

KG
11365
171

H. 17

Vol. III 289-388

Equatorial.

From March 10th 1853.

To April 3 1854

KG 11365.171

240

Dimensions of Object Glass of Great Equatorials

No 26-

Flint lens	15. ⁱⁿ 37	entire polished surface
Crown "	15. 37	"

Whole Diameter 15.ⁱⁿ 50

Effective

14.97

See page 292



KG 11365,171

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Dimension of Object-Glass of Lt. Equatorial

Flint lens	ⁱⁿ 15.37	entire polished surface
Crown ..	15.37	
Whole Diameter	ⁱⁿ 15.50	
Effective ..	14.97	

March 12

E.C. 7,49.00
236 7, 48,04.4

March 14th 1853 Monday

Star of 9^h = α
 Star of 11^h = γ = Star of Comp

$\gamma = 11$
 $\left. \begin{array}{l} \cdot \\ \cdot \end{array} \right\} 2.20''$

 γ is of α d.s.f. γ

34
 α 7.43 14.6
 7.09 18.3 1.07.7
 γ 1.09 6.34 22.3 1.07.8
 7.10 26.1

γ 8.81 29.1
 7.15 53.4 1.16.8
 δ 3.30 5.01 17 6.2 1.16.9
 7.17 10.3

α 8.07 56.8
 7.11 00.9 1.08.0
 γ 1.44 6.33 4.8 1.08.1
 12. 8.8

γ 8.32 18.02, 4
 7.2
 δ 3.35 4.57 19 20.0 1.16.6
 7.19 24.0 1.16.8

α 8.46 82.3
 7.13 36.3
 γ 6.32 1.07.8
 2.04 40.1 1.07.9
 7.14 44.2 6) 47.3
 9. $\times \gamma \alpha$ 1.07.88 = $\Delta \alpha$

γ 8.31 55.4
 7.20 59.5
 δ 3.45 4.46 22 12.2 1.16.8
 7.22 16.3 1.16.8
 117 29.0 47
 14.44 $\delta \gamma$ 1.16.88 = $\Delta \alpha$
 4.547

Scale error. $\frac{6.33 - 1.5}{6.31.5}$
 error for ref. $+ .2$
 $\times \gamma \alpha$ 6.31.7 = $\Delta \delta$

Scale error. $- \frac{1.1}{4.53.6}$ 7.19.34.83
 $\frac{25.8}{7.19.09.53}$ = chron. error
 error for ref. $+ \frac{1}{23.28.50.30}$
 $\delta \gamma$ 48 4.537 7.50.19.23
 $\frac{1.19.04}{7.49.02.19}$ M. S. Y. time

March 14 Continued
 Star x
 (236) 13.2

H 2.46.10 Dec. - 1.42.1

7.24.24. center of field scale reads 5.00

Starformag 7.27.23.0 scale read 10.23

7.24
 2 46 10
 4.37 50

Star x is Weiss H. IV No. 809 α 4.35.47.62 δ - 1.45.58.0 $\ln. p. + 3.032$ $+ 7.20$
 $\frac{1.24.90}{4.37.12.52} + \frac{3.19.9}{-1.42.38.1}$ $\frac{28}{242.86}$ $\frac{606.9}{848.96}$ $\frac{7.14}{-28}$ $\frac{57.12}{142.8}$ $\frac{199.92}{3.19.9}$
 $\frac{1853.0}{848.96}$ $\frac{7.14}{-28}$ $\frac{57.12}{142.8}$ $\frac{199.92}{3.19.9}$

$f = -6.34$ $g + 3.16$ $G 209.12$ $h + 18.75$ $H 276.09$ $i - 8.08$ $\alpha = 69.18$
 $\delta - 1.42.38$

H 276.09 i 0.90741
 α 69.18 $\cos$ 9.99981
 $H + \alpha = 345.27$ $\sin$ 0.90722 -8.08
 $\sin H + \alpha$ 9.40006 $\cos H + \alpha$ 9.98584
 $\sec. \delta$ 0.00019 $\sin \delta$ 8.47226
 h 1.27300 h 1.27300
 $0.67325 - 4.71$ $9.73110 - 0.549$

Mean α Weiss H. IV No. 809 α 4.37.12.52 Mean Dec - 1.42.38.1
 Correction to app -73 -8.1
 $x =$ No. 809 App. α 4.37.11.79 App. δ - 1.42.46.2
 follows x $\Delta \alpha$ 1.7.88 y south x $\Delta \delta$ 6.31.7
 App. α Dec of star y α 4.38.19.67 δ - 1.49.17.9
 follows x, y $\Delta \alpha$ 1.16.78 Δ s. of y $\Delta \delta$ 4.53.7
 App. α 4.39.36.45 App. δ - 1.54.11.6

$G 209.12$
 $G + \alpha$ 278.30
 $\sin(G + \alpha)$ 9.99520 $\cos(G + \alpha)$ 9.16970
 $\tan. \delta$ 8.47397 g 0.49969
 g 0.49969 $9.66939 + 0.47$
 $8.96886 + 0.09$

$f - 6.34$
 $- 11.05$
 $- 10.96$
 3.65
 $- .731$

By obs. in α and δ
 Star of comparison = $y = *11$ mag. Position, derived
 from Weiss H. IV No. 809 as follows -
 α 4.38.19.67 App. δ - 1.49.17.9

1853 March 14th $h m s$ 7.49.02.19 M. S. Time

$\Delta - x$
 $\Delta \alpha + 1.16.78$ $\Delta \delta - 4.53.7$

$h m s$
 App. α 4.39.36.45
 $\delta - 1.54.11.6$

Comparison of stars of March 10

7, 39, 50.7	4	4, 42	4, 42, 10	
7, 42, 01.6		7, 47	7, 50	4, 48
7, 42, 48.5	1, 57	8, 05	8, 08	8, 13
				3-25

~~Star~~ Salandre No. 9068 Dec-7, 22

236 7, 57, 50.2 H 3, 15, 32 No doubt the Star.

$$\begin{array}{r}
 7, 57, 50.2 \\
 - 25 \\
 \hline
 7, 57, 25 \\
 7, 57, 25 \\
 - 15, 12 \\
 \hline
 4, 42, 13 \\
 4, 42, 13 \\
 - 48 \\
 \hline
 4, 41, 25
 \end{array}$$

Star of 9 mag north of Salandre

Rigel

(236) 8, 03, 18.0 H 2, 54, 56 Star of 9 mag. 8, 00, 18.2 S 8, 32

$$\begin{array}{r}
 8, 03, 18.0 \\
 - 25 \\
 \hline
 8, 02, 53 \\
 2, 54, 56
 \end{array}$$

Salandre 8, 01, 06.3 2, 32
48.1 6, 00
8

$$\begin{array}{r}
 5, 07, 57 \\
 5, 07, 28 \\
 \hline
 30
 \end{array}$$

Comparison stars of March 8th
 Compom Weifu 1031

(236) 8^h 20^m 37^s H 3^h 31^m 53^s - 10° 49'

$$\begin{array}{r} 28 \\ 8\ 20\ 37 \\ 3\ 31\ 53 \\ \hline 4\ 48\ 19 \\ 46\ 51 \\ \hline 1 - 28 \end{array}$$

10 53

04

(236) W 1069? 8^h 43^m 55.1^s H 3^h 54^m 17^s Dec. - 11° 04'

$$\begin{array}{r} 25 \\ 8\ 43\ 55.1 \\ 3\ 54\ 17 \\ \hline 4\ 49\ 13 \end{array}$$

98

March 14
comet south of star γ
Dy. Dec

8^h 58^m 10^s 29.68
9^h 00^m 00^s 29.79
9^h 02^m 15^s 30.72
27^h 00^m 25^s 30.19
9^h 00^m 08.3 30.063
25.3
8^h 59^m 43.0 30.32
0.257

9.8

2056

2313

8^h 59^m 43.08 = -25186corr. for mot. in 8^m +16.614.082 = 43 at 9^h 08^m 08^s

γ 9^h 5 53.7
1.2
12.2
25.0
6^h 29.0

7^h 05^m 10^s

13.0

24.0

37.6

9^h 07^m 41.3

120.9

9^h 07^m 24.189^h 42.46

17 06.64

Mean 9^h 08^m 33.32

Chron. error 25.3

9^h 08^m 08.02 s.t. $\Delta\alpha = 1^m 11.70$ 23^h 28^m 50.309^h 39^m 17.721^m 34.899^h 37^m 42.83M. S. Time 3 obs. in 8 and 12 in α

Star of comparison = γ = * 11 mag. Position from
Weisse H. IV No. 809. (See prec. pages) * app α 4^h 38^m 19.67 * 8-1^h 49^m 17.9

1853 March 14th 9^h 37^m 42.83 M. S. Time

March 15

86 19^h 50^m 00^s 19^h 50^m 00^s
236 19^h 49^m 9.0 1^m 17.1
19^h 48^m 42.9
19^h 49^m 09.0
29.1

 $\Delta\alpha + 1^m 11.70$ $\Delta\delta + 0^m 14.08$ app. α 4^h 39^m 31.378-1^h 49^m 03.82

1853

Imm. 102 Tauve

March 16^E h m s
(236) 4..38..50-4^htoObserver G. P. B.
Great Refractorh m s
E.C. 4..45..00
236 4..44..10.8

March 16 P.m.

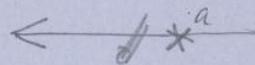
Immersion 105 Tauve Instantaneous

Chron. 236 h m s
8..14..55.5-4^hto

Observer C. W. J. State Equatorial

E.C. 8..22..00
236 8..21..10.6

March 18thR 4^h 38^m
Dec +4^o 10^m

$$\begin{array}{r} 9 \text{ } 1^{\circ} 12' \\ 6 \end{array} \quad \begin{array}{r} 6.00 \\ 1.50 \\ \hline 4.10 \end{array}$$


* a of ganag.

p north free. * of Ganag. = B

Pos. 89.9

Def. Dec. with * 9th

8.58.00	3675
9.00.00	3666
9.11.00	3730
<u>26.59.00</u>	<u>2071</u>
8 59.	3690
	3032
	658
	9.8
	5264
<u>5922</u>	
	64489
	1.04.48

Def. R
m.p.*

9.05.48.0 07

29.0

6.5

B is a star of the 9th mag
a " " 8th mag

B is s of a

Scale

B	5.00	"	9.24.04.4	1.13.5
a	5.19	19	25.17.9	

5.05	23	9.26.48.4	1.13.4
28	42	24.01.8	9
	21		1.13.45

* B

9.30.04.5 N 2.11'
Hw 4.52.58

9.30.04.5
37.7
9.29.26.8
4.52.58
<u>4.36.28.8</u>

1853 March 14th

Comet

Comet is n p. star of 9^{th} = β

dR

diff. Dec. Comet is n p. star.

