)

Uranus, (G.M.S.)

3 rd Satellite	2 ^h 49 ^m 40 ^s	276° 45'	49 rev .34	wires on star.
"	50 ^m 40 ^s	275° 28'	49 " .03	"
" s. f.	52 ^m 40 ^s	274° 10'	49 " .10	"
"	53 ^m —	275° 43'	49 " .19	"
"	54 ^m 20 ^s	275° 25'	56 " .06	Planet in the middle
"	56 ^m 20 ^s	277° 46'	56 " .16	"
"	57 ^m 40 ^s	276° 44'	50 " .26	"
"	3 ^h 1 ^m 30 ^s	277° 17'	56 " .29	"
			52 " .52	Coincidence
			52 " .54	"
			52 " .55	"
			52 " .54	"
			52 " .54	"
4 th Sat.	3 ^h 7 ^m 20 ^s	255° 31'	48 " .24	Sat. v. faint. obs doubtful.
"	8 ^m 45 ^s	254° 40'	48 " .11	This far alone, wire on star.
" s. f.	10 ^m 20 ^s	254° 0'	57 " .27	Planet in the middle.
"	11 ^m 45 ^s	252° 27'	57 " .09	"
			52 " .52	Coincidence
			54 " .54	
			54 .54	
			50 .50	
			52 53	

Mars. Poles pretty well marked, north pole most distinctly. The south pole appears a little less than 180° (say 170°) from ^{rest} A, counting N to E. The whole limb much brighter than the ~~middle~~ ^{generally} which in the centre appears reddish, and is marked with dusky lines nearly perpendicular to line of poles. The southern part of central portion perhaps a little green.

Power no 4.

Dec 30. Sunday

Virginia & Sz. 1105-

pos. $35^{\circ} 38'$

		$\Delta\alpha$		
5 ^h	44 50	18.92	59 06	Planet / m cells
	45 25	19.04	04	
	46 0	18.57	06	
	46 40	18.54	07	
	47 30	18.69	06	
	48 15	18.74	06	

5 ^h	53 15	51.05	39.07	
	53 40	50.68	39.07	
	54 15	50.79	39.11	Planet north
	54 40	50.82	39.09	
	55 10	50.79	39.08	
	55 35	50.75		
	56 10	50.73		

		$\Delta\alpha$	
6	00 15	13.29	54 28
	1 50	13.29	54 31
	1 50	13.28	54 29
	2 15	13.19	54 27
	2 3		28

Jan. 3. 1867 - Thursday

hrs 350 38

Satellites of Uranus - G. M. S.

	position circle	scale	
3 ^h 34 ^m 37 ^s	90 + 26 3. 5-	37.91	Satellite faint ~~at~~ in the middle. Satellite North.
36 8	259 48	37.99	
	coinc.		

Another satellite thought to be seen independently by J. W. & G. M. S. at about 3^h 15^m. G. M. S. estimates its position (N to E) about 5° > than that of No. 3. and its distance about 1/3 of that of No. 3. Satellite No. 4 well seen at first but haze subsequently prevented measurement.

48.66

48.63.

48.64

48.62

48.59

48.63

1.68

1.98

3.96

4.20

.24

~~diameters~~ of Mr. Davis
Coincidences

48.46

48.88

.42

Virginia & Aug. 1077 G. M. S.

time	$\Delta \alpha$	Planet follows
5 ^h 27 55	69.60	coincidence
28.30	69.72	49.10
28.57	69.64	49.11
29 13	69.78	.10
29 38	69.49	.10
30 5	69.54	49 11
30 48	69.63	

arc 170.38
or 350 38

	$\Delta \delta$	Planet south
35 40	19.51	same
37 40	19.28	
38 20	19.69	
39 4	19.67	
20	19.68	
30	19.73	

not very satisfactory
Can't get a good light

Jan 3. 1867 Thursday

$\Delta\delta$

5- 40 00
40 17
40 30
40 47
42 00

19 59
19 63
63
63
69

lim e

49. 11
14
11
11

19. 28 certainly wrong

$\Delta\alpha$

5- 46 8
46 47
47 27
48 22
48 49
49 19
49 45
50. 31

68. 68-
69. 00
68. 44
68. 38
68. 49
68. 31
68. 22
68. 37

55 17

68. 18

also Mr. Davis

Race hide washer put on to declination axis in the afternoon, making its movement much more easy and uniform.

