

1880phase.proj. 18432

KG
11366
v. 839

Form of Despatch.

Eleventh May fifteen six four-

ascension twenty-two fifty-nine eighteen three

with fourteen thirty-six zero.

- Translation -

May 11 d. 15^h 2^m

R.A. 22^h 59^m 5^s 18.3

Decl. + 14° 36' 0."

address S. C. Chandler, Jr. Preble House, Portland Me.

place is Mean place 1881.0

time is Camb. M. Time to tenths of minutes -

Value of

Constants.

Value of diagonal of square = $889''.8$

Geographical Latitude of Cambridge $42^{\circ} 22' 46''.3$

Geocentric " " " $42^{\circ} 11' 20''.7$

Log. Earth's Radius (ρ) = 9.9993429

Correction to be applied to Washington Sid.
time of mean noon to obtain Cambridge

Sid. time do. = $-3''.89$

$$\log. \cos. \varphi' = 9.86978$$

$$\text{" sin. } \varphi' = 9.82710$$

$$\text{" tan } \varphi' = 9.9573$$

$$\log. \rho \pi \cos. \varphi' = 0.8021^{\circ} \text{ on basis } \pi = 8''.571^{\circ}$$

$$\text{" } \rho \pi \sin. \varphi' = 0.7594^{\circ} \text{ " " } \pi = 8''.571^{\circ}$$

$$\log. \frac{8''.88}{8''.57} = 0.0154^{\circ} = (\log. \text{ of ratio, to be added}$$

to log. of quantity taken from H. C. O. tables, to ob-
tain log. $f. \rho$.

$$\log. \rho \pi \cos. \varphi' = 0.8161^{\circ} \text{ on basis } \pi = 8''.45$$

$$\text{" } \rho \pi \sin. \varphi' = 0.7734^{\circ} \text{ " " " "}$$

$$\log. \frac{8''.45}{8''.571} = 0.0139^{\circ}$$

Nov. 3, 1880:
Reduction in R. A. C. C.

1	2	3	4
Comet.	Star.	Diff.	$\frac{\text{Diff.}}{2}$
h	h		
21 25 18.8	21 25 14.8		
25 44.8	25 34.0		
51 3.6	50 48.8	+ 0 ^m 14.8 ^v	+ 0 ^m 7.40 ^v (Rej.)
27 1.7	26 57.3		
27 44.3	27 33.7		
54 46.0	54 31.0	+ 0 ^m 15.0 ^v	+ 0 ^m 7.50 ^v
28 14.8	28 10.4		

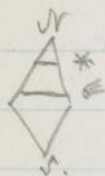
28 44.2	28 38.5		X
29 34.0	29 13.1		
58 8.2	57 51.6	+ 0 ^m 16.5 ^v	+ 0 ^m 8.30 ^v
30 1.7	39 55.6		
30 41.8	30 31.4		
60 43.5	60 27.0	+ 0 ^m 16.5 ^v	+ 0 ^m 8.25 ^v
31 18.8	31 11.8		
31 59.0	31 48.5		
63 17.8	63 0.3	+ 0 ^m 17.5 ^v	+ 0 ^m 8.75 ^v
32 40.4	32 33.4		

33 22.2	33 14.2		
34 0.8	33 51.2		
67 23.0	67 5.4	+ 0 ^m 17.6 ^v	+ 0 ^m 8.80 ^v Rej.
34 29.8	34 21.8		
35 9.9	34 59.5		
69 39.7	69 21.3	+ 0 ^m 18.4 ^v	+ 0 ^m 9.20 ^v
		(5)	+ 0 ^m 8.40 ^v

Compa star + 37° 4577

H. C. Cor. - 51" + 41

D. C. " - 7' - 4'



Reduction in Dec.

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$$\begin{array}{ccccccc} (15) & (16) & 7 & 8 & 9 & 10 \\ (\text{diff. } \equiv) & (\text{diff. } \times) & (\text{Col. 5} - \text{Col. 6}) & (\text{Col. 5} + \text{Col. 6}) & (\frac{15 \cos. \text{dec.}}{2}) & (\text{diag.} - \text{col. 9}) \end{array}$$

$$\begin{array}{r} 37^{\circ} \quad 50' \quad 3.1'' \\ - 12.8'' \\ \hline + 37 \quad 49 \quad 50.3'' \end{array}$$

$$0^{\circ} \quad 42.6^{\circ} \quad 0^{\circ} \quad 36.4^{\circ} \quad 0^{\circ} \quad 6.2^{\circ} \quad (46.2'')$$

$$\begin{array}{l} \text{Log } 4.32 = 0.635484 \\ \text{ " } 7.5 = 0.875061 \\ \text{ " } \cos \text{ dec.} = 9.897511 \\ \hline 2) 25.59 = 1.408056 \\ \quad 12.80 \end{array}$$

$$\begin{array}{r} 0^{\circ} \quad 39.5^{\circ} \\ \hline 0^{\circ} \quad 40.2^{\circ} \end{array} \quad 0^{\circ} \quad 34.6^{\circ} \quad 0^{\circ} \quad 5.2^{\circ} \quad (39.0'')$$

$$\begin{array}{r} 0.635484 \\ 0.875061 \\ 9.897532 \\ \hline 25.59 = 1.408077 \end{array}$$

$$0^{\circ} \quad 40.1^{\circ} \quad 0^{\circ} \quad 35.8^{\circ} \quad 0^{\circ} \quad 4.3^{\circ} \quad (32.25'')$$

$$0^{\circ} \quad 40.2^{\circ} \quad 0^{\circ} \quad 36.7^{\circ} \quad 0^{\circ} \quad 3.5^{\circ} \quad (26.25'')$$

$$\begin{array}{r} + 37^{\circ} \quad 50' \quad 3.1'' \\ - 25.6'' \\ \hline + 37 \quad 49 \quad 37.5'' \end{array}$$

$$0^{\circ} \quad 38.6^{\circ} \quad 0^{\circ} \quad 37.0^{\circ} \quad 0^{\circ} \quad 1.6^{\circ}$$

$$\begin{array}{r} 0^{\circ} \quad 40.1^{\circ} \\ \hline 0^{\circ} \quad 40.56^{\circ} \end{array} \quad 0^{\circ} \quad 37.7^{\circ} \quad 0^{\circ} \quad 2.4^{\circ} \quad (18.0'')$$

$$0^{\circ} \quad 4.33^{\circ}$$

$$\begin{array}{r} \text{Mean of uncorrected sid. times of obs. } 21^h \quad 30^m \quad 35.3^s \\ - 4 \quad 35.5^s \\ \hline 21 \quad 25 \quad 59.8^s \quad \text{Chr. Cor.} \end{array}$$

$$\text{Mean cor. to M.S. of obs. } \equiv 6^h \quad 31^m \quad 39.8^s$$

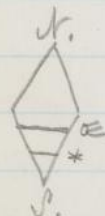
4



Nov. 8. 1880. Con. on p. 64.
Reduction in R. A.

C. C.

	1	2	3	4
	Comet.	Star.	Diff.	Diff.
	<i>h</i> <i>m</i> <i>s</i>	<i>h</i> <i>m</i> <i>s</i>		
23	24 51.5	26 9.5		
	25 41.9	26 32.0		
	27 3.0	28 21.4		
	27 57.1	28 35.4		
	29 10.4	30 29.5		
	30 3.8	30 41.6		
	31 35.3	32 54.7		
	32 29.8	33 6.4		
	34 4.7	35 23.8		
	35 1.0	35 35.8		
	36 34.4			
	45 55.0	46 58.8		
	46 56.2			
	47 30.2	48 35.5		
	48 19.8	49		
<hr/>				
	49 49.4	50 54.5		
	50 38.4	51 14.8		
	100 27.8	102 9.3	-1 ^m 41.5 ^r	-0 ^m 50.75 ^r
	51 38.9	52 43.4		
Rej.	52 28.9	53 3.4	Rej.	
104	7.8	105 46.8	-1 ^m 39.5 ^r	-0 ^m 49.50 ^r



$$(\text{Diff. } \overset{5}{\text{OE}}) (\text{Diff. } \overset{6}{*}) (\text{Col. } \overset{7}{5} - \text{Col. } \overset{8}{6}) (\text{Col. } \overset{9}{5} + \text{Col. } \overset{10}{6}) \left(\frac{15 \cos. \text{dec.}}{2} \right) (\text{Dir.} - \text{Col. } \overset{11}{9})$$

$$0^{\text{h}} 49.0^{\text{m}} 0^{\text{s}} \quad 20.3^{\text{s}} \quad 0^{\text{m}} 28.7^{\text{s}} \quad (215.25)$$

$$0^{\text{h}} 50.0^{\text{m}} 0^{\text{s}} \quad 20.0^{\text{s}} \quad 0^{\text{m}} 30.0^{\text{s}} \quad (220.0)$$

6



Nov. 9. 1880 Reduction in R.A.

C.C.

	1	2	3	4
	Correct.	Star.	Diff.	Diff.
23	42 17.7	33 40 52.44		
	42 39.7	42 1.2		
84	57.4	83 53.6	+2 ^m 3.8 ^s	+1 ^m 1.90 ^v
44	25.3	42 59.5		
44	49.2	44 8.9		
89	14.5	87 8.7	+2 ^m 5.8 ^s	+1 ^m 2.90 ^v
46	33.8	45 8.4		
		46 17.4		
48	21.7	46 56.2		
48	47.3	48 5.3		
97	9.0	95 1.5	+2 ^m 7.5 ^s	+1 ^m 3.75 ^v
50	51.6	49 26.3		
51	19.4	50 35.9		
103	11.0	100 2.2	+2 ^m 8.8 ^s	+1 ^m 4.40 ^v
53	5.2	51 39.2		
53	34.2	52 48.9		
106	39.4	104 28.1	+2 ^m 11.3 ^s	+1 ^m 5.65 ^v
			(5)	+1 ^m 3.72 ^v

Use cor. for refraction.

H. A. = +42° 54'

Comp. Star N. M. +44° 4320 (K) mag. 8.5

H. C. Cor. -36 +2"

Dec. " -6 +2'

Mean of uncorrected sid. times of obs. = 23^h 42^m 29.3^s

-4 40.6 = Chron. Cor.

23^h 42^m 48.7^s

$$(Diff. \overset{5}{\equiv}) (Diff. \overset{6}{*}) (Col. \overset{7}{5} - Col. \overset{6}{6}) (Col. \overset{8}{5} + Col. \overset{6}{6}) \left(\frac{15 \cos. dec.}{2} \right) (Diag. - Col. \overset{9}{9})$$

$$0^{\circ} \quad 22^{\circ}.0' \quad 1 \quad 9.8^{\circ} \quad 0^m \quad 46.5^s \quad (351.0)$$

$$0 \quad 23.9' \quad 1 \quad 9.1^{\circ} \quad 0^m \quad 45.2^s \quad (339.0)$$

$$0 \quad 25.6' \quad 1 \quad 9.1^{\circ} \quad 0^m \quad 43.5^s \quad (326.25)$$

$$0 \quad 27.8' \quad 1 \quad 9.6^{\circ} \quad 0^m \quad 41.8^s \quad (313.5)$$

$$\begin{array}{r} 0 \quad 29.0' \quad 1 \\ \hline 0 \quad 25.6' \quad 1 \end{array} \quad 9.7^{\circ} \quad \begin{array}{r} 0^m \quad 40.7^s \\ 0^m \quad 43.6^s \end{array} \quad (305.25)$$

$$\text{Mean cor. C. H. I. of obs. } \equiv = 8^h \quad 24^m \quad 30.5^s$$

$$0.72570 = \lg. \left(\frac{15 \cos. dec.}{2} \right)$$



Nov. 11. 1850.
Reduction in R. A.

C. C.

1			2			3			4		
Comet			Star.			Diff.			$\frac{2\frac{1}{2}}{2}$		
h	m	s	h	m	s						
1	58	59.7	1	58	32.3						
	59	21.3		59	2.3						
	118	21.0		117	34.6	+0 ^m 46.5 ^s 4 ^v			+0 ^m 23.5 ^s 20 ^v		
2	0	14.0	1	59	45.8	Use These.					
	0	35.4		0	16.0						
	0	49.4		0	1.8				+0 ^m 47.5 ^s 6 ^v	+0 ^m 23.5 ^s 80 ^v	
2	1	33.6	2	1	4.7						
	1	54.4		1	35.2						
	3	28.0		3	39.9	+0 ^m 48.5 ^s 1 ^v			+0 ^m 24.5 ^s 05 ^v		
	3	14.8	2	2	44.0						
	3	33.6		3	18.6						
	6	48.4		5	57.6						
				4	7.5						
				4	37.8						
	6	15.3		5	58.3						
	6	48.5		6	18.3						
	13	3.8		12	11.6	+0 ^m 52.5 ^s 3 ^v			+0 ^m 26.5 ^s 10 ^v		
	7	33.7		7	16.8	Use These.					
	8	6.3		7	31.7						
	15	40.0		14	48.5				+0 ^m 51.5 ^s 5 ^v	+0 ^m 25.5 ^s 75 ^v	
	9	34.4		9	16.1				(5)	+0 ^m 24.5 ^s 55 ^v	
	10	6.4?		9	31.5						
	11	30.4		11	12.2						
	12	4.4		11	27.5						

Comp. star Δ m. +46° 40' 25" (R).

H.C. Cor. -35 -5'

D.C. -41 +1'

10



Swifts

Nov. 18. 1880.
Reduction in R. A.

C. C.

Const.	Star.	Diff.	Diff.
25 32 30.9	33 31 5.9		
33 30.7	32 20.0		
65 6.6	63 25.9	+2 ^m 40.7 ^v	+1 ^m 20.35 ^v X
35 35.3	34 8.3		
36 28.2	35 11.5		
71 58.5	69 14.8	+2 ^m 43.7 ^v (Rej.)	+1 ^m 21.85 ^v
58.5	36 45.8		
38 41.4	37 6.5		
39 32.8	38 19.3		
78 14.2	75 25.8	+2 ^m 48.4 ^v	+1 ^m 24.20 ^v X
41 38.0	40 0.8		
42 28.1	41 14.6		
84 6.1	81 15.4	+3 ^m 50.7 ^v (Rej.)	+1 ^m 26.35 ^v
	42 58.6		
45 0.3	43 20.9		
45 50.3	44 36.0		
90 50.6	87 56.9	+3 ^m 53.7 ^v (Rej.)	+1 ^m 26.88 ^v
48 34.8	46 58.1		
49 29.0	48 13.7		
98 3.8	95 5.8	+2 ^m 58.0 ^v	+1 ^m 29.00 ^v X
53 6.0	50 22.4		
52 56.3	51 38.3		
105 2.3	102 0.7	+3 ^m 1.6 ^v	+1 ^m 30.80 ^v X
55 4.8	53 18.3		
55 54.7	54 36.1		
110 59.5	107 54.4	+3 ^m 5.1 ^v	+1 ^m 32.55 ^v X
H.C. Cor. -29 ^v	-9 ^v	(5)	+1 ^m 27.30 ^v
2 C. " -31	+1 ^v		

Comp. star DM +53° 121 (A).

Reduction in Dec.

$$(Diff. \overset{5}{\alpha}) (Diff. \overset{6}{\delta}) (Col. \overset{7}{5} - Col. \overset{8}{6}) (Col. \overset{8}{5} + Col. \overset{9}{6}) \left(\frac{15 \cos. dec.}{2} \right) (Diff. Col. \overset{10}{9})$$

$$0^m 54.8^s 1^m 14.1^s 0^m 19.3^s (144.8)$$

$$0 51.4^s 1 12.8^s 0^m 21.4^s (160.5)$$

$$0 54.2^s 1 19.6^s 0^m 25.4^s (190.5)$$

$$0 50.3^s 1 15.9^s 0^m 25.6^s (192.0)$$

$$0 49.9^s 1 17.2^s 0^m 27.9^s (209.2)$$

$$0^m 23.92^s \quad \log \left(\frac{15 \cos. dec.}{2} \right) = 0.65138^s$$

Mean of uncorrected sid. times of obs = $23^h 45^m 7.0^s$ $\overset{Corr.}{-47.4^s}$
 $23^h 44^m 19.6^s$

Cor. for refraction $N. A. = -52''$ $29.5''$
 Mean cor. C. M. S. of obs $= 7^h 50^m 38.3^s$

12



Swifts

Corr.

 Nov. 19, 1880.
 Reduction in R.A.
 Star. Diff.

C. C.

Diff.

23 ^h 21 ^m 47.2	23 ^h 21 ^m 52.9		
22 20.2	22 57.0		
44 7.4	44 49.9	-0 ^m 42.5 ^s	-0 ^m 31.25 ^s
23 20.0	23 24.0		
23 51.7	24 28.8		
47 11.7	47 52.8	-0 ^m 41.5 ^s	-0 ^m 20.55 ^s
24 53.4	24 56.5		
25 25.1	26 0.9		
50 18.5	50 57.4	-0 ^m 38.9 ^s	-0 ^m 19.45 ^s
26 26.4	26 28.5		
26 57.0	27 82.8		
53 23.4	54 1.3	-0 ^m 37.9 ^s	-0 ^m 18.95 ^s
27 53.9	27 55.4		
28 24.1	28 59.8		
56 18.0	56 55.2	-0 ^m 37.2 ^s	-0 ^m 18.60 ^s
		(5)	-0 ^m 19.76 ^s

Comp. Star D M. + 53° 184. (B) Mag. 8.4

-46^s-8^s-3^s+1^sMean of uncorrected sid. times of obs. = 23^h 25^m 17.8^s

-48.0 Chr. Cor.

23^h 24^m 29.8^s

No correction for refraction

N. A. = -1^h 25^m 50^s

$$(\text{diff.}^5 \text{E}) (\text{diff.}^6 \text{Star}) (\text{Col.}^7 \text{5} - \text{Col.}^6 \text{6}) (\text{Col.}^8 \text{5} + \text{Col.}^6 \text{6}) \left(\frac{15 \text{ cor. dec.}^9}{2} \right) (\text{Diff.}^{10} \text{Col.})$$

$$0^m 33.0^s 1^m 4.1^s (161.6) 1^m 37.1^s$$

$$0 31.7^s 1 4.8^s (166.0) 1^m 36.5^s$$

$$0 31.7^s 1 4.4^s (169.0) 1^m 36.1^s$$

$$0 30.6^s 1 4.3^s (174.0) 1^m 34.9^s$$

$$\begin{array}{r} 0 \quad 30.2^s 1 \\ \hline 0 \quad 31.44^s \end{array} \quad 4.4^s (180.3) \quad \begin{array}{r} 1^m 34.6^s \\ \hline 0^m 95.84^s \end{array}$$

$$\text{Mean cor. to N.E.T. of obs. } \ll = 7^h 26^m 55.8^s$$

$$\text{Log.} \left(\frac{15 \text{ cor. dec.}}{2} \right) = 0.64679^s$$

14



Nov. 21. 1880.
Reduction in R. A.
Const. $\frac{1}{2}$ $\frac{3}{2}$ $\frac{4}{2}$
Class. Diff.

C.C.

 $\frac{Diff.}{2}$

h m s
0 31 0.2



31 28.3

33 3.8

35 1.8

33 58.1

36 2.9

67 1.6

71 4.7

$-4^m 3.1^s$

$-2^m 1.55^s$

38 16.2

39 11.1

39 41.0

41 25.8

40 37.2

42 37.2

80 18.2

84 13.0

$-3^m 54.8^s$

$-1^m 57.40^s$

43 1.2

44 54.2

43 57.4

45 55.3

86 58.6

90 49.5

$-3^m 50.9^s$

$-1^m 55.45^s$

46 24.0

48 15.2

47 20.5

49 17.0

93 44.5

97 32.2

$-3^m 47.7^s$

$-1^m 53.80^s$

49 47.5

50 11.3

52 0.6

51 8.7

53 2.0

101 20.0

105 2.6

$-3^m 42.6^s$

$-1^m 51.30^s$

(5) $-1^m 55.91^s$

Comp. dist = $2^m 54^s 29^s$ Mag. 8.0 (L)

-40^s

$+18^s$

$+10^s$

-5^s

$$(\text{Diff.}^5) (\text{Diff.}^6 \text{ star.}) (\text{Col.}^7 5 - \text{Col.}^6 6) (\text{Col.}^8 5 + \text{Col.}^6 6) \left(\frac{15 \cos. \text{dec.}^9}{2} \right) (\text{Diag.} - \text{Col.}^9 9)$$

$$0^{\circ} 54.6^{\circ} 1^{\circ} 1.1^{\circ} 0^m 6.5^v (48.8)$$

$$0^{\circ} 56.2^{\circ} 1^{\circ} 1.4^{\circ} 0^m 5.2^v (39.0)$$

$$0^{\circ} 56.2^{\circ} 1^{\circ} 1.1^{\circ} 0^m 4.9^v (36.8)$$

$$0^{\circ} 56.5^{\circ} 1^{\circ} 1.8^{\circ} 0^m 5.3^v (39.8)$$

$$\begin{array}{r} 0^{\circ} 54.4^{\circ} 1^{\circ} 1.4^{\circ} 0^m 4.5^v (30.0) \\ \hline 0^{\circ} 56.18^{\circ} 1^{\circ} 0^m 5.18^v \end{array}$$

No cor. for refraction. H. A. = $36^m 27.5^s$
 Mean cor. to Me. S. of obs. = $8^h 37^m 26.5^s$

$$\text{mean of uncorrected sid. times of obs} = 0^h 43^m 54.2^s$$

$$\begin{array}{r} 5.2^s \\ \hline 43^m 59.0^s \text{ Chr. Cor.} \\ \hline 0^h 43^m 5.2^s \end{array}$$

16



Nov. 22. 1880.
Reduction in R.A.

C. C.

Const.

Star.

Diff.

Diff.

h m s
 2 20 41.0
 21 1.2

h m s
 2 22 17.9
 22 48.8

22 18.0

23 11.4

22 48.8

23 59.5

45 1.8

47 10.9 $-2^m 9.^s 1^v$ $-1^m 4.^s 5^v$

24 37.1

25 5.2

25 29.8

26 0.8

26 50.1

26 25.0

27 40.3

52 25.8

54 30.4 $-2^m 4.^s 6^v$ $-1^m 2.^s 30^v$

28 48.0

29 31.6

29 7.8

30 21.2

57 50.8

59 52.8 $-2^m 2.^s 0^v$ $-1^m 1.^s 0^v$

30 54.6

31 19.9

32 2.7

31 40.8

32 56.4

63 0.7

64 59.1 $-1^m 58.^s 4^v$ $-0^m 59.^s 20^v$

33 31.3

34 17.5

33 56.6

35 6.8

67 27.9

69 24.3 $-1^m 56.^s 4^v$ $-0^m 58.^s 20^v$ (5) $-0^m 1.^s 0^v$ Comp. star Dec. $+54^\circ 36'$ (A) mag. 8.4

-345

+25

-3'

0'

(Diff. ⁵) (Diff. ⁶ Star) (Col. ⁷ 5 - Col. 6) (Col. ⁸ 5 + Col. 6) ($\frac{15 \text{ cor. dec.}}{2}$) (Diag. ¹⁰ Col. 9)

0^m 25.8^s 0^m 48.1^s (335.6) 1^m 18.9^s

0 24.2^s 0 50.2^s (331.8) 1^m 14.4^s

0 24.8^s 0 49.6^s (331.8) 1^m 14.4^s

0 20.9^s 0 53.7^s (330.3) 1^m 14.6^s

0 25.3^s 0 49.3^s (330.3) 1^m 14.6^s
 0 24.2^s 0 48.3^s

mean of uncorrected sid. times of obs = 2^h 29^m 5.8^s

Long. ¹⁰ cor. dec. = 48.6^s Cor. Cor.
 2^h 28^m 16.6^s

No cor. for refraction. H. A. = -52^m 15^s
 Mean cor. to H. A. of obs = 10^m 18^s 24.8^s

18



Nov. 23. 1860.
Reduction in R. A.

C. C

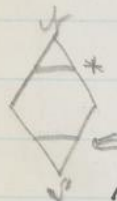
Const.

Star.

Diff.

 $\frac{2^{\circ} 45'}{25}$

h m s h m s
1 28 5.0



29 39.2

16

31 38.9 30 29.6

32 39.5 31 48.7

64 18.4 63 13.3 + 2^m 5.1^v+ 1^m 2.55^v

33 0.7

35 49.1 34 40.1

37 18.7 36 8.9

38 22.6 37 22.8

75 41.3 73 31.7 + 2^m 9.6^v+ 1^m 4.80^v

40 10.8 38 57.4

41 12.3 40 11.9

81 23.1 79 9.3 + 2^m 13.8^v+ 1^m 6.90^v

43 51.8 41 87.6

42 53.1

45 17.2 43 59.3

46 18.4 45 15.1

91 35.6 89 14.4 + 2^m 21.2^v+ 1^m 10.60^v

48 1.1 46 41.7

49 1.1 47 57.1

97 2.2 94 38.8 + 2^m 23.4^v+ 1^m 11.70^v

(5)

+ 1^m 7.31^v

Comp. star 2 m. + 54° #415 (L) mag. 8.0

-1^m 23^v+ 48^v+ 11^v+ 16^v

$$(Diff. \text{ } \text{ }^5) (Diff. \text{ } \text{ }^6) (Col. \text{ } \text{ }^7 - Col. \text{ } \text{ }^6) (Col. \text{ } \text{ }^8 + Col. \text{ } \text{ }^6) \left(\frac{15 \cos. \text{ } \text{ }^9}{2} \right) (Dist. \text{ } \text{ }^{10} - \text{ } \text{ }^{11})$$

$$1^m \quad 0.6^s \quad 1^m \quad 14.1^s \quad (120.45) \quad 2^m \quad 14.7^s$$

$$1 \quad 3.9^s \quad 1 \quad 13.9^s \quad (143.7) \quad 2^m \quad 17.8^s$$

$$1 \quad 1.5^s \quad 1 \quad 14.5^s \quad (130.2) \quad 2^m \quad 16.8^s$$

$$1 \quad 1.2^s \quad 1 \quad 15.8^s \quad (169.2) \quad 2^m \quad 17.0^s$$

$$\begin{array}{r} 1 \quad 0.0^s \quad 1 \quad 15.4^s \quad (185.7) \quad 2^m \quad 15.4^s \\ 1 \quad 1.44^s \quad \quad \quad \quad \quad \quad \quad 2^m \quad 16.1^s \end{array}$$

Mean of uncorrected sid. times of obs = $1^h 40^m 26.4^s$
 $\frac{15 \cos. \text{ } \text{ }^9}{2} = 48.8^s \text{ } \text{ }^{\text{Cor.}}$
 $\frac{1}{39} \quad 37.6^s$

Mean cor. to No. 1. of obs = $9^h 25^m 57.8^s$



Nov. 26. 1840.

C. C.

Reduction in R. A.

Correct.

Star.

Diff.

~~Diff.~~

h	m	s	h	m	s
4	7	46.1	4	7	17.8

9	8.2	8	32.7
---	-----	---	------

9	48.8	9	19.4
---	------	---	------

18	49.0	17	52.1	+0 ^m 56. ^s 9 ^v	+0 ^m 28. ^s 45 ^v
----	------	----	------	---	--

10	20.8
----	------

11	20.8
----	------

12	57.6	12	26.2
----	------	----	------

13	37.5
----	------

14	34.6	14	2.8
----	------	----	-----

15	18.5	14	46.5
----	------	----	------

29	53.1	28.	49.3	+1 ^m 3. ^s 8 ^v	+0 ^m 31. ^s 90 ^v
----	------	-----	------	--	--

16	27.0	15	55.4
----	------	----	------

17	11.2	16	39.0
----	------	----	------

33	38.2	32	34.4	+1 ^m 3. ^s 8 ^v	+0 ^m 31.90 ^v
----	------	----	------	--	------------------------------------

18	26.2	17	52.4
----	------	----	------

19	10.2	18	36.0
----	------	----	------

37	36.4	36	28.4	+1 ^m 8. ^s 0 ^v	+0 ^m 34. ^s 00 ^v
----	------	----	------	--	--

22	54.0	32	27.2
----	------	----	------

23	46.4	23	1.3
----	------	----	-----

46	40.4	45	28.5	+1 ^m 11. ^s 9 ^v	+0 ^m 35. ^s 95 ^v
----	------	----	------	---	--

24	59.2	24	19.6
----	------	----	------

25	39.7	25	4.4
----	------	----	-----

50	38.9	49	24.0	+1 ^m 14. ^s 9 ^v	+0 ^m 37. ^s 45 ^v
----	------	----	------	---	--

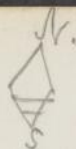
Comp. star D. m. +54° 59' (13) Aug. 8.8
 -59°
 -31°
 -48°
 0°

+0 ^m 34. ^s 24 ^v
--

~~0.425~~

$0 \quad 40.5^{\circ} \quad 0 \quad 44.8^{\circ} \quad (250.05) \quad 1^m \quad 33.33^{\circ} \text{ mean} = 1^m 26.96^{\circ}$

$\frac{mean \text{ of uncorrected sid. times of obs}}{86400} = \frac{4^h 19^m 33.6^s - 30.0^s}{86400} = \frac{4^h 19^m 3.6^s}{86400} \text{ Cor. Cor.}$



Nov. 27. 1880.
Reduction in R. A.

C. C.

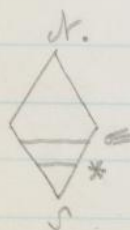
¹
Comet.

²
Star.

³
Diff.

⁴
 $\frac{2}{2} \frac{2}{2}$

^h	^m	^s	^h	^m	^s
2	31	7.0			
	32	4.9			



32	26.2	34	31.4		
33	25.9	35	0.1		
65	52.1	69	31.5	-3 ^m 39. ^s 4 ^v	-1 ^m 49. ^s 70 ^v
35	21.1	37	25.3		
36	21.1	37	54.0		
71	42.2	75	19.3	-3 ^m 37. ^s 1 ^v	-1 ^m 48. ^s 55 ^v
38	23.7	40	25.3		
39	20.6	40	58.5		
77	44.3	81	18.8	-3 ^m 34. ^s 5 ^v	-1 ^m 47. ^s 25 ^v
41	41.5	43	40.6		
42	38.5	44	9.3		
84	20.0	87	49.9	-3 ^m 29. ^s 9 ^v	-1 ^m 44. ^s 95 ^v
44	36.7	46	35.1		
45	34.0	47	3.9		
90	15.7	93	39.0	-3 ^m 28. ^s 3 ^v	-1 ^m 44. ^s 15 ^v
					-1 ^m 46. ^s 92 ^v

Comp. star D. at. +53° 59' mag. 4.8
 - 59^s - 34^s
 - 3' 0'

Mean of uncorrected sid times of obs = 2^h 39^m 52.^s 4^v
 - 49.6^s Chr. Cor.
 2 39 2.8

$$(\text{Diff.}^5 \text{ E}) (\text{Diff.}^6 \text{ X}) (\text{Col.}^7 \text{ 5} - \text{Col.}^6 \text{ 6}) (\text{Col.}^8 \text{ 5} + \text{Col.}^6 \text{ 6}) \left(\frac{15 \cos. \text{dec.}^9}{2} \right) (\text{Dir.}^{10} - \text{dir.}^9)$$

$$0^- \quad 59.7^{\circ} \quad 0^- \quad 28.7^{\circ} \quad 0^m \quad 31.0^{\circ} \quad (232.5)$$

$$1 \quad 0.0^{\circ} \quad 0 \quad 28.7^{\circ} \quad 0^m \quad 31.3^{\circ} \quad (234.75)$$

$$0 \quad 56.9^{\circ} \quad 0 \quad 28.2^{\circ} \quad 0^m \quad 28.7^{\circ} \quad (215.25)$$

$$0 \quad 57.0^{\circ} \quad 0 \quad 28.7^{\circ} \quad 0^m \quad 28.3^{\circ} \quad (212.25)$$

$$\begin{array}{r} 0 \quad 57.3^{\circ} \quad 0 \quad 28.5^{\circ} \quad 0^m \quad 28.5^{\circ} \quad (213.75) \\ 0 \quad 58.18^{\circ} \quad 0^m \quad 29.56^{\circ} \end{array}$$

$$\begin{array}{r} + 53^{\circ} \quad 56' \quad 52.8'' \\ + 1 \quad 5.2'' \\ \hline + 53 \quad 54 \quad 58.0'' \end{array}$$

$$\text{Log. } 29.56 = 1.470704^{\circ}$$

$$1.75 = 0.875061^{\circ}$$

$$11 \cos. \text{dec.} = 9.769761^{\circ}$$

$$130.47 = 2.115526^{\circ}$$

$$65.24$$

$$+ 2' \quad 10.42 = 130.42 = 2.115337^{\circ}$$

$$\begin{array}{r} 1.470704^{\circ} \\ 0.875061^{\circ} \\ 9.769761^{\circ} \\ \hline 2.115526^{\circ} \end{array}$$

$$\text{mean cor. to No. T. of obs E} = 10^h \quad 9^m \quad 29.7^{\circ}$$



Nov. 29. 1850.
Reduction in R.A.