β $\times$ 9^{h} 9^{m} 10.7 6.9
 17.6

β $\times$ 9^{h} 09^{m} 35.8 6.7
 42.5

β $\times$ 9^{h} 57.3 6.8
 10 04.1

β $\times$ 10^{h} 19.5 7.2
 26.7

β $\times$ 9^{h} 10^{m} 48.0 6.9
 54.9

49 51.3 5

9^{h} 09^{m} 58.260^{m} $06.90 = 4\alpha$
 37.7

$23.43.44.97$
 46.74
 $23.44.36.51$

9^{h} 09^{m} 20.56
 23^{h} 44^{m} 36.51

9^{h} 24^{m} 44.05

$1.82.51$

9^{h} 23^{m} 11.54

9^{h} 23^{m} 11.54 M. G. Linn

9^{h} 14.04 40.12
 15.03 40.41

15.53 41.05

16.46 40.90

21.46 24.8

9^{h} 15.26 40.62

38 30.32

9^{h} 14.48 10.30

9.8

8240

9270

100.940

$1.40.94 = 48$

cor. for mot. in 5.3

12.72

1^{h} $53.66 = 48$

mot. in 8^{m} in $1 + 2.4$

5.3

72

120

1272

Star α is of α mag. = Weisse H. IV No. 974 = the star with which the comparison star of this comet was compared.

h m s

* α 4. 33. 57.20	8 + 2. 04. 45.8	1825.0	Ans. p. 3. 115	A + 7. 36
<u>1. 27. 22</u>	<u>3. 24. 7</u>		<u>28</u>	<u>- 1. 04</u>
4. 35. 18.42	2. 08. 10.5	1853.0	<u>24520</u>	<u>7. 31</u>
			<u>6230</u>	<u>28</u>
Δα * β 8 α 1. 13. 45	Δδ * β 8 α 21.		87.220	
* β 8 4. 36. 31.87	* β 8 + 2. 07. 49.5	1853.	1. 27. 22	5848
corr. to app. - .81	corr. to app. - 6.9			<u>1462</u>
* App. R 4. 36. 31.06	App. 8 + 2. 07. 42.6			20468
Δ prec. * <u>06.90</u>	Δ worth of * <u>+ 1. 53. 7</u>			<u>3. 24. 7</u>
Δ app. a 4. 36. 24.16	Δ app. + 2. 09. 36.3			

H 271.49 i 0.90956
a 69.08 008 9.99970
a 340.57 0.90926 ~8.11

$\sin. H + a 9^m.51374$ $\cos. H + a 9.97354$
 $\sec. \delta 0.00030$ $\sin \delta 8.57084$
 $h \underline{1.27277}$ $h \underline{1.27277}$
 $0^m.78681 - 6.12$ $9.81915 + 0.66$

9211.20

$$g + a_{280} = 28$$

$\sin \theta + a \sin^2 \theta$

tang 8 8.57084

$$g \quad \frac{0.48430}{n}$$
 $9.05815 \sim 0.11$

f- 5.98

-12.21

407

$$-0.814$$
 $\cos \gamma + a \quad 9.25927$

g 0.48430

9.74357

 $+ 0.55$ $+1.21$

-6.90

$$\Delta\alpha - 6.90 \quad \Delta\delta + 1.53.7$$

March 18^h 23. 11. 54 M. P. 2nd

h m s
 App a 4^h 36^m 24^s 16
 δ + 2^h 09^m 36^s 3

Loomis Planet

(236) 10 27, 02.0 H 10, 22, 25-
 1, 57, 35 1, 37, 35-
 12, 04, 37

10, 28, 39.7 H 10, 24, 25-
 1, 35, 35- 1, 35, 35-
 12 04, 34.7

N.O.D 75, 35, 20

planet south prec. slow
 $\mu = 9 \text{ mag} \quad * = 10 \text{ mag} = 9$

μ 4, 03 05.8 1st win
 10 44, 9.8 2nd win
 1, 11 1, 11 31.5
 31.5
 $q \times 10$ 5, 14 37.3
 10, 44, 41.3
 μ 3, 56 10, 50, 28
 32
 $q \times 5, 06$ 59.7
 37

$* 11^{\text{th}} * 2^{\text{p}} 6, 15-$ 37.2
 51, 41.2

μ 3, 21 24.2
 10 45, 28.2 31.6
 32.0
 1, 10 1, 10

$*$ 4, 31 55.8
 10, 46, 00.2

μ 2, 38 31.3
 10, 47, 35.3 31.7
 31.8
 1, 10 1, 10
 $*$ 3, 48 3.0
 10, 47, 7.1

~~(236) 10, 50, 28.2 H 10, 48, 50
 1, 12, 10 1, 12, 10
 12, 02, 10~~

March 18

Plane

(236) 10^h 59^m 42^s H 10^h 55^m 20^s
 1^m 4^m 40^s 1^m 04^m 40^s
 12 04^m 22^s

h 9^m 03^s 50.2
 10^m 41^m 54.2

x 5^m 13^s 1^m 10^s 21.8 31.6
 10 42^m 28.8 31.6

h 3^m 21^s 60.8
 1^m 11^s 7 3 4.8 31.3
 4^m 52^s

x 3.21 31.4
 4 3^m 36.2

h 3^m 56^s 49.2
 46^m 55.2

5.07 20.7 31.5
 47^m 24.7 31.5

6^m 16^s 58.2
 48^m 02.2

March 22 Pm Immersion of 46 Leonis - instantly: good

E.C. 6^h 13^m 00
286 6^h 12^m 19.7

Chⁱ (236)

^h ^m ^s
6^h 26^m 18.0

-4 hrs

Obs'r. C.W.E.
Gt. Equatorial

New Comet

March 22

Comet faint with apparent less diameters

x W 72°

x x
x a

←

e is 1.40 s.p.a

x a 8, 8, 05.5

x b 8, 10, 44.0

dy. 8 6 6
4, 04"

Dy. Dec
North fol. x of g mag. = a

7, 45, 00	55, 29	
48, 10	55, 92	
51, 30	56, 32	25, 65
14, 4, 40	17, 53	9, 8
7, 48, 13	55, 84	20, 520
	30, 19	230, 85
	25, 65	25, 1370
		4, 11, 37

Dy. R

x a 7, 55, 14.0	7, 56, 40.8	1, 26.8
" 55, 25.5	7, 56, 52.0	1, 26.5
x a 7, 16.5	7, 58, 43.0	1, 26.5
7, 57, 28.0	7, 58, 54.5	1, 26.5

8, 19, 30	60, 58	faint = clouds
21, 30	61, 10	" "
24, 00	61, 75	4, 11, 37
65, 00	3, 43	5, 13, 11
8, 21, 40	61, 14	1, 01.7 = mot. in 33
7, 48, 13	30, 19	
16, 09, 53	31, 95	
8, 04, 56.5	9, 8	
	25, 560	
	28, 755	

x a 23, 0	8, 00, 49.0	1, 26.0
x a 7, 59, 34.5	8, 01, 01.0	1, 26.5
	47, 853, 00.3	28
	7, 58, 50, 05	1, 26.47

Chron. fact

23, 59, 35.98	7, 57, 58.05
46, 70	24, 00, 22.72
24, 00, 22.72	7, 57, 35.33
	1, 18.24

7, 56, 17.09 M.G. Time

-466 - -2

7, 56, 15.09 M.G. Time

com. from mot.

4, 42, 24 = 18 at 8, 04

4, 31, 24 = 48 at 7, 58

x a (276) 8, 2, 6, 13.0 H 3, 52, 12 Dec. + 5, 03, 12

	8, 25, 21	
	3, 52, 12	
	4, 33, 09	
x a	8, 30, 02.0	H 3, 53, 59
		5, 03, 16

March 22

New Comet.

Mero

30° 19'

18'

19'

26'

3 5 187

El. 9, 25, 00
236 9, 24, 19.8

9, 25, 00

1, 31.9

9, 23, 28.1

9, 24, 19.8

0, 51.7

← x h 9.10 mag.

x 11
x a g

Star a is Weisse H IV No. 720

star h is " " " No. 780

Weisse Hora^{IV} 720 α 4, 31, 28.67 δ +4, 59, 28.8 3.178 +7.56

1, 28, 98 + 3, 30.3 25424 - .05

1853.0 x^s a 4, 32, 57.65-8 + 5, 02, 59.1 6356 +7.51

correc. to app. -0.89 - 6.0 88984 6008

x^s App. R, 4, 32, 56.76 Dec + 5, 02, 53.1 1502 210.28

March 22 f = -5.64 g = +2.94 δ = 213.26 h = 18.73 H 267.30 i = -8.02

H 267.30

a 68.14

H+a 335.44

sin H+a 9.61382

sec. 8 0.00169

h 1.27254

0.88805 - 7.75

i 0.90956

cos 9.99831

0.90787 - 8.09

cos H+a 9.95482

sin. 8 8.94461

h 1.27254

0.17697 + 1.50

Comp. star's app. α 4, 32, 56.76 δ + 5, 02, 53.1
of fol star 1, 26.47 δ n. n. x 4.31.2

d app. R 4, 34, 23.23 δ + 5, 07, 24.3

G 213.26

G+a 281.40

sin G+a 9.99093

tang. 8 8.94630

g 0.46835

8.30558 - 0.02

f - 5.64

- 13.39

446

- 0.893

cos G+a 9.30582

g 0.46835

9.77417 + 0.59

+ 2.09

- 6.00

Star of comparison Weisse H. IV No. 720

star's app. α 4, 32, 56.76 app. δ + 5, 02, 53.11853 March 22 7.56^m 15.09 M. S. Time

$\Delta \alpha$ + 1.26.47 $\Delta \delta$ + 4.31.2

d App. α 4, 34, 23.23 δ + 5, 07, 24.3

March 29

New Comet

See obs. on fol. page

Star of comp. = h = Weiss H. IV No

$$f = -5''.01 \quad g = +2''.74 \quad G = 217^\circ.12' \quad h = +18''.78 \quad H 260^\circ.00' \quad i = -8''.02$$

$H 260^\circ.00'$	$i 0''.90417$	Weiss H. IV No. 602	
$a 67.03$	$\cos \delta 9.99474$	$\alpha 4.26.41.55 + 8.50.33.5$	3.261
$H + a 327.03$	$0.89891 - 7.92$	$1.31.31 + 3.40.6$	28
$\sin H + a 9.73532$	$\cos H + a 9.92384$	$4.28.12.86 + 8.54.14.1$	26088
$\sec. \delta 0.00526$	$\sin \delta 9.18952$	$62 - 1.06$	6522
$h 1.27370$	$h 1.27370$	$\times b^3 \text{ app } a 4.28.11.80 + 8.54.09.3$	91.308
$1.01448 - 10.34$	$0.38706 + 2.44$	$\delta \text{ fol. } x$	6304
		$\delta \text{ app. } 4.32.25.47 \quad 8.57.46.3$	1576
			22064

$G 217.12$	
$G + a 284.15$	
$\sin G + a 9.98643$	$\cos G + a 9.39121$
$\tan. \delta 9.19478$	$g 0.43775$
$g 0.43775$	$9.82896 + 0.67$
$9.61896 - 0.41$	$+ 3.11$
$f - 5''.01$	$- 7.92$
15.76	$- 4.81$
5.15	
$- 1.061$	

March 29.30

$M.T. 6. 21.14.00$	$21.14.00$
$236 21.13.32.7$	1.44
$21.12.18$	$21.12.18$
$1.16.7$	

New Comet

March 29

a star of 10 mag. b of 9 mag. b is duplex comp. of 9 mag 8".5 fol.
comet-north fol. x b

$$\begin{array}{l} a \quad 3..18 \\ b \quad 3..37 \end{array} \times b \left\{ \begin{array}{l} \times 2 \quad 33..25.7 \\ \times 8..33..29.7 \end{array} \right.$$

4..13.4

4..14.1

3..33

$$\begin{array}{l} d \quad 7..10 \\ \quad \quad 37..89.1 \\ \quad \quad 8..87..43.8 \end{array}$$

$$\begin{array}{l} * \text{ of } 10 \text{ mag. } 2..51 \\ \quad \quad \quad 15..0 \\ \quad \quad \quad 6..38..19.0 \end{array}$$

$$\begin{array}{l} * b \quad 3..39 \\ \quad \quad \quad 57.2 \\ \quad \quad \quad 8..40..01.2 \end{array}$$

3..39

4..13.6

4..13.6

$$\begin{array}{l} d \quad 7..28 \\ \quad \quad 44 \quad 10.8 \\ \quad \quad 8..44..14.8 \end{array} \quad \begin{array}{l} 147 \\ 4..13.67 = 4\alpha \end{array}$$

$$\begin{array}{l} * \text{ of } 10 \text{ m } 2..54 \\ \quad \quad \quad 46.2 \\ \quad \quad \quad 50.2 \end{array}$$

$$\begin{array}{l} 12 \\ 48 = 3..36 \end{array}$$

163..48.5

8..40..57.12

1..16

0..27..11.85

46.74

0..27..58.59

8..39..41.12

0..27..58.59

8..11..42.53

1..20.54

8..10..21.99 M.G.M.

$$(286) * b \quad 8..47..28.8 + 8^{\circ} 56' 20''$$

$$x1 \quad H \quad 4..17..33$$

$$\text{chron. error } 4..29..55$$

1..16

4..28..39

G.P.B. observed and G.W.G. recorder

The companion of b is 9-10^h
follows b by 0.4
a is S of b 5".