Jan 4 Friday

66 Ceti G.M.S

Field Illumination; red light; stars very steady; power no 1.

	123° 1'
	123 55
	123 32
	125 12
	122 40
mean	123 40

90 +	29° 30'
	26 43
	25 58
	26 58
	27 52
mean	117 24

2^h 45^m

companion south

Distance

56.16
27
19
17
22

56.202

Come

54.53
54
54
55
55

54.548

γ_w

$$\begin{array}{r}
 90 + 214 \ 35 \\
 214 \ 55 \\
 215 \ 10 \\
 \hline
 214 \ 48
 \end{array}$$

$$\begin{array}{r}
 [126 \ 45] \\
 120 \ 0 \\
 125 \ 10 \\
 123 \ 30 \\
 123 \ 50 \\
 124 \ 45 \\
 \hline
 123^\circ 27'
 \end{array}$$

$$90 + 34.45$$

 γ beti SMS

$$\begin{array}{r}
 242 \ 28 \\
 243 \ 13 \\
 241 \ 14 \\
 239 \ 10 \\
 \hline
 \text{mean } 241.31
 \end{array}$$

Power no 1

 γ_w Power no 3 $3^h 20^m$

companion precedes.

$$\begin{array}{r}
 240 \ 35 \\
 237 \ 58 \\
 240 \ 15 \\
 240 \ 5 \\
 238 \ 35 \\
 \hline
 \text{mean } 239.20
 \end{array}$$

$$\begin{array}{r}
 90 + 329 \ 40 \\
 330 \ 20
 \end{array}$$

$$\begin{array}{r}
 55.25 \\
 27 \\
 275 \\
 255 \\
 285 \\
 \hline
 55.267
 \end{array}$$

$$\begin{array}{r}
 54.925 \quad 54.955 \\
 \cancel{94} \quad 95 \\
 \cancel{945} \quad 95 \\
 \cancel{98} \\
 \hline
 54.952
 \end{array}$$

Sun & Friday

Diameter of Uranus

J. W

Coinc

45.540

45.837

~~297~~

44.91

.870

90

measure not good

Position 16 40

Much time expended in trying to adapt pile illumination to observations of Uranus

Y.M.S. 45.411

44.880

0.531

Position 16 40

Satellites too faint to be measured with field illum.

4 th Satellite		Illum. of wires		JW	
Chron. 236		n.f. of			
6 ^h	0.0	90	+ 206 45	49:45	Wires on stars
	2.7		209 45	49.43	
	4.3		209 45	49.58	
	5.7			49.46	better measure
	7.3			49.55	
	7.8			49.47	too faint to be measured satisfactorily

Coinc.

44.86

87

Jan 4. Today

4th Sat. 4. M.S

about 6^h 15^m

49.12

208 40

rough measures, too faint
for accurate work

49.28

208 16

6.20^m

3rd Sat.

12.5-5.5- 4923

Coincidence changed, not measured
object -

So use to measure

owing to faintness of satellite and uncertainty caused
by proximity of a small star.

Jan 9 Wednesday

Neptune 2^h 30^m JW could see no satellite.G.M.S. suspected one close to the disc of the planet
on the s. fr. side. Powers no 3 & 2.

The atmosphere seemed clear. 1

Set on Shure 3062. Seeing too bad to measure it.

Uranus JW Power no 4.

by chrom 236

3^h 43^m. 3~~48.1~~

90+

336

0

~~32~~4th Satellite. preceding

very faint

3 48.1
50.63^d Satellite following
322 45

63.23 very poor measure wires on stars

Come.