C.C.

h	Comet.	Plav.	Diff.	(Diff.)
0	m 2.0	h. m. 2		
	49 2.0	0 49 47.5		
	50 5.9	50 4.2		
	99 7.9	99 51.7	-0 ^m 43.8 ^v	-0 ^m 21.90 ^v
	50 39.4			



51	0.6	51	45.0		
52	3.8	52	1.8		
103	4.4	103	46.8	-0 ^m 42.4 ^v	-0 ^m 21.20 ^v
56	3.0				

56	24.8	57	6.2	(Use last 5.)	
57	27.9	57	23.0		
113	52.7	114	29.2	-0 ^m 36.5 ^v	-0 ^m 18.25 ^v

57	51.8	58	32.5		
58	54.7	58	49.3		
116	46.5	117	21.8	-0 ^m 35.3	-0 ^m 17.6 ^v
59	18.7	59	38.7	-0 ^m 26.2	-0 ^m 13.10

1	0	20.9	1	0	15.3		
59	39.6	60	14.0	-0 ^m 34.4 ^v	-0 ^m 17.20 ^v		
1	0	55.7					

1	1	19.6	1	58.0			
2	21.0	2	15.0				
3	40.6	4	13.0	-0 ^m 32.4 ^v	-0 ^m 16.20 ^v		
2	45.1	3	22.7				
3	46.3	3	29.3				
6	31.4	7	2.0	-0 ^m 30.6 ^v	-0 ^m 15.30 ^v		

Comp. star \propto W. + 52° 674 mag. 9.3 (5) -0^m 16.92^v

Mean of unconnected ends. Times 4 obs = $\frac{1}{6} \frac{9}{11.5} (-50.0^{\circ}$ Chr. Cor.) =

(Diff.⁵ \Rightarrow) (Diff.⁶ \times) (Col.⁷ 5 - Col.⁶ 6) (Col.⁸ 5 + Col.⁶ 6) ($\frac{15 \cos. dec.}{2}$) (Diag. $\frac{10}{9}$)

$$\begin{array}{r}
 +52^{\circ} \quad 55' \quad 24.4''^{\vee} \\
 \quad \quad +1 \quad 42.6''^{\vee} \\
 \hline
 +52 \quad 57 \quad 7.0''^{\vee}
 \end{array}$$

$$\begin{array}{r}
 \text{Log. } 45.40 = 1.657056^{\vee} \\
 \text{" } 7.5 = 0.875061^{\vee} \\
 \text{cos. dec.} = 9.780232^{\vee} \\
 205.28 = 2.312349^{\vee} \\
 102.64^{\vee}
 \end{array}$$

$$1^{\text{m}}. \quad 3.9^{\circ} \quad 0'' \quad 16.8^{\circ} \quad 0^{\text{m}} \quad 46.3''^{\vee} \quad (347.25)$$

$$\begin{array}{r}
 1.657056^{\vee} \\
 0.875061^{\vee} \\
 9.779946^{\vee} \\
 \hline
 205.15 = 2.312063^{\vee}
 \end{array}$$

$$1 \quad 2.9^{\circ} \quad 0 \quad 16.8^{\circ} \quad 0^{\text{m}} \quad 46.1''^{\vee} \quad (345.75)$$

$$\begin{array}{r}
 52 \quad 55 \quad 24.4''^{\vee} \\
 \quad \quad +3 \quad 25.2''^{\vee} \\
 \hline
 +52 \quad 58 \quad 49.6''^{\vee} \\
 \text{Pos. } 0.0
 \end{array}$$

$$1 \quad 2.2^{\circ} \quad 0 \quad 16.6^{\circ} \quad 0^{\text{m}} \quad 45.6''^{\vee} \quad (342.0)$$

$$1 \quad 1.4^{\circ} \quad 0 \quad 17.0^{\circ} \quad 0^{\text{m}} \quad 44.4''^{\vee} \quad (333.0)$$

$$\begin{array}{r}
 1 \quad 1.2^{\circ} \quad 0 \quad 16.6^{\circ} \quad 0^{\text{m}} \quad 44.6''^{\vee} \quad (334.5) \\
 \hline
 1 \quad 2.16^{\circ} \quad 0^{\text{m}} \quad 45.40''^{\vee}
 \end{array}$$

Mean cor. to Me. S. of obs $\approx .8'' \quad 22^{\text{m}} \quad 12.9''^{\vee}$



Dec. 2. 1880. Com. on p. 68.

C. V

Reduction in R. A.

Comet. Star. Diff. $\frac{2}{2}$ diff. $\frac{4}{2}$

h
6

45 14.2

h m s

~~45 42.5~~

45 42.8

6

48 46.8

49 41.4

49 13.8

50 51.9(?)

~~49 14.2~~

100 33.3

98 0.6

-2" 32.7(?)

-1" 16.35

52 41.9

53 34.5

53 10.4

~~53 25.6~~

~~53 25.2~~

54 48.9

105 52.3

108 23.7

-2" 31.4

-1" 15.70

55 26.6

56 21.5

~~55 27.6~~

57 32.2

55 57.6

113 53.7

-2" 29.5

-1" 14.75

7

0 39.6

60 40.6

1 11.9

(1 12.3)

7

3 18.9

3 12.8

2 51.3

4 25.0

~~(2 52.0)~~

5 10.2

7 37.8

-2" 27.6

-1" 13.20

~~4 34.8~~

8 4.2

(Broken set. - 1st tap)

7 54.8

8 6.5

accidental.

12 29.6

16 10.7

~~2" 41.1~~

~~-1" 50.55~~

8 35.8

9 17.7

9 2.7

10 31.8

17 38.5

19 49.5

-3" 21.8

-1" 10.50

11 10.7

12 2.0

11 46.9

13 25.2

~~11 42.2~~

~~13 15.8~~

22 54.6

25 17.2

-2" 19.6

-1" 9.80

Mean = -1" 12.91

(Diff. ⁵ Ξ) (Diff. ⁶ \times) (Col. ⁷ 5 - Col. ⁸ 6) (Col. ⁹ 5 + Col. ¹⁰ 6) ($\frac{15 \cos. \text{dec.}}{2}$) (Diag. - α)

0 28.5^u 1 14.1^u 0^m 45.6^v (342.0)

0 31.0^u 1 10.7^u 0^m 39.7^v (297.75)

0 32.4^u 1 12.2^u 0^m 39.8^v (298.5)

0 36.9^u 1 14.1^u 0^m 37.2^v (279.0)

0 36.2^u 1 13.2^u 0^m 37.0^v (277.5)

0 33.0^u 0^m 39.8^v

0.67678 = $\log \alpha$

Mean = 1^u 13.91^u



Dec. 3. 1880.
Reduction in R. A.

C. C.

1			2			3			4		
Comet.			Star.			Diff.			Diff.		
h	m	s	h	m	s						
3	46	33.6	3	48	48.2						
	46	50.6		49	12.8						
	93	24.2		98	1.0	-4 ^m 36.8 ^s			-3 ^m 18.4 ^s		
	49	46.4									
	55	52.2		58	18.4						
	56	23.0		58	27.11						
	113	15.2		116	45.5	-4 ^m 30.3 ^s			-3 ^m 15.15 ^s		
	58	45.6									
2 ^h	59	37.7	3	1	45.4						
	59	51.4		2	9.0						
	119	29.1		3	54.4	-4 ^m 25.3			-2 ^m 12.65		
	5	55.4		8	11.3						
	6	17.2		8	28.2						
	12	12.6		16	34.5	-4 ^m 21.9 ^s			-2 ^m 10.95 ^s		
	11	29.0		13	47.8						
	11	54.2									
	15	30.4		17	43.0						
	15	52.2		17	54.0						
	31	22.6		38	39.0	-4 ^m 16.4 ^s			-3 ^m 8.20 ^s		
						(5)			-2 ^m 13.07 ^s		

Comp. star D m. +50° 882 (A) Mag. 8.0

-34^s

+7^s

+9^s

+7^s (Prob. due to mistake)

Mean of uncorrected sid. times of obs. = 3^h 1^m 56.9^s

-51.6^s

dr. cor.

Reduction in Dec.

29

⁵ (Diff. \odot) ⁶ (Diff. \star) ⁷ (Col. 5 - Col. 6) ⁸ (Col. 5 + Col. 6) ⁹ ($\frac{15 \cos. dec.}{2}$) ¹⁰ (Diag. - col. 9)

⁵ 0^m 17.0^s ⁶ 0^m 24.6^s (577.8) ⁸ 0^m 41.6^s

0 30.8^s 0 8.7^s (593.55) 0^m 39.5^s

6.5 0 13.7^s 0 23.6^s (610.05) 0^m 37.3^s

0 21.8^s 0 11.9^s (637.05) 0^m 33.7^s

⁵ 0 21.8^s 0 9.0^s (658.8) ⁸ 0^m 30.8^s
¹⁰ 0 21.02^s 0^m 36.58^s

$$\log \left(\frac{15 \cos dec}{2} \right) = 0.68051^{\circ}$$

Mean cor. to the S. of obs. $\odot = 10^h 7^m 55.0^s$



Dec. 4, 1880.
Reduction in R.A.

C.C.

	1	2	3	4
	Comet.	Star.	Diff.	Diff.
1	$13^m 11.8$	$13^m 59.8$		
	$13^m 33.2$	$14^m 10.7$		
	$26^m 45.0$	$28^m 10.5$	$-1^m 25.5^v$	$-0^m 42.75^v$
	$14^m 48.4$	$15^m 30.4$		
	$15^m 3.5$	$15^m 40.4$		
	$29^m 46.9$	$31^m 10.8$	$-1^m 23.9^v$	$-0^m 41.95^v$
	$16^m 21.6$			
	$16^m 55.9$	$17^m 42.0$		
	$17^m 16.3$	$17^m 52.4$		
	$34^m 12.2$	$35^m 34.4$	$-1^m 22.2^v$	$-0^m 41.10^v$
	$18^m 24.3$			
	$19^m 3.3$	$19^m 49.3$		
	$19^m 28.6$	$19^m 58.8$		
	$38^m 26.9$	$39^m 47.8$	$-1^m 20.9^v$	$-0^m 40.45^v$
	$20^m 51.2$			
	$21^m 7.3$			
	$21^m 35.2$	$22^m 19.3$		
	$21^m 53.6$	$22^m 28.8$		
	$43^m 28.8$	$44^m 48.1$	$-1^m 19.3^v$	$-0^m 39.65^v$
			(5)	$-0^m 41.18^v$

Comp. star D in. $+49^\circ 11' 05''$ Aug. 21 (A)

$-34''$

$+4''$

$+9''$

$+6''$

Mean of uncorrected sid. times of obs = $1^h 17^m 36.6^v$
 $-52.1''$ Chr. Cor.
 $1^h 16^m 44.5^v$

Reduction in Dec.

31

⁵ (Diff. Ξ) ⁶ (Diff. \times) ⁷ (Col. 5 - Col. 6.) ⁸ (Col. 5 + Col. 6) ⁹ $\left(\frac{15 \cos. dec.}{2}\right)$ ¹⁰ (Day. - edg.

⁵ 0^m 21^s.4^c ⁶ 0^m 10^s.9^c ⁷ (647.55) ⁸ 0^m 32^s.3^v

⁵ 0 20.1^c ⁶ 0 10.0^c ⁷ (664.05) ⁸ 0^m 30^s.1^v

⁵ 0 20.4^c ⁶ 0 10.4^c ⁷ (658.8) ⁸ 0^m 30^s.8^v

⁵ 0 20.3^c ⁶ 0 9.2^c ⁷ (668.55) ⁸ 0^m 29^s.5^v

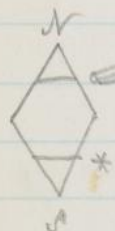
⁵ 0 18.4^c ⁶ 0 9.5^c ⁷ (680.55) ⁸ 0^m 27^s.9^v
⁵ 0 20.12^c ⁶ 0 9.5^c ⁷ (680.55) ⁸ 0^m 30^s.12^v

$\log \left(\frac{15 \cos. dec.}{2}\right) = 0.68699^v$
 Mean cor. to Me. Top of $\Xi = 8^h 19^m 53.5^v$



Dec. 7. 1880.
Redirection in R.A.

C. C.



	1	2	3	4
	Comet.	Star.	Diff.	Diff.
h	m	h	m	
1	17.0	1	58 28.4	
1	40.4	58	54.7	
2	57.4	117	23.1 + 5 ^m 34.3 ^v	+ 2 ^m 47.15 ^v
5	47.9	2	2 59.3	
6	18.2	3	25.6	
12	1.1	6	24.9 + 5 ^m 36.2 ^v	+ 2 ^m 48.10 ^v
9	41.3	6	51.7	
10	7.3	7	17.8	
19	48.6	14	9.5 + 5 ^m 39.1 ^v	+ 2 ^m 49.50 ^v
13	30.7	10	40.8	
13	58.2	11	6.7	
27	28.9	211	47.5 + 5 ^m 41.4 ^v	+ 2 ^m 50.70 ^v
17	20.8(?)	14	85.2. (2/3) looks like accidental	
17	24.1	15	1.2 Cap on sheet.	
34	44.9	29	36.4 + 5 ^m 8.8	+ 5 ^m 34.75
22	7.4	19	15.8	
		19	42.6	
25	28.0}	22	86.3	
25	28.8}			
25	59.3}	23	2.9	
25	59.8}			
51	27.3	45	39.2 + 5 ^m 48.1	+ 2 ^m 54.05 ^v
			(5)	+ 2 ^m 49.90 ^v

Comp. star Δ M. +46° 887 (B) mag. 8.4

-52"

-9"

-7'

+8'

Mean of uncorrected sid. times of obs. = 2^h 9^m 57.4^v
-53.9^v Chr. cor.
2 9 3.5

Reduction in Dec.

33

$$\begin{array}{ccccccc} 5 & 6 & 7 & 8 & 9 & 10 \\ (\text{Diff. } \equiv) & (\text{Diff. } \times) & (\text{Col. 5} - \text{Col. 6}) & (\text{Col. 5} + \text{Col. 6}) & \left(\frac{15 \cos. \text{Dec.}}{2}\right) & (\text{adj. Col. 9}) \end{array}$$

$$0^{\circ} 23.4^{\circ} 0^{\circ} 26.3^{\circ} (517.05) 0^{\text{m}} 49.57^{\text{v}}$$

$$0^{\circ} 25.3^{\circ} 0^{\circ} 26.3^{\circ} (502.8) 0^{\text{m}} 51.6^{\text{v}}$$

$$0^{\circ} 26.0^{\circ} 0^{\circ} 26.1^{\circ} (499.05) 0^{\text{m}} 53.1^{\text{v}}$$

$$0^{\circ} 27.5^{\circ} 0^{\circ} 25.9^{\circ} (489.3) 0^{\text{m}} 53.4^{\text{v}}$$

$$\begin{array}{r} 0 \quad 31.3^{\circ} \quad 0 \quad 26.6^{\circ} \quad (455.55) \quad 0^{\text{m}} 57.59^{\text{v}} \\ \hline 0 \quad 26.70^{\circ} \quad \quad \quad \quad \quad \quad 0^{\text{m}} 52.94^{\text{v}} \end{array}$$

$$\text{Mean cor. to Me. T. of obs. } \equiv = 9^{\text{h}} 0^{\text{m}} 16.1^{\text{s}}$$

$$0.71154 = \log\left(\frac{15 \cos. \text{Dec.}}{2}\right)$$



Dec. 11. 1880.
Reduction in R.A.

	1	2	3	4
	Comet.	Star.	Diff.	Diff.
h	m	s	h	m
9	14 4.9	9 14 4.7		
	14 26.8	14 25.0		
	28 31.7	28 29.7	+0 ^m 2.0	+0 ^m 1.00
	16 19.7	14 56.2		
	15 20.6	15 19.7		
	15 44.2	15 43.8		
		15 43.5		
	15 48.8	15 44.2		

Long rattles.

17 55.6..	17 45.1..	(long break.)
18 8.2..	17 56.3..	
	18 9.6..	

20 46.3

21 33.3

23 4.5

22 15.3

23 38.3

23 12.9

Comp. star

46 42.8

45 28.2

+1^m 14.56^v +0^m 37.30^v

R. m. +43°

24 47.2 (rat.?)

24 0.4

* 1124 (K)

25 24.8

24 57.3

Mag. 7.0

50 12.0

48 57.7

+1^m 14.3(2) +0^m 37.15

+45

26 36.7..

25 48.2..

5' 0'

27 18.5..

26 46.2..

mean of un-

~~28 27.7~~

~~27 40.1~~

corrected sid

53 50.2

52

34.4 +1^m 15.8 +0^m 37.90

times of obs

29 34.8

28 46.4

9^h 26^m 0.3^s

30 18.3

29 44.4

9^h 25^m 5.6^s

39 48.1

38

30.8 +1^m 17.3^v +0^m 38.63^v

Reduction in Dec.

35

$$\overset{5}{(\text{Diff. } \Xi)} \overset{6}{(\text{Diff. } \times)} \overset{7}{(\text{Col. 5} - \text{Col. 6})} \overset{8}{(\text{Col. 5} + \text{Col. 6})} \overset{9}{\left(\frac{15 \cos. \text{dec.}}{2}\right)} \overset{10}{(\text{Diag.} - \text{Col. 9})}$$

Mean of this
col. =
0^m 36.6^s

$$0^{\circ} 33.8^{\circ} 0^{\circ} 57.6^{\circ} 0^{\text{m}} 23.8^{\text{v}} (178.5)$$

$$0 37.6 0 56.9^{\circ} 0^{\text{m}} 19.3^{\text{v}} (144.75)$$

$$0 36.8 0 58.0^{\circ} 0^{\text{m}} 21.3^{\text{v}} (159.0)$$

$$0 38.5 0 58.0^{\circ} 0^{\text{m}} 19.5^{\text{v}} (146.25) (\text{Mean} = 0^{\text{m}} 20.95^{\text{v}})$$

Mean cor. to No. 3 of col. $\Xi = 15^{\text{h}} 59^{\text{m}} 23.2^{\text{s}}$

$$\log\left(\frac{15 \cos. \text{dec.}}{2}\right) = 0.73761^{\text{v}}$$

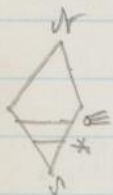


Dec. 19. 1880.
Reduction in R. A.

C.

1 Comet.			2 Star.			3 Diff.	4 Diff.
h	m	s	h	m	s		
0	35	38.8	0	32	31.9		
			34	42.4			
<hr/>			<hr/>				
	39	2.0		36	7.7		
	39	57.4		36	50.0		
	78	59.4		73	57.7 + 6 ^m 17 ^s		+ 3 ^m 1.85 ^v
<hr/>			<hr/>				
	43	29.8		40	35.3		
	43	30.8		41	6.9		
				44	14.2		
				44	15.1		

Rej.



45	43.8	44	49.0
46	38.1	45	22.6
93	16.9	90	11.6 + 2 ^m 5.3 + 1 ^m 2.65
47	49.7	46	54.2
		47	29.3

Comp. star

200. + 37°

#1174 (K)

mag. 5.5

-14° +12°

+15° +10°

~~49 11.3~~ ~~48 16.1~~~~49 11.7~~ ~~48 56.3~~

50 33.3 49 37.5

51 26.3 50 16.4

101 59.6 99 53.9 + 2^m 5.7^v + 1^m 2.85^v~~52 51.1~~ ~~51 55.1~~

(Rej.)

~~53 30.8~~ ~~52 21.1~~106 31.9 104 16.2 + 2^m 5.7^v (Rej) + 1^m 2.85^v~~54 50.5~~ ~~53 53.5~~~~55 32.7~~ ~~54 22.2~~110 22.9 108 16.0 + 2^m 6.9 + 1^m 3.45

Reduction in Dec.

37

$$\begin{array}{ccccccc}
 5 & 6 & 7 & 8 & 9 & 10 \\
 (\text{Diff. } \oplus) & (\text{Diff. } \oplus) & (\text{Col. 5} - \text{Col. 6}) & (\text{Col. 5} + \text{Col. 6}) & \left(\frac{N \cos. \text{dec.}}{2} \right) & \text{Diag. - Col. 9}
 \end{array}$$

$$0^m \quad 49^s.3 \quad 0^m \quad 33^s.6 \quad 0^m \quad 15^s.7 \quad (117.75)$$

$$0 \quad 53.0 \quad 0 \quad 38.9 \quad 0^m \quad 14^s.1 \quad (105.75)$$

$$0 \quad 41.9 \quad 0 \quad 28.4 \quad 0^m \quad 13^s.5 \quad (101.25)$$

$\log \left(\frac{15 \cos. \text{dec.}}{2} \right) = 0.77424^v$

Dec. 19, 1880. Com.
Reduction in R.A.

h	Comet		h	Star		3 Diff	4 Diff
	m	s		m	s		
5-8	46.3		57	48.8			
59	30.8		58	20.4			
118	17.1		116	8.9		$+2^m 8.2^s$	$+1^m 4.10^s$
1	49.8		1	0	52.2		
2	17.8		1	28.3			
3	16.3		2	48.3			
4	48.3		3	48.6			
5	25.7		4	14.9			
10	14.0		8	3.5		$+2^m 10.5^s$	$+1^m 5.25^s$
							$+1^m 3.66^s$

Mean of uncorrected r.a. times of obs = $0^h 54^m 47.2^s$
 $- 59.3^s$ Chr. Cor.
 $0^h 53^m 47.9^s$

Mean cor. b. N. S. of obs = $6^h 58^m 1.9^s$

⁵ (Diff. \equiv) ⁶ (Diff. \times) ⁷ (Col. 5 - Col. 6) ⁸ (Col. 5 + Col. 6) ⁹ ($\frac{15 \cos. dec}{2}$) ¹⁰ (Diag. - Col. 9)

⁰ 44.5" ⁰ 31.9" ⁰ 12.6" (94.5)

⁰ 37.4" ⁰ 26.3" ⁰ 11.1" (83.25)

⁰ 45.22" ⁰ 13.40"



Dec. 22, 1880.
Reduction in R. A.

C

	1	2	3	4
	Comet.	Star.	Diff.	$\frac{Diff.}{2}$
h	m	h	m	
3	0 59.6.	2 59 33.0.		
	1 51.2.	59 44.2.		
	2 50.8	119 17.2 + 3 ^m 33.6 ^v		+ 1 ^m 46.80 ^v - 0
	3 45.1.	3 2 18.4.		
	4 37.1.	2 29.6.		
	5 22.3	4 48.1 + 3 ^m 34.2 ^v		+ 1 ^m 47.510 ^v
	6 37.1.	5 8.4.		
		5 20.2.		
<hr/>				
	8 28.1.	7 0.1.		
	9 18.8.	7 11.5.		
	17 46.9	14 11.6 + 3 ^m 38.3 ^v		+ 1 ^m 47.65 ^v
	10 12.9.	9 44.5.		
	12 3.8.	9 56.5.		
	11 16.7			
	23 16.7	19 41.0 + 3 ^m 35.7		+ 1 ^m 47.85
		12 38.7.		
<hr/>				
	15 11.4.	13 42.9.		
	14 4.7			
	16 7.2	14 0.3.		
	31 18.6	27 43.2 + 3 ^m 35.4		+ 1 ^m 47.70
	18 48.1.	17 17.9.	(5)	+ 1 ^m 47.42
		17 32.4.		
<hr/>				
	21 29.8.	19 58.6.		
		20 15.8.		
<hr/>				
	24 2.3.	22 31.2.		
		22 47.8.		

Comp. star

D. in. + 35°

* 1158 (K)

Mag. 8.2

+ 1^m + 15°

+ 15° + 11°

Dec. 22. 1880. Com.
Reduction in R.A.

	1	2	3	4
	<u>Comet</u>	<u>Star</u>	<u>Diff.</u>	<u>Diff</u>
	25^m 52.2	24^m 20.6		
Rej.	26 46.2	24 39.3		
	52 38.4	48 59.8	+3 ^m 38.6	+1 ^m 49.30 ^v

Mean of uncorrected sid. times of obs. = $3^h 7^m 27.5^s$
 $\frac{-1^m 0.4^s}{3^h 6^m 27.4^s}$ Chr. Cor.

Mean cor. le. No. 1. of obs. = $8^h 58^m 31.9^s$

⁵
 (Diff. \oplus) ⁶
 (Diff. \times) ⁷
 (Col. 5 - Col. 6) ⁸
 (Col. 5 + Col. 6) ⁹
 ($\frac{10 \text{ con. dec.}}{2}$) ¹⁰
 (Adj. - Col. 9)

$0^{\circ} - 54.0^{\circ}$ $0^{\circ} - 18.8^{\circ}$ $0^{\circ} - 35.2^{\circ}$

44



Dec. 23. 1880.
Reduction in R. A.

C.

	1	2	3	4
	Comet.	Star.	Diff.	$\frac{2 \cdot \text{Diff.}}{2}$
4	(58.8 35.7?) (57 35.1?) 59 7.2	4 59 47.8 58 35.1 59 7.2		
5-	0 35.3			
5	3 33.8	5- 33.6		
	3 55.1	6 16.5		
	7 28.6	11 50.1 -4 ^m 21.5 ^v		-2 ^m 10.75 ^v
5	(8 0.2?)	8 33.3		
	(8 23.5?)	9 30.4		
	16 23.2	18 3.7 -1 ^m 40.0		-1 ^m 50.00 ^v
	10 13.7	12 12.3		
	10 37.1	12 57.9		
	20 50.8	25 10.2 -4 ^m 19.4 ^v		-2 ^m 9.70 ^v
	14 25.4	16 22.8		
	14 44.8	17 5.9		
	29 10.3	33 28.7 -4 ^m 18.5 ^v		-2 ^m 9.25 ^v
	17 45.5	19 41.8		
	17 56.3	20 17.8		
	35 41.8	39 59.6 -4 ^m 17.8 ^v		-2 ^m 8.90 ^v
	20 41.8			
	21 16.9	23 12.8		
	21 31.1?	23 53.4		
	43 48.0	47 6.2 -4 ^m 18.2 ^v		-2 ^m 9.10 ^v
				-2 ^m 9.54 ^v

Comp. star prob. 2 m. + 34° 1126. mag. 7.9

-52"

+1^m 28"

-15"

-15"

$0^- \quad 21.6^+ \quad 0^- \quad 42.9^+ \quad 0^+ \quad 21.3^- \quad (159.75)$

0 23.4 0 45.6 0 22.2 (166.5)

0 19.4° 0 43.1° 0 23.7° (177.75)

0 10.8 0 36.0° 0^m 25.5° ✓ (189.0)

$$\begin{array}{r} \textcircled{} \quad 14.2^{\circ} \quad \textcircled{} \quad 40.6^{\circ} \quad \textcircled{} \sim 26.4^{\circ} \quad (198.0) \\ \hline \textcircled{} \quad 17.8^{\circ} \end{array}$$

Mean cor. to No. 1 of obs = 11^h 28.3^m



Dec. 28. 1880.
Reduction in R.A.

C. C.

1	2	3	4
Comet.	Star.	Diff.	$\frac{Diff.}{2}$
h m s	h m s		
47 27.3	45 11.2		
48 0.2	45 23.0		
93 27.8	90 34.2	$+4^m 53.3^v$	Rej. $+3^m 26.65^v$
51 42.9?	49 22.3		
52 15.3	49 39.8		
103 58.2	99 2.1	$+4^m 56.1^v$	Rej. $+2^m 28.05^v$
55 3.0	52 48.2		
55 36.1	53 0.4		
110 39.1	105 43.6	$+4^m 55.5^v$	$+2^m 27.75^v$
58 24.4	56 2.7		
58 57.2	56 20.7		
117 21.6	112 23.4	$+4^m 58.2^v$	$+2^m 29.10^v$
	59 54.6		
<hr/>			
2 40.7	3 0 19.4		
3 18.8	0 36.5		
3 15.5	0 55.9	$+5^m 0.3$	$+2^m 30.15$
5 56.2			
6 11.8	3 52.1		
6 47.0	4 8.2		
	4 8.6?		
12 58.8	8 0.3	$+4^m 58.5$	$+2^m 29.25$
9 40.6	7 19.8		
10 15.6	7 36.2		
10 15.8			
19 56.2	14 56.0	$+5^m 0.2$	$+2^m 30.10$
		(5)	$+2^m 29.27$
<hr/>			
Comp. Star D M. $+32^\circ$ # 1076 (L) Mag. 8.0			
-38	$+53^\circ$		
-15	$+23^\circ$		

use last
five sets
according
to Record
Book.

use

Mean & uncorrected sid. times of obs = 3^h 1^m 21.5^s

$$(\text{Diff. } \oplus) (\text{Diff. } \times) (\text{Col. } 5 - \text{Col. } 6) (\text{Col. } 5 + \text{Col. } 6) \left(\frac{15 \cos \delta \cos \epsilon}{2} \right) (\text{Diag. - Col. } 9)$$

$$0^{\circ} 33.1^{\circ} 0^{\circ} 17.2^{\circ} (512.55) 0^{\text{m}} 50.53^{\circ}$$

$$0 32.8^{\circ} 0 18.0^{\circ} (508.8) 0^{\text{m}} 50.58^{\circ}$$

$$0 34.8^{\circ} 0 17.1^{\circ} (500.55) 0^{\text{m}} 51.59^{\circ}$$

$$0 35.2^{\circ} 0 16.1^{\circ} (505.05) 0^{\text{m}} 51.53^{\circ}$$

$$\begin{array}{r} 0 \\ 0 \end{array} \frac{35.0^{\circ}}{34.18^{\circ}} 0 16.4^{\circ} 504.3) 0^{\text{m}} 51.54^{\circ}$$

$$51.14^{\circ}$$

$$\begin{array}{r} 3^{\text{h}} 1^{\text{m}} 26.6^{\circ} \\ - 59.8^{\circ} \text{ Chr. Cor.} \\ \hline 3^{\text{h}} 0 26.8^{\circ} \end{array}$$

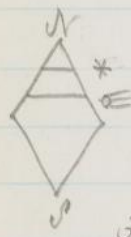
$$\log \left(\frac{15 \cos \delta \cos \epsilon}{2} \right) = 0.80259^{\circ}$$

Mean cor. to No. 1 of the 1st = 8 28 56.9

48

Dec. 30. 1880.
Reduction in R.A.

C.C.



	1	2	3	4
	Comet	Star.	Diff.	$\frac{2 \text{ diff.}}{2}$
h	m	h	m	
3	45 39.5	3 47 53.3		
	46 10.3	48 2.0		
	91 49.8	95 55.3	-4 ^m 5.5	-2 ^m 2.75
	48 34.1	50 44.8		
	49 8.7	51 0.8		
	97 42.8	101 48.6	-4 ^m 2.8 ^v	-2 ^m 1.40 ^v
	51 32.9	53 44.6		
	52 2.3	53 54.3		
	103 35.2	107 38.9	-4 ^m 3.7 ^v	-2 ^m 1.85 ^v
	54 28.8	56 39.4		
	55 4.8	56 55.8		
	109 33.6	113 35.2	-4 ^m 1.6 ^v	-2 ^m 0.80 ^v
	57 25.7			
	58 2.2			
	58 27.2	4 0 38.0		
	59 3.2	0 54.0		
	117 30.4	121 33.0	-4 ^m 1.6 ^v	-2 ^m 0.80 ^v
				-2 ^m 1.52 ^v

Comp. star = α U. + 31° 1127 mag. 8.7 K.
 H. Cir. Cor. - 8^m 5.5^v
 D. " " - 12' - 3.6

Mean of uncorrected sid times obs = 3^h 53^m 1.9^v
 - 59.7^s Ch. cor.
 3^h 52^m 2.2^v

$$\begin{array}{ccccccc}
 \overset{5}{} & \overset{6}{} & \overset{7}{} & \overset{8}{} & \overset{9}{} & \overset{10}{} \\
 (2 \text{ diff. } \epsilon) & (2 \text{ diff. } *) & (\text{Col. } 5 - \text{Col. } 6) & (\text{Col. } 5 + \text{Col. } 6) & \left(\frac{15 \text{ cor. dec.}}{2} \right) & (\text{Diag.} - \text{Col. } 9)
 \end{array}$$

$$0 \quad 30.8^{\circ} \quad 0^{\circ} \quad 8.7^{\circ} \quad 0^{\circ} \quad 22.1^{\circ} \quad (165.75)$$

$$0 \quad 34.6^{\circ} \quad 0^{\circ} \quad 16.0^{\circ} \quad 0^{\circ} \quad 18.6^{\circ} \quad (139.5)$$

$$0 \quad 29.4^{\circ} \quad 0^{\circ} \quad 9.7^{\circ} \quad 0^{\circ} \quad 19.7^{\circ} \quad (147.75)$$

$$0 \quad 36.0^{\circ} \quad 0^{\circ} \quad 16.4^{\circ} \quad 0^{\circ} \quad 19.6^{\circ} \quad (147.0)$$

$$\begin{array}{r}
 0 \quad 36.0^{\circ} \quad 0^{\circ} \quad 16.0^{\circ} \quad 0^{\circ} \quad 20.0^{\circ} \quad (150.0) \\
 \hline
 0 \quad 33.36^{\circ} \quad \quad \quad \quad \quad \quad 20.00^{\circ}
 \end{array}$$

Moran cor. to Me. I. of obs. $\epsilon = 9^{\text{h}} 12^{\text{m}} 32.0^{\circ}$

$$\log\left(\frac{15 \text{ cor. dec.}}{2}\right) = 0.80619^{\circ}$$

50

Dec. 31. 1880.
Reduction in R.A.

C. C.

1		2		3	4
Correct.		Star.		Diff.	Diff.
h	m s	h	m s		
4	14 37.2	4	14 2.2		
	15 17.2		14 49.8		
	29 54.4	38	53.0	+1 ^m 2.4 ^v	+0 ^m 31.20 ^v
	16 40.3	16	4.9		
	17 20.1	16	51.4		
	34 0.4	33	56.3	+1 ^m 4.1 ^v	+0 ^m 32.05 ^v
	18 29.4	17	58.5		
Reject.	19 7.3	18	39.4		
	37 36.7	36	33.9	+1 ^m 3.8 ^v (rej.)	+0 ^m 31.90 ^v
	20 8.1	19	32.5		
	20 46.8	20	17.9		
	40 54.9	39	50.4	+1 ^m 4.5 ^v	+0 ^m 32.23 ^v
	23 25.8	22	50.2		
Reject	24 4.6	23	35.9		
	47 30.4	46	26.1	+1 ^m 4.3 ^v (rej.)	+0 ^m 32.13 ^v
	25 16.2	24	40.4		
	25 53.3	25	35.9		
	51 11.5	50	6.3	+1 ^m 5.2 ^v	+0 ^m 32.60 ^v
	27 42.7	27	7.4		
	28 22.5	27	52.3		
	56 5.2	54	59.7	+1 ^m 5.5 ^v	+0 ^m 32.65 ^v
				(5)	+0 ^m 32.77 ^v

Comp Star = D M. + 30° 1133 May. 7.4

H. Circ. Cor. - 2^v 0^v

D. " " - 13' - 4.8

Mean of uncorrected sid times of obs = 4^h 20^m 56.6^v
 - 59.1^v chr. cor.
 4 19 57.5^v

⁵ ⁶ ⁷ ⁸ ⁹ ¹⁰
 (Diff. ϵ) (Diff. \star) (Col. 5 - Col. 6) (Col. 5 + Col. 6) ($\frac{15 \cos. \delta \sin. \delta}{2}$) Diag. Col. 9

0 40.0^c 0 47.6^c 0^m 7.5^v (57.0)

0 39.8^c 0 46.5^c 0^m 6.7^v (50.25)

0 38.7^c 0 45.4^c 0^m 6.7^v (50.25)

0 39.1^c 0 45.5^c 0^m 6.4^v (48.0)

$\frac{0 \quad 39.8^c}{0 \quad 39.4^c}$ 0 44.9^c $\frac{0^m \quad 5.1^v}{6.50^v}$ (38.25)

Mean cor. to Me. L. of obs $\epsilon = 9^h 36^m 26.8^s$

$$\log\left(\frac{15 \cos. \delta \sin. \delta}{2}\right) = 0.80848^c$$

52



Jan. 1. 1881.
Reduction in R. A.

C. C.

	1	2	3	4	
	Comet.	Star.	Diff.	Diff.	
h	m	s	h	m	s
7	54	14.2	7	54	33.0
<hr/>					
	55	3.3	55	20.2	
	55	38.5	55	43.3	
	110	41.8	111	3.5 ^m -0 ^m 21.5 ^s ^v	-0 ^m 10.85 ^s ^v
<hr/>					
	57	37.9	57	54.8	
	58	8.4	58	13.2	
	115	46.3	116	8.0-0 ^m 21.5 ^s ^v	-0 ^m 10.85 ^s ^v
<hr/>					
	59	13.8	59	34.6	
	59	46.9	59	52.0	
8	119	2.7	119	26.6-0 ^m 23.9 ^s ^v	-0 ^m 11.95 ^s ^v
<hr/>					
8	0	57.5	1	15.4	
<hr/>					
	1	20.5 Reg.	1	24.9	
	1	24.9	1	29.3 [±]	
	2	22.4	2	44.7-0 ^m 22.3	-0 ^m 11.15 ^s
<hr/>					
8	3	28.6			

Reg.