Star of comparison app. R & Dec.
a 4..28..11.80 8 + 8..54..09.3

March 29th 8..10..22.0 M.P. Lane

$$\Delta\alpha + 4..13.67 \quad \Delta\delta + 3..36''$$

By two comp. in Dec. and four in R

$$\Delta \text{ app. } \alpha 4..32..25.47 \quad \text{app. } \delta + 8..57..45.3$$

March 29^{E 2}

C Tr S. leads

C Tr S
9/12/1328.4 12.1
40.55.4 11.8
17.230.3 12.1
42.457.5 11.7
9.225.0 11.8
36.853.8 12.2
6021.4 12.1
33.549.0 11.9
00.923.5 12.0
35.52.3 11.6
13.9~~14.0~~~~30.8~~

16.0

20.0

36.0

~~42.4~~ 16.1
~~58.5~~~~13.2~~

GPB Leads

GPB
y 52.8 16.2
10.0

23.
44.0 16.0

1.8
18.0 16.2

37.5
53.5 16.0

08.0
24.0 16.0

39.1
55.0 15.9

14.0
30.0 16.0

28.0
44.0 16.0

16.0

16.1

t_4 16.04

t_L 19.98

06

+ 0.03

C/P Leads

44.0
00.0 16.0

23.0
38.7 15.7

54.4
10.5 16.1

25.5
41.3 15.8

31.5
47.8 15.8

14.5
30.6 16.1

50.0
06.5 16.5 ?

28.0
44.0 16.0

9.5
21.3 15.8

37.0
53.0 16.0
19.98

Cm P Leads

March 30 1857
GPB leads

236

23.0
38.8 15.80.0
15.5 15.538.0
54.1 16.141.4
27.5 16.143.0
59.2 16.220.8
36.7 15.956.0
11.9 15.926.5
42.5 16.004.0
19.8 15.839.0
55.0 16.0
4 15.93
4 16 12
+ 1900.2
16.5 6.326.5
42.5 6.054.2
10.1 5.922.8
39.0 16.253.0
9.2 16.241.5
57.5 6.022.0
38.0 6.001.2
17.4 16.228.6
45.9 16.359.8
15.9 6.1
16.12

March 31st 1853

B' Leads

$$\begin{array}{r} 5.4 \\ 19.3 \end{array} \quad 13.4$$

$$\begin{array}{r} 49.0 \\ 03.4 \end{array} \quad 14.4$$

$$\begin{array}{r} 14.9 \\ 33.8 \end{array} \quad 13.9$$

$$\begin{array}{r} 52.0 \\ 06.1 \end{array} \quad 14.1$$

$$\begin{array}{r} 17.8 \\ 32.0 \end{array} \quad 14.2$$

$$\begin{array}{r} 45.2 \\ 59.2 \end{array} \quad 14.0$$

$$\begin{array}{r} 7.2 \\ 21.5 \end{array} \quad 14.3$$

$$\begin{array}{r} 30.4 \\ 44.3 \end{array} \quad 13.9$$

$$\begin{array}{r} 2.4 \\ 16.5 \end{array} \quad 14.1$$

$$\begin{array}{r} 30.8 \\ 44.4 \end{array} \quad 13.6$$

$$\begin{array}{r} 20.5 \\ 34.41 \end{array} \quad 13.9$$

$$\begin{array}{r} 11.5 \\ 25.4 \end{array} \quad 13.9$$

14.01

G P B Leads

$$\begin{array}{r} 20.6 \\ 33.8 \end{array} \quad 13.2 \quad \text{thought bad}$$

$$\begin{array}{r} 48.1 \\ 1.9 \end{array} \quad 13.8$$

$$\begin{array}{r} 18.3 \\ 32.0 \end{array} \quad 13.7$$

$$\begin{array}{r} 47.0 \\ 0.7 \end{array} \quad 13.7$$

$$\begin{array}{r} 16.4 \\ 30.0 \end{array} \quad 13.6$$

$$\begin{array}{r} 48.3 \\ 2.0 \end{array} \quad 13.7$$

$$\begin{array}{r} 16.3 \\ 29.9 \end{array} \quad 13.6$$

$$\begin{array}{r} 45.8 \\ 59.5 \end{array} \quad 13.7$$

$$\begin{array}{r} 8.5 \\ 22.3 \end{array} \quad 13.8$$

$$\begin{array}{r} 39.0 \\ 42.7 \end{array} \quad 13.7$$

$$\begin{array}{r} 10.8 \\ 24.8 \end{array} \quad 14.0$$

$$\begin{array}{r} 48.7 \\ 2.5 \end{array} \quad 13.8$$

$$\begin{array}{r} 14.4 \\ 28.0 \end{array} \quad 13.6$$

13.72

t_L 13.72t_a 14.01

0.29

0.15

April 1st Pm

G.P.B. Leads

$$\begin{array}{r} 63.8 \\ 7.2 \end{array} \quad 13.9$$

$$\begin{array}{r} 17.4 \\ 31.3 \end{array} \quad 3.9$$

$$\begin{array}{r} 40.5 \\ 54.4 \end{array} \quad 8.9$$

$$\begin{array}{r} 1.6 \\ 15.5 \end{array} \quad 3.9$$

$$\begin{array}{r} 28.8 \\ 42.5 \end{array} \quad 13.7$$

$$\begin{array}{r} 54.4 \\ 08.0 \end{array} \quad 13.6$$

$$\begin{array}{r} 15.0 \\ 29.0 \end{array} \quad 14.0$$

$$\begin{array}{r} 39.9 \\ 53.5 \end{array} \quad 13.6$$

$$\begin{array}{r} 08.7 \\ 17.8 \end{array} \quad 14.0$$

$$\begin{array}{r} 26.0 \\ 39.8 \end{array} \quad \underline{13.8}$$

$$\begin{array}{r} t_a \\ t_L \end{array} \quad \begin{array}{r} 13.83 \\ 13.78 \end{array}$$

$$\begin{array}{r} 0.05 \\ + 0.025 \end{array}$$

Personal Equation

C.M.Y. Leads

$$\begin{array}{r} 18.8 \\ 32.5 \end{array} \quad 3.7$$

$$\begin{array}{r} 52.7 \\ 6.5 \end{array} \quad 3.8$$

$$\begin{array}{r} 22.5 \\ 36.4 \end{array} \quad 13.9$$

$$\begin{array}{r} 5.6 \\ 19.5 \end{array} \quad 13.9$$

$$\begin{array}{r} 35.3 \\ 49.3 \end{array} \quad 13.8$$

$$\begin{array}{r} 8.5 \\ 22.3 \end{array} \quad 13.8$$

$$\begin{array}{r} 39.0 \\ 52.7 \end{array} \quad 13.7$$

$$\begin{array}{r} 9.4 \\ 23.3 \end{array} \quad 13.9$$

$$\begin{array}{r} 40.0 \\ 53.7 \end{array} \quad 13.7$$

$$\begin{array}{r} 9.9 \\ 23.5 \end{array} \quad \underline{13.6}$$

$$13.78$$

April 2nd 1853

e Aquila

W.C. Blands

6 hr I had

W.C. B

6 hr I had

53.4
9.5^{-16.1}10.0
25.4^{15.4}40.9
56.7^{15.8}26.0
41.3^{.3}108.0
23.5^{15.5}38.0
53.3^{.3}06.4
29.0^{5.6}5.0
20.4^{.4}36.5^{-15.9}
52.49.5
24.7^{.2}29.5^{-15.5}
45.033.5
49.1^{.6}13.5^{-15.9}
29.443.3
58.5^{.2}55.0
11.0^{16.0}8.8
24.4^{.6}42.0
57.5^{.5}10.9
26.1^{.2}20.9
36.6^{15.7}42.0
57.3^{.3}8.3
24.0^{.7}56.5
12.0^{.5}7.5^{-5.8}
23.348.5
3.7^{.2}36.7
52.4^{.7}26.9
42.2^{.3}45.5
1.4^{5.9}22.3
37.6^{.3}4.9
20.5^{.6}59.5
15.0^{.5}13.6
29.4^{5.8}1.0
16.2^{.2}31.3
47.0^{.5}38.5
52.0^{.5}41.0
56.5^{5.5}35.4
50.7^{.3}58.3
14.8^{.7}18.8
34.1^{.3}4.5^{-5.5}
20.013.3
28.5^{.2}15.71
15.34
2/37
+ 0.185

15.34

15.71
15.34
1/37
+ 0.185

15.34

1853 April 2nd2
G. P. B. heads

Personal Equations

C. W. P. heads

20.1		
<u>29.0</u>	8.9	
54.0		
<u>2.8</u>	.8	
18.0		
<u>27.6</u>	.0	
39.4	.0	
<u>48.4</u>		
6.1	.1	
15.2		
27.2		
36.1	.9	
48.8		
57.5	.7	
7.8		
6.9	.1	
27.5		
36.5	.0	
49.0	.0	
58.0		
44.2	.1	
<u>23.3</u>		
56.4	8.96	t_a
	<u>8.90</u>	t_b
	.06	
	+ .03	

56.4	.5	omit
<u>44.9</u>		
17.5	.8	
26.3		
43.0	.0	
52.0		
5.8	.9	
44.7		
29.0	.1	
38.1		
54.0	.8	
2.8		
16.5	.0	
25.5		
42.4	.9	
51.3		
7.5	.0	
16.5		
31.0	.9	
39.9		
55.0	.0	
4.0		
51.4	.9	
.3		
25.0	.0	
34.0		
	<u>8.90</u>	

See Chron. Expec.

Aug 26th

Comet of Klinkerfues

R 11^h 35^m 30^s4^h 30^m PM +21^o 06'

-4.12 -1.20 -1.22

Observations for comparing Spring Governors α & γ
 * Belonging to the Observatory & that ordinarily in use
 y " West Haverford School - Pa - just made

Aug 26th P.M. 1853

W.C.B. Transits of α Virginis over Micrometer wires
 Signal - 1st wire - 2nd wire - Break -

See proper page for date Aug-26th

April 2nd

← *a →

Corner much fainter - considerable
concentration of light in the center

Wero

31.87

86

56

31.86

Dif. Dec
downth fol. * of 9 mag.
$$\begin{array}{r} 9.23.30 \\ 28.00 \\ \hline 0.50 \\ 0.90 \\ \hline 1.40 \end{array}$$

0.70

31.86

31.16

9.8

$$\begin{array}{r} 44.30 - 0.97 \\ \hline 43.33 \end{array}$$

$$\begin{array}{r} 9.49.00 - 1.97 \\ \hline 9.47.03 \end{array}$$

$$\begin{array}{r} 9.36.15 - 1.47 \\ \hline 9.34.68 \end{array}$$

31.86

33.33

9.8

266.64

29991

326.634

5.26.63

5.05.37

1.82.00

5.16.00

cor. for mot. in 1 min

$$\begin{array}{r} 5.15.00 \\ \hline 1.00 \\ \hline 5.16.00 \end{array}$$

(236) *a 9.55.52

1.31

9.54.21

5.24.57

4.29.24

Nat?