66.30

Satellite no longer visible

4 Sat

56.8

333 30

70.82

poorer measure than the other of same satellite
come

66.34

3^d Satellite

4 2.8

4.7

63.23 - 3/
.33

Obsns. discontinued, and resumed at 5^h 30^m
3^d Satellite

5 35.0	90+329 5	63.22	
37.0	333 55	63.09	G.M.S. Meas dist poor angle about right
40 35	334 46	62.97	dist not good
42	332 52	69.79	planet in middle
46	333 0	70.10	
47	330 47	59.59	Satellite in middle
50	332 17	59.70	

Coincidences - 66.25 .29 .30 .29 .29 .30 .29

this coin should
be used for my obs. also
Coinc in previous page was
not carefully measured
J.W

4th Sat

5 55	90+339.44	70.60	
5 57.30	340 30	70.45	
58 45	340 53	70.47	
6 0 35	339 30	62.20	planet in middle
2 10	340 15	62.10	

coincidences 66.34 .32 .30

wise on stars.

Jan. 9. Wednesday.

4th Sat

6 16^m

249 15-

3^d Sat.

7^m

241 5-8

Wires tangent to ball of planet; satellite between.



Jan 12 Saturday

Z 651 JW

Power no 4.

3^h 15^m

285 55
285 22
286 10
286 5
285 45

Direction of stars parallel to line of eyes.

90 + 17 45
16 25
16 0
15 20
14 30

42.48
42.515
42.40
42.49
42.46
42.45

ones
distance not so good as the preceding,
~~(reject)~~

3^h 30^m

cond.
40.93
93
925
925

G. N. S

3 35-

90 + 17 28'
270 16 54
16 10
16 48
16 33

42 44
42 45
42 44
42 40
42 42

wind blows stars about
companion follows.

286 40
286 55
286 10
287 16
286 14

coincidence
40.88
88
88
87
88

illumination of wises back
but improved before observations

Cone

~~50.99~~
~~97.8~~
~~94~~
~~98.5~~
~~96~~

ϵ
 Therm in At. above 21.2

Mic. wire set at 77.00

~~77.00~~
~~77.00~~

Pos circle 170 38 350 39

Transits of W V 615 over mic. wire and d, by Jw, Power
 Set at 171 38 by mistake no 1.
 for the finer fine transits

~~51.400~~
 084

080

095

080

095

687

083

086

077

072

082

080

081

095

~~072~~
 mean 51.083

Power no 5.

Coincidence with wire d. (GMS)

Power
 no
 1.

Transits of W V 615 over mic. wire at 81.00 and d
 " " " " " " " 71.00 " "
 " " " e " " " " 61.00 " d

51.072

079

060

060

058

090

073

078

064

086

mean 51.072

Coinc. with d.

Power no 4

Equatorial meridional

Star for zero point

Position circle

260 44 80 44

43 42

42 41

Power no 1.

Therm in E Mevce 20.4

Ext. Therm 15.5

Sirius. Neither W nor S. could be sure of a companion.

~~A~~Position Circle
249°
(following)Distance
about 1 rev.9 M S. Extremely uncertain
very probably a ghost;
a companion also occasion-
ally appeared on the other
side.

Mars. Seeing too poor for examination.

1867 Jan 14 Monday

Transits of W. 1. 886
over diaphragm.Pos circle 170 45
J W.

Power no 3.

a	b	c	d	e	Eye piece
26.638	31.695	50.712	51.736	76.700	slid across
632	700	698	690	701	to follow the
602	700	717	710	690	star.
615	713	705	710	685	
640	700	690	721	701	
650	692	700	721		
645			705		
615			712		

Transits of another star $\delta = -10^{\circ} 28''$

stellar focus 28.98

6 9
+10 0

Power no 3.