3	59.4	4	16.5
4	21.8	4	24.0
8	21.3	8	40.5 - 0 ^m 19.5 ^s
5	8.0	5	25.4
5	38.9	5	48.6
10	46.9	11	9.0 - 0 ^m 22.1 ^s
<hr/>			
(5) - 0 ^m 11.17 ^s			

Comp. star + 30° 1045 Aug. 7.8

H. C. Cor. + 18" - 6"

D. C. " + 1' - 1'

Mean of uncorrected sid. times of obs = 7^h 59^m 57.6^s- 58.3^s chr. cor.

7 58 59.3

⁵ (Diff. Ξ) ⁶ (Diff. \star) ⁷ (Col. 5 - Col. 6) ⁸ (Col. 5 + Col. 6) ⁹ ($\frac{15 \text{ cor. dec.}}{2}$) ¹⁰ (Diff. - Col. 9.

0^h 35^m 2^s 0 28.1^c 0^m 12^s 1^v (90.75)

0 30.5^c 0 18.4^c 0^m 12^s 1^v (90.75)

0 31.1^c 0 17.4^c 0^m 13^s 7^v (102.75)

0 27.4^c 0 13.9^c 0^m 13^s 5^v (101.25)

0 30.9^c 0 18.2^c 0^m 12.7^v (95.25)
 0 31.02 12.82^v

Mean cor. to Me. I. of obs $\Xi = 13^h 10^m 56.8^s$
 $\log\left(\frac{15 \text{ cor. dec.}}{2}\right) = 0.81053^v$



Jan. 3. 1880. Com. on p. 66.
Reduction in P.A.

C.C.

1		2		3	4
Comet		Star.		Diff.	Diff.
<i>h</i>	<i>m</i>	<i>h</i>	<i>m</i>		
8	9 3.5	9	41.0		
	9 39.4	9	42.3		
	18 41.9	19 23.3	-0 ^m 41.4	-0 ^m 20.70	
	10 1.3	10 51.7			
	10 48.4	11 19.7			
	20 49.7	23 11.4	-1 ^m 21.7	-0 ^m 40.85	
	11 54.3	12 44.2			
	11 42.5	13 14.4			
	13 15.2				
	13 37.2	14 56.7			
	14 1.4	15 59.5			
	14 1.5	15 59.5			
	14 56.6	15 20.8			
	28 58.1	31 20.3	-2 ^m 22.3	-1 ^m 11.10	
	16 59.7				
	18 17.4	19 15.1			
	19 13.4	19 37.7			
	37 30.8	38 53.8	-1 ^m 23.0	-0 ^m 41.50	
	21 48.6	22 44.5			
	23 43.1	23 9.2			
	44 31.7	45 53.7	-1 ^m 22.0	-0 ^m 41.50	
	25 40.8	26 50.5			
	26 10.6	27 31.2			
	51 51.4	54 21.7	-3 ^m 30.3	-1 ^m 15.15	
	28 11.8	29 21.4			
	28 46.8	30 6.4			
	56 58.6	59 27.8	-3 ^m 29.2	-1 ^m 14.60	

Long rattle
on sheet

⁵
 (Diff. \equiv) ⁶
 (Diff. \times) ⁷
 (Col. 5 - Col. 6) ⁸
 (Col. 5 + Col. 6) ⁹
 ($\frac{15 \text{ cor. dec.}}{2}$) ¹⁰
 (Diag. - Col. 9)

0" 29.8" 0" 40.5" 0" 10.9" (81.75)
 $\log \left(\frac{15 \text{ cor. dec.}}{2} \right) = 0.81428$
 0 35.0 0 45.0 0 10.3" (75.0)

56



Jan. 7. 1880.
Reduction in P.A.

C.C.

	1	2	3	4
	Const.	Star.	Diff.	Diff.
h	m	h	m	
9	45 25.2	46 57.0		
	46 7.2 (+1 ^s)	46 57.5		
	91 33.4	93 54.5	-2 ^m 22.1 ^v	-1 ^m 11.05 ^v
	47 40.3	49 10.4		
	48 17.6	49 37.9		
	95 57.9	98 48.3	-2 ^m 50.4 ^v	-1 ^m 24.70 ^v
	50 59.5	52 24.9		
	51 33.0	52 54.5		
	103 32.5	105 19.4	-2 ^m 46.9 ^v	-1 ^m 33.45 ^v
	54 8.7	55 26.8		
Rej.	54 34.0	55 57.0		
	108 37.7	111 23.8	-2 ^m 46.1 ^v	-1 ^m 23.05 ^v
	56 44.9	58 12.1		
	57 19.3	58 40.7		
	114 4.2	116 53.8	-2 ^m 48.6 ^v	-1 ^m 24.30 ^v
	59 30.8	0 58.1		
10	0 5.3	1 25.6		
	59 36.1	2 23.7	-2 ^m 47.6 ^v	-1 ^m 23.80 ^v
	2 17.2	3 44.4		
	3 51.9	4 11.2		
	5 9.1	7 55.6	-2 ^m 46.5 ^v	-1 ^m 23.25 ^v
				-1 ^m 24.00 ^v

Comp. star 2 m. + 28° 99% (K) mag. 5.3

+1^s-5^s

-3'

-3'

Mean of unconnected sid. times of obs = 9^h 56^m 26.0^s

-58.6^s chr. cor.

9 55 27.4

⁵ (Diff. \ominus) ⁶ (Diff. \times) ⁷ (Col. 5 - Col. 6) ⁸ (Col. 5 + Col. 6) ⁹ ($\frac{15 \cos. dec.}{2}$) ¹⁰ (Decl. - Col. 9)

0 37.3° 0 27.5° (403.8) 1^m 4.8^v

0 33.5° 0 29.6° (416.55) 1^m 3.5^v

~~0 30.3° 0 30.2° (436.05) 1^m 0.5^v~~

0 34.4° 0 28.6° (417.3) 1^m 3.0^v

0 34.5° 0 27.5° (424.8) 1^m 2.0^v

0 34.7° 0 26.8° (428.55) 1^m 1.5^v
 0 34.88° 62.88^v

$\log(\frac{15 \cos. dec.}{2}) = 0.81977^v$
 Meran cor. to Me. S. p. obs. $\ominus = 14 \ 43 \ 30.4^v$



Jan. 8. 1851.
Reduction in R. A.

C. C.

1		2		3	4
Comp.		Star		Diff.	Diff.
h	m	h	m		
10	19 13.3	21	6.8		
Rej.	19 45.0 45.0	21 54.9			
38	56.3	43 1.7		-4 ^m 5.4 ^v	Rej. - 2 ^m 2.57 ^v
23	1.2	24 57.9			
23	35.8	25 42.6			
46	37.0	50 40.5	-4 ^m 3.5 ^v	-2 ^m 1.76 ^v	
26	44.3	28 40.8			
27	18.6	29 25.7			
54	2.9	58 6.5	-4 ^m 3.6 ^v	-2 ^m 1.80 ^v	
30	36.5	32 34.2			
31	11.6	33 17.0			
61	48.1	65 51.2	-4 ^m 3.1 ^v	-2 ^m 1.55 ^v	
33	27.2				

34 36.7

35 4.8	37 2.4		
35 39.4	37 45.4		
70 44.2	74 47.8	-4 ^m 3.6 ^v	-2 ^m 1.80 ^v
38 49.8			

39 16.8	41 13.7		
39 51.8	41 56.6		
79 8.6	83 10.3	-4 ^m 1.7 ^v	-2 ^m 0.88 ^v
		(5)	-2 ^m 1.55 ^v

Comp. star + 27° # 975 (L.) Mag. 8.3

+ 2.0^v - 1.0^v

- 1' - 1'

Mean of uncorrected sid times of obs = 10^h 32^m 14.9^v
 - 1 1.0^v Chn. Cor.
 10 31 13.9^v

Reduction in Dec.

59

⁵ (Diff. Ξ) ⁶ (Diff. \times) ⁷ (Col. 5 - Col. 6) ⁸ (Col. 5 + Col. 6) ⁹ $\left(\frac{15 \cos. dec.}{2}\right)$ ¹⁰ (Diag. - Col. 9)

0^h 34.6^m 0^s 44.7^s (295.05) 1^m 19.53^v

0 34.3^m 0 44.9^s (295.8) 1^m 19.53^v

0 35.1^m 0 42.8^s (305.55) 1^m 17.59^v

0 34.6^m 0 43.0^s (307.8) 1^m 17.6^v

0 35.0^m 0 42.9^s (305.55) 1^m 17.59^v
 0 34.72^m 78.38^v

Mean cor. to N. I. of obs. $\Xi = 15^h 15^m 15.0^s$

$$\log\left(\frac{15 \cos. dec.}{2}\right) = 0.821221^v$$

60



Jan. 1 P. 1880.
Reduction in R.A.

C.C.

1			2			3	4
Comet			Star.			Diff.	$\frac{Diff.}{2}$
h	m	s	h	m	s		
4	12	18.2	4	10	58.8		
	12	46.9		11	15.2		
	25	0.1		22	14.0	$+2^m 46^s.1^v$	$+1^m 23^s.05^v$
	14	27.1		13	11.2		
	15	0.0		13	27.8		
	29	27.1		26	39.0	$+2^m 48^s.0^v$	$+1^m 24^s.00^v$
	18	49.9		17	35.5		
	19	25.6		17	51.9		
	38	15.5		35	27.4	$+2^m 48^s.1^v$	$+1^m 24^s.05^v$
	21	15.8		20	1.9		
	21	49.7		20	17.3		
	43	5.5		40	19.2	$+2^m 46^s.3^v$	$+1^m 23^s.15^v$
	23	19.6		22	5.0		
	23	58.4		22	20.8		
	47	13.0		44	28.8	$+2^m 47^s.2^v$	$+1^m 23^s.60^v$
						(5)	$+1^m 23^s.57^v$

Comp. star D.M. $+25^\circ$ #1174. (K). long. 8.2

Mean uncorrected sid. time of obs. = $4^h 17^m 36^s.3^v$
 $- 16.8^v$ (#236 corr.)

 $4^h 17^m 19^s.5^v$

Mean cor. le. No. 1. of obs. = $8^h 23^m 2^s.9^v$

⁵ (Diff. Ξ) ⁶ (Diff. \times) ⁷ (Col. 5 - Col. 6) ⁸ (Col. 5 + Col. 6) ⁹ ($\frac{15 \text{ cor. dec.}}{2}$) ¹⁰ (Diag. - Col. 9)

0⁻ 33.7^c 0⁻ 16.4^c 0^m 17.3^v (129.75)

0 32.9^c 0 16.6^c 0^m 16.3^v (122.25)

0 35.7^c 0 16.4^c 0^m 19.3^v (144.75)

0 33.9^c 0 15.4^c 0^m 18.5^v (138.75)

0 33.8^c 0 15.8^c 0^m 18.0^v (135.0)
 0 34.00^c 17.88^v

$$\log \left(\frac{15 \text{ cor. dec.}}{2} \right) = 0.83134^v$$

62



Jan. 20. 1886.
Reduction in R. A.

C. C.

h.	1 Comet		2 Star		3 Diff.	4 <u>Diff.</u>
	m.	s.	h.	m.	s.	
5	32	22.5	32	59.5		
	32	42.9	33	32.4		
	65	5.4	66	31.9	-1 ^m 26.5 ^s	-0 ^m 43.25 ^s
	84	5.0				
	84	20.3				
<hr/>						
	34	47.6	35	38.7		
	35	16.3	35	58.2		
	70	3.9	71	31.9	-1 ^m 38.8 ^s	-0 ^m 44.00 ^s
	86	24.5	87	9.3		
	86	52.1	87	33.8		
	73	16.6	74	43.1	-1 ^m 26.5 ^s	-0 ^m 43.25 ^s
	88	18.3	88	58.9		
	38	42.4	39	23.3	-1 ^m 26.5 ^s	-0 ^m 43.25 ^s
	76	55.7	78	22.3	-1 ^m 32.5 ^s	-0 ^m 46.25 ^s
	39	55.3	40	40.7		
	40	24.3	41	5.4		
	80	19.5	81	46.1	-1 ^m 36.6 ^s	-0 ^m 43.30 ^s
					(5)	-0 ^m 43.41 ^s

Comp. Star Dec. + 24° 1200

Mean of uncorrected sid. times of obs. = 5^h 36^m 55.8^s

-1 2.0^s Chr. Cor.
5 35 53.8

Mean cor. to No. 1 of obs. = 9^h 33^m 32.5^s

$$\begin{array}{cccccc} 5 & 6 & 7 & 8 & 9 & 10 \\ (\text{Diff. E}) & (\text{Diff. X}) & (\text{Col. 5} - \text{Col. 6}) & (\text{Col. 5} + \text{Col. 6}) & \left(\frac{15 \cos. \text{dec}}{2}\right) \text{ Dig. Col. 9} & \end{array}$$

$$0^- 20.4^\circ 0^- 32.9^\circ (490.05) 0^m 53.3^v$$

$$0 28.7^\circ 0 24.5^\circ (490.8) 0^m 53.2^v$$

$$0 27.6^\circ 0 24.5^\circ (499.05) 0^m 52.1^v$$

$$0 29.1^\circ 0 24.4^\circ (488.55) 0^m 53.5^v$$

$$\begin{array}{r} 0 \quad 29.1^\circ \quad 0 \quad 24.7^\circ \quad (486.3) \quad 0^m \quad 53.8^v \\ \hline 0 \quad 26.98^v \end{array}$$

$$\begin{array}{r} + 24^\circ \quad 57' \quad 12.6''^v \\ - 4 \quad 24.1''^v \\ \hline + 24 \quad 52 \quad 48.5''^v \end{array}$$

$$\text{Log. } 5318 = 1.725748^v$$

$$'' 7.5 = 0.875061^v$$

$$'' \cos. \text{dec} = 9.957440^v$$

$$361.62^v = 2.558249^v$$

$$\begin{array}{r} 859.8^v \\ 2 \overline{) 528.18^v} \\ \underline{264.09^v} \end{array}$$

$$1.725748^v$$

$$0.875061^v$$

$$9.957699^v$$

$$361.83^v = 2.558508^v$$

$$\begin{array}{r} 859.8^v \\ \sqrt{27.97^v} = -8' 48.0''^v \end{array}$$

Nov. 8. 1880. Com.
Reduction in R. A.

	1	2	3	4
	Comet.	Star.	Diff.	$\frac{Diff.}{2}$
h	m s	h m s		
	53 35.3	54 40.4		
	54 26.1	55 0.6		
	108 1.4	109 41.0	$-1^m 39.6^s$	$-0^m 49.80^s$
	55 36.2	56 41.1		
	56 28.8	57 1.8		
	113 5.0	113 43.6	$-1^m 37.6^s$	$-0^m 48.80^s$
	57 37.0	58 41.6		
	58 30.8	59 2.1		
	116 7.8	117 43.7	$-1^m 35.9^s$	$-0^m 47.95^s$
	59 31.7	0 0 36.5		
0	0 27.2	0 57.8		
	119 58.9	1 34.0	$-1^m 35.1^s$	$-0^m 47.55^s$
			(5)	$-0^m 48.970^s$

Mean of uncorrected sid. times of obs. $23^h 56^m 4.6^s$
 $\frac{-4 \quad 39.6^s}{23 \quad 51 \quad 25.0^s}$ Chr. cor.

Mean cor. L. M. S. obs. = $8^h 37^m 1.6^s$

Comp. star = D M. +43° 43' 53". Aug. 9.1
 H. C. Cor. = -3.6 +3.5
 Dec. " = -6 0'

$$\begin{array}{ccccccc}
 5 & & 6 & & 7 & & 8 & & 9 & & 10 \\
 (\text{Diff. } \odot) & (\text{Diff. } \star) & (\text{Col. } 5 - \text{Col. } 6) & (\text{Col. } 5 + \text{Col. } 6) & \left(\frac{15 \cos. \text{dec.}}{2} \right) & (\text{Diag.} - \text{Col. } 9)
 \end{array}$$

$$0^{\circ} 50.8^{\circ} 0^{\circ} 20.2^{\circ} 0^{\text{m}} 30.6^{\circ} (229.5)$$

$$0^{\circ} 52.6^{\circ} 0^{\circ} 20.4^{\circ} 0^{\text{m}} 33.3^{\circ} (241.5)$$

$$0^{\circ} 53.8^{\circ} 0^{\circ} 20.5^{\circ} 0^{\text{m}} 33.3^{\circ} (249.75)$$

$$\begin{array}{r}
 0^{\circ} 55.5^{\circ} 0^{\circ} 21.0^{\circ} 0^{\text{m}} 34.3^{\circ} (258.75) \\
 0^{\circ} 52.34^{\circ} 0^{\text{m}} 31.86^{\circ}
 \end{array}$$

$$\text{Log. } 31.86 = 1.503246^{\circ}$$

$$\text{" } 7.5 = 0.875061^{\circ}$$

$$\text{" } \cos. \text{dec} = 9.859970^{\circ}$$

$$\begin{array}{r}
 173.09^{\circ} \\
 86.54^{\circ}
 \end{array}
 = 2.238277^{\circ}$$

$$\begin{array}{r}
 43^{\circ} 34' 55.9^{\circ} \\
 + 1^{\circ} 26.5^{\circ} \\
 \hline
 43^{\circ} 36' 22.4^{\circ}
 \end{array}$$

$$\begin{array}{r}
 43^{\circ} 34' 55.9^{\circ} \\
 + 2^{\circ} 53.0^{\circ} \\
 \hline
 + 43^{\circ} 37' 48.9^{\circ}
 \end{array}$$

$$\text{Log. } 31.86 = 1.503246^{\circ}$$

$$\text{" } 7.5 = 0.875061^{\circ}$$

$$\text{" } \cos. \text{dec} = 9.859797^{\circ}$$

$$173.02^{\circ} = 2.238104^{\circ}$$

Jan. 3. 1880. Com. See p. 54.
Reduction in R.A.

h 8	1 Comet.		2 Star		3 Diff.	4 Diff.
	m	s	h	m	s	
	30	58.3	32	2.3		
	31	30.0	32	48.9		
	63	23.3	64	51.3	$-2^m 27.9^s$	$-1^m 13.95^s$
	34	5.9	35	14.3		
	34	41.2	35	59.6		
	68	47.1	71	13.9	$-2^m 26.8^s$	$-1^m 13.40^s$
	37	3.8	38	12.6		
	37	37.8	38	56.7		
	74	41.6	77	9.3	$-2^m 27.7^s$	$-1^m 13.85^s$
					(5)	$-1^m 14.19^s$

Comp. Star D.M. + 29° # 1058. (S.) Aug. 7.8
 -17^s $+9^s$
 $-1'$ $-1'$

Mean of uncorrected sid. Times of obs = $8^h 32^m 5.8^s$
 -57.4^s ch. cor.
 $8^h 31^m 7.9^s$

Mean cor. to Me. T. of obs = $13^h 35^m 8.3^s$

$$\begin{array}{ccccccc}
 \overset{5}{} & \overset{6}{} & \overset{7}{} & \overset{8}{} & \overset{9}{} & \overset{10}{} \\
 (\text{Diff. } \equiv) & (\text{Diff. } *) & (\text{Col. 5} - \text{Col. 6}) & (\text{Col. 5} + \text{Col. 6}) & \left(\frac{15 \cos. \text{dec.}}{2} \right) & (\text{Adj. Col. 9})
 \end{array}$$

$$0^{\circ} \quad 36.7^{\circ} \quad 0^{\circ} \quad 46.6^{\circ} \quad 0^{\text{m}} \quad 9.9^{\text{s}} \quad (74.25)$$

$$0 \quad 35.3^{\circ} \quad 0 \quad 45.3^{\circ} \quad 0^{\text{m}} \quad 10.0^{\text{s}} \quad (75.0)$$

$$\begin{array}{rcl}
 0 & 34.0^{\circ} & 0 \quad 44.1^{\circ} \quad 0^{\text{m}} \quad 10.1^{\text{s}} \quad (75.75) \\
 \hline
 0 & 34.16 & \hline
 & & 10.18^{\text{s}}
 \end{array}$$

Dec. 2. 1880. See p. 26.
Reduction in R. A.

1	2	3	4
Comet.	Star.	Diff.	$\frac{Diff.}{2}$
46 10.0.	47 6.2.		
(46 10.8)			
46 35.0 ^h .	48 18.8		
	(48 19.0)		
	(48 19.7)		

Pos. rat.

The break at 46^m 35.0^s
 looks so much like a
 rattle that it is prob-
 ably best to omit the
 above set.

Comp. star Dec. +50° 849 Mag. 7.4 (A)
 -35" +30
 -3' +1'

Mean of uncorrected sid. times of obs. = 7^h 2^m 53.7^s
51.1^s Chr. Cor.
7 2 2.6^s

⁵ (Diff. Ξ) ⁶ (Diff. \ast) ⁷ (Col. 5 - Col. 6) ⁸ (Col. 5 + Col. 6) ⁹ (15 cos. dec.) ¹⁰ (Diag. - Col. 9.

Mean cor. to Me. T. of obs $\Xi = 14^h 12^m 6.8^s$

72

55 yrs.1825.

Nov. 3. 1880.

M. Po. 1855 $22^h 20^m 30.2$ $+37^\circ 41.1$
 D. M. 1855 $22^h 19^m 20.7$ $+37^\circ 42.6$ (6.6) K.
 W. $22^h 18^m 1.15$ $+37^\circ 33' 57.3$ (9)

Log. $\Delta_0 + 9.760070^m$
 Corr. $+16^c$

log tan δ 9.886014^c

Cum. logs 9.646100^c

number cor. -0.44269^c

$\frac{1}{15} m$ $+3.07009^c$

Orig. P. $+2.62740^c$

log 0.419526^c

" 55 1.740363^c

Sum logs 2.159889^c

Cor. P. 144.51^c

" " $3^m 24.51^c$

Orig. A. R. $22^h 18^m 1.15^c$

1880. 1st Apr $22^h 20^m 25.66^c$

Log. $\Delta_0 + 9.750370^m$

Corr. -99^c

log tan δ 9.890347^c

Cum. Logs. 9.640618^c

num. Cor. -0.443714^c

$\frac{1}{15} m$ $+3.07122^c$

Result. $+2.63408^c$

1st ap. 2.62740^c

mean. 2.63074^c

Sum logs.

Tab. Ly. $+18.1033^c$

Corr. $+7^c$

Log $+18.1040^c = 1.257775^c$

" 55 $= 1.740363^c$

Result $995.72^c = 2.998138^c$

Cor. P. $+16' 35.72^c$

$37' 33' 57.3^c$

(1880 1st Apr) $37^\circ 50' 33.0^c$

Tab. 2y. $+18.1931^c$

Cor. -42^c

Result. $+18.1889^c$

1st ap. $+18.1040^c$

Log. mean. $+18.1464^c = 1.258791^c$

" 55. $= 1.740363^c$

Cor. P. $998.05^c = 2.999154^c$

$+16' 38.05^c$

Orig. Dec. $37' 33' 57.3^c$

1880. 2^d ap. $37^\circ 50' 35.4^c$

log. mean 0.420075°
 " 55. 1.740363°
 Sum logs. 2.160441°
 Cor. Prc. $144.69^{\circ} = 2^m 24.69^{\circ}$
 Orig. A. R. $22 \quad 18 \quad 1.15^{\circ}$
 1880. 2^d ap. $22^h 20^m 25.84^{\circ}$

log. A. + 9.750350°
 Corr. -99°

log. tan. 9.890358°
 Sum logs. 9.640609°

Univ. Cor. -0.43713°
 1/2 w 3.07122°

Result. $+2.63409^{\circ}$

1st ap. $+2.62740^{\circ}$

Mean. $+2.63074^{\circ}$

log. mean 0.420078°

" 55. 1.740363°

Sum logs. 2.160441°

Cor. Prc. $144.69^{\circ} = 2^m 24.69^{\circ}$

Orig. A. R. $22 \quad 18 \quad 1.15^{\circ}$

1880. 3^d ap. $22^h 20^m 25.84^{\circ}$

Final.

Sat. 2y. $+18.1932^{\circ}$
 Cor. -42°

Result. $+18.1890^{\circ}$

1st ap. $+18.1040^{\circ}$

log. mean. $+18.1465 = 1.258793$

" 55. 1.740363

log. Cor. Prc. $998.1^{\circ} = 2.999156$
 $16' 38.1^{\circ}$

Orig. Dec. $+37^{\circ} 33' 57.3^{\circ}$

1880. 3^d ap. $+37 \quad 50 \quad 35.4^{\circ}$

Final.

74

70 yrs.

1810.

Nov. 8, 1880.

m. (1855) $22^h 51^m 56.7^s$ $+43^\circ 26.3'$ (9.1)
 $22 \quad 54 \quad 39.7 \quad +43 \quad 25.4$ (7.5) (5)
 hr. 3951. $22 \quad 52 \quad 37.63 \quad +43^\circ 10' 46.0$ (8)

Log Δ_0 9.588190^m
 Corr. $+48^v$

Log. tan δ . 9.972391^c

Sum logs -9.560629^v

number cor. -0.36360^v

to m. $+3.06978^v$

Result $+2.70618^v$

Log. 0.432357^v

" 70 1.845098^v

Sum logs 2.277455^v

Cor. Pm. $189^\circ 43'$

" " $3^m 9^s 43^v$

Orig. A. P. $22 52 37.63^v$

(1880.1st ap) $22 55 47.06^v$

Tab. Ly. $+19.1960^v$

Corr. $+21^v$

Log $+19.1981 = 1.283258^v$

" 70 $= 1.845098^v$

Result $1343.9^v = 3.128356^v$

Cor. Pm. $+22' 23.9^v$

$43 \quad 10 \quad 48.0^v$

(1880.1st ap) $43^\circ 33' 11.9^v$

Log. Δ_0 9.567920^m
 Corr. $+99^v$

Log. tan δ 9.978059^v

Sum logs 9.545880^m

number cor. -0.35146^v

to m. $+3.07122^v$

Result. 2.71976^v

tot. ap. 2.70618^v

mean. 2.71297^v

Tab. 2y. $+19.2742^v$

Corr. $+44^v$

Result. $+19.2698^v$

1st ap. $+19.1981^v$

Log. mean. $+19.2340 = 1.284070^v$

" 70. $= 1.845098^v$

Cor. Pm. $1346.4^v = 3.129168^v$

$+22' 26.4^v$

Orig. Dec. $43 \quad 10 \quad 48.0^v$

1880.2^d ap. $43^\circ 33' 14.4^v$

Log. mean. 0.433445^v
 " γ_0 1.845098^v
 Sum logs. 2.278543^v
 Cor. Pre. 189.91^v = 3^m 9.91^v
 Orig. A. R. 22 52 37.63^v
 1880. 2^d ap. 22^h 55 47.54^v

Log. 40 + 9.567870^u
 Cor. -99^c
 Log. Lat. 5 9.978069^c
 Sum logs. 9.545840^u
 Mean. Cor. -0.35143^c
 1/5 m +3.07122^c
 Result. +2.71979^c
 1st ap. +2.70615^c
 Mean. +2.71298^c
 Log. Mean. 0.433447^c
 " γ_0 1.845098^c
 Sum logs. 2.278545^c
 Cor. Pre. 189.91^v = 3^m 9.91^c
 Orig. A. R. 22 52 37.63^c
 1880. 3^d ap. 22^h 55 47.54^c
 Final.

Tab. Zy. +19.2744^c
 Cor. -44^c
 Result. 19.2700^v
 1st ap. 19.1981^v
 Log. Mean. 19.2340^v = 1.284070^v
 " γ_0 = 1.845098^v
 Cor. Pre. 1346.4 = 3.129168^v
 22' 26.4^v
 Orig. Dec. +43° 10' 48.0^v
 1880. 3^d ap. +43° 33' 14.4^v
 Final.

55470.1825.

hor. 9. 1880.

22m. (1855)
2) K. 22, 131922^h 57^m 40^s

22 56 18.18

+ 44°

44

41.2

(K)

32 26.5 (9)

Log. (Δ. t)

9.564490^m+ 19.2868^m

Corr.

+ 16^m+ 8^m

Log. tan. d

9.993036^mlog. + 19.2876^m = 1.285278^m

Sum

9.557542^mlog. 55. = 1.740363^mCorresponding Δ. - 0.36103^m17' 40".8 = 1060".8 = 3.025641^m

1/5 m.

+ 3.07009^mResult (1825) + 2.70906^m = 0.432819^m44° 32' 26.5^m

55.

= 1.740263^m

17

40.8^m2^m 29.00^m = 149.00^m = 2.173182^m44° 50' 7.2^m (1880)22 56 18.18^m22 58 47.18^m (1880)+ 19.3452^m
- 44^mLog. (Δ. t) = 9.547650^mlog. + 19.3408^m = 1.286451^m

Corr.

- 99^m

Log. tan. d

9.997504^m19.2876^m6.284^m

Sum

9.545055^mlog. 19.3142^m = 1.285877^m

Cor. Δ.

- 0.35080^m17' 42".3 = 1062".3 = 3.026240^m

1/5 m

+ 3.07122^m44° 32' 26.5^mlog. + 2.72042^m44 50 8.8^m = (1880 2^d approx)2.70906^m2948^m

Final.

log. 2.71474^m = 0.433728^m22 57 18.18^m log. 55. = 1.740363^m2^m 29.31 = 149.31^m = 2.174091^m22 56 18.18^m22 58 47.49^m [1880 2^d approx.]

Nov. 9. 1880.

$$\log. (A. +) = 9.547620''$$

$$-99''$$

$$9.997510''$$

$$-0.35078'' = 9.545031''$$

$$3.07122''$$

$$+2.72044''$$

$$+2.70906''$$

$$2950''$$

$$+2.71475'' = 0.403730''$$

$$55. = 1.740763''$$

$$2 - 2'' = 149.31 = 2.174093''$$

$$22 \quad 5-6 \quad 18.18''$$

$$2 \quad 29.31''$$

$$22 \quad 58 \quad 47.49'' \text{ Final}$$

$$+19.3453''$$

$$-44''$$

$$+19.3410''$$

$$19.2876''$$

$$.6286''$$

$$+19.3143 \quad 1880 \quad 3'' \text{ 90\%}$$

$$55$$

$$965715$$

$$965715$$

$$60 \overline{) 10622865} (17$$

$$60$$

$$462$$

$$420$$

$$42.29$$

$$17'$$

$$42.3$$

$$44 \quad 32$$

$$26.5$$

$$44 \quad 50$$

$$2.2 \quad (1880 \quad 3'' \text{ 90\%})$$

44 yro.

1836

Nov. 11. 1880.

M. (1255) 23^h 16^m 7.3^s + 46° 49.7 (R)
 R. #11103. 23 15 13.60 + 46 43 2.6

$$\log. \Delta. \delta = 9.414230^{\circ}$$

Corr.

-7^v

$$\log. \tan. \delta. \quad 0.026051^{\circ}$$

$$-0.27560^{\circ} = 9.440274^{\circ}$$

$$+3.07032$$

$$+2.79472^{\circ} = 0.446338^{\circ}$$

$$44. = 1.643453^{\circ}$$

$$2 - 2.97 = 122.97 = 2.089791^{\circ}$$

$$\begin{array}{r} 23 \quad 15 \quad 13.60^{\circ} \\ \quad \quad 2 \quad 2.97^{\circ} \\ \hline 23 \quad 17 \quad 16.57^{\circ} \end{array}$$

$$(1880 \text{ 1st app.})$$

$$+19.6749^{\circ}$$

-2^v

$$\log. +19.6747^{\circ} = 1.293905^{\circ}$$

$$\log. 44. = 1.643453^{\circ}$$

$$14' 25.7^{\circ} = 865.7^{\circ} = 2.937361^{\circ}$$

$$46 \quad 43 \quad 2.6^{\circ}$$

$$+46 \quad 57 \quad 28.3^{\circ} = 1880 \text{ 1st app.}$$

$$\log. \Delta. \delta = 9.394130^{\circ}$$

Cor.

-99^v

$$\log. \tan. \delta. \quad 0.029704^{\circ}$$

Sum.

$$19.433735^{\circ}$$

$$\text{Cor. Minutes} -0.26530^{\circ}$$

$$\frac{1}{15} \text{ in } 3.07122^{\circ}$$

$$\text{Result. } +2.80592^{\circ} = 0.441075^{\circ}$$

$$2.79472$$

$$5.60064$$

$$\log. 2.80032 = 0.447208^{\circ}$$

$$44. = 1.643453^{\circ}$$

$$2 - 3.21^{\circ} = 123.21^{\circ} = 2.090661^{\circ}$$

$$\begin{array}{r} 23 \quad 15 \quad 13.60^{\circ} \\ \quad \quad 2 \quad 3.21^{\circ} \\ \hline (23 \quad 17 \quad 16.81^{\circ}) \end{array}$$

$$(1880 \text{ Final Val. 1880.})$$

$$24 \text{ from Table. } +19.7089^{\circ}$$

Corr.

-45^v

$$19.7044^{\circ}$$

$$19.6747^{\circ}$$

$$1.3791^{\circ}$$

$$\log. \text{Mean pr.} = 19.6896^{\circ} = 1.294237^{\circ}$$

$$\log. 44. = 1.643453^{\circ}$$

$$866.34^{\circ} \quad 2.937690^{\circ}$$

$$+14' 26.34^{\circ}$$

$$46 \quad 43 \quad 2.60^{\circ}$$

$$14 \quad 26.34^{\circ}$$

$$+46^{\circ} 57' 28.94^{\circ}$$

$$\text{Final Val. 1880}$$

Nov. 11. 1880.

$$\log. \Delta. \pm = 9.394090^{\circ}$$

Cor.

$$-99^{\circ}$$

$$\text{Dec. from Table. } 19.7089^{\circ}$$

Corr.

$$\log. \tan. \delta = 0.029707^{\circ}$$

Ly.

$$\text{Sum. } 9.423698^{\circ}$$

$$\text{Cor. number } -0.26528^{\circ}$$

$$\frac{1}{15} \text{ m } 3.07122^{\circ}$$

$$\text{Result. } 2.80594^{\circ} = 0.44817^{\circ}$$

$$\text{Orig. pr. } 2.79472^{\circ}$$

$$1.60066^{\circ}$$

$$\text{mean pr. } 2.80033^{\circ} = 0.447210^{\circ}$$

$$\log. 44. = 1.643453^{\circ}$$

$$2^{\circ} 3.21' = 123.21' = 2.090663^{\circ}$$

$$2^{\circ} 3.21' = 123.21'$$

$$\frac{23}{15} \quad 13.60^{\circ}$$

$$\frac{23}{17} \quad 16.51^{\circ}$$

38970.