East H 5.24.57

Dec + 16.34.00

Dif. RA north fol. * of 9.10

$$\begin{array}{r} 30.21.0 \\ 9.30.37.0 \\ \hline 30.21.0 \end{array}$$

xa 4.01.0

xa 9.34.17.5

9.36.56.5

9.37.13.5

21.01.0

9.35.15.25

-2

9.35.13.25

1.31.9

9.33.41.35

0.43.44.81

8.49.56.54

1.26.81

8.48.29.73

00.42.58.07

46.74

043.44.81

April 2nd

86, 10, 15, 00	10, 15, 00
236 10, 14 37.1	1, 54.8
1	10, 13, 05.2
	10, 14, 37.1
	1, 31.9

1st Comet of 1853

April 18

comp. star = a = 11 mag
b = 9 mag

Comet 3.50" south of star of 11 mag. (236) 10.40.30

Comet precedes star $\frac{5}{3}$ of time 10.41.40

x a is m. prec. b

comparison star of 11 mag.

10 45.23.6
27.6scale
5.21

a	50.00	6.58
a	10.50.04.1	1.40.4
b	51.40.4	1.40.5
b	10.51.44.6	6.01

 $\leftarrow$
 $c = 12 \frac{1}{2}$
 $\times 10 \frac{1}{2} \frac{1}{11} \frac{1}{11}$
 a =

April 26th 1853

I Comet 1853

α 4^h 34^m 23^s
 δ +16° 41'

α Tauri R 4^h 27^m 29^s
 16° 12' 33"

Zero

41^m 48

41 57

46

49

194

41 48

$\times$ of 9. δ south fol. a 28^r
 α is 9 mag. δ is 9.10 mag.

$\times$
 δ
 $\times$

δ is 40" north of α

 α Tauri 10^h 41^m 49

54

10^h 48^m 43 δ south fol. a28 a^r δ 10^h 57^m 00 23^r 4058^m 10 24 1159^m 18 24 8211^h 1^m 40 24 50

16 83

24^r 21Dy. 8 $\times$ a^r δ

his north fol. a

37^r 89

Zero 41.48

3 59

a $\times$ 10 47^m 18.0
 δ 7^m 28.0 10.0
 h $\times$ 7 43.8 15.8

a $\times$ 52^m 53.6⁻
 δ 53^m 7.0 11.4
 h $\times$ 10^h 53^m 20.4 13.4

a $\times$ 3^m 35.0 11.7
 δ 3^m 46.7
 h $\times$ 10^h 53^m 59.8 13.1

34

11.03 = $\Delta \alpha$ & δ

By comparison with
 α Tauri the Comet was
 within 1' of its predicted
 place by C. & P.
 Ephemeris

April 26

scale

e is 9 mag.

a 11, 8, 54.8

4.27

h 9, 20.8

5.10

c 10, 13.0

6.15

April 27th 1853

Comet

a Gauss	4 ^h 27 ^m 29 ^s	16 ^h 12 ^m 33 ^s
Comet	4 ^h 34 ^m 37 ^s	16 ^h 51 ^m 42 ^s
	7 ^m 08 ^s	39 ^m 09 ^s

4 ^h 27 ^m 29 ^s	16 ^h 12 ^m 33 ^s
8.04	34.50
RA 4 ^h 35 ^m 33 ^s	Dec 16 ^h 47 ^m 23 ^s 7 ^h 8 ^m

	scale
xa 35 16.5	00.01
xa 35 20.4	
xh 42.0	0.42
xh 10 35 46.1	
xc 34.4	1.50
xe 36.36.4	
xd 42 49.1	10.11
d 10 42 53.2	

xa 9.10
h 9.10 "
e 10 "
d 7.8 "

* d is Lalande No. 9055

RA 4 ^h 38 ^m 50.36	NO. 73 ^h 09 ^m 08.1	3.449	6.956
3.02181	-6.08.7	53	33
1853.0 RA 4 ^h 41 ^m 53.17	73.02.59.4	9357	20868
8 + 16 ^h 57 ^m 00.6	16.57.00.6	17245	34780
		182807	368668
		3.02.81	6.08.67

d is Bessel's 2 340

April 27

Comet extremely faint - difficult to see
at all* ~~47.27.8~~ comet γ north of α

*a	10,48,44.1	22.0
δ	10,49 6.1	

*a	10,50 17.9	23.8
δ	10 50,41.7	

1853
July 15 Pm

In Immersion of

Choron. 236 17^h Occultation lost

1853

August 1st Am.

Ther 41.33

41.38

41.365

22.54.00

23.00

22.54.00

5.20

da

♂

2.49

C

5.45.0 2.56.0

♂

23.03.06.5 - C 23.06.01.0 2.54.5

23.02.20

23.01.47

8.36.57

14.24.56

2.21

14.22.34

23.14.00

9.08

23.02.20

- 6.00

8.29

2.73

41.36

38.63

9.8

309.04

347.67

376.574

6.18.57

ds

moon's mid

6.3

6.21.57

ds

86 1.52.00

236 1.52.32.8

1.52.00.0

1.51.59.4

1.52.32.8

33.4

8.36.04.84

46.84

8.36.51.58

10.10.2 2.53.2

C 23.10.29.0 3.04.9

32.25.2 10.48.6

23.05.04. 23.08.06.3 2.57.1

2

23.08.04.3

33.4

23.07.30.9

8.36.51.6

14.30.39.3

2.22.63

14.28.16.67

M.S.J.

Approximate

h an s

July 31 14.28.16.67 M.S.J. Comb

Dy. R ♂ & C ♂ - C = + 2.57.17

" Dec " - 6.21.57

From the Cusp of ♀ Limb

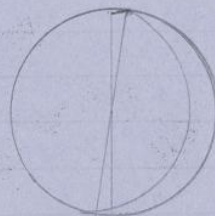
The moon rose concealed in a bank of stratus - At five minutes past two it discovered itself by a dull glimmering - and at ten minutes after two, was enabled to see Mars about 15 minutes from the moon's nearest limb. The above measures are the differences of R and Dec between Mars's centre and the termination of the light of the moon's northern cusp, as at a in the above diagram - They are not, however, very accurate owing to the faintness of the planet and moon seen with difficulty through the mist.

August 1st A.M.

Reduction of the measures of the northern cusp to the moon's northern limb and centre

8

Inclination of cusps to the meridian = $6^\circ = \varphi$
 semidiameter = $14''.54'' = S$
 $14''.9$



$$\begin{array}{rcl}
 S & 1.17319 & \cos \varphi 9.99961 \\
 \sin \varphi & 9.01923 & \\
 & 0.19242 & 0.99462 \\
 & 1.56 = 1''.093 & 0.00548 = (1 - \cos \varphi) \\
 & & 7.73878 \\
 S & 1.17319 & \\
 & 8.91197 & \\
 & 0.082 = 0''.017 &
 \end{array}$$

cor. for inclination to the circle of C's illumination
 in R - $1''.9''$
 or $0''.17$

$$\begin{array}{r}
 120 \\
 57 \\
 177 \cos 24^\circ = 162 \\
 40''.30'' \\
 1''.9 \\
 39''.21
 \end{array}$$

Dist. A, centre of Mars = $2'' 57'.1 - 4.6 = 2'' 52'.5$

at $2^h 28^m$ A, nearest limb $24'$ from Mars

$$\begin{array}{r}
 25''.30 \\
 + \\
 24''
 \end{array}$$

AR 1^h 13^m -
Dec 36° 51'

5 58

1 13

4^m 45

Aug. Saturday Pm.

Chron (236)

$18^{\text{h}} 40.2^{\text{s}}$

$H 7.10.20^{\text{s}}$

Dec. + $27^{\circ} 58'$

Aug. 23 Pm Tuesday

Chron (236) $18 31.51.5$

$H 6.56.30^{\text{s}}$

Dec. $25^{\circ} 02'$

Comparison of Simultaneous Records made on two Spring Governors

X That of the Harvard Observatory

Y " Observatory of the West Haverford Pa School

Aug - 26th 1853 Transits of Spica over Micrometer
wires of Great Refractor - By W.C.B.
Signal - 1st wire - 2nd wire - Break

The first 10 on the extreme left hand column were read off
by G.P.B. with a scale - The remainder by the eye by W.C.B.
By single reading -

No. of Obs	X	Y	X - Y	X	Y	X - Y
1	14 ^h 17 ^m 21 ^s .33	21.35	-0.02	14 ^h 23 ^m 17.80	17.80	0.00
2	27.13	27.10	+ .03	23.40	23.35	+ .05
3	49.30	49.25	+ .05	50.40	50.46	- .06
X 4	55.00	54.95	+ .05	56.05	56.10	- .05
5	18 29.00	28.95	+ .05	24. 22.65	22.65	.00
6	34.62	34.70	- .08	28.30	28.35	- .05
7	55.60	55.65	- .05	54.40	54.45	- .05
8	19 01.20	1.20	.00	25. 00.15	00.15	.00
.	26.40	26.45	- .05	26.75	26.10	- .15
	32.18	32.20	- .02	31.70	31.85	- .15
	34.65	34.65	.00	26. 18.90	18.95	- .05
	~~56.75~~ ⁵⁵	56.60	- .05	24.70	24.75	- .05
20	2.15	2.20	- .05	43.15	43.16	.00
	24.40	24.35	+ .05	48.90	48.95	- .05
	30.35	30.30	+ .05	29. 17.80	17.80	.00
	55.15	55.25	- .10	23.50	23.50	.00
21	1.00	1.00	.00	51.30	51.35	- .05
	26.10	26.15	- .05	57.00	57.00	.00
	31.90	31.85	+ .05	26. 23.00	23.10	- .10
	52.00	51.95	+ .05	28.75	28.85	- .10
	57.85	57.80	+ .05	52.40	52.40	.00
22	20.36	20.40	- .05	56.00	56.05	- .05
	26.00	26.00	.00	29. 39.95	39.90	+ .05
	49.60	49.65	- .05	45.70	45.75	- .05
	55.35	55.35	.00			