G.M.S.

a	b	c	d	e	
24.225	29.284	48.300	49.274	74.270	
221	270	299	290	277	Therm in
230	284	294	279	280	
229	280	296	298	269	E. above
225	287	297	282	270	
218	271	292	304	252	
226	288	294	290	270	20° 5'
198	271	298	302	278	
246	271	304	290	269	
228	275	294	281	255	
mean 24.225	29.278	48.296	49.289	74.269	

Pos circle 170 40

wire e in coincidence. Transits of 75 (6) Orionis for value of screw rev. Power no 3
 wire d nearly in coincidence. " " " " " " " " " " " "

24.220	29.247	48.289	49.292	74.258	
222	249	281	278	252	
221	279	288	273	262	Power no 3.
234	273	250	288	261	
187	265	300	289	271	
mean 24.217	29.26 ³	48.282	49.284	74.261	

1867 Jan 16 Wednesday

Set the telescope to observe the occultation of Aldebaran, but clouds prevented seeing the moon.

1867 Jan 16 Wednesday
 Stellar focus adjusted by J.W. Reads 29.5
 Power no 1. Position circle $170^{\circ} 40'$
 Mic. wire at 31 rev. half way between a & b.
 Transits of W VI 639 for value of screw revolution. G.M.S.

Jan 18 Friday
 Set for Σ 622 but did not find it.
 " " " 844 " " " " Pretty cluster near the place.

Σ 901 J.W.

$107^{\circ} 30'$ Companion precedes. Seeing wrecked
 $104 20$
~~10~~ no use to try any more

90 + 196 30

45.87 very rough
 stars like
 nebulae

.92

com.
 47.67

.70

.69

Seeing too bad to continue observation.

1867 Jan 19 Saturday

+13°

Chron 236

 $\Delta \alpha \cos \delta$ Planet (91)? and Arg Z ~ 318

J W

3^h 45^m 43.18

47.7 48

48.5 10

49.0 05

49.5 42.88

50.0 42.80

51.0 43.05 best

mean 52.0 ~~43.063~~

43.19

43.091

Pos. 170° 40'

Planet precedes

with ~~com~~ wrong thread~~47.71~~~~.72~~~~.72~~~~.68~~~~.65~~~~.65~~

with right one.

48.80

.65

.65

48

56.5 19.91

57.3 92

57.7 92

57.8 83

58.1 83

 $\Delta \alpha \cos \delta$

4 45 42.61

5.0 43.10

Planet S

same com.

$\Sigma 622 \quad 4^h 15^m$

Dupllicity of star just perceptible; seeing very bad.

Distance evidently much less than 1 rev. (J.W. & G.M.S.)

$5^h 30^m$

Seeing improved though still poor.

J W
176 50
177 15
175 40
176 40

Components equal.

90 + 0

[81. 20]

59.48 better than the three following

465

435

50

44

pretty good measure

85 15

84 55

85 45

84 40

not a careful measure

afterwards seen to be evidently wrong

49.05

11

13

06

04

05

04

Mum. bad.

better

$\Sigma 850$. If found, not well enough seen for measurement.

Ext. Therm. -2° (No 4)
 of δ Draconis

Transits $\wedge$ for screw rev. J W.

Circumpolar L.C.

Vernier III 292 33

Zero point 80 36

260 38

Mic. wire in coincidence with c at 48.12

Ext. Therm. $0 - 6^{\circ}$ No. 4.

m

34.92

ζ Cancri $7^h 58^m 4^s.5$ $+18^\circ 4'$

Σ	1625	+12	10	+80° 52'	6.5	7.0	Dist	14"
π Urs Min	1972	15	39	80 53	6.1	7.0		30"
	2034	16	8	84 0	7.5	8.0		11.5

78 108

$$\begin{array}{r}
 41.3 \\
 34 \\
 \hline
 1652 \\
 1239 \\
 \hline
 1404. \\
 1080 \\
 \hline
 324 \\
 438 \\
 \hline
 1414
 \end{array}$$

$$\begin{array}{r}
 26.7 \\
 34 \\
 \hline
 1068 \\
 801 \\
 \hline
 908 \\
 468 \\
 \hline
 188 \\
 298 \\
 \hline
 298
 \end{array}$$

1866phae.pr0f..291w