1842

Nov. 18. 1880.

Dec. 1855	0	33	52.4	+53°	9.7	(18)
Dec. 1863	0	33	9.39	+53°	5'	27.0 (9)

Log. Δ + 9.285030 v.

Tab. Zy. + 19.84680

Corr. -19 v

-80

Log. tan. δ. 0.124319 v

log. +19.84680 = 1.297673 +

Sum logs. 9.409330 v

" 38. = 1.579784 v

Number cor. +0.25664 v

754.15 = 2.877457 v

1/10 m. +3.07044 v

+12' 34.15 v

Orig. Pre. +3.32708 v

53 5 27.0 v

Log. " 5 0.5220630

53 18' 1".2 (1880 1st app.)

" 38. 1.579784 v

Sum logs. 2.101847 v

Cor. Pre. 126.43 v

2m 6.43 v

0 33 9.39 v

1880 1st app.) 0 35 15.82 v

Log. Δ + 9.311590 v

Tab. Zy. + 19.81940

Corr. -99 v

Corr. -46 v

Log. tan. δ. 0.127629 v

Result + 19.8148 v

Sum logs. 9.439120 v

1st App + 19.8460 v

Cor. Number. 0.27487 v

Log Mean. + 19.8304 = 1.297332

1/10 m. 3.07122 v

" 38. = 1.579784 v

Result. 3.34609 v

Cor. Pre. Result. = 753.56 = 2.877116

1st " 3.32708 v

+12' 33.56 v

Mean. 3.33658 v

Orig. Dec. 53 5 27.0 v

Log. " 0.523301 v

53 18' 0".6 (1880 2nd app.) Final

" 38. 1.579784 v

Sum logs. 2.103085 v

Cor. Pre. 126.49 = 2m 6.79 v

Orig. A. R. $0^h 33^m 9.39^s$

Cov. Pre. $2 6.79^s$

(1880 2nd Apr.) $0^h 35^m 16.18^s$ (not used for final)

Log. A. + 9.311660^c

Corr. -99^c

Log. tan. 0.127627^c

Sum logs. 9.439188^c

Number cov. 0.27491^c

$\frac{1}{3}^m$ 3.07122^c

Result 3.34613^c

1st " 3.32708^c

Mean 3.33660^c

Log. 0.523304^c

" 38 1.579784^c

Sum logs. 2.103088^c

Cov. Pre. 126.79^c

" $2^m 6.79^c$

(Orig. A. R.) $0^h 33 9.39^s$

$0^h 35^m 16.18^s$ Final.

Tab. 2y. $+19.8193^c$

Corr. -46^c

Result $+19.8147^c$

1st Apr $+19.8460^c$

Log mean $+19.8304^c = 1.297332^c$

" 38 $= 1.579784^c$

Result $753.56^c = 2.877116^c$

$+12' 33.56^c$

$53^\circ 5' 27.0^c$

$53^\circ 18' 0.6^c$ Final.

2590.1855

Nov. 19. 1880.

M. 1855.	0 ^h	49 ^m	7 ^s .9	+53°	36.7	(13)
B. Z. 184	0	49	7.82	+53	36	41.2 (6.7)

Mean of two.

log Δ_0 9.453990^v
 Corr. -47^v

Tab. Zy. +19.5973^vlog tan. d. 0.132559^vlog. +19.5951^v = 1.292147^v +Sum logs 9.586502^v" 25. = 1.397940^vnumber cor. 0.38592^v489.88° = 2.690087^vto m. 3.07071^v+8' 9.88^vResult 3.45663^v53 36 41.2^vlog. Par. 0.538653^v53° 44' 51.1^v (1850 1st app.)" 25. 1.397940^vSum logs. 1.936593^vCor. Pre. 86.42^v1^m 26.42^v0 49 7.82^v1850 1st app. 0^h 50^m 34.24^vlog. Δ_0 9.466350^vTab. Zy. +19.5701^vCorr. -99^vCor. -45^vlog. tan. d. 0.134720^vResult +19.5656^vSum logs. 9.600971^v1st app +19.5951^vnum. cor. 0.39900^vLog Mean. +19.5804^v = 1.291822^vto m. 3.07122^v" 25. = 1.397940^vResult 3.47022^vResult 489.51^v = 2.689762^v1st " 3.45663^v+8' 9.51^vMean. 3.46342^vAug. Dec. 53 36 41.2^vLog " 0.539505^v53° 44' 50.7^v (1850 2nd app) Final" 25. 1.397940^v

1 26.59

Sum logs. 1.937443^v86.59^v = 1^m 26.59^v 0 50 41.102^v

Orig. A. R. $0^h 49^m 7.82^s$
 Cor. P. $+1^m 26.59^s$
 (1880 2nd Apr) $0^h 50^m 34.41^s$ (1880 2nd Apr)

Log. Δ. 9.466370^c
 Cor. -99^c

Log. tan. δ. 0.134718^c

Sum logs. 9.600989^c

number cor 0.399010

to 3.07122^s

Result 3.47023^s

1st " 3.45663^s

Mean 3.46343^s

Log " 0.539507^c

" 25 1.397940^s

Sum logs. 1.937447^s

Cor. P. 86.59^c

Orig. " $17^m 26.59^c$

Orig. A. R. $0 49 7.82^s$

$0^h 50^m 34.41^s$ Final.

Tab. 2y. $+19.5701^s$

cor. -45^c

Result $+19.5656^s$

1st Apr $+19.5951^s$

Log. mean $+19.5804^s = 1.291822^s$

" 25 $= 1.397940^s$

Result $489.51^s = 3.689762^s$

$+8' 9.51''$

$53^\circ 36' 41.2$

$53^\circ 44' 50.7$ Final.

80400.

1800

Nov. 21. 1880.

D 24. 1855 1 19 48.1 +54° 31.0 (L)
 L.L. #2623. 1 16 25.51 54° 14' 15.4 (9.)

log. Δ d 9.641140 v
 Corr. +69 v

Tab. Zy. +18.95160

+300

log. tan. d. 0.142532 v

log. +18.9546 = 1.2777150

Sum logs. 9.783741 v

" 80. = 1.9030900

correspondingly 0.60777 v

1516.37 = 3.1808050

to m. 3.06958 v

+25' 16.37"

Result 3.67735 v

54 14 15.40

log. " 0.5655350

54° 39' 31.8" (1880 1st app.)

" 80. 1.9030900

Sum logs. 2.4686250

Cor. Pre. 294.19 v

4" 54.190

1 16 25.510

1" 21 19.70 (1880 1st app.)

log. Δ d 9.6670600

Tab. Zy + 18.80680

Corr. -990

Cor. -430

log. tan. d. 0.1492810

Result. +18.80250

Sum logs. 9.8162420

1st app. +18.9546

Unum. Cor. 0.655000 v

Log Mean. +18.87860 = 1.2759700

to m. 3.071220 v

" 80. = 1.9030900

Result 3.726220 v

Result 1510.26 = 3.1790600

1st " 3.67735 v

+25' 10.13"

Mean. 3.70178 v

Aug. Dec. 54 14 15.4

Log " 0.5684120

54 39 25.7 (1880 2nd app.)

" 80 1.9030900 v

Sum logs. 2.4715020 v

Cor. Pre. 296.140 = 4" 56.140

Orig. A. R. 1^h 16^m 25.51^s ✓
 Cor. Pre. 4 56.14^s ✓
 (1880 2nd ap.) 1^h 21^m 21.65^s ✓ (1880 2nd ap.)

Log. Δ. + 9.667230 ✓
 Cor. -99 ✓
 Log. tan. δ. 0.149254
 Sum logs. 9.816385 ✓
 number cor. 0.65522 ✓
 1st 3.07122 ✓
 Result 3.72644 ✓
 1st 3.67735 ✓
 Mean. 3.70190
 Log. 0.568425 ✓
 " 80 1.903090 ✓
 Sum logs. 2.471515 ✓
 Cor. Pre. 296.15 ✓
 " 4^m 56.15 ✓
 Orig. A. R. 1 16 25.51 ✓
 1^h 21^m 21.66^s ✓ Final.

Tab. Log. +18.8058 ✓
 Cor. -43 ✓
 Result +18.8015 ✓
 1st ap +18.9546 ✓
 Log mean +18.8780 = 1.275956 ✓
 " 80 = 1.903090 ✓
 Result 1510.24 = 3.179046 ✓
 +25' 10.2" ✓
 54° 14 15.4 ✓
 54° 39' 25.6 Final.

86

38 yrs.

1842

Nov. 22. 1880.

Dec. 1855	1	34	21.3	+54°	52' (A)
Dec. A. 1885	1	33	30.86	+54°	48' 45.6 (B)

log. $\Delta \alpha$ 9.724730 v
 Corr. -19 v

Tab. 24. +18.4098 v

log. $\Delta \alpha$ d. 0.151755 v

log. +18.4091° = 1.265032 v

Sum logs. 9.876465 v

" 38. = 1.579784 v

corresponding 0.75243 v

699.54° = 2.844816 v

to m. 3.07044 v

+11' 39.54°

Result. 3.82287 v

54 48 45.6 c

log. " 0.582390 v

55° 0' 25.1° (1880 1st app.)

" 38. 1.579784 v

Sum logs. 2.162174 v

Cor. Pre. 145.27 v

2- 25.27 c

1st 38 30.86 c1st 35- 56.13° (1880 1st app.)log. $\Delta \alpha$ 9.735200 v

Tab. 24. +18.3247 v

Corr. -99 c

Cor. -42 v

log. $\Delta \alpha$ d. 0.154886 v

Result. +18.3205 v

Sum logs. 9.889987 v

1st App +18.4091 v

Sum. Cor. 0.77622 v

log Mean. +18.3648° = 1.263986°

to m. 3.07122 v

" 38. = 1.579784 v

Result. 3.84744 v

Result 697.86° = 2.843770°

1st " 3.82287 v

+11' 37.86°

Mean. 3.83516 v

Orig Dec. 54 48 45.6 v

Log " 0.583784 v

55° 0' 23.5° (1880 2nd app) Final.

" 38. 1.579784 v

Sum logs. 2.163568 v

Cor. Pre. 145.74° = 2nd 25.74°

Orig. A. B. $1^h 33^m 30.86^s$ ✓

Cor. Pre. $+2 25.74^s$ ✓

(1880 2nd Apr) $1^h 35^m 56.60^s$ ✓ (Final)

Log. A. B. 9.735230^c

Corr. -99^c

log. tan. d. 0.154579^c

Sum logs 9.890010^c ✓

number cor. 0.77626^c ✓

$\frac{1}{15}^m$ 3.07122^c ✓

" Result 3.84748^c ✓

1st " 3.82287^c ✓

Mean 3.83518^c ✓

Log. 0.583786^c ✓

" 38 1.579784^c ✓

Sum logs 2.163570^c ✓

Cor. Pre. 145.74^c

" " $2^m 25.74^c$

Orig. A. R. $1 33 30.86^s$ ✓

$1^h 35^m 56.60^s$ ✓ Final.

Tab. Ly. $+18.3244^c$

cor. -42^c

Result $+18.3202^c$

1st Apr $+18.4091^c$

Log. mean $+18.3646^c = 1.263981^c$

" 38 $= 1.579784^c$

Result $697.86 = 2.843765^c$

$+11' 37.86$

$54 48 45.6$

$55^{\circ} 0' 23.5$ (1880 3rd Apr)

1890.

1800

Nov. 23. 1880.

m. 1255 1^h 46^m 10^s.2 + 54° 52.0 (L)
 Lb. 3452 1 42 36.20 54 35 22.5 (9)

Log Δ₀ 9.762535 ✓

Tab. 2y. + 18.0798 c

corr. +69 ✓

+29 c

log. tan. d. 0.148169 ✓

log. + 18.0827° = 1.257263 c

Sum logs 9.910773 ✓

" 80. = 1.903090 c

Corresponding by 0.81428 ✓

1446.62 = 3.160353 c

to m. 3.06958 ✓

+ 24' 6" 6 c

Result. 3.88386 ✓

54 35 22.5 c

log. " 0.589264 c

54 59 29.1 (1880 1st app.)

" 80. 1.903090 c

Sum logs. 2.492354 c

Cor. Pre. 310.571 c

5^m 10.71 c

1 42 36.20 c

1^h 47^m 46.91 c (1880 1st app.)log. Δ₀ 9.782396 d

Tab. 2y. + 17.8790 c

Corr. -99 c

Cor. -41 c

log. tan. d. 0.154635 c

Result + 17.8749 c

Sum logs. 9.936932 c

1st app + 18.0827

Unum. Cor. 0.86483 ✓

Log Mean. + 17.9788 c = 1.254761 c

to m. 3.07122 c

" 80. = 1.903090 c

Result. 3.93605 ✓

Result 1438.31 = 3.157851 c

1st " 3.88386 ✓

+ 23' 58.3

Mean. 3.90996 ✓

Orig Dec. 54 35 22.5 ✓

Log " 0.592173 c

54° 59' 20" 8 (1880 2nd app.)

" 80. 1.903090 c

Sum logs. 2.495263 ✓

Cor. Pre. 312.80 c = 5^m 12.80 c

Orig. A. R. $1^h 42^m 36^s.20^v$

Cor. Pre. $5^m 12^s.80^v$

(1870 2nd Apr) $1^h 47^m 49^s.00^v$

log. $\Delta.2$ 9.782526^v

Corr. -99^v

log. tan. $5. 0.154598^c$

Sum logs. 9.937025^v

number cor 0.86502^c

$\frac{1}{10}^m$ 3.07122^v

Result 3.93624^v

$\frac{1}{10}^m$ 3.88386^v

Mean, 3.9100^v

Log. 0.592183^v

" 50 1.903090^v

Sum logs. 2.495273^v

Cor. Pre. $312^s.80^c$

" $5^m 12^s.80^c$

Orig. A. R. $1^h 42^m 36.20^v$

$1^h 47^m 49^s.00^v$ Final.

Tab. Ly. $+17.8777^v$

cor. -41^v

Result $+17.8736^v$

1^st Apr $+18.0827^v$

Log mean $+17.9782^v = 1.254746^v$

" 50 $= 1.903090^v$

Result $1438.26^v = 3.157936^v$

$+23' 58.3^v$

$54^\circ 35' 22.5^v$

$54^\circ 59' 20.8^v$ Final.

25470.1855

Nov. 26. 1880.

Dec. 1855	2	30	0.6	+ 54°	22.3 (B)
N. 2. 591	2	30	0.60	+ 54°	22' 18.8 (90)

Log $\Delta_0 +$ 9.910634 ✓
 Corr. - 47 ✓

Tab. $\Delta_0 + 15.91130$ Log. $\Delta_0 +$ 0.144680 ✓

Log. + 15.9095 = 1.201657 c

Sum logs. 0.055267 ✓

" 25. = 1.397940 c

Corresponding Δ_0 1.13571 ✓

392.74° = 2.599597 c

 $\frac{1}{15}$ m. 3.07071 ✓

+ 6' 37.74 c

Result. 4.20642 ✓

54 22 18.8 c

log. " 0.623913 c

54 22 56.5 (1880 1st app.)

" 25. 1.397940 c

Sum logs. 2.021853 c

Cor. Pres. 105.16 ✓

1^m 45.16 c

2 30 0.60 c

2^d 31 45.76 c (1880 1st app.)log. $\Delta_0 +$ 9.914927 ✓Tab. $\Delta_0 + 15.81740$

Corr. - 99 c

Cor. - 36 c

Log. $\Delta_0 +$ 0.146449 c

Result + 15.8138 ✓

Sum. logs. 0.061277 c

1st app + 15.9095 ✓

Sum. Corr. 1.15153 ✓

Log. Mean. + 15.8616 ✓ = 1.200347 c

 $\frac{1}{15}$ m. 3.07122 c

" 25. = 1.397940 c

Result 4.22275 ✓

Result 396.54° = 2.598287 c

1st " 4.20642 ✓

+ 6' 36.54 c

Mean. 4.21458 ✓

Orig. Dec. 54 22 18.8 ✓

Log. 0.624754 c

54° 28' 55.3 (1880 2nd app.) Final.

" 25. 1.397940 ✓

Sum logs. 2.022694 ✓

Cor. Pres. 105.36 = 1^m 45.36 c

Orig. A. R. $2^h 30^m 0.60^s$

Corr. Prev. $1 45.36^s$

(1850 2nd Op) $2^h 31^m 45.96^s$ (1850 2nd Op)

Log. $\Delta \alpha$ 9.914935^c

Corr. -99^c

log. tan. d. 0.146444^c

Sum logs. 0.061280^c

sin. tab. cor. 1.15154^c

$\frac{1}{15}^m$ 3.07122^c

Result 4.22276^c

$\frac{1}{15}^m$ 4.20642^c

Mean. 4.21459^c

Log α 0.624755^c

25 1.397940^c

Sum logs. 2.022695^c

Corr. Prev. 105.36^c

" " $1^m 45.36^c$

Orig. A. R. $2 30 0.60^s$

$2^h 31^m 45.96^s$ Final.

Tab. $\Delta \alpha$ $+15.8172^c$

Corr. -36^c

Result $+15.8136^c$

1^st Op $+15.9095^c$

Log Mean $+15.8616^c = 1.200347^c$

" $25 = 1.397940$

Result $396.54^c = 2.598287$

$+6' 36.54^c$

$54^0 22 18.8^c$

$54^0 28' 55.3^c$ Final.

3 Eys.1842Nov. 27, 1880.

21. 1855.	2	44	31.8	+ 53°	49.7
D. 21. 1855.	2	48	19.5	+ 53°	42.1 (8.6) (LA)
Dec. 4. 3325	2	47	23.94	+ 53°	38' 47.9 (9)

Log Δ_0 9.950404^c
 Corr. -19^c

Tab. Ly. + 14.9400^c
 Corr. -6^c

Log. tan δ . 0.133118^c

Log. + 14.9394 = 1.174334^v

Sum logs. 0.083503^v

" 38 = 1.579784^v

number cor. 1.21200^c

Result 567.70 = 2.754118^v

$\frac{1}{15}$ m 3.07044^c

Cor. Pr. + 9' 27.70^v

Result 4.28244^v

53° 38' 47.9

Log. 0.631691^c

(18501st ap) 53° 48' 15.6^v

" 38 1.579784^c

Sum logs. 2.211475^v

Cor. Pr. 162.73^v

" " + 2^m 42.73^c

Orig. A. R. 2^h 47^m 23.94^v

(18501st ap) 2^h 50^m 16.67^v

Log. Δ_0 9.956074^v

Tab. 2y. + 14.7806^v

Corr. -99^v

Cor. -34

Log. tan δ . 0.135624^v

Result. + 14.7772

Sum logs. 0.091599^v

1st ap. + 14.9394^v

num. Cor. 1.23481^c

Log. mean. + 14.8583 = 1.171969

$\frac{1}{15}$ m 3.07122^c

" 38. = 1.579784^v

Result 4.30603^v

Cor. Pr. 564.62 2.751753

1st ap. 4.28244^v

+ 9' 24.62

mean. 4.29424^v

Orig. Dec. 53° 38' 47.9^v

1850. 2^d ap. 53° 48' 12.5^v

Log. Mean. 0.632886^c
 " 38. 1.579784^c

 Sum logs. 2.212670^c
 Cor. Pr. $163.181 = 2^m 43.18^s$
 Orig. A.R. $2 \quad 47 \quad 23.94^s$
 1880, 2^d ap. $2^h \quad 50^m \quad 7.12^s$ Final.

Log Δ_0 + 9.956090^c
 Cor. -99^c

 Log. tan. δ . 0.135610^c
 Sum logs. 0.091601^c
 number cor. 1.23481^c
 $\frac{1}{15}^m$ 3.07122^c

 Result 4.30603^c

Tab. 2y + 14.7800^c
 Cor. -34^c

 Result + 14.7766^c
 1st ap. + 14.9394^c

 Log Mean + $14.8580^c = 1.171960^c$
 " 38 $= 1.579784^c$

 Cor Pr $564.60^c = 2.751744^c$
 + $9' 24.60^c$
 Orig. Dec. $53 \quad 38 \quad 47.9^c$
 (1880 3rd ap) $53^\circ \quad 48' \quad 12.5^s$
 Final.

(1880.0) $2^h \quad 50^m \quad 7.12^s$ + $53^\circ \quad 48' \quad 12.5^s$
 ~~$+ 4.294^c$~~
 (1881.0) $2 \quad 50 \quad 11.41$ + $53 \quad 48 \quad 27.4^c$
 ~~$+ 14.9^c$ wrong~~

25700.1555

Nov. 29. 1880.

2 m. 1855.

3

6

48.5

+52° 50.5

2 m. 1855.

3

5

45.2

+52° 54.6 (9.5)(3)

B.Z. 673.

3

5

45.19

+52° 54' 33.5 (9.5)

Log $\Delta_0 +$

9.986280°

Tab. 2y. + 13.8216°

Corr.

-47°

Corr.

-15°

log. tan. δ .

0.121456°

Log + 13.8201 = 1.140511°

Sum logs

0.107689°

" 25 = 1.397940°

number cor

1.28141°

Result 345.50° = 2.538451°

1/5 m.

3.07071°

Cor. Pre. + 5' 45.50°

Result

4.35212°

52 54 33.5°

Log "

0.638701°

(1880 1/2 ap) 53° 0' 19".0°

" 25

1.397940°

Sum logs

2.036641°

Cor. Pre.

108.80°

" "

1^m 48.80°

Orig. A. R. 3

5

45.19

1880 1/2 ap) 3^h 7^m3^h

33.99°

Log $\Delta_0 +$

9.989522°

Tab. 2y. + 13.7062°

Corr.

-99°

Corr.

-32°

log. tan. δ .

0.122969°

Result. + 13.7030°

Sum logs

0.112392°

1st ap. + 13.8201°

Sum. Cor.

1.29536°

log. mean. + 13.7616° = 1.138669°

1/5 m

3.07122°

" 25. = 1.397940°

Result.

4.36658°

Cor. Pre. 344.04° = 2.536609°

1st ap.

4.35212°

+ 5' 44.04°

mean.

4.35935°

Orig. Dec. 52 54 33.5°

1880. 2^d ap. 53° 0' 17.5°

Log. mean. 0.639422^v
 " 25. 1.397940^v
 Sum logs. 2.037362^v
 Cor. Pr. $108.98^v = 1^m 48.98^v$
 Orig. A.R. $3^h 5^m 45.19^v$
 1880. 2nd ap. $3^h 7^m 34.17^v$ Final.

Log Δ_0 9.989527^v
 Cor. -99^v
 log. tan δ . 0.122962^v
 Sum logs. 0.112390^v
 number cov. 1.29536^v
 15^m. 3.07122^v
 Result 4.36658^v
 Log "
 " 25
 Sum logs.
 Cor. Pr.
 " "
 Orig. A.R.
 (1880 3rd ap)

Tab. Ly. $+13.7060^v$
 Cor. -32^v
 Result $+13.7028^v$
 1st Ap. $+13.8201^v$
 Log mean $13.7614^v = 1.138663^v$
 " 25 $= 1.397940^v$
 Cor. Pr. $344.04^v - 2.536603^v$
 $+5^v 44.04^v$
 Orig. Dec. $52^v 54' 33.5^v$
 1880 3rd Ap. $53^v 0' 17.5^v$ Final.

1880.0

$3^h 7^m 34.17^v$
 4.36^v
 $3^h 7^m 38.53^v$

1881.0

$+53^v 0' 17.5^v$
 $+13.8^v$ wrong.
 $+53^v 0' 31.3^v$

38 yrs.

1842

Dec. 2. 1840.

Dec. 1855	3	42	14.0	+50°	36.6 (20)
Dec. 4212	3	41	16.34	+50°	34' 10.6 (8)

Log. Δ₀ t. 0.041205 v

Tab. ly. + 11.4125 v

Corr. -19 v

-5 v

log. tan. d. 0.184971 v

log. + 11.4120° = 1.057362 v

Sum logs. 0.126157 v

38. = 1.579784 v

Correspondingly 1.33708 v

433.66° = 2.637146 v

to m. 3.07044 v

+ 7' 13.66 v

Result. 4.40752 v

50 34 10.6 v

log. " 0.644194 v

50 41 24.3° (1840 1st app.)

" 38 1.579784 v

Sum logs. 2.223978 v

Cor. Pre. 167.49 v

2" 47.49 v

3 41 16.34 v

3h 44" 3.83° (1840 1st app.)

Log. Δ₀ t. 0.044818 v

Tab. ly. + 11.2108 v

Corr. -99 v

Cor. -26 v

log. tan. d. 0.086833 v

Result + 11.2082 v

Sum logs. 0.131552 v

1st App. + 11.4120 v

Cor. 2y. 1.35379 v

Log Mean. + 11.3101 v = 1.053467 v

to m. 3.07122 v

" 38. = 1.579784 v

Result. 4.40501 v

Result 429.78° = 2.633251 v

1st " 4.40752 v

+ 7' 9.78 v

Mean. 4.41626 v

Orig. Dec. 50 34 10.6 v

Log " 0.645055 v

50° 41' 20.4" (1880 2nd app.)

" 38 1.579784 v

Final.

Sum logs. 2.324839 v

Cor. Pre. 167.82° = 2" 47.82 v

Orig. A.R. $3^h 41^m 16.34^s$ ✓

Cor. Pae. $2 47.82^s$ ✓

(1880 2nd Apr) $3^h 44^m 4.16^s$ (1880 2nd Apr.)

log. $\Delta_0 + 0.044825^c$

Cor. -99^c

Tab. Ly. $+11.2104^c$

Cor. -26^c

log. tan $\delta. 0.056817^c$

Result $+11.2078^c$

Sum logs. 0.131543^c

1st Apr $+11.4120^c$

number cor 1.35376^c

Log mean $+11.3099^c = 1.053459^c$

$\frac{1}{15}^m. 3.07122^c$ ✓

" 38 $= 1.579784^c$

Result 4.42498^c ✓

Result $429.78^c = 2.633243^c$

1st " 4.40752^c ✓

$+7' 9.78^c$

mean 4.41625^c ✓

50 34 10.6

Log " 0.645054^c

50° 41' 20".4 (1880 3rd Apr)

" 38 1.579784^c ✓

Sum logs. 2.224838^c ✓

Cor. Pae. 167.52^c

" " $2^m 47.82^c$

Orig. A.R. $3 41 16.34^s$ ✓

$3^h 44^m 4.16^s$ Final.

38970.

1842

Dec. 3. 1860.

pm. 1855.	3	51	3.0	+50°	13.5	(A)
Oct. 4349.	3	50	5.29	+50°	11' 13.6	(B)

Log $\Delta_0 +$ 0.052297^v
 Corr. -19^v

Tab. Zy. +10.7698^v-4^vlog. tan d. 0.079065^vlog. +10.7694^c = 1.032191^cSum logs. 0.131346^v3^d. = 1.579784^cCorresponding by 1.35315^v409.24^v = 2.611975^c15 m. 3.07044^v+6' 49.24^cResult. 4.42359^v50 11 13.6^clog. a 0.645775^c50 18 2.8^c (1860 1st app.)" 3^d 1.579784^cSum logs. 2.225559^cCor. Pre. 168.10^v2nd 48.10^v3 50 5.29^v3rd 52 53.39^c (1860 1st app.)log. $\Delta_0 +$ 0.055631^vTab. Zy. +10.5622^vCorr. -99^cCor. -24^vlog. tan d. 0.080821^cResult +10.5598^vSum logs. 0.136353^c1st app. +10.7694^vSum. Cor. 1.36884^vLog Mean. +10.6646^c = 1.027945^c15 m. 3.07122^v3^d. = 1.579784^cResult 4.44006^vResult 405.26^c = 2.607729^c1st 4.42359^v+6' 45.26^cMean. 4.43182^vOrig. Dec. 50 11 13.6^vLog " 0.646582^c50° 17' 58.9^c (1860 2nd app.)" 3^d 1.579784^v

Final.

Sum logs. 2.226366^vCor. Pre. 168.41^c = 2nd 48.41^c

Orig. A.R. $3^h 50^m 5.29^s$ ✓
 Cor. Per. $2 48.41^s$ ✓
 (1550 2nd ap) $3^h 52^m 53.70^s$ ✓

log. Δ + 0.055638^c
 Cor. -99^c
 log. tan δ 0.080804^c
 Sum logs. 0.136343^c
 number cor. 1.36881^c
 $\frac{1}{15}^m$ 3.07122^c
 Result 4.44003^c
 $\frac{1}{15}^m$ " 4.42359^c
 Mean. 4.43181^c
 Log " 0.646581^c
 " 35 1.579784^c
 Sum logs. 2.226365^c
 Cor. Per. 168.41^c
 " " $2^m 48.41^c$

Orig. A.R. $3 50 5.29^s$ ✓
 $3^h 52^m 53.70^s$ Final.

Tab. Ly. $+10.5618^v$
 Cor. -24^v

Result $+10.5594^v$

1st ap $+10.7694^v$

Log mean $+10.6644^v = 1.027936^v$

" 35 $= 1.579784^v$

Result $405.25^v = 2.607720$

$+6' 45.25^v$

50 11 13.6 c

50 17 58.4 c Final.

100

38 yrs.

1842

Dec. 4. 1880.

Dec. 1255. 3 57 42.6 + 49° 29.6 (A)
 Dec. 4466. 3 56. 44.57 + 49° 27' 25.5 (8.9)

Log. Δ_0 + 0.0600701
 Cor. -19 v

Tab. Ly. +10.2740 v

log. tan. d. 0.067843 v

log. +10.2736° = 1.011723 c

Sum logs. 0.127894 v

" 38. = 1.579724°

Corresponding Ly. 1.34244 v

390.40° = 2.591507°

1/5 m. 3.07044 v

+ 6' 30.40 c

Result. 4.41288 v

49 27 25.5°

log. " 0.644722 v

49 33 55.9° (1880 1st app.)

" 38 1.579724°

Sum logs. 2.224506 c

Cor. Pre. 167.69 v

2~ 47.69 v

3 56 44.57 v

3~ 59~ 32.26° (1880 1st app.)

log. Δ_0 + 0.063185 v

Tab. Ly. +10.0632 v

Corr. -99 c

Cor. -23 v

log. tan. d. 0.069507 c

Result +10.0609 v

Sum logs. 0.132593 c

1st app. +10.2736 v

Sum. Cor. 1.35704 v

Mean. +10.1672 v

1/5 m. 3.07122 c

Result. 4.42826 v

1st " 4.41288 v

Mean. 4.42057 v

Log. " 0.645478 c

" 38 1.579724 v

Sum logs. 2.225262 v

Cor. Pre. 167.98° = 2~ 47.98°

Orig. A. R. $3^h 56^m 44.57^s$
 Cor. Par. $2 47.98^s$
 (1580 2nd up) $3^h 59^m 32.55^s$

Log. 4. 0.063191^c
 Cor. -99^c
 Log. tan. d. 0.069490^c
 Sum logs. 0.132582^c
 number cor. 1.35701^c
 to m. 3.07122^s
 Result 4.42823^s
 1st " 4.41288^s
 mean. 4.42056^s
 Log 4 0.645477^c
 " 35 1.579784^s
 Sum logs. 2.225261^s
 Cor. Par. 167.98^c
 " " $2^m 47.98^c$

Orig A. R. $3 56 44.57^s$
 $3^h 59^m 32.55^s$ Final.

Tab. 2y. $+10.0629^s$
 Cor. -23

Result $+10.0606$

1st ap $+10.2736$

Log mean $+10.1671 = 1.107197$
 " 38 $= 1.579784$

Result $386.35 = 2.586981$
 $+6' 26.35$

25700.

1855

Dec. 7. 1880.

M. 1855. 4 17 25.6 +46° 36.2 (B)
 B. L. 887. 4 17 25.59 +46° 36' 11.6 (8.5)

Log. Δ_0 + 0.081130 v
 Corr. -47 v

Tab. 2y. +8.67980

Log. tan. d. 0.024314 v

Log. +8.6788° = 0.938460 v

Sum log. 0.105397 v

" 25. = 1.397940 v

Number. cor. 0.127467 v

216.97° = 2.336400 v

1/5 m. 3.07071 v

+3' 36.97 v

Result 4.34538 v

46 36 11.0 v

by. " 0.638028 v

46 39 48.0 (1880 1st app.)

" 25. 1.397940 v

Sum logs. 2.035968 v

Cor. Pac. 108.63 v

1" 48.63 v

4 17 25.59 v

4 19 14.22 (1880 1st app.)

log. Δ_0 + 0.082760 v

Tab. 2y. +8.5366 v

Corr. -99 v

Cor. -20 v

log. tan. d. 0.025230 v

Result +8.5346 v

Sum logs. 0.107891 v

1st app. +8.6788 v

Num. Cor. 1.28201 v

Mean. +8.6067 v

1/5 m. 3.07122 v

log. " = 0.934837 v

Result 4.35323 v

" 25 = 1.397940 v

1st 4.34538 v

" Result 215.17° = 2.332777 v

Mean. 4.34930 v

2y. Cor. +3' 35.17 v

Log. 0.638419 v

Grig. Dec. 46 36 11.0 v

" 25 1.397940 v

(1880 2nd app.) 46° 39' 46.2 v Final.

Sum logs. 2.036359 v

Cor. Pac. 108.73 v = 1" 48.73 v

Orig. A.R. $4^h 17^m 25.59^s$ ✓
 Cor. P.R. $1^m 48.73^s$ ✓
 (1880 2^d app.) $4^h 19^m 14.32^s$ ✓ (1880 2^d app.)

log. Δ + 0.052762^c
 Corr. -99^c
 log. tan. δ 0.025222^c
 Sum logs. 0.107585 ✓
 number cor. 1.28199^c
 $\frac{1}{15}$ m. 3.07122 ✓
 Result 4.35321 ✓
 1st " 4.34538 ✓
 Mean 4.34930 ✓
 Log " 0.638419 ✓
 " 25 1.397940 ✓
 Sum logs 2.036359 ✓
 Cor. P.R. 108.573^c
 " " 1^m 48.73^c

Orig. A.R. $4^h 17^m 25.59^s$ ✓
 $4^h 19^m 14.32^s$ ✓ Final.

Tab. 2y. + 8.5365^c
 Corr. -20^c

Result + 8.5345 ✓
 1st app + 8.6788
 Log mean + 8.6066 ✓ = 0.934832^c
 " 25 = 1.397940^c
 Result 215.17 = 2.332772^c

104

55910.1825

Dec. 11. 1880.

Dec. 1855.	4	44	54.9	+43°	10.4 (K)
N ^o 999 mean of	4	42	47.64	43	7 13.7

Log. Δ_0 + 0.101038 v
 Cor. +16 v

Tab. 2y + 6.6294 v

log. tan d. 9.971487 v

log. +6.6297° = 0.821494 v

Sum logs. 0.072541 v

" 55. = 1.740363 v

corresponding 1.18179 v

364.63° = 2.561857 v

to m. +3.07009 v

+6' 4.63 v

Result. 4.25188 v

43 7 13.7 v

log. " 0.628581 v

43 13' 18.3° (1880 1st app.)