X	Y	X - Y	X	Y	X - Y
14.. 30.41.20	30.. 41.25	-0.05	14.. 42.37.15	37.20	-0.05
46.95	46.95	.00	42.90	42.90	.00
31.. 21.25	21.30	-.05	56.. 8.90	8.95	-.05
27.16	27.10	+.05	11.85	11.85	.00
54.70	54.70	.00	14.80	14.85	-.05
32 0.50	0.45	+.05	17.56	17.50	+.05
23.70	23.75	-.05	18.95	19.00	-.05
29.40	29.35	+.05	21.90	21.85	+.05
53.60	53.60	.00	25.63	25.50	+.05
59.30	59.40	-.10	54.25	54.30	-.05
33.. 13.90	13.95	-.05	55.00	55.00	.00
19.65	19.65	+.10	~~56.95~~	~~57~~	---
34.. 5.90	5.90	.00	57.65	57.70	-.05
11.55	11.65	-.10	58.95	58.95	.00
43.30	43.30	.00	59.95	59.95	.00
49.15	49.15	.00	67.. 5.95	6.00	-.05
36.. 10.80	10.85	-.05	9.95	10.00	-.05
16.60	16.50	+.10	13.00	+13.00	.00
36 2.80	2.80	.00	14.95	14.95	.00
8.45	8.50	-.05	~~16.20~~	~~16~~	---
42.70	42.70	.00	17.30	17.30	.00
48.40	48.40	.00	18.20	18.20	.00
38.. 44.85	44.90	-.05	19.00	19.00	.00
50.45	50.50	-.05	19.75	19.80	-.05
39 8.95	9.00	-.05	20.00	20.00	.00
14.70	14.70	.00	20.50	20.50	.00
39.. 42.85	42.90	-.05	<i>Dots</i>	<i>Dots</i>	
48.60	48.65	-.05	67.. 37.50	37.50	.00
40.. 16.35	16.40	-.05	40.00	40.00	.00
22.20	22.25	-.05	42.15	42.15	-.05
51.15	51.20	-.05	44.15	44.20	-.05
56.90	56.90	.00	45.80	45.80	.00
41.. 27.95	28.00	-.05	~~47.05~~	~~47.10~~	-.10
33.60	33.65	-.05	48.25	48.25	.00
42.. 4.65	4.65	.00	49.25	49.20	+.05
10.10	10.25	-.15	50.00	50.00	.00

No record marks

Comparison of Spring Governors

X	Y	X - Y
14.57.50.65	50.65	0.00
51.20	51.20	.00
51.65	51.65	00

$$\pm 0.019 \times 0.845 = \pm 0.016$$

$$\Sigma + = +1.03$$

$$\Sigma - = -3.39$$

$$n = 123 \quad \begin{array}{r} 2.36 \\ 1.23 \\ \hline 1130 \end{array} \quad 0.019$$

$$n = 123 \quad \begin{array}{r} 4.42 \\ 3.69 \\ \hline 730 \end{array} \quad 0.036$$

$$0.036 \times 0.845 = \pm 0.030 = \text{Probable value of } X - Y$$

Probable error of a single eye estimate of reading the record
Reading to the nearest 0.05

$$e = \frac{0.030}{\sqrt{2}} = \pm 0.021 \quad \text{W.C.B.}$$

Supposing the two records to be simultaneous & the whole of $X - Y$ to result from erroneous reading of only - as is proved on next pages to have been the case very nearly -

For the following, which include all the cases in which $X - Y$ in the above trial exceeds 0.05. The exact readings measured by a scale of proportional parts have been found as follows

The probable error arising from reading only to the nearest 0.05 would be ± 0.0125
 $\sqrt{0.021^2 - 0.0125^2} = \pm 0.0169$

The prob. er. arising from reading only to the nearest tenth of a record (if there were no other source of error) would be exactly $0.1 = 0.025$. So that the probable error of reading by the eye and to the nearest tenth only is
 $\sqrt{0.025^2 + 0.017^2} = \pm 0.030$

Reading by Seals

x	y	$x - y$
34.62	34.62	$0^{\circ}00$
55.25	55.23	+ .02
50.42	50.44	- .02
26.07	26.07	- .00
31.70	31.70	.00
23.07	23.07	.00
28.77	28.73	+ .04
59.40	59.39	+ .01
19.50	19.48	+ .02
11.56	11.57	- .01
16.48	16.46	+ .02
10.14	10.11	+ .03

No second marks before 9.10 or after

(4)(b) There were an obvious mistakes if the observing mark was taken for the clock mark for X.

See over -

$$(X-Y)^2 = 2(0.0125)^2 + 2($$

(Pr. err of reading off by eye to nearest tenth)² = $\Sigma^{IV^2} = 0.0250^2 + \Sigma_1^2$
 " scale hundredth $\Sigma^{V^2} = K^2 + \Sigma_1^2$
 " by eye to nearest 0.05 $\Sigma^{VI^2} = 0.0125^2 + \Sigma_1^2$

$$\varepsilon^{II^2} = \varepsilon^{IV^2} - (0.0250^2 - 0.0125)^2 = \varepsilon^{IV^2} - 3 \times 0.0125^2$$

Comparison of Spring Governors

The following are readings from the same sheets by a proportional scale - carefully made & revised

The most considerable discrepancy viz that at $14^h 32^m 28^s$ appears on revision to be actually of near the amt 0.07

X	Y		#	Interval
14..17 21.33	21.32	+01	14..24 28.27	28.30 -03 0.71
27.13	27.10	+03	54.41	54.42 -01
49.30	49.27	+03	25..00 14	00.14 .00 73
55.00	55.05 (a)	-05	70	26.07 26.07 +00
18 29.00	29.00 (a)	.00		31.70 31.73 x -03 63
34.62	34.62	-00	62	26..18.90 18.90 .00
55.60	55.62	-02		26.. 24.66 24.63 +03 76
19.. 01.20	01.18	+02	60	43.13 43.14 +01
26.40	26.40	.00	(a)	49.00 49.00 (a) .00 85
32.18	32.18	.00	78	27.. 17.74 17.74 .00
34.60	34.57	+03		23.50 23.48 +02 76
56.45	56.49	-01	82	51.33 51.33 .00
20.02.15	02.14	+01	67	(a) 57.00 57.00 (a) .00 67
24.34	24.32	+02		28 .. 23.07 23.07 .00
30.29	30.27	+02	95	28.76 28.72 +04 69
53.25	53.23	+02		52.38 52.40 +02
(a) 21 1.00?	1.00	.00	75	58.06 58.05 +01 68
26.13	26.13	.00		29 .. 39.95 39.90 +05
31.74	31.79	-05	61	45.63 45.63 .00 68
(a) 52.00	52.00 (a)	.00		30.. 41.25 41.25 .00
57.71	57.74	-03	71	(a) 47.00 47.00 .00 75
22 20.36	20.39	-03		31 .. 21.26 21.26 .00
(a) 26.00	26.00 (a)	.00	64	27.12 27.12 +00 86
49.59	49.59	.00		54.67 54.68 +04
55.37	55.40	-03	78	32 .. 00.37 00.34 +03 70
23 17.74	17.75	-01	x	32 .. 23.68 23.61 +07
23.32	23.33	-01	58	29.31 29.30 +01 63
50.43	50.44	-01		53.57 53.57 .00
56.06	56.06	.00	63	59.36 59.38 +01 82
24 22.56	22.56	.00		33.. 13.90 13.88 +02
(a) On the second mark	Σ+19			19.49 19.48 +01
	Σ-26			Σ+34
				Σ-10

X	Y		
(a) 14 34 .. 5.90	5.93	-.03	
11.55	11.57	-.02	65
43.34	43.32	+.02	
49.12	49.12	.00	78
35 .. 10.80	10.81	-.01	
16.46	16.45	+.01	66
36 .. 2.80	2.81	-.01	
8.43	8.41	+.02	63
42.64	42.62	+.02	
48.36	48.39	-.03	72
38 .. 44.93	44.90	+.03	x
50.41	50.43	-.02	48
39 .. 8.95	8.96	-.01	
14.66	14.62	+.04	71
42.82	42.86	-.04	
48.56	48.57	-.01	74
40 .. 16.26	16.27	-.01	
22.21	22.23	-.02	95
51.16	51.18	-.02	
56.97	57.00	-.03	81
(a) 41 .. 28.00	28.00	.00	
33.53	33.53	.00	53
42 .. 4.50	4.57	+.03	
10.12	10.12	+.01	53
37.22	37.22	.00	
42.90	42.90	.00	5, 68
(a) 36 .. 9.00	9.00	.00	
11.80	11.83	-.03	80
14.80	14.76	+.04	
17.44	17.46	+.02	64
(a) 19.99	19.00	.00	
21.80	21.85	-.05	x

Σ+ 24
Σ- 34

X			
14 .. 56 .. 25.42	25.41	+.01	
54.30	54.28	+.02	
(a) 55.00	55.00	.00	
(a) 59.00	59.00	.00	
(a) 59.95	59.95		
(a) 57 .. 6.00	6.00	.00	
(a) 9.95	10.00	-.05	
(a) 18.00			
17.30	17.29	+.01	
18.18	18.19	-.01	
(a) 19.05	19.00	.00	
19.70?	19.68	+.04	
37.34	37.52	+.02	
(a) 40.00	40.03	-.03	
42.10	42.10	.00	
44.19	44.17	+.02	
45.73	45.72	+.01	
48.23	48.22	+.01	
49.23	49.23	.00	
(a) 50.00	50.00	.00	
(a) 51.10	51.10		
(a) 51.10	51.10	.00	
51.56	51.58	-.02	
	Σ+ 14		
	Σ- 11		

$\Sigma +$	$\Sigma -$	84	$\Sigma + = 91$
+ 0.19	- 0.26	<u>16</u>	$\Sigma - = 81$
+ .34	- .10	50.4	$n = 113 / 1.72 (0.016)$
+ .24	- .34	<u>84</u>	<u>110</u>
+ <u>.14</u>	- <u>.11</u>	134.4	620
+ 0.91	- 0.86 = Sum of γ greater than x		.013
	+ 0.91 " γ less than x		
	113 / + 0.10 (0.0009)		

Mean of 113 scale readings give for the difference of absolute time of the two records made by x & y

$$x - y = +0.0009 \pm 0.0012$$

The final result of the foregoing trial is that

- 1st The two Spring Governors x & y give records which do not differ by a constant quantity as large as 0.001
- 2nd The probable difference of the two records including the error of scale reading is ± 0.013 for a single observation & a single reading.
- 3rd As there is certainly a part of this to be attributed to error of scale reading. The probable error of the record ^{of a single obs} _{or} either of these cylinders must be less than $\frac{0.013}{\sqrt{2}} = 0.009$

Probable error of a single observation read off from the sheet by a scale & including error of reading off is:-

$$\epsilon = \pm 0.009$$

Including those sources of error to be ascribed properly to the method of observing by electro magnetism

- 4th Probable error of a reading of the record by an eye estimate
- $$\epsilon = \pm 0.021$$

Sept. 20 Pm.
1833

Chron. Emission of 38 Arietis Gt. Equatorial Obs. & C. W. J.
(236) 20 " 55, 59.0 - 465 good

Oct. 11 Pm. Imm. of 7550 B. A. C. C. W. J. Observed
(236) 22 " 45, 36.4 - 465 good Gt. Equatorial

1853

Oct. 23/24 A.M.

Observer E. W. J.

Chron. (236) Im. of γ Gemincorum $5^h 26^m 33.5^s - 4^h 45^m$ Gt. Equatorial
 star rather faint - fleeting clouds

Immersion of 32 Capricorni (5)

1853 Nov 7th 6^h 32^m 12^s inst predicted

Obsd by G.P.B. - Great Equatorial -

Lim- 220 = 21^h 29^m 25.7 - 4 beats = 2^s exact236 21^h 32^m 00^s
J.H 220 21^h 20^m 29.75236 - 21^h 52^m 00.0220 - 21^h 40^m 29.7MTC - 6^h 47^m 45^s - 6^h 50^m 45^s236 - 21^h 58^m 19^s - 22^h 01^m 19^s

obs. occultation of 33 Capricorni (6 mag) 13' North,

W.C.B.

By. Gmo. No 889 - 6^h 32^m 22.1 - 6 beats, grad -MTC - 6^h 20^m 0^s889 - 6^h 21^m 55.6889 ~~Cal~~ of Lamb
$$\begin{array}{r} -3 \\ 6\ 32\ 19.1 \\ \hline 0\ 15.8 \end{array}$$
6^h 32^m 03.3

R.T.P. Cal

6^h 32^m 12.0

diff. 8.7

MTC - 6^h 35^m 0.0889 - 6^h 36^m 55.66^h 35^m 0.01^m 39.86^h 36^m 39.86^h 36^m 55.6889 ~~Cal~~ + 15.8

1853 Nov-10⁺ Phe occ. 30 Piscium D.L.
R.T.P. incl. 9..40..57

G.P.B. 236 - 1..02..59.9 - 12 beats 9^{ft} Equatorial
6

C.W.T. 220 - 00..57..17.2 - 4 beats. 5^{ft} Equatorial

W.C.B. 889 - 9..41..52.2 - 5 beats. Christophe Reflecto

M.T.C. 9..31..0.0
889 9..32..56.4

M.T.C. 9..43..0.0
889 9..44..56.3

889 fast 15.4 approx

G.P.B. chron. 236
1..02..59.9
- 6
1..02..53.9
chron. fast 47.13 15.18..13.36
1..02..06.77 46.74
15..19..00.10 15..1900.10
9..43..06.67
1..35.53
9..41.31.14 M.G.T.

C.W.T. chron. 220
00..51..17.2
9
00..51..15.2
220 slow 10..52.15
1..02..07.35
15..19..00.10
9..43..07.25
1..35.53
9..41.31.72 M.G.T.

W.C.B. 889 M.T. chron.
1..19..25.0
47.15
1..18..37.85
~~2.5.56.6~~
1..18.37.85
15..19..00.10
9..59.37.75
1..38.23
9..57..59.52
9..58..15.5
889 fast 15.98

236 - 1..19..25
889 - 9..58 15.5
236 - 1..21..0
220 - 1..09..20.7

daily rate of 236 + 3.5
" " 220 + 0.9

1..21..00
47.15
1..26..12.85
1..9 20.7
10..52.15

9..41..52.2
- 2.5
9..41..49.7
15.98
9..41..33.72 M.G.T.

1853 Nov. 10 Immersion of 30 Piscium

W.C.B. 9..41.33.72 M.G.T. Camb.
G.P.B. 9..41.31.14
C.W.T. 9..41.31.72

Christophe - Reflector
Great Equatorial
5 foot "

Nov 1853

± 6.0

Saturn's ball is nearly tangent to ring
See Mr Dawes Obj. Astr. Soc. Notices.

R ^h 1^m 55^m
Dec 41^o 36'

21.10 ~~15~~
1 15
21.09.00
~~18 17~~
2.52

Nov. 26 Pm.

planet Ioene = $\odot$
 place from N.A. Ephemeris at 7^h C.M.T. $\odot$ R $4^h 15^m 42^s$ hour. int - $2^s 5'$
 $\odot 8 + 15^m 42^s$

B.A.C. 1366	α $4^h 17^m 03.91$	1850.0	N.P.D. $74^{\circ} 24' 24.8$	$A_p - 8.71$
	Δ $+10.22$		-26.1	3
3.407	α $4^h 17^m 14.13$	1853.0	$74^{\circ} 23' 58.7$	2613
$\frac{3}{10.22}$			$\ast \delta + 15^m 36^s 01.3$	1853.0

$4^h 17^m 14$
 $4^h 15^m 42$
 1-32

Nov. 26th $7^h 8^m$ P.M. Saturn

Looked at Saturn with Gt. Equatorial. Power 140
 Very good seeing. New ring well defined. Could perceive the
 ball through it where it crossed between us and the ball. Noticed
 particularly the continuation of the edge of the ball down through
 the dusky ring to the inner bright one on both sides.

Nov. 26

planet m.p. * of comp
Dy. Dec

(286) $0^h 37^m 05^s$ 2177
 $38^m 50^s$ 2150
 $40^m 15^s$ 2131

$0^h 51^m 00^s$ 2148
 $52^m 50^s$ 2161
 $0^h 54^m 30^s$ 2144

Dy. R

(14) $3^h 22^m 5^s$ x $4^h 11^m 4^s$ $0^h 49^m 1^s$
 (14) $0^h 43^m 38^s$ x $0^h 44^m 27^s$ 49.0

(14) 38.0 x 27.0 49.0
 (14) $0^h 45^m 53^s$ x $0^h 46^m 43^s$ 49.1

(14) 18.3 7.6 49.3
 (14) $0^h 47^m 34^s$ x $0^h 48^m 23^s$ 49.2

Not the planet!

(14) 52.5 41.5 90
 (14) $1^h 03^m 8^s$ x $1^h 03^m 58^s$ 49.2

(14) 49.5 38.5 49.0
 (14) $1^h 05^m 6^s$ $1^h 05^m 50^s$ 49.0

(14) 54.0 43.0 49.0
 (14) $1^h 07^m 10^s$ $07^m 59^s$ 49.0



a comp. star = 202m
 & star of 11m

Nov. 26/27 A.M. 1853

G.T. - Emission of 66 Virginis Chrom. 286 $10^{\text{h}} 30^{\text{m}} 07^{\text{s}} - 4^{\text{h}}$ ^{late} perhaps
 G.T. Equatorial C.W.S.

M.T.C. 18. 18. 10

286 10. 44. 35.5

H.G.B. - Em. 66 virginis Chrom. 889 - $18^{\text{h}} 03^{\text{m}} 37^{\text{s}} - 7^{\text{h}}$ ^{late}
 6 mag. 14' south of centre

M.T.C. - 18. 12. 0

889 - 18. 11. 52

Nov 29th Looked for Van Asseendale's Comet?
not found-

Saturn's ring - outside - is now nearly
tangent to ball on true pole perhaps the
ring is a little outside the ball.

The ball seems to be visible through the
dusky inner ring but the vision was not
sufficiently distinct - to allow us to be certain
of this

Dec. 9 P.M.

Observer G. P. B.

Imm. 397 B.A.C

Chr. 236

 $1^{\text{h}} 25^{\text{m}} 51.0^{\text{s}} - 4^{\text{h}5}$ Gt. Equat.

Dec. 11 P.M. Sunday

Chron. 236

Imm. 38 Arietis

 $21^{\text{h}} 47^{\text{m}} 35.3^{\text{s}} - 4^{\text{h}5}$ Gt. Eq. Observer C. M. J.

Star of Comp is 47 Andromeda = BAC 409

$$\begin{array}{r} .394 \\ 3 \end{array} \quad \begin{array}{r} 1^h 15^m 06.80 \\ +10.18 \\ \hline 10.182 \end{array} \quad \begin{array}{r} 18.97 \\ 3 \\ \hline 56.91 \end{array} \quad \begin{array}{r} 53^m 04^s 08.8 \\ -56.9 \\ \hline 53^m 03^s 11.9 \end{array}$$

$$\begin{array}{r} 03 \\ \hline 1853.0 = 36 \end{array} \quad \begin{array}{r} 56^m 48.1 \\ -7^m 08.1 \\ \hline 49^m 40.0 \end{array}$$

$$\alpha / 1853.0 = 1^h 15^m 17.01$$

$$\beta - * = -1^m 24.24$$

$$\beta \alpha = 1^h 13^m 52.77$$

$$\delta = 36^m 49^s 40.0$$

$$\gamma \text{ of } 1853.0 =$$

$$11.2 \text{ Dec } 14^{\text{th}} 12^h 52^m 28.4^s - 1853-$$

Robt. Van Arsdalen's Comet

$$1853 \text{ Dec } 14^{\text{th}} 12^h 52^m 28.4^s$$

$$\Delta \alpha = \beta - * = -1^m 24.24$$

$$\Delta \delta = " = -7^s 08.1$$

Compared with B.A.C 409

$$* \alpha 1^h 15^m 17^s$$

$$" \delta +36^m 57^s$$

354

$$\begin{array}{r}
 353 \\
 + 007 \\
 \hline
 2) 3360 \\
 \underline{16800} \\
 1008 \\
 \underline{17808} \\
 - 19162 \\
 + 1040 \\
 \hline
 19142 \\
 19142 \\
 957.1 \\
 574 \\
 \hline
 1) 10145 \\
 60 \\
 \hline
 414 \\
 360 \\
 \hline
 54
 \end{array}$$

$$\begin{array}{r}
 12.51 \quad 1.12 \\
 35.50
 \end{array}$$

$$\begin{array}{r}
 3,352 \\
 + 007 \\
 \hline
 2) 3,359
 \end{array}$$

$$\begin{array}{r}
 2) 1900 \\
 950 \\
 16
 \end{array}$$

$$A.C. 2377/8\frac{1}{2}$$

$$\begin{array}{r}
 7.6795 \\
 1008 \\
 \hline
 178.03
 \end{array}$$

$$H.C. 2392/9\frac{1}{2}$$

$$1.08.48.88$$

$$2.58.08$$

$$1.11.46.96$$

$$54.24.55.2$$

$$-16.54.5$$

$$54.08.00.7$$

$$35.51.59.3 \quad 1853.0$$

$$1.09.16.59$$

$$2.58.03$$

$$1.12.14.62$$

$$54.38.42.4$$

$$16.52.8$$

$$54.21.49.6$$

$$35.38.10.4$$

$$3534$$

$$5426$$

$$19.11$$

$$1911.0$$

$$955.5$$

$$573$$

$$60) 10128(16$$

$$60$$

$$412$$

$$-360$$

$$52$$

du? was this the * of Comp? I think not

$$1853.0 * R \quad 1.11.46.96$$

$$du \quad 35.51.59.3$$

$$R \quad 1.12.14.62$$

$$du \quad 35.50$$

$$\sin a \quad 9.48411$$

$$\log 8 \quad 9.55913$$

$$\log \cos d: \quad 1.30221$$

$$0.64545$$

$$+4.420$$

$$+46.039$$

$$50.479$$

$$h = +3.365$$

$$\cos a \quad 9.97882$$

$$1.30221$$

$$1.28103$$

$$h = +19.10$$

$$+3.365$$

$$26920$$

$$6730$$

$$94220$$

$$1.34.22$$

$$28$$

$$15280$$

$$3820$$

$$53480$$

$$8.54.8$$

$$H.C. 2377 = \text{Bessel's } Z_{\text{sun}} 446$$

$$h \quad m \quad s$$

$$t = 1.10.19.75 \quad \delta + 35.44.39.7$$

$$k + k' - D = -7.21 \quad d - 1.44.5$$

$$R \quad 1.10.12.59 \quad d' - D = 0.0$$

$$1.34.22 \quad Dec. + 35.42.55.2 \quad 1825.0$$

$$1.11.46.76 \quad 8.54.8$$

$$35.51.50.0$$

$$K = -7.206 \quad k = -0.120$$

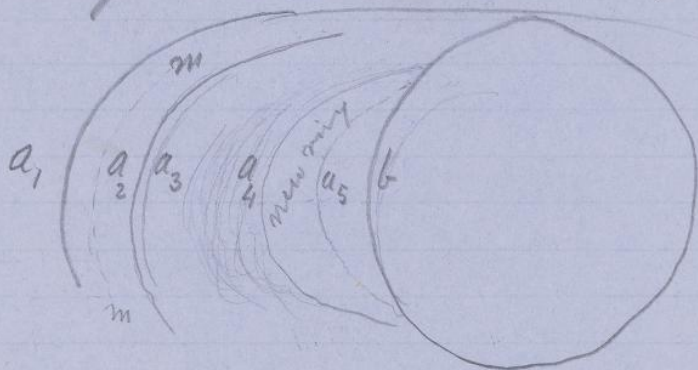
$$\frac{\delta - D}{100} = \frac{-0.000}{+0.000120}$$

Δ
 Δ 22.27.3 Δ 04 23.44.1 1.16.8
 $\times$ 00.22.42.0 Δ 23 58.8 1.16.8
 $\times$ 0.24.18.1 Δ 0.25.35.4 1.17.3
 $\times$ 24.32.4 Δ 0.25.49.5 1.17.1
 $\times$ 0.37.19.2 Δ 0.38.35.6 1.16.4
 $\times$ 37.37.4 Δ 38 53.8 1.16.4

176 37.2 40.8
0.29.26.2 1.16.80 = Δa
Chrom. slow 5.8
17.36.12.87 0.29.31.01
46.74
17.36.59.61 17.36.59.61
6.52.31.40
1 7.50
6.51.23.90 M.P.J.
Cor to Dec 2.11.0
By motion of Comet from Dec 14th 6 53.34.9
 Δ 1.13.27
 Δ +38.05
Dec 15th 6^h 53^m 34^s Δa $\Delta \delta$
 Δ +1^m 16.74 Δ +6' 14".3

Dec 15th 1853 $\frac{3}{2}$ $\frac{3}{4}$

8^h P.M. Saturn.
Ball at true S pole just tangent to outer edge
of outer ring - But ball at N pole invisible



Power No 4.