" 55. 1.740363 v

Sum logs. 2.361944 v

Cor. Pre. 233.25 v

3" 53.25 v

4 42 47.64 v

4 46 41.49 (1880 1st app.)log. Δ_0 + 0.103555 v

Tab. 2y. + 6.3065 v

Cor. -99 v

Cor. -15 v

log. tan d. 9.973025 v

Result + 6.3050 v

Sum logs. 0.076481 v

1st app. + 6.6297 v

Sum. Cor. 1.19256 v

Mean. + 6.4674 v

to m. 3.07122 v

Log. " = 0.818730 v

Result 4.25378 v

" 55 = 1.740363 v

1st " 4.25188 v

" Result 355.71° = 2.551093 v

Mean. 4.25783 v

Ly. Cor. +5' 55.71 v

Log. " 0.629188 v

Orig Dec. 43 7 13.7 v

" 55. 1.740363 v

(1880 2nd app.) 43° 13' 9.4 v

Sum logs. 2.369551 v

Final.

Cor. Pre. 234.18° = 3" 54.18 v

Orig. A.R. $4^h 42^m 47.64^v$

Cor. Pre. $3 54.18^v$

(1880 2nd Apr) $4^h 46^m 41^s.82^v$ (1880 2nd Apr)

Log. Δ. 2 0.103558^c

Leorr. -99^c

Tab. 2y. $+6.3061^v$

Corr. -15

Log. tan. d. 9.972987^c

Result $+6.3046$

Sum logs. 0.076446^c

1st Apr $+6.6297$

number cor. 1.19247^c

Log mean $+6.4672 = 0.810716$

$\frac{1}{15}$ m. 3.07122^v

" 55. $= 1.740363$

Result 4.26369^v

Result $355.70 = 2.551079$

1st " 4.25188^v

$+5' 55.70$

Mean. 4.25778^v

Log " 0.629183^v

" 55 1.740363^v

Sum logs. 2.369546^v

Cor. Pre. $234^s.18^c$

" " $3^m 54^s.18^c$

Orig. A.R. $4 42 47.64^v$

$4^h 46^m 41^s.82^v$ Final.

55470.

1825

Dec. 19. 1880.

m. 1855. 5 14 41.9 +37° 31.2 (K)
 K.(2) 399 5 12 40.08 37° 29 17.9 (8.)

Log. Δ_0 + 0.116834c
 Corr. +16c

Tab. 2y. +4.1128c
 +2c

log tan d. 9.884797c

log. +4.1130° = 0.614159v

Sum log. 0.001647c

" 55. = 1.740363c

number cor. 1.00380c

226.22° = 2.354522c

$\frac{1}{15}$ m. 3.07009v

+3' 46.22c

Result. 4.07389c

37 29 17.9°

Log " 0.610009c

37 33 4.1° (1880 1st app.)

" 55. 1.740363c

Sum logs. 2.350372c

Cor. Pre. 224.06 v

3" 44.06 c

5 12 40.08 c

5" 16" 2K.14° (1880 1st app.)

log. Δ_0 + 0.118256c

Tab. 2y. +3.7924c

Corr. -99c

Cor. -9c

log. tan. d. 9.885783c

Result +3.7915v

Sum log. 0.003940c

1st App. +4.1130v

num. Cor. 1.00911v

Mean. 3.9523v

$\frac{1}{15}$ m. 3.07122c

Log " = 0.596839v

Result. 4.08033v

" 55 = 1.740363v

1st " 4.07389v

" Result 217.37° = 2.337202v

Mean. 4.07711v

Ly. lev. +3' 37.37v

Log " 0.610352c

Orig. Dec. 37 29 17.9v

" 55 1.740363v

(1880 6th app.) 37° 32' 55.3v Final.

Sum logs 2.350715v

Cor. Pre. 224.24° = 3" 44.24c

Orig. A. R. $5^h 12^m 40.08^s$ ✓
 Cor. Pre. $3 44.24^s$ ✓
 (1850 2nd App) $5^h 16^m 24.32^s$ (1850 2nd App)

Log. Δ. + 0.118257^c
 less. -99^c
 Log. tan δ. 9.885744^c
 Sum logs. 0.003902^c
 number cor. 1.00903^c
 $\frac{1}{15}$ m. 3.07122^s ✓
 Result 4.08025^s ✓
 1st " 4.07389^s ✓
 Mean. 4.07707^s ✓
 Log " 0.610348^s ✓
 " 55 1.740363^s ✓
 Sum logs. 2.350711^s ✓
 Cor. Pre. 224.24^s ✓
 " " $3^m 44.24^s$ ✓
 Orig. A. R. $5^h 12^m 40.08^s$ ✓
 $5^h 16^m 24.32^s$ Final.

Tab. 2y. + 3.7921^s ✓
 Cor. -9
 Result + 3.7912
 1st App + 4.1130
 Log Mean + $3.9521 = 0.596828$
 " 55 $= 1.740363$
 Result $217.37 = 2.337191$
 + $3' 37.37$

108

5590.1825

Dec. 22, 1880.

m. 1855. 5 22 34.9 +35° 31.1 (K)
 h. 642 5 20 34.48 35° 29' 30.1 (89)

log. Δ_0 + 0.119704 v
 Corr. +16 v

Tab. 2y. +3.4332 v

log. tan. d. 9.853134 v

log. +3.4333° = 0.535712 v

Sum log. 9.972854 v

" 55. = 1.740363 v

Cor. 2y. 0.93941 v

188.83° = 2.276075 v

 $\frac{1}{15}$ m 3.07009 v

+3' 8.83 v

Result. 4.00950 v

35 29 30.1 v

log. " 0.603090 v

35 32 38.9° (1880 1st app.)

" 55. 1.740363 v

Sum logs. 2.343453 v

Cor. P. 220.52 v

3m 40.52 v

5 20 34.48 v

5 24 15.00° (1880 1st app.)

log. Δ_0 0.120856 v

Tab. 2y. +3.1159 v

Corr. -99 v

Cor. -7 v

log. tan. d. 9.853975 v

Result +3.1152 v

Sum logs. 9.974732 v

1st app +3.4333 v

Cor. 2y. 0.94348 v

Log Mean. +3.2742° = 0.515105 v

 $\frac{1}{15}$ m 3.07122 v

" 55 = 1.740363 v

Result. 4.01470 v

Result 180.08° = 2.255468 v

1st " 4.00950 v

+3' 0.08 v

Mean. 4.01210 v

Orig. Dec. 35 29 30.1 v

Log " 0.603372 v

35° 32' 30.2° (1880 2nd app.) Final

" 55. 1.740363 v

Sum logs. 2.343735 v

Cor. P. 220.67° = 3m 40.67 v

Orig. A. R. $5^h 20^m 34^s.48^v$
 Cor. Pre. $3 40.67^v$
 (1850 2nd ap) $5^h 24^m 15^s.15^v$ (1850 2nd ap)

log. Δ_0 0.120857^c
 Cor. -99^c
 log. tan. δ 9.853937^c
 Sum logs 9.974695^v
 number cor 0.94340^c
 $\frac{1}{15}^m$ 3.07122^v
 Result 4.01462^v
 job " 4.10950^v
 Mean 4.01206^v
 Log 0.603368^v
 " 55 1.740363^v
 Sum logs 2.343731^v
 Cor. Pre. $220^s.66^c$
 " " $3^m 40^s.66^c$

Orig. A. R. $5^h 20 34.45^v$
 $5^h 24^m 15^s.14^v$ Final.

Tab. 2y. $+3.1157^v$
 Cor. -7
 Result $+3.1150$
 $1\frac{1}{4}$ ap $+3.4333$
 Log Mean $+3.2742 = 0.515105$
 " 55 $= 1.740363$
 Result $180".08 = 2.255468$
 $+3' 0".08$

55 yro.1825

Dec. 23. 1850.

m. 1855(?) 5^h 29 12.4 + 34° 59.1 (K)
 4^h 880 5 27 12.13 + 34° 57' 52.8 (8)

Log. $\Delta_0 +$ 0.121700 v
 Corv. +16 v

Tab. 2y. + 2.86040

log. tan. d. 9.844657 v

log. + 2.8605^c = 0.4564420

Sum logs. 9.966373 v

" 55. = 1.7403630

number corv. 0.92549 v

157.33^v = 2.1968050

15 m. 3.07009 v

+ 2' 37.330

Result. 3.99558 v

34 57 52.8^v

log. " 0.6015800

35° 0' 30.1^v (1850 1st app.)

" 55. 1.7403630

Cum logs. 2.3419430

Cor. Pres. 219.760

3^m 39.760

5 27 12.130

5^h 30 51.89^v (1850 1st app.)log. $\Delta_0 +$ 0.1226430

Tab. 2y. + 2.54290

Corv. -99 v

Corv. -60

log. tan. d. 9.845361 v

Result + 2.5423 v

Sum logs. 9.9679650

1st app + 2.8605 v

Cor. 2y. 0.92876 v

Log Mean + 2.7014 = 0.431589 v

15 m. 3.071220

" 55 = 1.740363 v

Result. 3.99998 v

Result 148.58^c = 2.171952 v1st " 3.99558 v+ 2' 28.58^v

Mean. 3.99778 v

Orig. Dec. 34 57 52.8 v

Log " 0.6018190

35° 0' 21.4^v (1880 2nd app.) Final

" 55 1.740363 v

Sum logs. 2.342182 v

Cor. Pres. 219.88^c = 3^m 39.88^c

Orig. A.R. 5^h 27^m 12^s.13^v
 Cor. Pre. 3 39.88^v
 (1850 2nd ap) 5^h 30^m 52^s.01 (1850 2nd ap)

log. A. +	0.122643 ^c	Tab. 2 _y + 2.5427 ^v
corr.	-99 ^c	corr. -6
log tan d	9.845322 ^c	Result + 2.5421
Sum logs.	9.967866 ^v	1 st ap + 2.8605
number cor	0.92868 ^c	Log. mean + 2.7013 = 0.431573
1/5 ^m .	3.07122 ^v	" 55 = 1.740363
Result	3.99990 ^v	Result 148.57 = 2.171936
1 st "	3.99555 ^v	+ 2' 28.57
Mean.	3.99774 ^v	
Log "	0.601814 ^c	
" 55	1.740363 ^v	
Sum logs	2.342177 ^v	
Cor. Pre.	219.88 ^c	
" "	3 ^m 39.88 ^c	
Orig. A.R.	5 27 12.13 ^v	
	5 ^h 30 ^m 52 ^s .01 ^v Final.	

112

80 yrs.

1800

Dec. 28. 1880.

M. 1855.	5	35	0.4	+ 32°	10.2	(L)
Lb. #10767	5	31	25.05	32°	8' 7.8	(8.5)

Log. $\Delta_o +$ 0.122775 v
 Corr. +69 v

log tan d. 9.798072 v

Sum log. 9.920916 v

number cor 0.83352 v

$\frac{1}{15} m$ 3.06958 v

Result. 3.90310 v

log. " 0.591410 c

" 80. 1.903090 c

Sum logs. 2.494500 c

Cor. Pre. 312.25 v

5" 12.525 c

5 31 25.05 v

5 36 37.30 (1880 1st app.)

Tab. Ly. +2.4949 c

+4 v

log. +2.4953 v = 0.397123 c

" 80. = 1.903090 c

199.62 v = 2.300213 c

+ 3' 19.62 c

32 8 7.8 c

32° 11' 27.4" (1880 1st app.)

log. $\Delta_o +$ 0.123895 v

Corr. -99 v

log. tan. d. 9.799005 c

Sum logs. 9.922804 c

Cor. 2y. 0.83715 v

$\frac{1}{15} m$ 3.07122 c

Result 3.90837 v

1st 3.90310 v

Mean. 3.90574 v

Log " 0.591703 c

" 80 1.903090 v

Sum logs 2.494793 v

Cor. Pre. 312.46 c = 5" 12.46 c

Tab. Ly. +2.04230

Corr. -5 c

Result +2.0418 v

1st App +2.4953 v

Log Mean +2.2686 v = 0.355758 v

" 80 = 1.903090 c

Result 181.49 c = 2.258848 v

+ 3' 1.49 v

Orig. Dec. 32 8 7.8 v

32° 11' 9".3 (1880 2nd app) Final.

Orig. A. R. $5^h 31^m 25.05^s$

Cor. P. $5 12.46^s$

(1880 2nd ap) $5^h 36^m 37.51^s$ (1880 2nd ap)

log. Δ 0.123899^c

corr. -99^c

log. tan d. 9.798920^c

Sum logs. 9.922720^c

number cor 0.83699^c

$\frac{1}{15} m$ 3.07122^c

Result 3.90821^c

1st " 3.90310^c

Mean. 3.90566^c

Log 0.591695^c

" 80 1.903090^c

Sum logs. 2.494785^c

Cor. P. 312.45^c

" " $5^m 12.45^c$

Orig. A. R. $5 31 25.05^s$

$5^h 36^m 37.50^s$ Final.

Tan. $2y. + 2.0420^v$

corr. -5

Result $+2.0415$

1st ap $+2.4953$

Log Mean $+2.2684 = 0.355720$

" 80 $= 1.903090$

Result $181.47 = 2.258810$

$+3' 1.47$

$32^{\circ} 8' 7.8"$

$32^{\circ} 11' 9.3"$

114

55470.1825

Dec. 30. 1880.

M. 1855. 5 43 11.5 +31° 24.6 (K)
 K. = 1429 5 41 14.91 31° 23' 50.5 (89)

Log. Δ_0 + 0.124707 ✓ Tab. 24. + 1.6392 ✓
 Corr. +16 ✓ +1 ✓
 Log. tan d. 9.785571 ✓ Log. + 1.6393 = 0.214658 ✓
 Sum logs 9.910294 ✓ " 55. = 1.740363 ✓
 number cor. 0.81338 ✓ 90.16" = 1.955021 ✓
 15" 3.07009 ✓ +1' 30.16" ✓
 Result. 3.88347 ✓ 31 23 50.5" ✓
 Log. " 0.589220 ✓ 31° 25' 20.7" (1880 1st app.)
 " 55. 1.740363 ✓
 Sum logs. 2.329553 ✓
 Cor. Par. 213.59 ✓
 3" 33.59" ✓
 5 41 14.91" ✓
 5h 44m 44.50" (1880 1st app.)

Log. Δ_0 + 0.125207 ✓ Tab. 24. + 1.3285 ✓
 Corr. -99 ✓ Cor. -3 ✓
 Log. tan. d. 9.785998 ✓ Result + 1.3282 ✓
 Sum logs. 9.911106 ✓ 1st app + 1.6393 ✓
 Cor. 24. 0.81490 ✓ Log. Mean + 1.4838 = 0.171375 ✓
 15" 3.07122 ✓ " 55 = 1.740363 ✓
 Result 3.88612 ✓ Result 81.61" = 1.911738 ✓
 1st " 3.88347 ✓ +1' 21.61" ✓
 Mean. 3.88480 ✓ Aug Dec. 31 23 50.5 ✓
 Log. " 0.589369 ✓ 31° 25' 12.1" (1880 3rd app.) Final.
 " 55 1.740363 ✓
 Sum logs. 2.329732 ✓
 Cor. Par. 213.66" = 3" 33.66" ✓

Orig. A. R. $5^h 41^m 14.91^v$

Cor. Pre. $3 33.66^v$

(1880 2nd ap) $5^h 44^m 48.57^v$ (1880 2nd ap)

Log. Δ_0 0.125207^c

low. -99^c

log. tan. d. 9.785958^c

Sum logs. 9.911066^v

number cor. 0.81483^c

$\frac{1}{15} m.$ 3.07122^v

Result 3.88605^v

1st 3.88347^v

Mean. 3.85476^v

Log. 0.589364^c

$\frac{1}{15} m.$ 1.740363^v

Sum logs. 2.329727^v

Cor. Pre. 213.66^c

" " $3^m 33.66^c$

Orig. A. R. $5 41 14.91^v$

$5^h 44^m 48.57^v$ Final.

Tab. Δ_0 $+1.3284^v$

Cor. -3

Result $+1.3251$

1st ap $+1.6393$

Log Mean $+1.4837 = 0.171346$

" $55 = 1.740363$

Result $81.60 = 1.911709$

$+1' 21.60$

$31 23 50.5$

$31 25 12.1$

116

55900.

1825

Dec. 31. 1880.

M. 1855. 5^h 42^m 21.9 +30° 54'.8 (14)
 W. 1395+6 5 40 25.87 +30° 53' 52.1 (7.9)

Log. Δ_0 + 0.124577^v
 Corr. +16^v

Tab. Zy. +1.7104^vlog. tan d. 9.777017^vlog. +1.7105^c = 0.233123^vSum logs 9.901610^v" 55. = 1.740363^cnumber cor. 0.79728^v94.08^v = 1.973486^v1/5 m. 3.07009^v+1' 34.08^cResult. 3.86737^v30 53 52.1^vlog. " 0.587416^c30 55 26.2^c (1880 1st app.)" 55. 1.740363^cSum logs 2.327779^cCor. Pn. 212.71^v3^m 32.71^v5 40 25.87^v5^h 43 58.58^c (1880 1st app.)log. Δ_0 + 0.125100^vTab. Zy. +1.4012^vCorr. -99^vCor. -3^vlog. tan. d. 9.777467^cResult +1.4009^vSum logs 9.902468^c1st app. +1.7105^vCor. Zy. 0.79886^vLog Mean +1.5557^v = 0.191926^c1/5 m. 3.07122^v" 55 = 1.740363^vResult 3.87008^vResult 85.56^c = 1.932289^v1st " 3.86737^v+1' 25.56^vMean. 3.86872^vAug. Dec. 30 53 52.1^vLog " 0.587567^c30 55 17.7^v (1880 2nd app.) Final," 55 1.740363^vSum logs 2.327930^vCor. Pn. 212.78^c = 3^m 32.78^c

Orig. A. R. $5^h 40^m 25.87^s$ ✓

Cor. Pre. $+3 \quad 32.78^s$ ✓

(1850.2nd Sep) $5^h 43^m 58.65^s$ ✓

Log. Δ. 0.125100^c

Cor. -99^c

Log. tan. d. 9.777426^c

Sum logs. 9.902427^s

number cor. 0.79878^c

$\frac{1}{2}$ m. 3.07122^s ✓

Result 3.87000^s

1st " 3.86737^s ✓

mean. 3.86868^s ✓

Log " 0.587563^c

" 55 1.740363^s ✓

Sum logs. 2.327926^s

Cor. Pre. 212.78^c

" " $3^m 32.78^c$

Orig. A. R. $5^h 40^m 25.87^s$ ✓

$5^h 43^m 58.65^s$ Final.

Tab. 2y. $+1.4011^s$

Cor. -3

Result $+1.4008$

1st ap $+1.7105$

Log mean $+1.5556 = 0.191898$

" 55 $= 1.740363$

Result $85.56 = 1.932261$

$+1^s 25.56$

118

56 yrs.

1825

Jan. 1. 1881.

M. 1855 5 44 56.8 +30° 26.9 (K)
 K. 1482 5 43 0.68 30 26 43.1 (S)

Log. Δ_0 + 0.124968c Tab. 2y. +1.4853c
 Corr. +16c

log. tan. d. 9.769200v log. +1.4854° = 0.171843c
 Sum logs. 9.894184c " 56. = 1.748188c
 number cor. 0.78376v 83.78° = 1.920031c
 15m. 3.07009v +1' 23".18c
 Result. 3.85385c 30 26 43.1v

log. " 0.585895c 30 28 6.3° (1881 1st app.)
 " 56. 1.748188c
 Sum logs. 2.334083c
 Corr. Par. 215.82v
 3" 35.82c
 5 43 0.68c
 5h 46 36.50 (1881 1st app.)

log. Δ_0 + 0.125420v Tab. 2y. +1.1713c
 Corr. -101c Cov. -3c
 log. tan. d. 9.769601c Result +1.1710°
 Sum logs. 9.894920c 1st app +1.4854°
 Corr. 2y. 0.78509v Log Mean +1.3282° = 0.123263°
 15m 3.07124v " 56 = 1.748188°
 Result 3.85633v Result 74.38° = 1.871451°
 1st " 3.85385v +1' 14".38°
 Mean. 3.85509v Aug. Dec 30 26 43.1v
 log. " 0.586035c 30 27 57.5° (1881 2nd app.)
 " 56 1.748188v Final.
 Sum logs. 2.334223v
 Corr. Par. 215.89 = 3m 35.89c

Orig. A. R. $5^h 43^m 0.68^s$ ✓

Cov. Pre. $3 35.89^s$ ✓

(1881 2nd ap) $5^h 46^m 36.57^s$ ✓

log. A. + 0.125420^c

Cov. -101^c

Tab. 2y. + 1.1712^c

Cov. -3

log. tan d. 9.769559^c

Result + 1.1709

Sum logs. 9.894878^c

1st ap + 1.4854

number cov. 0.78502^c

Log mean + $1.3282 = 0.123263$

$\frac{1}{5} m$, 3.07124^c ✓

" 56 $= 1.748188$

Result 3.85626^c ✓

Result $74.38 = 1.871451$

1st " 3.85385^c ✓

+1' 14.38

Mean. 3.85506^c ✓

Log 0.586031^c

" 56 1.748188^c ✓

Sum logs. 2.334219^c

Cov. Pre. 215.88^c

" " $3^m 35.88^c$

Orig. A. R. $5 43 0.68^s$ ✓

(1881 3rd ap) $5^h 46^m 36.56^s$ ✓ Final.

120

5890.

1830

Jan. 3. 1881.

$\log. 1855$ 5 49 9.1 + 29° 36.0 (5)
 $\log. 658$ 5 47 32.73 + 29° 35' 52.1 (8.0)

$\log. \Delta_0 +$ 0.125520 v
 Corr. +6 v

Tab. 24. +1.0894 c

$\log. \text{Van d.}$ 9.754370 v

$\log. +1.0894^c = 0.137187^c$

Sum logs. 9.879896 v

" 51. = 1.707570^c

number cor. 0.75840 v

55.56^c = 1.744757^c

$\frac{1}{15} m.$ 3.07020 v

+ 0' 55.56^c

Result. 3.82860 v

29 35 52.1^c

$\log. "$ 0.583040 c

29 36 47.7^c (1881 1st ap.)

" 51. 1.707570^c

Sum logs. 2.290610 c

Cor. Pr. 195.26 v

3- 15.26 c

5 47 32.73 c

5h 50- 47.99^c (1881 1st ap.)

$\log. \Delta_0 +$ 0.125812 v

Tab. 24. +0.8049 v

Corr. -101 c

Cor. -2 c

$\log. \text{Van d.}$ 9.754643 c

Result +0.8047 v

Sum logs. 9.880354 c

1st ap. +1.0894 v

Cor. 2y. 0.75920 c

Log Mean +0.9470^c = 9.976350^c

$\frac{1}{15} m.$ 3.07124 v

" 51 = 1.707570^c

Result 3.83044 v

Result 48.30^c = 1.683930^c

1st " 3.82860 v

+ 0' 48.30^c

Mean. 3.82952 v

Orig Dec 29 35 52.1^c

$\log. "$ 0.583144 c

29° 36' 40.4^c (1881 3rd ap.)

" 51 1.707570 v

Final.

Sum logs. 2.290714 v

Cor. Pr. 195.31^c = 3m. 15.31^c

Orig. A. R. $5^h 47^m 32.73^s$ ✓
 Cor. P. R. $3 15.31^s$ ✓
 (1881 2nd ap) $5^h 50^m 48.04^s$ ✓ (1881 2nd ap)

Log. A. R.	0.125812^c	Tab. 2y. + 0.8049^c
Corr.	-101^c	Corr. -2
Log. tan. d	9.754607^c	Result + 0.8047
Sum logs.	9.880318^c	1 st ap + 1.0894
number cor	0.75913^c	Log mean + $0.9470 = 9.976350$
to m.	3.07124^c ✓	" 51 $= 1.707570$
Result	3.83037^c ✓	Result $48.30 = 1.683920$
1 st "	3.82860^c ✓	+ $0' 48.30$
Mean.	3.82948^c	
Log	0.583140^c	
" 51	1.707570^c ✓	
Sum logs.	2.290710^c	
Cor P. R.	195.30^c	
" "	$3^m 15.30^c$	
Orig. A. R.	$5 47 32.73^s$ ✓	
(1881 3 rd ap)	$5^h 50^m 48.03^s$ ✓	Final.

122

56 yro.

1825

Jan. 7. 1848.

m. 1855 5 55 5.6 + 28° 18.0 (K)
 H. 1813 (W) 5 53 12.92 + 28° 17' 45.2 (R)

Log. $\Delta_0 +$ 0.125972 v
 Corr. +16 v

Tab. 24. + 0.5936 c

log. tan d. 9.731067 v

log. + 0.5936 = 9.773494 c

Sum logs. 9.857055 v

" 56 = 1.748188 c

number cor. 0.71954 v

33.24" = 1.521682 c

 $\frac{1}{15}$ m. 3.07009 v

+ 0' 33.24 c

Result. 3.78963 v

28 17 45.2 c

log. " 0.578597 c

28 18 18.4 (1850 (1st app.))

" 56. 1.748188 c

Sum logs. 2.326785 c

Cor. Par. 212.22 c

3" 32.22 c

5 53 12.92 v

56 45.14 (1851 (1st app.))

log. $\Delta_0 +$ 0.126118 c

Tab. 24. + 0.2842 v

Corr. -101 v

Cor. -1 v

log. tan. d. 9.731234 c

Result + 0.2841 v

Sum logs. 9.857251 c

1st app. + 0.5936 v

Cor. 24. 0.71986 c

Log Mean + 0.4388 = 9.642267 c

 $\frac{1}{15}$ m. 3.07124 c

" 56 = 1.748188 v

Result. 3.79110 v

Result 24.57" = 1.390455 v

1st app. 3.78963 v

+ 0' 24.57 v

Mean. 3.79036 v

Aug Dec. 28 17 45.2 v

Log " 0.578681 c

28° 18' 9.8" (1851 2nd app.)

" 56 1.748188 v

Final.

Sum logs. 2.326869 v

Cor. Par. 212.26 c = 3" 32.26 c

Orig. A. R. $5^h 53^m 12.92^s$ ✓
 Cor. P. $3 32.26^s$ ✓
 (1881 2nd ap) $5^h 56^m 45.18^s$ ✓ (1881 2nd ap)

Log. Δ. 0.126118^c Tab. 2y. $+0.2841^c$
 Corr. -101^c cor. -1
 Log. stand. 9.731190^c Result $+0.2840$
 Sum logs. 9.857207^c 1st ap $+0.5936$
 number cor. 0.71979^c Log mean $+0.4355 = 9.642267$
 to m. 3.07124^c " 56 $= 1.745155$
 Result 3.79103^c Result $24.57 = 1.390455$
 1st " 3.78963^c $+0' 24.57$
 Mean. 3.79033^c
 Log " 0.578677^c
 " 56 1.745155^c
 Sum logs 2.326865^c
 Cor. P. $212^s.26^c$
 " " $3^m 32^s.26^c$
 Orig. A. R. $5 53 12.92^s$ ✓
 (1881 3rd ap) $5^h 56^m 45.18^s$ ✓ Final.

124

81 yrs.1800

Jan. 8. 1881.

Dm. 1855.

5

57

7.3

+ 27°

56.4

(L)

Lb. 11504

5

53

39.82

+ 27°

56'

8.0

(9)

Log. Δ, +

0.125996 v

Tab. 2y. + 0.5545 c

Less.

+ 69 v

+ 1 c

Log. tan d.

9.724495 v

log. + 0.5546 c = 9.743980 c

Sum logs.

9.850560 v

" 81. = 1.908485 c

number cor.

0.70886 v

44.92° = 1.652465 c

to m.

3.06958 v

+ 0' 44.92°

Result.

3.77844 v

27 56 8.0 c.

log. "

0.577312 c

27 56 52.9° (1880 1st app.)

" 81.

1.908485 c

Sum logs.

2.485797 c

Cor. Par.

306.05 v

5^m 6.05 c

v 53 39.82 c

v 58^m 45.87° (1881 1st app.)

Log. Δ, +

0.126155 c

Tab. 2y. + 0.1081 c

Corr.

- 101 c

Cor.

0 c

Log. tan d.

9.724724 c

Result + 0.1081 v

Sum logs.

9.850778 c

1st app. + 0.5546 c

Cor. 2y.

0.70922 c

Log Mean + 0.3314 v = 9.520353 c

to m

3.07124 v

" 81 = 1.908485 v

Result

3.78046 v

Result 26.84° = 1.428838 v

1st "

3.77844 v

+ 0' 26.84°

Mean

3.77945 v

Orig. Dec 27 56 8.0 v

Log "

0.577428 c

27° 56' 34.8" (1881 2nd app.)

" 81

1.908485 v

Final.

Sum logs.

2.485913 v

Cor. Pre.

306.14 = 5^m 6.14 v

Orig. A.R. $5^h 53^m 39.82^s$ ✓
 Cor. Prc. $+5 6.14^s$ ✓
 (1881 3rd ap) $5^h 58^m 45.96^s$ ✓ (1881 3rd ap)

Log. 4.2 0.126155^c Tab. 2y. $+0.1080^c$
 Cor. -101^c Cor. 0
 Log. tan. 9.724631^c Result $+0.1050$
 Sum logs. 9.850685^c 1st ap $+0.5546$
 number cor 0.70906^c Log. mean $+0.3313 = 9.520221$
 15^m. 3.07124^c " 81 $= 1.908485$
 Result 3.78030^c Result $26.84 = 1.438706$
 1st " 3.77544^c Cor Prc. $+0' 26.84$
 Mean. 3.77937^c 27 56 8.0
 Log. 0.577419^c 27° 56' 34".84
 " 81 1.908485^c
 Sum logs. 2.485904^c
 Cor. Prc. 306.13^c
 Orig. A.R. $5^m 6.13^c$
 Orig. A.R. $5 53 39.82^s$ ✓
 (1881 3rd ap) $5^h 58^m 45.95^s$ ✓ Final.

126

56 yrs.

1825

Jan. 18. 1851.

25. 1825	6	5	51.3	+25°	16.6	(K)
K. • 139	6	4	0.19	25	17	15.0 (9.)

log. Δ_0 0.126096c
 Corr. +16c

log. tan. δ 9.674339c

Sum logs. 9.800451c

number corr. 0.63161c

to in 3.07009c

Result. 3.70170c

log. " 0.568401c

" 56. 1.748188c

Sum logs. 2.316589c

Cor. Pre. 207.30c

3^m 27.30c

6 4 0.19c

6^h 7^m 27.49c (1881 1st ap.)

Tab. 2y. -0.3503c

log. -0.3503 = 9.544440^c

" 56. = 1.748188c

-19.62 = 1.292628m

-0' 19.62c

25 17 15.0c

25 16 55.4 (1881 1st ap.)

log. Δ_0 0.125932c

Corr. -101c

log. tan. δ 9.674232c

Sum logs. 9.800063c

Cor. 2y. 0.63105c

to in 3.07124c

Result 3.70229c

1st " 3.70170c

Mean. 3.70200c

Log " 0.568436c

" 56 1.748188c

Sum logs. 2.316624c

Cor. Pre. 207.31c = 3^m 27.31c

Tab. 2y. -0.6525c

Cor. -2c (from Comm.)

Result -0.6523c

1st ap. -0.3503c

log. Mean -0.5013c = 9.700098c

" 56 = 1.748188c

Result -28.07c = 1.448286c

-0' 28.07c

Aug. Dec. 25 17 15.0c

25° 16' 46.9" (1881 2nd ap.)

Final.

Orig. A.R. $6^h 4^m 0.19^s$ ✓
 Cor. Pw. $+3 \quad 27.31^s$ ✓
 (1851 2nd ap) $6^h 7^m 27.50^s$ ✓ (1851 2nd ap)

log. 4.7 0.125931^c
 Cor. -101^c

Tab. 2y -0.6526^c
 Cor. -2^c

log. tan. 5 9.674185^c

Result -0.6524^c

Sum logs 9.800015^c

1st ap -0.3503^c

number cor 0.63098^c

Log. mean $-0.5014^c = 9.700358^c$

15^m 3.07124^c

" 56 $= 1.748188^c$

Result 3.70222^c

Result $28.09^c = 1.448546^c$

1st " 3.70170^c

Cor Pw. $-0^c 28.09^c$

mean 3.70196^c

Orig. Dec. $25 \quad 17 \quad 15.0$

Log. 0.568432^c

$25^o \quad 16' \quad 46.9$

" 56 1.748188^c

Sum logs 2.316620^c

Cor Pw. 207.31^c

" " $3^m 27.31^c$

Orig. A.R. $6 \quad 4 \quad 0.19^s$ ✓

(1851 3rd ap) $6^h 7^m 27.50^s$ ✓ Final.

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51 yrs.1830

Jan. 20. 1841.

2m. 1855	6	10	24.9	+24°	57.2
----------	---	----	------	------	------

	6	10	56.3	+25	4.2 (7.2) (✓)
S. 712.	6	9	23.24	+25°	4' 34.0 (8)

Log $\Delta_0 t$ 0.125798^v
 Cor. +6^v

log. tan. δ . 9.670177^v

Sum logs. 9.795981^v

number cor. 0.62515^v

$\frac{1}{15}$ m. 3.07020^v

Result 3.69535^v

log. 0.567656^v

" 51 1.707570^v

Sum logs. 2.275236^v

Cor. Pre 188.46^v

" " 3^m 8.46^v

Orig. A. R. 6 9 23.24^v

(1841st ap.) 6^h 12^m 31.70^v

Log $\Delta_0 t$ 0.125512^v

Cor. -101^v

log. tan. δ . 9.669948^v

Sum logs. 9.795359^v

Sum Cor. 0.62425^v

$\frac{1}{15}$ m. 3.07124^v

Result. 3.69549^v

1st ap. 3.69535^v

mean. 3.69542^v

Tab. 24. -0.8213^v

Cor. 0^v

Log -0.8213^v = 9.914502^v

Log. 51 = 1.707570^v

Result -41.89 = 1.622072^v

+ -0 41.89^v

+25° 4' 34.0^v

25° 3' 52.11^v

Tab. 24. -1.0959^v

Cor. -3^v

Result. -1.0956^v

1st ap. -0.8213^v

log. mean. -0.9584^v = 9.951547^v

" 51. = 1.707570^v

Cor. Pre. -48.88^v = 1.689117^v

-0' 48.9^v

Orig. Dec. +25° 4' 34.0^v

1840 2^d ap. 25° 3' 45.1^v

Log. Mean. 0.567663^v

Tab. Zy = -1.0959^v

" 51. 1.707570^v

Sum Log. 2.275233^v

Cor. P.C. 188.47^v = 3^m 8.47^v

Orig. A. R. 6 9 23.24^v

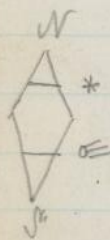
1880. 2^d sp. 6^h 12^m 31.71^v

Final.