Estimates by C. W. G.

By G. P. B.

$$a_1 - a_2 = a_4 - a_5 - \frac{2}{3}(a_2 - a_3)$$

$$a_1 - a_2 = a_4 - a_5$$

$$a_3 - a_4 = \frac{7}{4}(a_1 - a_2)$$

$$a_3 - a_4 = 2(a_1 - a_2)$$

$$a_5 - b = \frac{9}{8}(a_4 - a_5)$$

$$(a_5 - b) = \frac{5}{6}(a_4 - a_5)$$

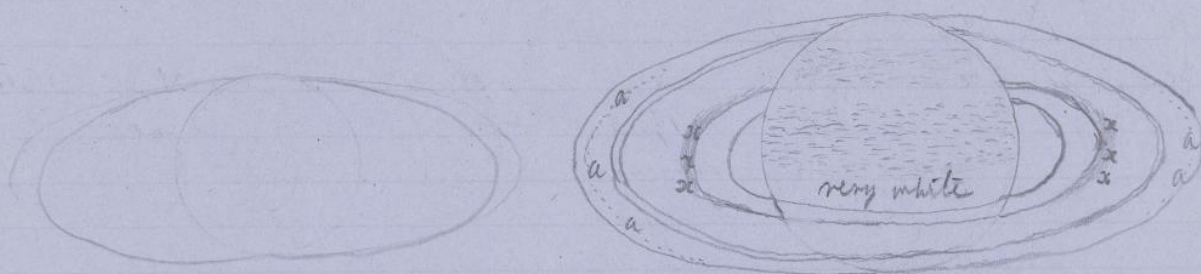
$$(a_2 - a_3) = \frac{1}{5}(a_1 - a_2)$$

The transparency of the inner new ring is very distinctly seen

There is also a division or shading on the outer ring at m m - The inner edge a₂ of the outer ring is the brightest part of it. The dividing line of the broad old ring from the new Schuster ring is decided & sharp - But I do not see that there is a separation of the two.

Very fine definition

Dec. 15



Suspect pretty strongly a division in the outer ring at $a a$. The new inner ring has (with power No. 4) rather a reddish tint. The inner edge of the inner bright ring is perfectly defined. Near the inner edge of this ring at $x x x x$ is a reddish, or more properly a copperish colored, vapor. It occupies the same position which it has heretofore and has nothing remarkable except its copperish tint and resemblance to thin vapor.

GPRB

$$a_1 - a_2 = \frac{5}{4}(a_4 - a_5)$$

$$a_3 - a_4 = \frac{5}{3}(a_1 - a_2)$$

$$a_5 - b = a_4 - a_5$$

$$a_4 - b = \frac{6}{5}(a_2 - a_1)$$

A Clark.



Proportions of Saturn's ring, carefully estimated
by him by the eye. A. Clark
communicated Aug 11th 1854.

No Clark estimates

$$a_3 - a_4 = a_1 - a_3$$

$$a_5 - b = a_4 - a_5$$

Dec 20th 8^h P.M.3/53
1771..04..33.69
- 9.89
1..04..43.58

B.A.C. 357

58..43..23.2

57.8

58..42..25.4

+31 17..34.6

R 14.08^mDec 31st 24'

Not the Comet

19.3
2/1930.

965

58

1023

17.03

8

1..04..31.1

58..34..21

9

1..04..52.2

58..42..28

7 1/2

1..04..53.4

58..42..26

(236) ^{h m s} 3 ..31..58 ^{h m s} Comet H. 2 ..22..40 Dec. + 30 ..17

8

3 32.06

2 22.40

1 09 28

Lul. 2207 1..03..54.39

2..57

1..06..51.39

N.P.D. 64..36..54.0 1800.0

- 17..

64..19..54

25..40..06

3..19.28

57

3784

9640

1021.84,

60

421

30 14

Nebula? = h 90

Star in B.A.C. 357

Pos. $89^{\circ}13'$

Comet north prec. star of 7 May.

Dif. 8
 3 15.19 31.72
 16.55 32.14
 31.93
 48.71
 16.78
 33
 164.5
 3, 25, 10
 Ad 2' 44.5"

Dif.
 3, 19, 56.1 * 3, 20, 88.9 42.8
 3, 20, 8.8 * 3, 20, 51.7 42.9
 3, 21, 14.8 * 3, 22, 37.3 43.0
 3, 21, 27.1 * 3, 22, 10.2 43.1
 3, 22, 25.8 * 3, 23, 9.0 43.2
 3, 22, 88.6 * 3, 23, 21.6 43.0
 Ad = 0" 43.00

Comet afterwards found
but near no star.

B.A.C. 357

Do not recognize the star.

h 90	1	2	46.6	58 46.50
		+1	15.9	-7 24
/853.0	1	4	02.5	58 39 26
Ad Ad			43.0	Ad 2 44
* AR	1	4	45.5	58 42 10
B.A.C.	1	4	43.6	Ad 31 17 50
				31 17 35

3.3	19.3
<u>23</u>	<u>23</u>
99	579
66	386
75.9	443.9
1" 15.4	7' 24"

From h 90

Dec. 24 P.M.

Bessel's Zone 388 x g mag $1^h 08^m 39.09^s$ $D + 26^h 00^m 12.0^s$
 $K + 4.66$ $d - 1 33.4$
 $K' 3 - 12$ 0.00
 100 $1^h 08^m 43.71^s$ $26^h 58^m 36.6^s$ 182570
 148 approx $+ 8 30$
 $* 49^h$ $1^h 10^m 31.71^s$ $+ 26^h 07^m 06.6^s$ approx
 $+ 2.48.45$ $- 4^m 12$
 an $* 49^h$ $1^h 13^m 20.16^s$ $+ 26^h 02^m 54.6^s$

12.6
24.3

29.5-
49.4-

Dec 24 P.M. G.P.B obs

Star of 9 mag. north
 Comet-south pol. star of 9 mag.

Dif R

Dif. Dec

42 9.2 42 25.8 16.6 1,44,54 33 60
 X 1, 42, 19.2 1, 42, 36.2 17.0 45, 50 33 39
46.40 33 01

X 43 10.0 43 26.8 16.8 17 24 100
 43, 20.2 43, 36.8 16.6 1, 45, 48 33 33

48.71

1538

X 48 3.2 48 19.6 16.4
 X 1, 48, 14.2 48, 31.3 16.7

3.1

1507 = 2' 30".7

X 48 44.6 49 1.0 16.4
 X 1 48 56.0 49 12.5 16.5
47 190.0 53.0

236 1, 45, 53.75 16.63

236 slow 0, 13.35

11, 41.9

46.7

12 28.6

1, 46, 07.10

18, 12, 28.6

7, 33, 38.5

1, 14.3

Assy 7, 32, 24.2

1853 Dec 24 " 7, 32, 24.2

Dec

AD

 $\rho - * = +0^m 16.63$

+ 2' 30".7

42

1130

Comet

(236) 1, 50, 38.5 H 0, 43, 28 Dec + 26, 56
 14

1, 50, 52.5

43 28

1, 07, 24.5

374

Dec 27th 18531.05
25.06Comet north pol. star of 6th mag G. P. B. observes
C. W. T. records

Zero 4873

4871
48739
4873

Dif. R

Dif. Dec.

* 51.0
1, 20, 52.8 1.8

1, 23, 56.0 1768

25, 51.0 1817

26, 34 1793

28, 20 1848

23, 55.0 3226

1, 25 39 1806

4873

30.67

9.8

24536

27593

300.466

5, 00.47 = d8

* 28.2 2.2
1, 30.4* 21, 50.4 2.2
1, 52.6x 30, 0.2 2.1
1, 30 2.3x 30, 22.1 2.2
1, 30 24.3x 30, 37.5 2.4
1, 30, 39.7

155-242.1 129

1, 25, 57.01 2.15 = Δα

chron. error + 17.2

1, 26, 14.21

18, 23, 31.57

18, 24, 18.31

46.74
18, 24, 18.31

7, 01, 55.90

1, 9.12

7, 00, 46.78 M. G. Linn

Comet (236)

1, 32, 28.2

26.02

1, 06, 02

West

H 0, 26, 06

Sun

Dec. + 23, 54.00

$$\begin{array}{r} 3.08 \\ 1.26 \\ \hline 1.42 \end{array} \quad \begin{array}{r} 1.15'' \\ 5.07 \\ \hline 3.52 \end{array} \quad \left. \vphantom{\begin{array}{r} 3.08 \\ 1.26 \\ \hline 1.42 \end{array}} \right\}$$

Star of comp. = Bet. 365 = φ Piscium

$$\begin{array}{r} \text{K} 1.05 \dots 36.71 \\ + 9.71 \end{array}$$

$$\text{K.P.D. } 66.12 \dots 40.0 \quad 1850. \text{ p. 1}$$

$$- 57.72$$

$$\alpha \quad 1.05 \dots 46.42 \quad 1857.0$$

$$66.11 \dots 42.24$$

$$\delta + 23.48 \dots 17.72 \quad 1858.0$$

$$2.15$$

$$\alpha \quad 1.05 \dots 48.57$$

$$48 + 57.00.47$$

$$\delta + 23.53 \dots 18.19$$

$$\begin{array}{r} 1.3 \\ 3.9 \end{array} \quad \begin{array}{r} 102 \\ 103 \end{array} \quad \begin{array}{r} \text{An. p.} + 3.287 \\ 3 \end{array}$$

$$\begin{array}{r} 0013 \\ 0026 \end{array} \quad 34 \quad + 9.711$$

$$\begin{array}{r} 1.8 \\ 4.5 \end{array} \quad \text{An. prec.} - 19.24$$

$$\text{sec. rem.} + .60$$

$$- 19.24$$

$$3$$

$$57.72$$

Jan 2nd PM 1854-1st 10th 455

1 10 53

0th 05.301st 5 3319th 06'X
R R
Dec

Star of comp = $h = 10$ mag.
 $* a = B.A.C. 336 = 6$ "
 h north pol. a

Dy. B a b

$$x a = 17.2 \times b = 36.49.0231 \times a \text{ Dec. } 1.30 \text{ approx}$$

$$x a / 1.34.29.4 \times b \quad 1.37.01.32315 \times b \quad 6.38$$

$$5.08$$

$$x a \quad 45.5 \times b \quad 1.40.17.4 \quad 2.31.9$$

$$+ a \quad 1.37.67.8 \times b \quad 1.40.29.6 \quad 2.31.8$$

$$2.31.85$$

$$1.01.48.69$$

$$1287$$

$$1.02.01.50$$

$$a \quad 2.31.85$$

$$\text{Star } 5.05.9 \quad a \quad 04.33.35 \times b$$

$$\text{Scale } 5.08.0$$

Dy. Dec. a & b

$$17.52$$

$$48.73$$

$$31.24$$

$$6.2$$

$$30.59$$

$$71.08.35.2$$

$$-1.17.3$$

$$71.07.17.9$$

$$18.52.42.1$$

$$40.5.05.9$$

$$+18.57.48.0 \times b$$

Comet north

Dy. R & B x b

$$51.47.8$$

1854

Jan 2

Comet north pole. xh

Dq. Dec. 8 & xh

δ 1. 51.47 $9^r 29$
 δ 1. 54.16.0 $9. 88$

δ 2. 02.30.2 $11^r 49$
 δ 03. 54.6 $11. 83$

$232 \ 27.8 \ 42.43$
 $1. 58. 06.9 \ 10.61$

$18. 47. 57.6 \ 48.73$
 $7. 10. 09.3 \ 38.12$

$1. 10.5 \ 7.6$

$MSY \ 7. 08. 58.8 \ 373.6 = 6. 13.6$

18. 47. 10.9

46.7

57.6

$xh \ 6. 29.2 \ \delta \ 1. 57. 11.8 \ 42.6$
 $xh \ 1. 56 \ 49.2 \ \delta \ 1. 57. 31.7 \ 42.6$