Swifts (new) Comet.
May 3. 1881.
Reduction in A. R.

du.

1 Comet			2 Star			3 Diff.	4. Diff. 2
h	m	s	h	m	s		
17	55	48.2	17	52	15.2		
	56	47.4		52	27.5		
	112	35.6		104	42.7	7 ^m 52.9 ^v	3 ^m 56.45 ^v
			17	57	28.8		
<hr/>							
18	1	18.1	17	57	46.3		
	2	17.8		57	57.2		
	3	35.9		115	43.5	7 52.4 ^v	3 ^m 56.20 ^v
	8	55.3	18	5	2.9		
	9	45.7		5	42.6		
	18	41.0		10	45.5	7 55.5 ^v	3 ^m 57.75 ^v
<hr/>							
	14	10.8		10	16.4		
	14	58.3		10	56.5		
	29	9.1		21	12.9	7 56.2 ^v	3 ^m 58.10 ^v
	19	28.2		15	30.7		
	20	13.2		16	11.8		
	39	41.4		31	42.5	7 58.9 ^v	3 ^m 59.45 ^v
	55	48.2	17	52	15.2		+ 3 ^m 57.59 ^v
	56	47.4		52	27.5		+ 0.01
			17	57	28.8		+ 3 57.60 ^v



$$\begin{array}{ccccccc} 5 & 6 & 7 & 8 & 9 & 10 \\ \text{Diff. } \oplus & \text{Diff. } * & (\text{Col. 5} - \text{Col. 6}) & (\text{Col. 5} + \text{Col. 6}) & \left(\frac{15 \cos. \text{dec}}{2} \right) & (\text{Diag.} - \text{Col. 9}) \end{array}$$

$$0^- 59^{\circ}.2 \quad 0^- 12^{\circ}.3 \quad 0^- 46^{\circ}.9 \quad 4' 50^{\circ}.9^{\circ}$$

$$0^- 59^{\circ}.7 \quad 0^- 10^{\circ}.9 \quad 0^- 44^{\circ}.8 \quad 5' 2^{\circ}.7^{\circ}$$

$$0^- 50^{\circ}.4 \quad 0^- 39^{\circ}.7 \quad 1^- 30^{\circ}.7 \quad 5' 30.9^{\circ}$$

$$0^- 47^{\circ}.5 \quad 0^- 40^{\circ}.1 \quad 1^- 27^{\circ}.6 \quad 5' 46^{\circ}.4^{\circ}$$

$$\begin{array}{r} 0^- 45^{\circ}.0 \quad 0^- 41^{\circ}.1 \\ \hline 0 \quad 52.36 \end{array}$$

$$\begin{array}{r} 1^- 26^{\circ}.1 \quad 5' 55^{\circ}.7 \\ \hline 5' 25^{\circ}.3 \\ \hline -2 \\ \hline -5' 25^{\circ}.1 \end{array}$$

$$\begin{array}{r} 0^h 8^m 57^{\circ}.99 \\ + 3 \quad 57.60 \\ \hline 0^h 12^m 55^{\circ}.59 \end{array} \quad \begin{array}{r} + 34^{\circ} 12' 31.4 \\ - 5 \quad 25.1 \\ \hline + 34^{\circ} 7' 6.3 = \text{Pos. of} \end{array}$$

\oplus at $15^h 17^m$ 1° May 3. C. M. J.

May. 3.

$$\text{Log. } 46.9 = 1.671173$$

$$" \quad 7.5 = 0.875061$$

$$" \cos. dec = 9.917504$$

$$290.90 = 2.463738$$

$$145.45 + 34^{\circ} \quad 12' \quad 31.0''$$

$$\begin{array}{r} - 2 \quad 25.4 \\ + 34 \quad 10 \quad 5.6 \end{array}$$

$$\text{Log. } 48.8 = 1.688420$$

$$" \quad 7.5 = 0.875061$$

$$" \cos. dec = 9.917504$$

$$302.68 = 2.480985$$

$$151.34$$

$$+ 34^{\circ} \quad 12' \quad 31.0''$$

$$\begin{array}{r} - 2 \quad 31.3 \\ + 34 \quad 9 \quad 59.7 \end{array}$$

$$\text{Log. } 90.1 = 1.954725$$

$$" \quad 7.5 = 0.875061$$

$$" \cos. dec = 9.917504$$

$$558.84 = 2.747290$$

$$889.8$$

$$330.96$$

$$165.48 + 34^{\circ} \quad 12' \quad 31.0''$$

$$\begin{array}{r} - 2 \quad 45.5 \\ + 34 \quad 9 \quad 45.5 \end{array}$$

$$\text{Log. } 46.9 = 1.671173$$

$$" \quad 7.5 = 0.875061$$

$$" \cos. dec = 9.917711$$

$$291.03 = 2.463945$$

$$- 4' \quad 51.0''$$

$$\text{Log. } 48.8 = 1.688420$$

$$" \quad 7.5 = 0.875061$$

$$" \cos. dec = 9.917719$$

$$302.83 = 2.481200$$

$$- 5' \quad 2.8''$$

$$\text{Log. } 90.1 = 1.954725$$

$$" \quad 7.5 = 0.875061$$

$$" \cos. dec = 9.917740$$

$$559.15 = 2.747526$$

$$889.8$$

$$330.65$$

$$- 5' \quad 30.6''$$

May 3. con.

$$\text{Log. } 87.6 = 1.942504$$

$$" \quad 7.5 = 0.875061$$

$$" \text{ cos. dec} = 9.917504$$

$$543.34 = 2.735069$$

$$889.8$$

$$346.46$$

$$+34^{\circ} \quad 12' \quad 31.0''$$

$$173.23$$

$$\begin{array}{r} -2 \quad 53.2 \\ +34 \quad 9 \quad 37.8 \end{array}$$

$$\text{Log. } 87.6 = 1.942504$$

$$" \quad 7.5 = 0.875061$$

$$" \text{ cos. dec} = 9.917751$$

$$543.65 = 2.735316$$

$$889.8$$

$$346.15$$

$$-5' \quad 46.2''$$

$$\text{Log. } 86.1 = 1.935003$$

$$" \quad 7.5 = 0.875061$$

$$" \text{ cos. dec} = 9.917504$$

$$534.03 = 2.727568$$

$$889.8$$

$$355.77$$

$$+34^{\circ} \quad 12' \quad 31.0''$$

$$177.89$$

$$\begin{array}{r} -2 \quad 57.9 \\ +34 \quad 9 \quad 33.1 \end{array}$$

$$\text{Log. } 86.1 = 1.935003$$

$$" \quad 7.5 = 0.875061$$

$$" \text{ cos. dec} = 9.917751$$

$$534.34 = 2.727822$$

$$889.8$$

$$355.46$$

$$-5' \quad 55.5''$$

$$-4' \quad 51.0''$$

$$-5 \quad 2.8$$

$$-5 \quad 30.6$$

$$-5 \quad 46.2$$

$$-5 \quad 55.5$$

$$-5' \quad 25.2'' = \text{mean}$$

$$\text{Ref. cor.}$$

$$5 \quad 25.0$$

Swift's new Comet.
May 3. 1844.

Comp. star Dm. + 34° # 20

Pos. 1855. 0h 7m 36.7" + 34° 4.5' (K) (7.3 mag.)

W. 208. 0h # 208.

Pos. 1825. 0h 6m 3.81" + 33° 53' 48.0" (Pump)

+ 2" + 18 4
0h 8m 57.5" + 34° 12' 3" "

f. + 2.517°
Log. g. + 1.1214°
" sin. (B+t) + 9.1772°
" lat. d. + 9.8325°
" sum + 0.1311°
" 15 + 1.1761°
" result. + 8.9550°
Ly. + 0.090°
" h + 1.2919°
" sin. (H+t) - 9.8564°
" rec. d. + 0.0826°
" sum - 1.2309°
" 15 + 1.1761°
" result - 0.0548°
Ly. - 1.134°
t' - t + 0.973°

(15.3) (+.01 day.)°

(H+t) 15h 3.7"
(B+t) 0h 34.6"

Ly. g. + 1.1214°
" cos. (B+t) + 9.9950°
" sum + 1.1164°
Ly. + 13.08°
Log. h + 1.2919°
" cos. (H+t) - 9.8424°
" sin. d. + 9.7499°
" sum - 0.8842°
Ly. + 7.66°
" i - 0.7629°
" cos. d. + 9.9174°
" sum - 0.6863°
Ly. - 4.86°
(d' - d) + 0.56°

For red to app. pl. see
Book to p. 6.

May 3. 1881.

Pos. 1881.0	0 ^h 8 ^m 57.02 ^s	+ 34° 12' 30".8
Red. to ap. place.	+ 0.97	+ 0.6
ap. pos. May 3.	0 ^h 8 ^m 57.99 ^s	+ 34° 12' 31".4

Clock comparison for error of 1327, May 4.

Bond 391. May 4.			Prod. 1327.		
3 ^h	3 ^m	0.0	5 ^h	54 ^m	2.3
		15.5			48.1
3	2	44.5	3	3	14.2
		44.2			-30.0
		0.3	3	2	44.2

Cor. + 0.3 for 1327. at May 4. 3^h 3^m

May 7. 10^h 9^m Sid. time cor. = -2.65
 May 2.7 cor. = -0.04

18 ^h	6 ^m	23.5 ^s	2	46	56.09 ^s
					-4.54
2	46	51.5 ^s	2	46	51.55 ^s
15	19	32.0 ^s			
	-2	30.6 ^s			
15 ^h	17 ^m	1.4 ^s	2	30.56 ^s	
				.09	
			2	30.65 ^s	

C. M. J.

May 4, 1881.
Swifts' new Comet.

3 m. + $+33^{\circ} 37'$

Pos. 1855 0^h 16^m 51.9^s

$+33^{\circ} 3.6'$ (9.1) (K.)^v

W. 0^h 428 0^h 15^m 19.27^v

$+32^{\circ} 54.28.4'$ (9.0) mag.

$+2$ 55.17^c

$+18$ 40.6^c

0^h 18^m 14.44^c

$+33^{\circ} 13'$ 4.0^c

Red. to ap. pl.

$+1.02$

$+0.9$

2 p. pos. 1881. mag. 0 18 15.46^c

$+33$ 13' 4.9^c

~~f~~ $+2.025^{\circ}$
~~Log. g.~~ $+1.1233^{\circ}$
~~" sin (g+t)~~ $+9.2707^{\circ}$
~~" tan d~~ $+9.8163^{\circ}$
~~" sum~~ $+0.2103^{\circ}$
~~" 15~~ $+1.1761^{\circ}$
~~" result~~ $+0.0342^{\circ}$
~~Log.~~ $+0.108^{\circ}$
~~" h~~ $+1.2925^{\circ}$
~~" sin (H+B)~~ -9.8641°
~~" sec. d~~ $+0.0776^{\circ}$
~~" sum~~ -11.2342°
~~" 15~~ $+1.1761^{\circ}$
~~" result~~ $+0.0358^{\circ}$
~~Log.~~ -1.117°
~~f' - t~~ $+1.016^{\circ}$

~~Log. g.~~ $+1.1233^{\circ}$
~~" cos. (g+t)~~ $+9.9923^{\circ}$
~~" sum~~ $+1.1156^{\circ}$
~~Log. h~~ $+1.2925^{\circ}$
~~" cos. (H+t)~~ -9.8338°
~~" sin. d~~ $+9.7385^{\circ}$
~~" sum~~ -0.8651°
~~Log.~~ -7.33°
~~" i~~ -0.7616°
~~" cos. d~~ $+9.9224^{\circ}$
~~" sum~~ -0.6840°
~~Log.~~ -4.83°
~~d' - d~~ $+0.89^{\circ}$

~~(g+t) = 0^h 43^m~~
~~(H+t) = 15^h 8^m~~

For red. to ap. pl, see
Book 85. p. 7.

May. 4. 1881.

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$$\text{Log. } 48.68 = 1.687351 \checkmark$$

$$" 7.5 = 0.875061 \checkmark$$

$$" \cos. \text{dec} = 9.922514 \checkmark$$

$$305.44 = 2.484926 \checkmark$$

$$152.72$$

$$\begin{array}{r} +33^{\circ} \quad 13' \quad 4.3 \checkmark \\ -2 \quad 32.7 \checkmark \\ \hline +33 \quad 10 \quad 31.6 \checkmark \end{array}$$

$$\text{Log. } 48.68 = 1.687351 \checkmark$$

$$" 7.5 = 0.875061 \checkmark$$

$$" \cos. \text{dec} = 9.922725 \checkmark$$

$$305.59 = 2.485137 \checkmark$$

$$51 \quad 5.6 \checkmark$$

$$\begin{array}{r} +33^{\circ} \quad 13' \quad 4.3 \checkmark \\ -5 \quad 5.1 \checkmark \\ \hline +33 \quad 7 \quad 59.2 \checkmark \end{array} \quad \text{ap. pos. } \infty$$

May 4. 1891.
Swift's new Comet.

1. Comet.	2. Star.	3. Diff.	4. $\frac{Diff.}{2}$
34 53.2	37 6.2		
35 49.6	37 17.5		
<hr/> 70 42.8	<hr/> 74 23.7	3 40.9	1 50.45

37 52.3	40 5.5		
38 50.7	40 18.0		
<hr/> 76 43.0	<hr/> 80 23.5	3 40.5	1 50.25

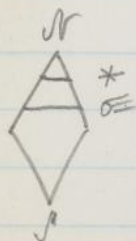
41 0.8	43 14.4		
42 1.6	—		

44 6.6	46 20.1		
45 4.9	46 29.7		
<hr/> 89 11.5	<hr/> 92 49.8	3 38.3	1 49.15

47 9.6	49 23.3		
48 10.8	49 33.5		
<hr/> 95 20.4	<hr/> 98 56.8	3 36.4	1 48.20

50 17.0	52 30.6		
51 19.7	52 41.7		
<hr/>	<hr/>	ref.	

54 13.0	56 27.0		
55 14.3	56 35.6		
<hr/> 109 27.3	<hr/> 113 2.6	5 35.3	1 47.65
		(5) mean - 1	49.14
			+0.03
		-1	49.17



$$\overset{5}{\text{Diff.}} \equiv \overset{6}{\text{Diff.}} \times (\overset{7}{\text{Col. 5 - Col. 6}}) (\overset{8}{\text{Col. 5 + Col. 6}}) (\overset{9}{\frac{\text{Col. 7. 11 con. dec.}}{2}}) (\overset{10}{\text{Diag. - Col. 9}})$$

$$0^- \ 56^{\circ}.4 \ 0^- \ 11^{\circ}.3 \ 45^{\circ}.1 \ 283.1^{\circ}$$

$$0^- \ 58^{\circ}.4 \ 0^- \ 12^{\circ}.5 \ 45^{\circ}.9 \ 288.1^{\circ}$$

$$0^- \ 58^{\circ}.3 \ 0^- \ 9^{\circ}.6 \ 48^{\circ}.7 \ 305.7^{\circ}$$

$$1^- \ 1^{\circ}.2 \ 0^- \ 10^{\circ}.2 \ 51^{\circ}.0 \ 320.1^{\circ}$$

$$\begin{array}{r} 1^- \ 1^{\circ}.3 \ 0^- \ 8^{\circ}.6 \ 52.7^{\circ} \ 330.8^{\circ} \\ \hline 0 \ 59.12^{\circ} \ 48.68^{\circ} \ \text{mean } 305.6^{\circ} \\ \hline \phantom{59.12^{\circ}} \phantom{48.68^{\circ}} \phantom{\text{mean}} -0.5^{\circ} \\ \hline \phantom{59.12^{\circ}} \phantom{48.68^{\circ}} \phantom{\text{mean}} 305.1^{\circ} \end{array}$$

May. 4, 1881.
Swift's new comet.

$$\begin{array}{r}
 17^h \quad 45^m \\
 \underline{\quad \quad 0 \quad 16} \\
 17 \quad 29 \\
 \underline{\quad \quad 24} \\
 H.A. = 6^h \quad 31^m
 \end{array}$$

$$\begin{array}{r}
 + 33^\circ \quad 13' \quad 4''.9 \\
 \underline{\quad \quad \quad 5 \quad 5.6} \\
 + 33^\circ \quad 8' = 33^\circ 13'
 \end{array}$$

$$\begin{array}{lcl}
 \text{Cor. for Ref. in A. P.} & + 0''.03 \\
 \text{" " " " Dec.} & - 0''.5
 \end{array}$$

$$\begin{array}{l}
 \text{Mean of sid. times of obs.} = \\
 17^h \quad 45^m \quad 35.1^s
 \end{array}$$

$$\begin{array}{rcl}
 \text{Pos. Star May. 4.} & 0^h \quad 18^m \quad 15''.46^v & + 33^\circ \quad 13' \quad 4''.9^v \\
 & \underline{\quad \quad -1 \quad 49.14^v} & \underline{\quad \quad -5 \quad 5.1^v} \\
 \text{Pos. } \oplus & 0^h \quad 16^m \quad 26''.29^v & + 33^\circ \quad 14' \quad 59''.8^v \\
 \text{at } 14^h \quad 51^m & 49.5^s \text{ C. M. J.} &
 \end{array}$$

May 4. 1881.
Swift's new comet.

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May 4 Sid. time mean noon = 2 50 52.64
4.54

" " " " Camb. 2 50 48.10

2 20 21.8

23 29 33.7

-3 50.9

23 25 42.8

23^h 26^m 0.0^s

15.5^s

23 25 44.5^s

42.8^s

1.7

17^h 45

11 30

2 20

2 20

8 35

14 50

1 sec. slow.

17^h 45^m 3.7^s

2 50 48.1^s

14 54 15.0^s

+1.0^s

14 54 16.0^s

-2 26.5^s

C. M. J. 14 51 49.5^s

2 50 52.64^s

4.54^s

2 50 48.10^s

~~2 26.46~~

~~.13~~

~~2 26.59~~

2 26.46^s

.04^s

2 26.50^s

Nov. 3. 1880.

f
 Log. g.
 " sin. (3+t)
 " tan. δ
 " sum
 " 15
 " result.
 2y.
 " h
 " sin. (H+t)
 " sec. δ
 " sum
 " 15
 " result
 2y
 (t' - t)

Log. g.
 Log. cos. (3+t)
 " sum
 2y
 " h
 " cos. (H+t)
 " sin. δ
 " sum
 2y
 " i
 " cos. δ
 " sum
 2y
 (t' - t)

Nov. 8. 1880.

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f	$\log. g.$
" $\sin. (g+t)$	" $\cos. (g+t)$
" $\tan. \delta$	" $\sec.$
" \sum	" \sum
" $15.$	" h
" result	" $\cos. (H+t)$
" \sum	" $\sin. \delta$
" h	" $\sec.$
" $\sin. (H+t)$	" \sum
" $\sec. \delta$	" i
" \sum	" $\cos. \delta$
" 15	" $\sec.$
" result	" \sum
" \sum	" $(\delta' - \delta)$
" $\delta' - \delta$	

Nov. 9. 1880.

A. R.

Dec.

Obs. pl. 1880.0 $22^h 58^m 47.49^s$
 Red. to app. pl. $+ 3.97^s$
 True pos. \times $22^h 58^m 51.46^s$
 $\oplus - \times$ $+ 1.372^s$
 Pos. \oplus $22^h 59^m 55.1^s$

$44^\circ 50' 5.8''$
 $+ 39.3''$
 $44^\circ 50' 48.1''$
 $- 352.0''$
 $44^\circ 46' 56.1''$

f $+ 3.613^s$
 Log. g 1.3722^s
 " sin. $(g+t)$ 9.4158^-
 " tan. δ 9.9975^+
 " sum 0.7855^-
 " 15 1.1761^+
 " result 9.6094^-
 2y -0.407
 " h 1.2947^+
 " sin. $(H+t)$ 9.6122^+
 " sec. δ 0.1493^+
 " sum 1.0562^+
 " 15 1.1761^+
 " result 9.8801^+
 2y $+0.759$
 $(t' - t)$ $+ 3.965^s$

$(g+t) = 22^h 59^m 6^s$
 $(H+t) = 1^h 36^m 4^s$

-16 day.

 $\delta = 44^\circ 44'$

Log. g 1.3722^s
 " cos. $(g+t)$ 9.9547^+
 " sum 1.3569^+
 2y $+ 22.75$
 " h 1.2947^+
 " cos. $(H+t)$ 9.9601^+
 " sin. δ 9.5482^+
 " sum 1.1030^+
 2y $+ 12.6^s$
 " i 0.7355^+
 " cos. δ 9.8507^+
 " sum 0.5862^+
 2y $+ 3.86$
 $\delta' - \delta$ $+ 39.29$

log. 43.6 = 1.639486

log. $\frac{15 \cos. dec}{2} = 0.72570^s$ 231.8^s 2.36519^s $115.9^s = -1' 55.9''$ $44^\circ 50' 48.1''$ $44^\circ 48' 52.3''$

log. 43.6 = 1.639486
 " $\frac{15 \cos. dec}{2}$ = 0.725947

 $232.0^s = 2.365433^s$

11420

Nov. 11. 1880.

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A. R.

Dec.

Mean pl. 1880.0	23 ^h 17 ^m 16.81 ^s	46° 57' 28.9"
Red. to app. pl.	+ 4.20 ^s	+ 39.8"
True pos. *	23 ^h 17 ^m 21.01 ^s	46° 58' 8.7"
⊖ - *	+ 0 24.58 ^s	+ 10 34.1"
Pos. ⊖	23 17 45.59 ^s	47° 8' 42.8"

f	+ 3.631	log. g	1.3744+
log. g	1.3744+	" cos. (G+H)	9.9929+
" sin. (G+H)	9.2544-	" sum	1.3673+
" tan. δ	0.0297+	2y	+ 23.30
" sum	0.6585-	" h	1.2960+
" 15	1.1761+	" cos. (H+I)	9.9508+
" result	9.4824	" sin. δ	9.8638+
2y	- 0.304	" sum	1.1106+
" h	1.2960+	2y	+ 12.90
" sin. (H+I)	9.6533+	" i	0.7172+
" sec. δ	0.1659+	" cos. δ	9.8341+
" sum	1.1152+	" sum	0.5513+
" 15	1.1761+	2y	+ 3.56
" result	9.9391+	$\delta' - \delta$	+ 39.76
2y	+ 0.869		
$\delta' = \delta$	+ 4.196		

$$\log. 50.04 = 1.699317$$

$$\log. \frac{15 \cos. \delta}{2} = 0.709096$$

$$256.1 = 2.408413$$

$$889.8$$

$$633.7$$

$$316.8$$

$$+ 5' 16.8''$$

$$46^\circ 58' 8.7''$$

$$47^\circ 3' 25.5''$$

$$\log. 50.04 = 1.699317$$

$$\log. \frac{15 \cos. \delta}{2} = 0.708380$$

$$255.7 = 2.407697$$

$$889.8$$

$$634.1 = + 10' 34.1''$$

$$(G+H) = 23^h 18.6^m$$

$$(H+I) = 1^h 47.0^m$$

$$-0.8 \text{ day.}$$

Nov. 18. 1840.

A. R.

Dec.

Mean. pl. 1840.0 $0^h 35^m 16^s.18^v$
 Red. to app. pl. $+ 5.47^v$
 True pos. * $0^h 35^m 21^s.65^v$
 $\odot - *$ $+ 1 27.38^c$
 Pos. \odot $0 36 49.03^c$

$53^\circ 18' 0''.6^v$
 $+ 38.8^v$
 $53^\circ 18' 39''.4^v$
 $+ 1 47.2^v$
 $53 20 26.6^v$

f $+ 3.695^c$
 $\log. g$ $1.3821+$
 $" \sin. (g+t)$ $9.2221+$
 $" \tan. \delta$ $0.1276+$
 $" \sin$ $0.7318+$
 $" 15$ $1.1761+$
 $" \text{result}$ $9.5557+$
 $2y$ $+ 0.359$
 $" h$ $1.3002+$
 $" \sin. (H+t)$ $9.8033+$
 $" \sec. \delta$ $0.2236+$
 $" \sin$ $1.3271+$
 $" 15$ $1.1761+$
 $" \text{result}$ $0.1510+$
 $2y$ $+ 1.416$
 $t' - t$ $+ 5.470^c$

$\log. g.$ $1.3821+$
 $" \cos. (g+t)$ $9.9939+$
 $" \sin$ $1.3760+$
 $2y$ $+ 23.77$
 $" h$ $1.3002+$
 $" \cos. (H+t)$ $9.8876+$
 $" \sin. \delta$ $9.9041+$
 $" \sin$ $1.0919+$
 $2y$ $+ 12.36$
 $" i$ $0.6453+$
 $" \cos. \delta$ $9.7764+$
 $" \sin$ $0.4217+$
 $2y$ $+ 2.64$
 $\delta' - \delta$ $+ 38.77$

$\log. 23.92 = 1.378761^c$
 $\log. \left(\frac{15 \cos. dec}{2} \right) = 0.65138^c$
 $107.2^c = 2.03014^c$
 $53.6^c =$

$(g+t) = 0^h 38.4^c$
 $(H+t) = 2^h 37.9^c$

$+ 53.6^c$
 $53^\circ 18' 39''.4^c$
 $53^\circ 19' 33''.0^c$

$\log. 23.92 = 1.378761^c$
 $" \frac{15 \cos. dec}{2} = 0.651227^c$
 $107.2^c = 2.029988^c$

$- .19 \text{ day.}^c$

Nov. 21. 1840.

A. R.

Dec.

mean pl. 1840.0	1 ^h 21 ^m 21.66 ^s	54° 39' 25.6"
Red. to app. pl.	+ 6.27 ^s	+ 35.9"
True pos. *	1 ^h 21 ^m 27.93 ^s	54° 40' 1.5"
≡ - *	- 1 55.91	- 22.5"
Pos. ≡	1 19 32.02 ^s	54 39 39.0"

f	+ 3.725 ^c	Log. g.	1.3855 ⁺
Log. g	1.3855 ⁺	" cos. (g+t)	9.9693 ⁺
" sin. (g+t)	9.5602 ⁺	" sum	1.3546 ⁺
" Lat. d	0.1493 ⁺	2y	+ 22.64
" sum	1.0950 ⁺	" h	1.3019 ⁺
" 15	1.1761 ⁺	" cos. (H+t)	9.8249 ⁺
" result	9.9189 ⁺	" sin. d	9.9115 ⁺
2y	+ 0.830 ^c	" sum	1.0383 ⁺
" h	1.3019 ⁺	2y	+ 10.92
" sin. (H+t)	9.8716 ⁺	" i	0.6072 ⁺
" rec. d	0.2377 ⁺	" cos. d	9.7623 ⁺
" sum	1.4117 ⁺	" sum	0.3695 ⁺
" 15	1.1761 ⁺	2y	+ 2.34
" result	0.2356 ⁺	d' - d	+ 3.590
2y	+ 1.1718 ^c		
d' - t	+ 6.273 ^c		

$$\log. 5.18^{\circ} = 0.714330^{\circ}$$

$$\log. \left(\frac{15 \cos. d \sin. t}{2} \right) = 0.637234$$

$$22.5^{\circ} = 1.351564$$

$$11.2^{\circ}$$

$$- 11.2^{\circ}$$

$$(g+t) \quad 1^h 25.2^m$$

$$(H+t) \quad 3^h 12.3^m$$

$$54 \quad 40 \quad 1.5$$

$$54^{\circ} 39' 50.3''$$

$$\log. 5.18^{\circ} = 0.714330^{\circ}$$

$$\log. \left(\frac{15 \cos. d \sin. t}{2} \right) = 0.637267^{\circ}$$

$$22.5^{\circ} = 1.351599$$

- 16 day.

Nov. 22. 1880.

147

A. R.

Dec.

Mean pl. 1880.0	1 ^h 35 ^m 56. ^s 60 ^v	55° 0' 20".5 ^v
Red. to app. pl.	+6.52 ^v	+34.8 ^v
True pos. *	1 ^h 36 ^m 3. ^s 12 ^v	55° 0' 58".3 ^v
$\Delta - *$	- 0 1.05 ^v	- 9 29.3 ^v
Pos. Δ	1 ^h 36 2.07 ^v	54° 51' 29".0 ^v

f	+3.735 ^v	Log g.	1.3868 ^v
Log g.	1.3868 ^v	" cos. (y+t)	9.9574 ^v
" sin(y+t)	9.6255 ^v	" sum	1.3442 ^v
" tan d.	0.1549 ^v	2y.	+22.09 ^v
" sum.	1.1672 ^v	" h	1.3025 ^v
" 15	1.1761 ^v	" cos. (H+t)	9.5019 ^v
" result	9.9911 ^v	" sin d	9.9134 ^v
2y.	+0.980 ^v	" sum	1.0178 ^v
" h	1.3025 ^v	2y.	+10.42 ^v
" sin(H+t)	9.5885 ^v	" i	0.5926 ^v
" sec. d	0.2415 ^v	" cos. d	9.7585 ^v
" sum	1.4325 ^v	" sum	0.3511 ^v
" 15	1.1761 ^v	2y.	+2.24 ^v
" result	0.2564 ^v	$\delta' - \delta$	+34.75 ^v
2y.	+1.805 ^v		
$\delta' - \delta$	+6.520 ^v		

$$\log. 74.35^v = 1.871456^v$$

$$\log. \frac{15 \cos. dec.}{2} = 0.633497^v$$

$$319.8^v = 2.504933^v$$

$$\frac{889.8^v}{570.0^v} = -4 \quad 45.0^v$$

$$\frac{285.0^v}{55 \quad 0 \quad 56.3^v}$$

$$54^\circ 56' 13.3^v$$

$$(y+t) \quad 1^h 39.9^v$$

$$(H+t) \quad 3^h 22.7^v$$

$$-.09 \text{ day}^v$$

$$\log. 74.35^v = 1.871456^v$$

$$\log. \frac{15 \cos. dec.}{2} = 0.634333^v$$

$$320.5^v = 2.505789^v$$

$$\frac{889.8^v}{569.3^v} = -9' 29.3^v$$

148

Nov. 23. 1850.

a. R.

Dec.

Mean pl. 1850.0 $1^h 47^m 49.00^s$
 Red. to app. pl. $+6.70^s$
 True pos. * $1^h 47^m 55.70^s$
 $\oplus - \times$ $+1 7.31^s$
 Pos. \oplus $1 49 3.01^s$

$54^\circ 59' 20.8''$
 $+33.7''$
 $54^\circ 59' 54.5''$
 $-5 3.3''$
 $54^\circ 54' 51.2''$

$f.$ $+3.746$ c
 $\text{Log. } g$ $1.3880+$ c
 $" \sin (g+t)$ $9.6720+$ c
 $" \tan \delta.$ $0.1546+$ v
 $" \text{ sum.}$ $1.2146+$ v
 $" 15$ $1.1761+$ v
 $" \text{ result}$ $0.0385+$ v
 Ly. $+1.093$ c
 $" h$ $1.3029+$ c
 $" \sin (H+t)$ $9.9008+$ c
 $" \text{ sec. } \delta$ $0.2413+$ v
 $" \text{ sum}$ $1.4450+$ v
 $" 15$ $1.1761+$ v
 $" \text{ result.}$ $0.2689+$ v
 Ly. $+1.857$ c
 $\delta - \delta$ $+6.696$ v

$\text{Log } g$ $1.3880+$ c
 $" \cos. (g+t)$ $9.9458+$ c
 $" \text{ sum}$ $1.3338+$ v
 Ly. $+21.57$ v
 $" h$ $1.3029+$ c
 $" \cos. (H+t)$ $9.7822+$ c
 $" \sin \delta$ $9.9133+$ v
 $" \text{ sum}$ $0.9984+$ v
 Ly. $+9.96$ v
 $" i$ $0.5788+$ c
 $" \cos. \delta$ $9.7587+$ v
 $" \text{ sum}$ $0.3375+$ v
 Ly. $+2.18$ v
 $\delta' - \delta$ $+33.71$ v

$\text{Log } 136.18 = 2.134113^v$
 $\text{log } 15 \text{ sec. dec.} = 0.633669^v$
 $\frac{585.8^v}{589.8^v}$
 $\frac{304.0^v}{152.0^v} =$
 2.767782^v

$(g+t)$ $1^h 52.1$ c
 $(H+t)$ $3^h 30.9$ c

-12. day

$54 59 54.5^v$
 $54 57 22.5^v$
 $\text{Log } 136.18 = 2.134113^v$
 $" 15 \text{ sec. dec.} = 0.634125^v$
 $\frac{586.5^v}{589.8^v}$
 $\frac{303.3^v}{-5' 3.3''}$

Nov. 26. 1880.

149

A. R.

Dec.

Mean pl. 1880.0 $2^h 31^m 45^s.96^v$ $54^{\circ} 28' 55.3^v$ Red. to app. pl. $+7.25^v$ $+29.1^v$ True pos. * $2^h 31^m 53^s.21^v$ $54^{\circ} 29' 24.4^v$ $\alpha - *$ $+0 34.24^v$ $-8 30.3^v$ Pos. \equiv $2 32 27.45^v$ $54 20 54.1^v$ f. $+3.777^v$

Log g.

 $1.3916+$ Log. g. $1.3916+$

" cos.(G+t)

 $9.8894+$ " sin.(G+t) $9.8005+$

" sum

 $1.2810+$ " tan. δ . $0.1464+$

Ly.

 $+19.10$ " sum. $1.3385+$

" h

 $1.3046+$ " 15 $1.1761+$

" cos.(H+t)

 $9.6893+$ " result $0.1624+$ " sin. δ . $9.9106+$ Ly. $+1.453$

" sum

 $0.9045+$ " h. $1.3046+$

Ly.

 $+5.03$ " sin.(H+t) $9.9407+$

" i

 $0.5304+$ " sec. δ . $0.2359+$ " cos. δ . $9.7641+$ " sum $1.4812+$

" sum

 $0.2945+$ " 15 $1.1761+$

Ly.

 $+1.97$ " result $0.3050+$ $\delta' - \delta$. $+29.10$ Ly. $+2.019$ $t' - t$ $+7.249$ log. $86.96^v = 1.939320^v$ log. $\frac{15 \cos. \delta}{2} = 0.639120^v$ $378.2^v = 2.578440^v$ $\frac{889.8^v}{511.0^v} = -4 15.5^v$ 255.5^v $54^{\circ} 25' 18.9^v$ (G+t) $2^h 36.7^v$ (H+t) $4^h 2.9^v$

-02. day.

log. $86.96^v = 1.939320^v$ " $\frac{15 \cos. \delta}{2} = 0.639873^v$ $379.5^v = 2.579193^v$ $\frac{889.8^v}{510.3^v} = -8' 30.3^v$

150

Nov. 27. 1860.