$xh \ 57. 42.0 \ \delta \ 58. 24.3 \ 42.3$
 $xh \ 1. 58. 01.8 \ \delta \ 1. 58. 44.4 \ 42.6$

$31. 52.2 \ 2.0$

$1. 57. 58.0 \ 42.50$

Compared with α^* of 10^{th} which was itself
 referred to B.A.C. 336.

1854 Jan 2nd $7^h 08^m 58.8$ M.S.Y.

 $\Delta\alpha$ $\Delta\delta$

$\rho - * + 0^m 42.50 + 6. 13.6$

1854.0 $\alpha = 1. 04. 33.35$
 $\delta = 18. 57. 48.0$

18 57 48

6 13.6

19 04 01.6

$mo \approx 48^m \ 1 \ 34.6$

19 04 3.2

19° 5' 38"

1864
Jan. 9thChron. (236) Im. of 43 Jovii 1^h 17^m 48^s 3 - 4⁴⁵

Gr. Equator. C. M. J.

Feb. 3 P. M.

Im. of 728 B. A. C. (Chron 236) 6^h 40^m 56^s 0 - 4⁴⁵Five feet Equatorial C. M. J.
Mr. Paine's time too early by about $3/4$ of an hour

1854

Feb. 9 P.M.

Imm. of 57 Gem. (Chron 236) ^{h m s} 5^h 19^m 16^s.7 - 3^h 5^m

St. Equator: C.W.Y.

E.C. 5^h 32^m 00^s
236 5^h 31^m 19^s.6

March 12 P.M.

E.C. 5^h 27^m 00^s236 5^h 25^m 14^s.83^vImm. of 46 Leonis ^{h m s} 7^h 37^m 54^s.0

(Chron. 236) Doubtful, very faintly seen at the last

Christophe Reflection W.C.B.

1832

April 2 P.M.

Verg fine Bright Comet - Tail 10° - Comet size

Comet mouth prec. star 8

- 2.09.00

39

* R - 2.09.39
Dec 17.47'

7 58 3.1 7.11
7 58 7.1

43.0
43.0 5.19

48.1 1.52 x
7.58.52.1

7.12
7 59 31.2
7.59.33.2

43.7
43.8 5.16

8.06.19.0 1.56

8 0 57.4 8.04
8 01. 1.7

5.14

43.4
43.4 49
24.3 5.16.3 d8

44.05 dca + 1.3 cm. for ref.
cor. for ref - 0.07 5.17.6 = d8
43.98 = dca

408 2.50 x
8.01.45.1 x
47 57 15.7
7.59.32.62

7.59.32.62
1.57.00
8.01.29.62
0.42.47.62
7.18.42.00
1.11.86
7.17.30.14 M2.2

~~Comet (236) 8.03.49.1 H 5.56.13 Dec~~

Comet (236) 8.06.16.7 H 5.58.38 Dec. + 17.68'

2.09.36.7
- 37
R 2.09.00
Dec + 17.52'

8.08.14.7
5.58.38
2.09.36.7

2 07.36.1
2 07.38.7

April 2 P.M.

alt 8°

a Arctis
 (236) 8^h 21^m 37.2 H West 6^h 24^m 01 Dec. + 22^h 49^m 00

8^h 21^m 37.21^m 588^h 23 35.26^m 24 011^m 59 34.21^m 58 57.0

Int cor - 37.2 d ref

26^m 42.3 7^m 078^h 28^m 46.3

s

27.0

4^m 19

x 9.3 2.48

27.4

y 8^h 29^m 13.7+ 22^h 49^m 0022^h 46

Int cor - 3 d ref

ref - 3^m70 58.2 6^m 418^h 30^m 2.34^m 15

26.0

x 24.2 2^m 2626.1 4^m 17 = d8x 8^h 30^m 28.4

26.5 + 1.3 = cor for ref.

11 8^m 29.126.62 da 4^m 18.3 = d88^h 29^m 37.27

cor. for ref. - 0.07

1^m 57.0

26.55 = da

8^h 31^m 34.270^m 42^m 47.627^m 48^m 46.65* M 2^h 09^m 40.44* Dec. + 17^h 46^m 38.01^m 16.79

da - 26.55

d8 + 4^m 18.8April 2nd M.S. 7^h 47^m 29.86da M 2^h 09^m 13.89d8 + 17^h 50^m 56.8

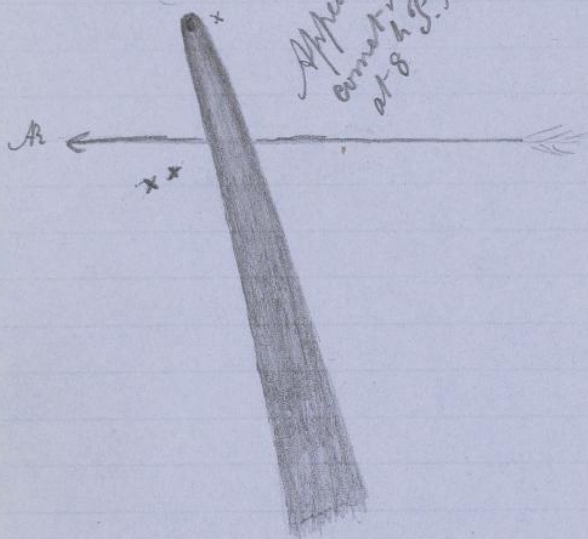
Leimut (236) 8^h 31^m 42.1 H West 6^h 23^m 42 Dec. 17^h 56^m 00

E. 6^m 9^m 06.00236 9^m 3^m 56.5

84

April 2 P.M.

Appearance of the
comet in the comet-secor
at 8 P.M. meridian



Tail 10°



Nucleus = * 4th mag - very decided

Hirt Celeste 4238

1854.0
* R 2..06..42.51
Dec + 2..57.93
* R 2..09..40.44
Dec - 43.98
* R 2..08..56.46

72..28..43.8
- 15..21.8
72..13..22.0
* Dec 17 46..38.10
Dec + 5..17.6
Dec + 17..51..55.6

3.291
+ 004
3.295
54
13180
16475
177930
- 17.071
54
6828
8535
921.78

April 2nd ^{h m s} 7..17..30.14 No. 87. Comet. * R ^{h m s} 2..08..56.46 Dec. + 17..51..55.6

15..21.8.

Cor Refractⁿ in R
 " " Du

$$0.14 \times \frac{5'}{10'} = -0.07''$$

$$2.6 \times \frac{5'}{10'} = +1.3''$$

For $\Delta\alpha \propto \Delta\delta$

Monday April 3 1854

Comet

Comet S.p. Star - 7th

236 = 8^h 01^m 13.5^s + 17^o 04' 45"

(236)

7^h 51^m 49.0^s 15.0^s 4^m 28^s
 52 04.0 5^m 51^s

2^h 21^m 9.5^s 1^m 38^s
 2^h 23^m 07^s

2 seconds to be subtracted from the time of passage

7^h 53^m 19.5^s 18.8^s 3^m 33^s 1^m 29^s
 38.3 5^m 02^s

7^h 54^m 20.3^s 18.5^s 2^m 46^s 1^m 31^s
 38.8 4^m 17^s

7^h 55^m 19.0^s 18.2^s 4^m 17^s 1^m 32^s
 37.2 5^m 49^s

7^h 56^m 42.0^s 17.3^s 4^m 14^s 1^m 37^s
 56 59.3 5^m 51^s

7^h 57^m 49.8^s 16.7^s 4^m 14^s 1^m 38^s
 58 06.5 5^m 52^s
 39.5
 27 30.6 da 17.90 48-1^m 33.4

7^h 55^m 30.12^s
 7^h 56^m 28.12^s
 1^m 57.5^s
 7^h 57^m 25.62^s
 0^h 46^m 44.17^s
 7^h 10^m 41.45^s
 1^m 16.55^s
 7^h 9^m 30.90^s M.G.V.

7^h 55^m 30.12^s
 1^m 57.5^s
 0^h 45^m 57.48^s
 46.74
 0^h 46^m 44.17^s
 7^h 57^m 27.62^s
 0^h 46^m 44.17^s
 7^h 10^m 43.45^s
 1^m 10.55^s
 7^h 9^m 32.90^s M.G.V.
 7^h 9^m 36.90^s

2^h 22^m 31.03^s 17^o 01' 50.7"

Apr. 8^d

The comet is brighter than the star

B.A.C. 771

3.309

$$\begin{array}{r} 4 \\ 13.236 \end{array}$$

-16.30

$$\begin{array}{r} 4 \\ 65.20 \end{array}$$

2..22..35.69

$$\begin{array}{r} +13.24 \\ 2..22..48.93 \end{array}$$

72..57..41.1

$$\begin{array}{r} -1..05.2 \\ 72..56..36.9 \end{array}$$

8+17..03..24.1

16.30

72..57..41.1

$$\begin{array}{r} *AR\ 2..22..48.93 \\ -17.90 \end{array}$$

$$\begin{array}{r} *8+17..03..24.1 \\ -1..33.4 \end{array}$$

$$AR\ 2..22..31.03\ 8+17..01..50.7$$

(236) Star precedes comet-

* 9..03..49.3

$$\begin{array}{r} 4\ 9.1\ 19.4 \end{array}$$

* 9..4..22.1

$$\begin{array}{r} 4\ 42.6\ 20.5 \end{array}$$

* 9..4..55.1

$$\begin{array}{r} 5..15.7\ 20.6 \\ \hline 60.9 \end{array}$$

14..07.4 +20.3=da

9..4..42.47

1..57.5

9..06..39.97

0..46..44.17

8..19..55.80

M.P.T. da+20.3

27 Apr 1853

6² - 8⁴

8

10

12

14

16

18

20

22

24

46.43

- 2.30

44.13

2.25

41.48

2.24

39.24

2.20

37.04

2.18

34.46

2.15

32.31

2.14

30.17

2.08

28.17

1.40

26.36

1.26

1.23

1.18

1.16

1.14

1.12

1.10

1.09.30

1.06

44.13 4.49

39.24 4.38

34.46 4.29

30.17 4.19

25.58 4.19

15

35.55

6.55

21

29.00

5.06

27

23.54

5.20

Jan 2 = 33

18.20