L. Star obs. Apr. 30. 1861.

Wong.

Example. 1861.0 =	2 ^h 50 ^m 11.41 ^s	53° 48'	27.4 ^a
Red. to app. pl.	+ 0.68 ^v		-4.8 ^v
True pos. *	2 ^h 50 ^m 12.09 ^v	53° 48'	22.6 ^v
	-3 47.04 ^v	+8	13.0 ^v
Pos. * (W)	2 ^h 46 ^m 25.05 ^v	53° 56'	35.6 ^v

f	+1.992	Log g.	1.1158+
Log. g	1.1158+	" cos (L+d)	9.8198+
+ sin (L+d)	9.8756+	" sum	0.9356+
" tan d	0.1359+	Ly.	+8.620
" sum.	1.1271+	" h	1.2899+
" 15	1.1761+	" cos (H+d)	8.1312 w
" result	9.9510+	" sin d	9.9069+
Ly.	+0.893 ^v	" sum	9.3280 w
" h	1.2899+	Ly.	+10.21
" sin (H+d)	10.0000 w	" i	0.7895 w
" sec. d.	0.2288+	" cos. d.	9.7712+
" sum.	1.5187 w	" sum	0.5607 w
" 15	1.1761+	Ly.	-3.647
" result.	0.3426 w	d' - d.	-14.77
Ly.	-2.2081		
d' - d	+0.684 ^v		

For final pos. = see
page 190.

$$\log. 89.73' = 1.952938^v$$

$$\log. \left(\frac{15 \cos. dec.}{2} \right) = 0.646293^v$$

$$\begin{array}{r} 397.4^v \\ 889.8^v \\ \hline 492.4^v \\ 246.2^v \end{array}$$

$$2.599231^v$$

$$+ 4 \quad 6.2^v$$

$$\begin{array}{r} 53 \quad 48 \quad 22.6^v \\ 53^\circ 52' 28.8^v \end{array}$$

$$\begin{array}{l} (L+d) = 3^h 14.7^v \\ (H+d) = 17^h 56.9^v \end{array}$$

$$\log. 89.73' = 1.952938^v$$

$$\log. \frac{15 \cos. dec.}{2} = 0.645584^v$$

$$396.8^v = 2.598522$$

$$\begin{array}{r} 889.8^v \\ 493.0^v \end{array}$$

$$\begin{array}{r} + 8 \quad 13.0^v \\ 53^\circ 48' 22.6^v \\ 53^\circ 56' 35.6^v \end{array}$$

+ .10 day^v

Nov. 29, 1880.
~~S. Star obs. May 2, 1881.~~

Mean pl. 1881.0 = $3^h 7^m 39.53^s$ + $53^\circ 0' 31.3''$
 Red. to app. pl. +0.77" +4.7"
 True pos. * $3^h 7^m 39.30^s$ $53^\circ 0' 36.0''$
 +1 4.12" -5 17.6"
 Pos. * (U) $3^h 8^m 43.42^s$ $52^\circ 55' 18.4''$

f.	+2.008	Log. g.	1.1193+
Log g.	1.1193+	" cos. (l+t)	9.7774+
" sin. (l+t)	9.9027+	" sum.	0.8967+
" tan. δ .	0.1230+	Ly.	+7.88
" sum.	1.1450+	" h.	1.2911+
" 15	1.1761+	" cos. (H+t)	8.4593+
" result	9.9689+	" sin. δ .	9.9024+
Ly.	+0.931	" sum.	9.6528+
" h.	1.2911+	Ly.	+0.45
" sin. (H+t)	9.9998-	" δ .	0.7766-
" sec. δ .	0.2206+	" cos. δ .	9.7794+
" sum.	1.5115w	" sum.	0.5560 m.
" 15	1.1761+	Ly.	= 3.60
" result	0.3354w	$\delta' - \delta$	+4.73
Ly.	-2.165		
$\delta' - \delta$	+0.774		

For final pos. =

see page 190.

log. $70.30^\circ = 1.846955^v$
 log. $\frac{15 \cos. \delta}{2} = 0.654423^v$
 317.2^v 2.501378
 158.6 $-2' 38.6''$
 $53 0 36.0''$
 $52^\circ 57' 57.4''$
 log. $70.30^\circ = 1.846955^c$
 " $\frac{15 \cos. \delta}{2} = 0.654866^c$
 $317.6^c = 2.501821^c$
 $-5' 17.6''$
 $53 0 36.0''$
 $52^\circ 55' 18.4''$

(l+t) = $3^h 32.8^m$

(H+t) = $18^h 56.6^m$

-14 day.

Dec. 2. 1850.

a. R.

Dec.

mean pl. 1850.0 $3^h 44^m 4.16^s$
 Red. to app. pl. $+ 7.60^s$
 True pos. \times $3^h 44^m 11.76^s$
 $\epsilon - \star$ $-1 12.91^s$
 Pos. ϵ $3 42 58.85^s$

$50^\circ 41' 20.4''$
 $+ 19.7''$
 $50^\circ 41' 40.1''$
 $+ 3 9.3''$
 $50 44 49.4''$

f $+3.841^c$
 $\log g$ $1.3990+$
 $\sin(\theta + \delta)$ $9.9261+$
 $\tan \delta$ $0.0868+$
 \sum $1.4119+$
 15 $1.1761+$
 result $0.2358+$
 \sum $+1.721^c$
 h $1.3071+$
 $\sin(H + \delta)$ $9.9807+$
 $\sec. \delta$ $0.1982+$
 \sum $1.4860+$
 15 $1.1761+$
 result $0.3099+$
 \sum $+2.041^c$
 $\delta - \delta$ $+7.603^s$

$\log g$ $1.3990+$
 $\cos(\theta + \delta)$ $9.7299+$
 \sum $1.1289+$
 \sum $+13.46^c$
 h $1.3071+$
 $\cos(H + \delta)$ $9.4653+$
 $\sin \delta$ $9.8886+$
 \sum $0.6610+$
 \sum $+4.58^c$
 i $0.4106+$
 $\cos. \delta$ $9.8018+$
 \sum $0.2124+$
 \sum $+1.63^c$
 $\delta' - \delta$ $+19.67^s$

$$\log. 39.86 = 1.600537^c$$

$$\log \left(\frac{15 \cos. dec.}{2} \right) = 0.676775^c$$

$$189.4^c = 2.277312^c$$

$$94.7^c = +1' 34.7^c$$

$$\begin{array}{r} 50 \quad 41 \quad 40.1 \\ 50 \quad 43 \quad 14.8 \end{array}$$

$$(G + \delta) \quad 3^h 50.1^m$$

$$(H + \delta) \quad 4^h 52.1^m$$

$$+0.8 \text{ day}^c$$

$$\log. 39.86 = 1.600537^c$$

$$\log \left(\frac{15 \cos. dec.}{2} \right) = 0.676534^c$$

$$189.3^c = 2.277071^c$$

Dec. 3. 1880.

153

A. R.

Dec.

Mean pl. 1880.0 $3^h 52^m 53.70^s$ $50^\circ 17' 58.8''$ Red. to app. pl. $+7.63^s$ $+18.4''$ True pos. * $3^h 53^m 1.33^s$ $50^\circ 18' 17.2''$ $\equiv - *$ $-2 13.07^s$ $-11 54.2''$ Pos. \equiv $3 50 48.26^s$ $50 16 23.0''$

f.	$+3.850^s$	Log. g.	$1.4000+$	
Log. g.	$1.4000+$	" cos(H+t)	$9.7019+$	
" sin(H+t)	$9.9365+$	" sum	$1.1019+$	
" tan d.	$0.0808+$	Ly.	$+12.64$	
" sum	$1.4173+$	" h	$1.3075+$	
" 15.	$1.1761+$	" cos(H+t)	$9.4289+$	
" result	$0.2412+$	" sin d.	$9.8861+$	
Ly.	$+1.743$	" sum	$0.6225+$	
" h	$1.3075+$	Ly.	$+4.19$	
" sin(H+t)	$9.9838+$	" i	$0.3910+$	
" sec d.	$0.1947+$	" cos. d.	$9.8053+$	
" sum	$1.4860+$	" sum	$0.1963+$	
" 15	$1.1761+$	Ly.	$+1.57$	
" result	$0.3099+$	$\delta' - \delta.$	$+18.40$	
Ly.	$+2.041$			
$K - t$	$+7.634$			
		log. $36.58^s =$	1.563244^s	
		log. $\frac{15 \cos. d.}{2}$	0.680360	
		$175.2^s =$	2.243604	
		889.8^s	$-5'$	$57.3''$
		714.6^s	50	$17.2''$
		357.3^s	$50^\circ 12'$	$19.9''$
(Y+t)	$3^h 59.1^m$			
(H+t)	$4^h 57.7^m$	log. $36.58^s =$	1.563244^s	
-.09 day		" $\frac{15 \cos. d.}{2} =$	0.681265^s	
		$175.6^s =$	2.244509^s	
		889.8^s		
		$714.2^s =$	$-11 54.2''$	

Dec. 4. 1880.

A. R.

Dec.

mean pl. 1880.0 $3^h 59^m 32.55^s$
 Red. to app. pl. $+7.61^s$
 True pos. \times $3^h 59^m 40.16^s$
 $\ominus - \times$ $-0 41.18^s$
 Pos. \ominus $3^h 58^m 58.98^s$

$49^\circ 33' 51.8''$
 $+17.5''$
 $49^\circ 34' 9.3''$
 $-12 23.0$
 $49^\circ 21' 46.3''$

f $+3.860$
 $\log. g.$ $1.4012+$
 $\sin. (H+t)$ $9.9438+$
 $\cos. S$ $0.0695+$
 \sin $1.4145+$
 15 $1.1761+$
 result $0.2384+$
 Σ $+1.731$
 h $1.3077+$
 $\sin. (H+t)$ $9.9854+$
 $\sec. S$ $0.1880+$
 \sin $1.4811+$
 15 $1.1761+$
 result $0.3050+$
 Σ $+2.018$
 $L' - L$ $+7.609$

$\log. g$ $1.4012+$
 $\cos. (H+t)$ $9.6790+$
 \sin $1.0802+$
 Σ $+12.03$
 h $1.3077+$
 $\cos. (H+t)$ $9.4066+$
 $\sin. S$ $9.8815+$
 \sin $0.5958+$
 Σ $+3.94$
 i $0.3679+$
 $\cos. S$ $9.8120+$
 \sin $0.1799+$
 Σ $+1.51$
 $S' - S$ $+17.48$

$\log. 30.12 = 1.478855$
 $\log \frac{15 \cos. dec}{2} = 0.686990$
 $146.5 = 2.165845$
 $\frac{889.8}{743.3} =$
 371.6

$-6' 11.6''$
 $49 32 9.3$
 $49^\circ 27' 57.7''$

$(G+D)$ $4^h 5.9$
 $(H+D)$ $5^h 0.9$
 -17 days

$\log. 30.12 = 1.478855$
 $\log \frac{15 \cos. dec}{2} = 0.687908$
 $146.8 = 2.166763$
 $\frac{889.8}{743.0} =$
 $743.0 = -12 23.0$

Dec. 7. 1840.

155

A. R.

Dec.

Mean pl. 1840.0 $4^h 19^m 14.32^s$ $46^{\circ} 39' 46.2''$ Red. to app. pl. $+7.46^s$ $+14.7''$ True pos. \star , $4^h 19^m 21.78^s$ $46^{\circ} 40' 0.9''$ $\Delta = \star$ $+2 49.90^s$ $+10 17.8''$ Pos. Ξ $4 22 11.68^s$ $46 50 18.7''$ $f = +3.890^s$

Log. g.

 $1.4048+$ Log. g $1.4048+$

" cos. (G+H)

 $9.6007+$ " sin. (G+H) $9.9624+$

" sum

 $1.0055+$ " tan. δ $0.0252+$

2y

 $+10.13$ " sum $1.3924+$

" h

 $1.3087+$ " 15 $1.1761+$ " cos. (H+ δ) $9.3430+$ " result $0.2163+$ " sin. δ $9.8617+$ 2y $+1.646$

" sum

 $0.5134+$ " h $1.3087+$

2y

 $+3.26$ " sin. (H+ δ) $9.9892+$

" c

 $0.2812+$ " sec. δ $0.1635+$ " cos. δ $9.8365+$ " sum $1.4614+$

" sum

 $0.1177+$ " 15 $1.1761+$

2y

 $+1.31$ " result $0.2853+$ $\delta' - \delta$ $+14.70$ 2y $+1.929$ $\delta' - \delta$ $+7.465^s$ log. $52.94^s = 1.723784^s$ log $\frac{15 \cos. \delta}{2} = 0.711536$ $272.5^s = 2.435320$ $\frac{889.8^s}{617.3^s} = 1.4400$ $\frac{308.6^s}{617.3^s} = 0.4999$ $\frac{308.6^s}{617.3^s} = 0.4999$ $\frac{308.6^s}{617.3^s} = 0.4999$ $\frac{308.6^s}{617.3^s} = 0.4999$ $\frac{308.6^s}{617.3^s} = 0.4999$ $\frac{308.6^s}{617.3^s} = 0.4999$ (G+H) $4^h 26.0^m$ log. $52.94^s = 1.723784^s$ (H+ δ) $5^h 9.1^m$ log $\frac{15 \cos. \delta}{2} = 0.710846$

-14 day.

 $272.0^s = 2.434630$ $\frac{889.8^s}{617.8^s} = 1.4400$ $\frac{308.6^s}{617.8^s} = 0.4999$

Dec. 11. 1840.

a. R.

Dec.

mean pl. 1840.0 $4^h 46^m 41.82^s$
 Red. to app. pl. $+7.32^s$
 True pos. * $4^h 46^m 49.14^s$
 $\ominus - *$ $+0 37.75^s$
 Pos. \ominus $4^h 47^m 26.89^s$

$43^\circ 13' 9.4''$
 $+10.6''$
 $43^\circ 13' 20.0''$
 $+1 54.5''$
 $43 15 14.5''$

f	$+3.937$	\checkmark	Log. g	$1.4098+$	\checkmark
Log g .	$1.4098+$	\checkmark	" cos. $(g+t)$	$9.4533+$	\checkmark
" sin $(g+t)$	$9.9817+$	\checkmark	" sum.	$0.8631+$	\checkmark
" tan δ .	$9.9730+$	\checkmark	Ly.	$+7.30$	\checkmark
" sum	$1.3645+$	\checkmark	" h	$1.3097+$	\checkmark
" 15	$1.1761+$	\checkmark	" cos $(H+t)$	$9.2210+$	\checkmark
" result	$0.1884+$	\checkmark	" sin δ	$9.8356+$	\checkmark
Ly.	$+1.543$	\checkmark	" sum	$0.3663+$	\checkmark
" h	$1.3097+$	\checkmark	Ly.	$+2.32$	\checkmark
" sin $(H+t)$	$9.9939+$	\checkmark	" δ	$0.1287+$	\checkmark
" sec δ	$0.1374+$	\checkmark	" cos. δ	$9.8626+$	\checkmark
" sum	$1.4410+$	\checkmark	" sum	$9.9913+$	\checkmark
" 15	$1.1761+$	\checkmark	Ly.	$+0.98$	\checkmark
" result	$0.2649+$	\checkmark	$\delta - \delta$	$+10.60$	\checkmark
Ly.	$+1.840$	\checkmark			
$\delta - \delta$	$+7.320$	\checkmark			

$$\log. 20.95 = 1.321184$$

$$\log. \left(\frac{15 \text{ sec dec}}{2} \right) = 0.737612$$

$$114.5 = 2.058796$$

$$57.2 =$$

$$+ 57.2$$

$$43 13 20.0$$

$$43^\circ 14' 17.2''$$

$$(g+t) \quad 4^h 54.0 \quad \checkmark$$

$$(H+t) \quad 5^h 21.7 \quad \checkmark$$

$$+15 \text{ day.} \quad \checkmark$$

$$\log. 20.95 = 1.321184$$

$$\log. \left(\frac{15 \text{ sec dec}}{2} \right) = 0.737499$$

$$114.5 = 2.058683$$

Dec. 19. 1880.

157

a. R.

Dec.

Mean pl. 1st 0.0 $5^h 16^m 24.32^s$ $37^\circ 32' 55.3''$ Red. to app. pl. $+7.05^s$ $+6.3''$ True pos. * $5^h 16^m 31.37^s$ $37^\circ 33' 1.6''$ $\oplus - *$ $+1 3.66^s$ $+1 19.7''$ Po. \oplus $5 17 35.03^s$ $37 34 21.3''$ f $+4.026^c$ Log g. 1.4196^+ Log. g. 1.4196^+ " $\cos(\theta+t)$ 9.1895^+ " $\sin(\theta+t)$ 9.9947^+ " \sin 0.6091^+ " $\tan \delta$ 9.8857^+ Ly. $+4.07$ " \sin 1.3000^+ " h 1.3106^+ " 15 1.1761^+ " $\cos(\theta+t)$ 9.2198^+ " $\sec \delta$ 0.1239^+ " $\sin \delta$ 9.7849^+ Ly. $+1.330$ " \sin 0.3153^+ " h 1.3106^+ Ly. $+2.07$ " $\sin(\theta+t)$ 9.9939^+ " i 9.2904^+ " $\sec \delta$ 0.1008^+ " $\cos. \delta$ 9.8992^+ " \sin 1.4053^+ " \sin 9.1896^+ " 15 1.1761^+ Ly. $+0.16$ " $\sec \delta$ 0.2292^+ $\delta' - \delta$ $+6.30$ Ly. $+1.695$ $\delta' - \delta$ $+7.051$ log. $13.40 = 1.127105^c$ log $\frac{15 \cos. \delta}{2} = 0.774234$ $79.7^c = 1.901389^c$ $39.2^c = +39.2^c$ $37 33 1.6''$ $37 33 41.4''$ $(\theta+t)$ $5^h 24.4^m$ log. $13.40 = 1.127105^c$ $(\theta+t)$ $5^h 21.8^m$ " $\frac{15 \cos. \delta}{2} = 0.774170^c$ $79.7^c = 1.901275^c$ $-23. \text{ days.}^c$

Dec. 22. 1880.

A. R.

Dec.

Mean pl. 1440.0 $5^h 24^m 15.14^s$ $35^\circ 32' 30.2''$ Red. to app. pl. $+6.96^s$ $+5.1''$ True pos. * $5^h 24^m 22.10^s$ $35^\circ 32' 35.3''$ $\alpha - *$ $+1 47.42^s$ $+4 1.3''$ Pos. α $5 26 9.52^s$ $35 36 36.6''$ f $+4.061$ Log g. $1.4233+$ $\sin(\delta+t)$ $9.9969+$ $\tan \delta$ $9.8539+$ \sin $1.2741+$ 15 $1.1761+$ \sin $0.0980+$ Δ $+1.253$ \sin $1.3105+$ $\sin(H+t)$ $9.9927+$ $\sec \delta$ $0.0895+$ \sin $1.3927+$ 15 $1.1761+$ \sin $0.2166+$ Δ $+1.647$ $\delta - \delta$ $+6.961$ $(\delta+t)$ $5^h 32.5^m$ $(H+t)$ $5^h 18.0^m$

-14 day.

Log g.

 $\cos(\delta+t)$ \sin Δ \sin $\cos(H+t)$ $\sin \delta$ \sin Δ \sin $\sec \delta$ \sin Δ $\delta - \delta$ log. $39.56 = 1.597256$ log. $\left(\frac{15 \cos. dec}{2} \right) = 0.785514$ $241.4 = 2.382770$ $120.7 = +2' 0.7''$ $35 32 35.3$ $35 34 36.0$ log. $39.56 = 1.597256$ $\frac{15 \cos. dec}{2} = 0.785332$ $241.3 = 2.382588$

Dec. 23 1850.

159

a. R.

Dec.

Mean pl. $10^h 0.0$ $5^h 30^m 52.01^s$ $35^\circ 0' 21.4''$ ✓Red. to app. pl. $+6.93^c$ $+4.1^c$ ✓True pos. \times $5^h 30^m 58.96^s$ $35^\circ 0' 25.5''$ ✓ $\equiv - \times$ -2 9.54^c -2 26.0^c Pos. \equiv 5 28 49 42^c 34 57 59.5^c f $+4.073$ ✓Log. g $1.4246+$ ✓Log. g $1.4246+$ ✓" $\cos (L+t)$ $8.9593+$ ✓" $\sin (L+t)$ $9.9982+$ ✓" \sin $0.3839+$ ✓" $\tan d$ $9.8453+$ ✓" \tan $+2.42$ ✓" \sin $1.2681+$ ✓" h $1.3105+$ ✓" 15 $1.1761+$ ✓" $\cos (H+t)$ $9.2332+$ ✓" $\sec d$ $0.0920+$ ✓" $\sin d$ $9.7587+$ ✓" \tan $+1.236$ ✓" \sin $0.3024+$ ✓" h $1.3105+$ ✓" \tan $+2.01$ ✓" $\sin (H+t)$ $9.9936+$ ✓" i $9.6117-$ ✓" $\sec d$ $0.0867+$ ✓" $\cos d$ $9.9133+$ ✓" \sin $1.3908+$ ✓" \sin 9.5250 ✓" 15 $1.1761+$ ✓" \tan -0.33 ✓" $\sec d$ $0.2147+$ ✓" $d' - d$ $+4.10$ ✓" \tan $+1.639$ ✓" $f - t$ $+6.948$ ✓ $\log. 23.76 = 1.375846^c$ $\log \left(\frac{15 \cos d}{2} \right) = 0.788385^c$ ✓ $146.0^c = 2.164234^c$ $73.0^c =$ $-1'$ 13.5^c 35 0 25.5^c $34^\circ 59'$ 13.5^c (G+t) $5^h 39.1^m$ ✓ $\log. 23.76 = 1.375846^c$ (H+t) $5^h 20.6^m$ ✓" $\frac{15 \cos d}{2} = 0.788495^c$

-06 day. ✓

 $146.0^c = 2.164341^c$

Dec. 28. 1880.

A. R.

Pecr

near pl. 1840.0 $5^h 36^m 37.50^s$
 Red. to app. pl. $+6.82^s$
 True pos. * $5^h 36^m 44.32^s$
 $\equiv -*$ $+2 29.27^s$
 Pos. \equiv $5^h 39^m 13.59^s$

$32^\circ 11' 9.3''$
 $+3.3''$
 $32^\circ 11' 12.6''$
 $+9 25.5''$
 $32^\circ 20' 38.1''$

f $+4.129$ ✓
 $\log. g.$ $1.4305+$ ✓
 $" \sin(H+t)$ $9.9991+$ ✓
 $" \tan d$ $9.7989+$ ✓
 $" \text{sum}$ $1.2285+$ ✓
 $" 15$ $1.1761+$ ✓
 $" \text{result}$ $0.0524+$ ✓
 $Ly.$ $+1.128$ ✓
 $" h$ $1.3099+$ ✓
 $" \sin(H+t)$ $9.9557+$ ✓
 $" \sec. d$ $0.0725+$ ✓
 $" \text{sum}$ $1.3711+$ ✓
 $" 15$ $1.1761+$ ✓
 $" \text{result}$ $0.1950+$ ✓
 $Ly.$ $+1.569$ ✓
 $\delta' - \delta$ $+6.824$ ✓

$\log. g.$ $1.4305+$
 $" \cos. (H+t)$ $8.8185+$ ✓
 $" \text{sum}$ $0.2490+$ ✓
 $Ly.$ $+1.77$ ✓
 $" h$ $1.3099+$ ✓
 $" \cos. (H+t)$ $9.3521+$ ✓
 $" \sin d$ $9.7265+$ ✓
 $" \text{sum}$ $0.3885+$ ✓
 $Ly.$ $+2.45$ ✓
 $" i$ $0.0410-$ ✓
 $" \cos d$ $9.9275+$ ✓
 $" \text{sum}$ 9.9685 ✓
 $Ly.$ -0.93 ✓
 $\delta' - \delta$ $+3.29$ ✓

$\log. 51.14^\circ = 1.708761^\circ$
 $\log. \left(\frac{15 \cos. dec}{2} \right) = 0.802594$
 $324.6^\circ = 2.511355^\circ$
 $\frac{F+9.F^\circ}{565.2^\circ} = +4' 42.6''$
 $\frac{282.6^\circ}{32 11 12.6''}$
 $32^\circ 15' 55.2''$

$(G+t)$ $5^h 44.9^m$ ✓
 $(H+t)$ $5^h 8.0^m$ ✓
 -16 day. ✓

$\log. 51.14 = 1.708761^\circ$
 $\log. \frac{15 \cos. dec}{2} = 0.802218^\circ$
 $324.3^\circ = 2.510979^\circ$
 $\frac{889.8^\circ}{565.5^\circ} = +9' 25.5''$

Dec. 31 1880.

161

A. R.

Dec.

Mean pl. 1880.0 5^h 44^m 48.57^s

31° 25' 12.1"

Red. to app. pl. +6.81"

+2.0"

True pos. * 5^h 44^m 55.38^s

31° 25' 14.1"

- 2 1.52"

- 2 8.0"

Pos. = 5 42 53.86"

31 23 6.1"

f +4.152

Log g. 1.4329+

Log g. 1.4329+

" cos (G+t) 8.4786+

" sin (G+t) 9.9995+

" sum 9.9115+

" tan d 9.7860+

Ly. +0.82

" sum 1.2187+

" h 1.3096+

" 15 1.1761+

" cos (H+t) 9.3471+

" result 0.0426+

" sin d 9.7171+

Ly. +1.103

" sum 0.3738+

" h 1.3096+

Ly. +2.36

" sin (H+t) 9.9890+

" i 0.1430-

" sin d 0.0689+

" cos d 9.9311+

" sum 1.3675+

" sum 0.0741m

" 15 1.1761+

Ly. -1.19

" result 0.1914+

δ' - δ +1.99

Ly. +1.554

δ' - t +6.809

log. 20.00 = 1.301030°

log (15 cos. d. u. *) 0.80619°

125.0° = 2.107225°

64.0° = -1' 4.0"

31 25 14.1"

31° 24' 10.1"

(G+t) 5^h 53.1

log. 20.00 = 1.301030°

(H+t) 5^h 8.6

log (15 cos. d. u. *) 0.806278°

-13 day. °

125.0° = 2.107308°

Dec. 31. 1880.

A. R.

Dec.

mean pl. 1880.0 $5^h 43^m 58.65^s$ $30^\circ 55' 17.7''$ Red. to App. pl. $+6.78^s$ $+2.1''$ True pos. * $5^h 44^m 5.43^s$ $30^\circ 55' 19.8''$ $\oplus - *$ $+0 32.17^s$ $+6 54.0''$ Pos. \oplus $5^h 44^m 37.60^s$ $31^\circ 2' 17.8''$ f $+4.163$ Log g $1.4341+$ Log. g $1.4341+$ " $\cos(H+t)$ $8.5262+$ " $\sin(H+t)$ $9.9997+$ " \sin $9.9603+$ " $\tan. \delta$ $9.7774+$ Log $+0.91$ " \sec $1.2112+$ " h $1.3093+$ " 15 $1.1761+$ " $\cos(H+t)$ $9.3837+$ " \sec $0.0351+$ " $\sin. \delta$ $9.7108+$ Log $+1.084$ " \sec $0.4038+$ " h $1.3093+$ Log $+2.53$ " $\sin(H+t)$ $9.9569+$ " i $0.1858-$ " $\sec. \delta$ $0.0666+$ " $\cos. \delta$ $9.9334+$ " \sec $1.3628+$ " \sec 0.1192 " 15 $1.1761+$ Log -1.32 " \sec $0.1867+$ $\delta' - \delta$ $+2.12$ Log $+1.537$ $t' - t$ $+6.784$ log. $6.5-0 = 1.812913^c$ log. $\frac{15 \cos. dec}{2} = 0.80848^c$ $418.2^c = 2.621393$ $209.1^c = +3' 29.1''^c$ $30^\circ 55' 19.8''$ $30^\circ 58' 48.9''$ $(G+t)$ $5^h 52.3^m$ log. $6.50 = 1.812913^c$ $(H+t)$ $5^h 4.0^m$ " $\frac{15 \cos. dec}{2} = 0.808216^c$ -12 day.^c $418.0^c = 2.621129^c$

Jan. 1. 1881.

163

A. R.

Dec.

Mean pl. 1881.0 $5^h 46^m 36.56^s$
 Red. to App. pl. $+2.91^s$
 True pos * $5^h 46^m 39.47^s$
 $\equiv -x$ $-0 11.17^s$
 $P_2 \equiv$ $5^h 46^m 28.30^s$

$30^\circ 27' 57.5''$
 $+0.5''$
 $30^\circ 27' 58.0''$
 $-1 22.9''$
 $30 26 35.1''$

f	$+1.103$	$\log g$	$0.8604+$
$\log g$	$0.8604+$	$\cos (G+\delta)$	$8.8946w$
$\sin (G+\delta)$	$9.9987+$	\sin	$9.7550w$
$\tan \delta$	$9.7696+$	$2y$	-0.57
\sec	$0.6287+$	h	$1.3091+$
15	$1.1761+$	$\cos (H+\delta)$	$9.3971+$
result.	$9.4526+$	$\sin \delta$	$9.7050+$
$2y$	$+0.284$	\sec	$0.4112+$
h	$1.3091+$	$2y$	$+2.58$
$\sin (H+\delta)$	$9.9860+$	n	$0.2304-$
$\sec \delta$	$0.0645+$	$\cos \delta$	$9.9855+$
\sec	$1.3596+$	\sin	$0.1659w$
15	$1.1761+$	$2y$	-1.47
result.	$0.1835+$	$\delta' - \delta$	$+0.54$
$2y$	$+1.526$		
$\delta' - \delta$	$+2.913$		

$$\log 12.82 = 1.107888^c$$

$$\log \left(\frac{15 \cos \delta w}{2} \right) = 0.810533^c$$

$$82.9^c = 1.918421^c$$

$$41.4^c =$$

$30 27 56.0$
 $30^\circ 27' 16.6''$

$(G+\delta)$ $6^h 18.0$
 $(H+\delta)$ $5 2.2$
 $+0.04 \text{ day.}$

$$\log 12.82 = 1.107888^c$$

$$\log \left(\frac{15 \cos \delta w}{2} \right) = 0.810584^c$$

$$82.9^c = 1.918472^c$$

Jan. 3, 1881.

A. R.

Dec.

mean pl. 1881.0 $5^h 50^m 48.03^s$ Red. to App. pl. $+2.91^s$ True pos. * $5^h 50^m 50.94^s$ $\ominus - \times$ $-1 14.19^s$ Pos. \ominus $5 49 36.75^s$ $29^\circ 36' 40.4''$ $+0.2''$ $29^\circ 36' 40.6''$ $+1 6.4''$ $29 37 47.0''$ f. $+1.126^c$ Log. g. $0.8688+$ " sin (G+d) $9.9981+$ " tan. δ $9.7546+$ " sum $0.6215+$ " 15 $1.1761+$ " result $9.4454+$ Ly. $+0.279^c$ " h $1.3086+$ " sin (H+d) $9.9843+$ " sec. δ $0.0608+$ " sum $1.3537+$ " 15 $1.1761+$ " result $0.1776+$ Ly. $+1.505^c$ f' - f $+2.910^c$ Log g $0.8688+$ " cos (G+d) $8.9736-$ " sum $9.8424+$ Ly -0.70 " h $1.3086+$ " cos (H+d) $9.4214+$ " sin δ $9.6938+$ " sum $0.4238+$ Ly $+2.65$ " i' $0.2974-$ " cos. δ $9.9392+$ " sum $0.2366+$ Ly -1.72 $\delta' - \delta$ $+0.23^c$ log. $10.15^c = 1.007748^c$ log $\left(\frac{15 \text{ sec. dec.}}{2}\right) = 0.814279^c$ $66.4^c = 1.822027^c$ $33.2^c =$ $+33.2^c$ $29 36 40.6''$ $29^\circ 37' 13.8''$ log. $10.18^c = 1.007748^c$ " $\frac{15 \text{ sec. dec.}}{2} = 0.814239^c$ $66.4^c = 1.821987^c$ (G+d) $6^h 21.6^m$ (H+d) $4^h 58.8^m$

+ .05 day.

Jan. 7. 1881.

165

A. R.

Dec.

mean pl. 1881.0 $5^h 56^m 45.18^s$
 Red to App. pl. $+2.91^s$
 True pos \times $5^h 56^m 48.09^s$
 $\equiv - \times$ $-1 \ 24.00$
 P. \equiv $5^h 55^m 24.09^s$

$28^\circ 18' 9.8''$
 $-0.2''$
 $28^\circ 18' 9.6''$
 $-7 \ 54.3''$
 $28 \ 10 \ 15.3''$

f.	+1.170	c	Log g.	0.8852+	c
Log. g	0.8852+	c	" cos(H+d)	9.0572-	v
" sin(H+d)	9.9972+	v	" sum	9.9424w	v
" tan d.	9.7312+	v	Ly	-0.88	c
" sum	0.6136+	v	" h	1.3072+	c
" 15	1.1761+	v	" cos(H+d)	9.4811+	v
" result	9.4375+	v	" sin d	9.6759+	v
Ly.	+0.274	c	" sum	0.4642+	v
" h.	1.3072+	c	Ly	+2.91	c
" sin(H+d)	9.9791+	v	" i'	0.4059-	c
" sec. d	0.0553+	v	" cos. d	9.9447+	v
" sum	1.3416+	v	" sum	0.3506w	v
" 15	1.1761+	v	Ly	-2.24	c
" result	0.1655+	v	$\delta' - \delta$	-0.21	c
Ly.	+1.464	c			
$\delta' - \delta$	+2.908	c			
			log. 62.88 = 1.798513		
			log $\left(\frac{15 \cos. dec}{2} \right)$ = 0.819768		
			415.2 = 2.618281		
			889.8v		
			474.6v		
			237.3v		
				-3' 57.3"	
				28 18 9.6"	
				28 14 12.3"	
(H+d)	6 ^h 26.2	c	log. 62.88 = 1.798513		
(H+d)	4 ^h 49.5	c	" $\frac{15 \cos. dec}{2}$ = 0.820037		
+10 day.			415.5 = 2.618550		
			889.8v		
			474.3v		
				-7' 54.3"	

Jan. 5. 1881.

A. R.

Dec.

mean pl. 1881.0 $5^h 58^m 45.95^s$ Red to app. pl. $+2.91^s$ True pos. * $5^h 58^m 48.86^s$ $\equiv - +$ -2 1.55^s Pos. \equiv 5 56 47.31^s $27^\circ 56' 34.8''$ $-0.4''$ $27^\circ 56' 34.4''$ -6 $10.2''$ 27 50 $24.2''$ f. $+1.181$ Log. g. $0.8893+$ " sin(B+d) $9.9968+$ " cos d $9.7246+$ " sum $0.6107+$ " 15 $1.1761+$ " result $9.4346+$ Dy. $+0.272$ " h $1.3069+$ " sin(H+d) $9.9780+$ " sec. d $0.8538+$ " sum $1.3387+$ " 15 $1.1761+$ " result $0.1626+$ Dy $+1.454$ h' - d $+2.907$ Log g $0.8893+$ " cos(B+d) $9.0828-$ " sum $9.9721w$ Dy -0.94 " h $1.3069+$ " cos(H+d) $9.4923+$ " sec. d $9.6708+$ " sum $0.4700+$ Dy. $+2.95$ " i $0.4292-$ " cos. d $9.9462+$ " sum $0.3754w$ Dy -2.37 d' - d -0.36 log. 78.38 = 1.894205^c log. $\left(\frac{15 \cos. dec. *}{2}\right) = 0.82122^c$ $519.3^c = 2.71543^c$ $\frac{889.8^c}{370.5^c} =$ $185.2^c =$ $-8'$ $5''^2$ 27 56 $34.4''$ 27° $53'$ $29.2''$ log. 78.38 = 1.894205^c " $\frac{15 \cos. dec.}{2} = 0.821483^c$ $519.6^c = 2.715638^c$ $\frac{889.8^c}{370.2^c} = -6' 10.2''$ B+d) $6^h 27.8^m$ (H+d) $4^h 47.6^m$

+1.2 day.

Jan. 15. 1881.

167

A. R.

Dec.

mean pl. 1881.0 $6^h 7^m 27.50^s$ $25^{\circ} 16' 46.9''$ Red. to App. pl. $+2.86''$ $-1.1''$ True pos \times $6^h 7^m 30.36^s$ $25^{\circ} 16' 45.8''$ $\epsilon - \times$ $+1 23.57''$ $-2 1.3''$ P. ϵ $6 8 53.93''$ $25 14 44.5''$ f $+1.281''$ Log g $0.9240+$ Log. g $0.9240+$ $\cos(H+d)$ $9.1528w$ $\sin(H+d)$ $9.9556+$ \sin $0.0768w$ $\tan \delta$ $9.6742+$ $2y$ -1.19 \sin $0.5538+$ h $1.3022+$ 15 $1.1761+$ $\cos(H+d)$ $9.6296+$ result $9.3777+$ $\sin \delta$ $9.6305+$ $2y$ $+0.239$ \sin $0.5623+$ h $1.3022+$ $2y$ $+3.65$ $\cos(H+d)$ $9.9565+$ n' $0.5984-$ $\sec. \delta$ $0.0437+$ $\cos. \delta$ $9.9563+$ \sin $1.3024+$ \sin $0.5547w$ 15 $1.1761+$ $2y$ -3.59 result $0.1263+$ $\delta' - \delta$ -1.13 $2y$ $+1.338$ $\delta' - \delta$ $+2.858$ $\log. 17.88 = 1.252368$ $\log \frac{15 \cos. dec.}{2} = 0.831345$ $121.3 = 2.083711$ $60.6 = -1' 0.6''$ $25 16 45.8$ $25 15 45.2$ $(G+d)$ $6^h 32.7^m$ $\log. 17.88 = 1.252368$ $(H+d)$ $4^h 19.1^m$ $\log \frac{15 \cos. dec.}{2} = 0.831403$ -17 day. $121.3 = 2.083771$

Jan. 20. 1881.

A. R.

Dec.

f
 Log. g
 " $\sin(B+t)$
 " $\tan \delta$
 " sum
 " 15
 " result
 $2y$
 " h
 " $\sin(H+t)$
 " $\cos \delta$
 " sum
 " 15
 " result
 $2y$
 $\delta' - \delta$

Log g
 " $\cos(B+t)$
 " sum
 $2y$
 " h
 " $\cos(H+t)$
 " $\sin \delta$
 " sum
 $2y$
 " i
 " $\cos \delta$
 " sum
 $2y$
 $\delta' - \delta$

See Book 45. for Apparent Place Reduction

Nov. 3 1880.

Nov. 8 1880.

169

 θ t'

$$t' = (\theta - t')$$

$$\log. \sin. t'$$

$$\text{Co. log. cos. } \delta'$$

$$\log. (t - t')$$

$$(t - t') =$$

$$\text{Co. log. cos. } t'$$

$$\log. \tan. \gamma$$

 γ

$$\gamma - \delta'$$

$$\log. \sin. (\gamma - \delta')$$

$$\text{Co. log. sin. } \gamma$$

$$\log. (\delta - \delta')$$

$$(\delta - \delta') =$$

$$\delta =$$

Par. in A. R.

" " Dec.

 θ t'

$$t' = (\theta - t')$$

$$\log. \sin. t'$$

$$\text{Co. log. cos. } \delta'$$

$$\log. (t - t')$$

$$(t - t') =$$

$$\text{Co. log. cos. } t'$$

$$\log. \tan. \gamma$$

 γ

$$\gamma - \delta'$$

$$\log. \sin. (\gamma - \delta')$$

$$\text{Co. log. sin. } \gamma$$

$$\log. (\delta - \delta')$$

$$(\delta - \delta') =$$

$$\delta =$$

Par. in A. R.

" " Dec.

For cor. in Par. see Book 25. pp. 1 & 2.

170

Nov. 9, 1880.

$$H. A. = +42^{\circ} 54''$$

$$\begin{aligned} \theta & 23^{\circ} 42' 48.7'' \\ t' & 22 \quad 59 \quad 55.2'' \\ t' = (\theta - t') & +42^{\circ} 53.5'' \\ \log. \sin. t' & 9.2696+ \\ \text{Co. log. cos. } \delta' & 0.1489+ \\ \log. (t - t') & 0.2206 \\ (t - t') & 1.662 \text{ in arc.} \end{aligned}$$

$$\begin{aligned} \text{Co. log. cos. } t' & 0.0076+ \\ \log. \tan. \gamma & 9.9649+ \\ \gamma & 42.7 \end{aligned}$$

$$\begin{aligned} (\gamma - \delta') & -2.09 \\ \log. \sin(\gamma - \delta') & 8.5619w \\ \text{Co. log. sin. } \gamma & 0.1688+ \\ \log. (\delta - \delta') & 9.4901w \\ (\delta - \delta') & -0.31 \end{aligned}$$

$$\angle \delta = 44^{\circ} 46' 56.1''$$

$$\begin{aligned} \text{Par. in A.R.} & 0.111'' \\ \text{" " Dec.} & 0.32'' \end{aligned}$$

$$\begin{aligned} \log. 0.111 & = 9.0453'' \\ & 9.0592+ \end{aligned}$$

$$\begin{aligned} \log. 0.32 & = 9.5051'' \\ & 9.5190w \end{aligned}$$

Nov. 11, 1880.

$$\begin{aligned} \theta & 1 \quad 58 \quad 13.4'' \\ t' & 23 \quad 17 \quad 45.6'' \\ t' = (\theta - t') & +2 \quad 40 \quad 27.8'' \end{aligned}$$

$$\begin{aligned} \log. \sin t' & \\ \text{Co. log. cos. } \delta' & \\ \log. (t - t') & \\ (t - t') & \end{aligned}$$

$$\begin{aligned} \text{Co. log. cos. } t' & 0.1165'' \\ \log. \tan \gamma & 0.0738'' \\ \gamma & 49.8 \end{aligned}$$

$$\begin{aligned} (\gamma - \delta') & \\ \log. \sin(\gamma - \delta') & \\ \text{Co. log. sin } \gamma & \\ \log. (\delta - \delta') & \\ (\delta - \delta') & \end{aligned}$$

$$\angle \delta = 47^{\circ} 8' 42.8''$$

$$\begin{aligned} \text{Par. in A.R.} & 0.401'' \\ \text{" " Dec.} & 0.36'' \end{aligned}$$

$$\begin{aligned} \log. 0.401 & = 9.6031'' \\ & 9.6170+ \end{aligned}$$

$$\begin{aligned} \log. 0.36 & = 9.5563'' \\ & 9.5702+ \end{aligned}$$

Nov. 18. 1880.

Nov. 19. 1880.

171

H. A. $-52^{\circ} 29'$
 θ $23^{\circ} 44' 19.6''$
 δ $0^{\circ} 36' 49.0''$
 $t' = (\theta - \delta)$ $-52^{\circ} 29' 4''$
 $\log. \sin t'$ $9.3561u$
 $\text{Co. log. cos. } \delta$ 0.2240
 $\log. (\delta - \delta')$ $0.3822u$
 $(\delta - \delta')$ 2.411 in arc.
 $\text{Co. log. cos. } t'$ $0.0115+$
 $\log. \tan \gamma$ $9.9688+$
 γ 42.94
 $(\gamma - \delta')$ -10.40
 $\log. \sin(\gamma - \delta')$ $9.2565u$
 $\text{Co. log. sin } \gamma$ 0.1667
 $\log. (\delta - \delta')$ 0.1826
 $(\delta - \delta')$ 1.52

H. A. $-1^{\circ} 25' 50''$
 θ $23^{\circ} 24' 29.8''$
 δ $0^{\circ} 50' 20.4''$
 $t' = (\theta - \delta)$ $-1^{\circ} 25' 50.6''$
 $\log. \sin t'$ $9.5631+$
 $\text{Co. log. cos. } \delta$ $0.2295+$
 $\log. (\delta - \delta')$ $0.5947+$
 $(\delta - \delta')$ 3.933 in arc.
 $\text{Co. log. cos. } t'$ $0.0312+$
 $\log. \tan \gamma$ $9.9885+$
 γ 44.24
 $(\gamma - \delta')$ -9.64
 $\log. \sin(\gamma - \delta')$ $9.2239u$
 $\text{Co. log. sin } \gamma$ $0.1564+$
 $\log. (\delta - \delta')$ $0.1397u$
 $(\delta - \delta')$ -1.38

$\angle \delta = 53^{\circ} 20' 26.6''$

$\angle \delta = 53^{\circ} 53' 14.2''$

Par. in A.R. $0.5161''$

Par. in A.R. $0.5262''$

" " Dec. $1.53''$

" " Dec. $1.37''$

$\log. 0.161 = 9.2068''$
 $9.2204''u$

$\log. 0.262 = 9.4183''$
 $9.4322''u$

$\log. 1.53 = 0.1847''$
 $0.1986''u$

$\log. 1.37 = 0.1367''$
 $0.1506''u$

172

Apr. 21. 1880.

Apr. 22. 1880.

$$H.A. = -36^{\circ} 27'$$

$$\theta = 0^{\circ} 43' 5.2''$$

$$J' = 1 \quad 19 \quad 32.0''$$

$$t' = (\theta - J') = -36^{\circ} 26.8''$$

$$\text{Log. sin. } t'$$

$$\text{Co. log. cos. } \delta'$$

$$\text{Log. } (t - J')$$

$$(t - J')$$

$$\text{Co. Log. cos. } t'$$

$$\text{Log. tan } \gamma$$

$$\gamma$$

$$(\gamma - \delta')$$

$$\text{Log. sin } (\gamma - \delta')$$

$$\text{Co. log. sin } \gamma$$

$$\text{Log. } (\delta - \delta')$$

$$(\delta - \delta')$$

$$\delta = 54^{\circ} 39' 39.0''$$

$$\text{Par. in A.R. } 0.116''$$

$$\text{" " Dec. } 1.78''$$

$$\text{log. } 0.116 = 9.0645''$$

$$9.0784''$$

$$\text{log. } 1.78 = 0.2504''$$

$$0.2643''$$

(c)

$$\theta$$

$$J'$$

$$t' = (\theta - J')$$

$$\text{Log. sin } t'$$

$$\text{Co. log. cos. } \delta'$$

$$\text{Log. } (t - J')$$

$$(t - J')$$

$$\text{Co. Log. cos. } t'$$

$$\text{Log. tan } \gamma$$

$$\gamma$$

$$(\gamma - \delta')$$

$$\text{Log. sin } (\gamma - \delta')$$

$$\text{Co. log. sin } \gamma$$

$$\text{Log. } (\delta - \delta')$$

$$(\delta - \delta')$$

$$\delta = 54^{\circ} 51' 29.0''$$

$$\text{Par. in A.R. } 0.166''$$

$$\text{" " Dec. } 1.74''$$

$$\text{log. } 0.166 = 9.2201''$$

$$9.2340''$$

$$\text{log. } 1.74 = 0.2405''$$

$$0.2544''$$

Nov. 23. 1880.

Nov. 26. 1880. 173

$$\begin{array}{rcl} \theta & 1 & 39 \quad 37.6^{\circ} \\ \delta' & 1 & 49 \quad 3.0^{\circ} \\ t' = (\theta - \delta') & & -9 \quad 25.4^{\circ} \end{array}$$

$$\begin{array}{l} \text{Log. sin } t' \\ \text{Co. log. cos. } \delta' \\ \text{Log. } (\delta - \delta') \\ (\delta - \delta') \end{array}$$

$$\begin{array}{rcl} \text{Co. Log. cos. } t' & 0.0003^{\circ} & \\ \text{Log. tan } \gamma & 9.9576^{\circ} & \\ \gamma & 42.2^{\circ} & \end{array}$$

$$\begin{array}{l} (\gamma - \delta') \\ \text{Log. sin } (\gamma - \delta') \\ \text{Co. log sin } \gamma \\ \text{Log. } (\delta - \delta') \\ (\delta - \delta') \end{array}$$

$$\angle \delta = +54^{\circ} 54' 51.2''$$

$$\begin{array}{rcl} \text{Par. in A.R.} & 0.030^{\circ} & \\ \text{" " Dec.} & 1.88^{\circ} & \end{array}$$

$$\begin{array}{rcl} \text{log. } 0.030 & 8.4771^{\circ} & \\ & 8.4910^{\circ} \text{ n} & \end{array}$$

$$\begin{array}{rcl} \text{log. } 1.88 & 0.2742^{\circ} & \\ & 0.2881^{\circ} \text{ n} & \end{array}$$

$$\begin{array}{rcl} \theta & 4 & 19 \quad 3.6^{\circ} \\ \delta' & 2 & 32 \quad 27.4^{\circ} \\ t' = (\theta - \delta') & +1 & 46 \quad 36.2^{\circ} \end{array}$$

$$\begin{array}{l} \text{Log. sin } t' \\ \text{Co. log cos. } \delta' \\ \text{Log. } (\delta - \delta') \\ (\delta - \delta') \end{array}$$

$$\begin{array}{rcl} \text{Co. log. cos. } t' & 0.0488^{\circ} & \\ \text{Log. tan } \gamma & 0.0061^{\circ} & \\ \gamma & 45.4^{\circ} & \end{array}$$

$$\begin{array}{l} (\gamma - \delta') \\ \text{Log. sin } (\gamma - \delta') \\ \text{Co. log sin } \gamma \\ \text{Log. } (\delta - \delta') \\ (\delta - \delta') \end{array}$$

$$\angle \delta = 54^{\circ} 20' 54.1''$$

$$\begin{array}{rcl} \text{Par. in A.R.} & 0.325^{\circ} & \\ \text{" " Dec.} & 1.25^{\circ} & \end{array}$$

$$\begin{array}{rcl} \text{log. } 0.325 & = 9.5119^{\circ} & \\ & 9.5258^{\circ} + & \end{array}$$

$$\begin{array}{rcl} \text{log. } 1.25 & = 0.0969^{\circ} & \\ & 0.1108^{\circ} \text{ n} & \end{array}$$

174

Nov. 27. 1880

Nov. 29. 1880

θ	2	39	2.8"
δ'	2	44	35.1"
$t' = (\theta - \delta')$	-5		35.3"
Log. sin. t'			
Co. log. cos. δ'			
Log. $(\delta - \delta')$			
$(\delta - \delta')$			

Co. log. cos. t'	0.0001	"
Log. tan γ	9.9574	"
γ	42.2	"

$(\gamma - \delta')$	
Log. sin $(\gamma - \delta')$	
Co. log. sin γ	
Log. $(\delta - \delta')$	
$(\delta - \delta')$	

For err. in Parallax see Book 85. p.p. 4+5.

$$\delta = 53^\circ 58' 46.0''$$

Par. in A.R.	0.017"
" " Dec.	1.75"

$$\log 0.017 = 8.2304$$

$$8.2443^w$$

$$\log 1.75 = 0.2430$$

$$0.2569^w$$

θ	0	59	21.5"
δ'	3	8	26.5"
$t' = (\theta - \delta')$	-2	9	5.0"
Log sin t'			
Co. log. cos. δ'			
Log. $(\delta - \delta')$			
$(\delta - \delta')$			

Co. log. cos. t'	0.0729	"
Log. tan γ	0.0302	"
γ	47.0	"

$(\gamma - \delta')$	
Log. sin $(\gamma - \delta')$	
Co. log. sin γ	
Log. $(\delta - \delta')$	
$(\delta - \delta')$	

Par. in A.R.	0.375"
" " Dec.	0.82"

$$\log 0.375 = 9.5740$$

$$9.5879^w$$

$$\log 0.82 = 9.9138$$

$$9.9277^w$$

Dec. 2. 1880.

Dec. 3. 1880. 175

$$\begin{array}{rcll}
 \theta & 7 & 2 & 2.6 \\
 \delta' & 3 & 42 & 54.5 \\
 t' = (\theta - \delta') & +3 & 19 & 3.8 \\
 \text{Log. sin } t' & 9.8829 & + & \\
 \text{Co. log. cos. } \delta' & 0.1988 & + & \\
 \text{Log. } (\theta - \delta') & 9.8838 & & \\
 (\theta - \delta') & 0.765 & &
 \end{array}$$

$$\begin{array}{rcll}
 \text{Co. log. cos. } t' & 0.1899 & ^\circ & \\
 \text{Log. tan } \gamma & 0.1472 & ^\circ & \\
 \gamma & 54.5 & ^\circ &
 \end{array}$$

$$\begin{array}{rcll}
 (\gamma - \delta') & & & \\
 \text{Log. sin } (\gamma - \delta') & & & \\
 \text{Co. log. sin } \gamma & & & \\
 \text{Log. } (\delta - \delta') & & & \\
 (\delta - \delta') & & &
 \end{array}$$

$$\angle \delta = 50^\circ 44' 49.4$$

$$\begin{array}{rcll}
 \text{Par. in A.R.} & 0.511 & ^\circ & \\
 \text{" " Dec.} & 0.45 & ^\circ &
 \end{array}$$

$$\begin{array}{rcll}
 \text{log. } 0.511 & = & 9.7084 & ^\circ \\
 & & 9.7223 & ^\circ +
 \end{array}$$

$$\begin{array}{rcll}
 \text{log. } 0.45 & = & 9.6532 & ^\circ \\
 & & 9.6671 & ^\circ +
 \end{array}$$

$$\begin{array}{rcll}
 \theta & 3 & 1 & 7.3 \\
 \delta' & 3 & 50 & 48.3 \\
 t' = (\theta - \delta') & -49 & & 41.0 \\
 \text{Log. sin } t' & & & \\
 \text{Co. log. cos. } \delta' & & & \\
 \text{Log. } (\theta - \delta') & & & \\
 (\theta - \delta') & & &
 \end{array}$$

$$\begin{array}{rcll}
 \text{Co. log. cos. } t' & 0.0103 & ^\circ & \\
 \text{Log. tan } \gamma & 9.9676 & ^\circ & \\
 \gamma & 42.9 & ^\circ &
 \end{array}$$

$$\begin{array}{rcll}
 (\gamma - \delta') & & & \\
 \text{Log. sin } (\gamma - \delta') & & & \\
 \text{Co. log. sin } \gamma & & & \\
 \text{Log. } (\delta - \delta') & & & \\
 (\delta - \delta') & & &
 \end{array}$$

$$\angle \delta = 50^\circ 6' 23.0$$

$$\begin{array}{rcll}
 \text{Par. in A.R.} & 0.142 & ^\circ & \\
 \text{" " Dec.} & 1.07 & ^\circ &
 \end{array}$$

$$\begin{array}{rcll}
 \text{log. } 0.142 & = & 9.1523 & ^\circ \\
 & & 9.1662 & ^\circ n
 \end{array}$$

$$\begin{array}{rcll}
 \text{log. } 1.07 & = & 0.02294 & ^\circ \\
 & & 0.0433 & ^\circ n
 \end{array}$$

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Dec. 4 1880

Dec. 7. 1880.

$$\begin{array}{rcl}
 \theta & 1 & 16 & 44.5^{\circ} \\
 \delta' & 3 & 58 & 59.0^{\circ} \\
 t' = (\theta - \delta') - 2^h & 42^m & 14.5^s \\
 \text{Log. sin. } t' & & & \\
 \text{Co. log. cos. } \delta' & & & \\
 \text{Log. } (\theta - \delta') & & & \\
 (\theta - \delta') & & &
 \end{array}$$

$$\begin{array}{rcl}
 \text{Co. log. cos. } t' & 0.1193^{\circ} \\
 \text{Log. tan } \gamma & 0.0766^{\circ} \\
 \gamma & 50.0^{\circ}
 \end{array}$$

$$\begin{array}{rcl}
 (\gamma - \delta') & & \\
 \text{Log. sin. } (\gamma - \delta') & & \\
 \text{Co. log. sin } \gamma & & \\
 \text{Log. } (\delta - \delta') & & \\
 (\delta - \delta') & &
 \end{array}$$

$$\odot \delta = 49^{\circ} 21' 46.3$$

$$\begin{array}{rcl}
 \text{Par. in A.R.} & 0.423^{\circ} \\
 \text{" " Dec.} & 0.21^{\circ}
 \end{array}$$

$$\begin{array}{rcl}
 \log. 0.423 & = & 9.6263^{\circ} \\
 & & 9.6402^{\circ}
 \end{array}$$

$$\begin{array}{rcl}
 \log. 0.21 & = & 9.3222^{\circ} \\
 & & 9.3361^{\circ}
 \end{array}$$

(C)

$$\begin{array}{rcl}
 \theta & 2 & 9 & 3.5^{\circ} \\
 \delta' & 4 & 22 & 11.7^{\circ} \\
 t' = (\theta - \delta') - 2 & 13 & 8.2 \\
 \text{Log. sin } t' & & & \\
 \text{Co. log. cos. } \delta' & & & \\
 \text{Log. } (\theta - \delta') & & & \\
 (\theta - \delta') & & &
 \end{array}$$

$$\begin{array}{rcl}
 \text{Co. log. cos. } t' & 0.0777^{\circ} \\
 \text{Log. tan } \gamma & 0.0350^{\circ} \\
 \gamma & 47.3^{\circ}
 \end{array}$$

$$\begin{array}{rcl}
 (\gamma - \delta') & & \\
 \text{Log. sin. } (\gamma - \delta') & & \\
 \text{Co. log. sin } \gamma & & \\
 \text{Log. } (\delta - \delta') & & \\
 (\delta - \delta') & &
 \end{array}$$

$$\odot \delta = 46^{\circ} 50' 16.7$$

$$\begin{array}{rcl}
 \text{Par. in A.R.} & 0.339^{\circ} \\
 \text{" " Dec.} & 0.18^{\circ}
 \end{array}$$

$$\begin{array}{rcl}
 \log. 0.339 & = & 9.5302^{\circ} \\
 & & 9.5441^{\circ}
 \end{array}$$

$$\begin{array}{rcl}
 \log. 0.18 & = & 9.2553^{\circ} \\
 & & 9.2692^{\circ}
 \end{array}$$

Dec. 11. 1880.

Dec. 19. 1880. 177

$$\begin{array}{rcl} \theta & 9^{\text{h}} 25^{\text{m}} 5.6^{\text{s}} & ^{\circ} \\ \delta' & 4 \ 47 \ 26.9 & ^{\circ} \\ t' = (\theta - \delta') + 4^{\text{h}} 37^{\text{m}} 38.7^{\text{s}} & & ^{\circ} \\ \text{Log. sin } t' & & \\ \text{Co. log. cos. } \delta' & & \\ \text{Log. } (\theta - \delta') & & \\ (\theta - \delta') & & \end{array}$$

$$\begin{array}{rcl} \text{Co. Log. cos. } t' & 0.4537^{\circ} & \\ \text{Log. tan } \gamma & 0.4110^{\circ} & \\ \gamma & 68.8^{\circ} & \end{array}$$

$$\begin{array}{rcl} (\gamma - \delta') & & \\ \text{Log. sin } (\gamma - \delta') & & \\ \text{Co. log. sin } \gamma & & \\ \text{Log. } (\delta - \delta') & & \\ (\delta - \delta') & & \end{array}$$

$$\delta = 43^{\circ} 15' 14.5''$$

$$\begin{array}{rcl} \text{Par. in A. R.} & 0.544^{\circ} & \\ \text{" " Dec.} & 2.66^{\circ} & \end{array}$$

$$\begin{array}{rcl} \log. 0.544 & = 9.7356^{\circ} & \\ & 9.7495^{\circ} + & \end{array}$$

$$\begin{array}{rcl} -\log. 2.66 & = 0.4249^{\circ} & \\ & 0.4388^{\circ} + & \end{array}$$

$$\begin{array}{rcl} \theta & 0 \ 53 \ 47.9 & ^{\circ} \\ \delta' & 5 \ 17 \ 35.0 & ^{\circ} \\ t' = \theta - \delta' & -4 \ 23 \ 47.1 & ^{\circ} \\ \text{Log. sin } t' & & \\ \text{Co. log. cos. } \delta' & & \\ \text{Log. } (\theta - \delta') & & \\ (\theta - \delta') & & \end{array}$$

$$\begin{array}{rcl} \text{Co. Log. cos. } t' & 0.3899^{\circ} & \\ \text{Log. tan } \gamma & 0.3472^{\circ} & \\ \gamma & 65.8^{\circ} & \end{array}$$

$$\begin{array}{rcl} (\gamma - \delta') & & \\ \text{Log. sin } (\gamma - \delta') & & \\ \text{Co. log. sin } \gamma & & \\ \text{Log. } (\delta - \delta') & & \\ (\delta - \delta') & & \end{array}$$

$$\delta = 37^{\circ} 34' 21.3''$$

$$\begin{array}{rcl} \text{Par. in A. R.} & 0.487^{\circ} & \\ \text{" " Dec.} & 2.98^{\circ} & \end{array}$$

$$\begin{array}{rcl} \log. 0.487 & = 9.6875^{\circ} & \\ & 9.7014^{\circ} + & \end{array}$$

$$\begin{array}{rcl} \log. 2.98 & = 0.4742^{\circ} & \\ & 0.4881^{\circ} + & \end{array}$$

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Dec. 22, 1880.

$$\begin{array}{rcl}
 \theta & 3 & 6 & 27.4^{\circ} \\
 \delta' & 5 & 26 & 9.5^{\circ} \\
 t' = (\theta - \delta') & -2 & 19 & 42.1^{\circ} \\
 \text{Log. sin } t' & & & \\
 \text{Co. log. cos. } \delta' & & & \\
 \text{Log. } (\delta - \delta') & & & \\
 (\delta - \delta') & & &
 \end{array}$$

$$\begin{array}{rcl}
 \text{Co. log. cos. } t' & 0.0862^{\circ} \\
 \text{Log. tan } \gamma & 0.0435^{\circ} \\
 \gamma & 47.9^{\circ}
 \end{array}$$

$$\begin{array}{rcl}
 (\gamma - \delta') & & \\
 \text{Log. sin } (\gamma - \delta') & & \\
 \text{Co. log. sin } \gamma & & \\
 \text{Log. } (\delta - \delta') & & \\
 (\delta - \delta') & &
 \end{array}$$

$$\odot \delta = 35 \ 36 \ 36.6$$

$$\begin{array}{rcl}
 \text{Par. in A.R.} & 0.298^{\circ} \\
 \text{" " Dec.} & 1.65^{\circ}
 \end{array}$$

$$\begin{array}{rcl}
 \log. 0.298 & = & 9.4742^{\circ} \\
 & & 9.4881^{\circ}
 \end{array}$$

$$\begin{array}{rcl}
 \log. 1.65 & = & 0.2175^{\circ} \\
 & & 0.2314^{\circ}
 \end{array}$$

Dec. 23, 1880.

$$\begin{array}{rcl}
 \theta & 5 & 13 & 40.5^{\circ} \\
 \delta' & 5 & 28 & 49.4^{\circ} \\
 b' = (\theta - \delta') & - & 15^m & 8.9^s \\
 \text{Log. sin } t' & & & \\
 \text{Co. log. cos. } \delta' & & & \\
 \text{Log. } (\delta - \delta') & & & \\
 (\delta - \delta') & & &
 \end{array}$$

$$\begin{array}{rcl}
 \text{Co. log. cos. } t' & 0.0009^{\circ} \\
 \text{Log. tan } \gamma & 9.95812^{\circ} \\
 \gamma & 42.2^{\circ}
 \end{array}$$

$$\begin{array}{rcl}
 (\gamma - \delta') & & \\
 \log. \sin (\gamma - \delta') & & \\
 \text{Co. log. sin } \gamma & & \\
 \text{Log. } (\delta - \delta') & & \\
 (\delta - \delta') & &
 \end{array}$$

$$\odot \delta = 34 \ 57 \ 59.5$$

$$\begin{array}{rcl}
 \text{Par. in A.R.} & 0.034^{\circ} \\
 \text{" " Dec.} & 1.09^{\circ}
 \end{array}$$

$$\begin{array}{rcl}
 \log. 0.034 & = & 8.5315^{\circ} \\
 & & 8.5454^{\circ}
 \end{array}$$

$$\begin{array}{rcl}
 \log. 1.09 & = & 0.0374^{\circ} \\
 & & 0.0513^{\circ}
 \end{array}$$

Dec. 28. 1880

$$\begin{array}{rcl}
 \theta & 3 & 0 \ 26.8^{\circ} \\
 - \delta' & 5 & 39 \ 13.6^{\circ} \\
 \hline
 t' = (\theta - \delta') & -2 & 38 \ 46.8^{\circ} \\
 \text{Log. sin } t' & & \\
 \text{Co. log. cos. } \delta' & & \\
 \text{Log. } (\delta - \delta') & & \\
 (\delta - \delta') & &
 \end{array}$$

$$\begin{array}{rcl}
 \text{Co. log. cos. } t' & 0.1139^{\vee} & \\
 \text{Log. tan. } \gamma & 0.0712^{\vee} & \\
 \gamma & 49.7^{\circ} &
 \end{array}$$

$$\begin{array}{rcl}
 (\gamma - \delta') & & \\
 \text{Log. sin } \gamma - \delta' & & \\
 \text{Co. log. sin } \gamma & & \\
 \text{Log. } (\delta - \delta') & & \\
 (\delta - \delta') & &
 \end{array}$$

$$\delta = 32 \ 20 \ 38.1$$

$$\begin{array}{rcl}
 \text{Par. in A.R.} & 0.320^{\vee} & \\
 \text{" Dec.} & 2.25^{\vee} &
 \end{array}$$

$$\begin{array}{rcl}
 \text{log. } 0.320 & = 9.5051^{\vee} & \\
 & 9.5190^{\vee} &
 \end{array}$$

$$\begin{array}{rcl}
 \text{log. } 2.25 & = 0.3522^{\vee} & \\
 & 0.3661^{\vee} &
 \end{array}$$

(c)

Dec. 30. 1880. 179

$$\begin{array}{rcl}
 \theta & 3 & 52 \ 2.2^{\circ} \\
 - \delta' & 5 & 42 \ 53.9^{\circ} \\
 \hline
 t' = (\theta - \delta') & -1 & 50 \ 51.7^{\circ} \\
 \text{Log. sin } t' & & \\
 \text{Co. log. cos. } \delta' & & \\
 \text{Log. } (\delta - \delta') & & \\
 (\delta - \delta') & &
 \end{array}$$

$$\begin{array}{rcl}
 \text{Co. log. cos. } t' & 0.0530^{\vee} & \\
 \text{Log. tan } \gamma & 0.0103^{\vee} & \\
 \gamma & 45.7^{\circ} &
 \end{array}$$

$$\begin{array}{rcl}
 (\gamma - \delta') & & \\
 \text{Log. sin } (\gamma - \delta') & & \\
 \text{Co. log. sin } \gamma & & \\
 \text{Log. } (\delta - \delta') & & \\
 (\delta - \delta') & &
 \end{array}$$

$$\delta = 31 \ 23 \ 6.1$$

$$\begin{array}{rcl}
 \text{Par. in A.R.} & 0.231^{\vee} & \\
 \text{" Dec.} & 1.99^{\vee} &
 \end{array}$$

$$\begin{array}{rcl}
 \text{log. } 0.231 & = 9.3636^{\vee} & \\
 & 9.3775^{\vee} &
 \end{array}$$

$$\begin{array}{rcl}
 \text{log. } 1.99 & = 0.2989^{\vee} & \\
 & 0.3128^{\vee} &
 \end{array}$$

180

Dec. 31. 1880.

Jan. 1. 1881.

$$\begin{array}{rcl}
 \theta & 4 & 19 \ 57.5 \\
 \delta' & 5 & 44 \ 37.6 \\
 t' = (\theta - \delta') & -1 & 24 \ 40.1 \\
 \text{Log. sin } t' & & \\
 \text{Co. log. cos. } \delta' & & \\
 \text{Log. } (\delta - \delta') & & \\
 (\delta - \delta') & &
 \end{array}$$

$$\begin{array}{rcl}
 \text{Co. log. cos. } t' & 0.0304 \\
 \text{log. tan } \gamma & 9.9877 \\
 \gamma & 44.2
 \end{array}$$

$$\begin{array}{rcl}
 (\gamma - \delta') & & \\
 \text{Log. sin } (\gamma - \delta') & & \\
 \text{Co. log. sin } \gamma & & \\
 \text{Log. } (\delta - \delta') & & \\
 (\delta - \delta') & &
 \end{array}$$

$$\delta = 31 \ 2 \ 17.8$$

$$\begin{array}{rcl}
 \text{Par. in A.R.} & 0.178 \\
 \text{Dec.} & 1.87
 \end{array}$$

$$\begin{array}{rcl}
 \text{log. } 0.178 & = & 9.2504 \\
 & & 9.2643
 \end{array}$$

$$\begin{array}{rcl}
 \text{log. } 1.87 & = & 0.2718 \\
 & & 0.0857
 \end{array}$$

$$\begin{array}{rcl}
 \theta & 7 & 58 \ 59.3 \\
 \delta' & 5 & 46 \ 28.3 \\
 t' = (\theta - \delta') & +2 & 12 \ 31.0 \\
 \text{Log. sin } t' & & \\
 \text{Co. log. cos. } \delta' & & \\
 \text{Log. } (\delta - \delta') & & \\
 (\delta - \delta') & &
 \end{array}$$

$$\begin{array}{rcl}
 \text{Co. log. cos. } t' & 0.0770 \\
 \text{log. tan } \gamma & 0.0343 \\
 \gamma & 47.3
 \end{array}$$

$$\begin{array}{rcl}
 (\gamma - \delta') & & \\
 \text{Log. sin } (\gamma - \delta') & & \\
 \text{Co. log. sin } \gamma & & \\
 \text{Log. } (\delta - \delta') & & \\
 (\delta - \delta') & &
 \end{array}$$

$$\delta = 30 \ 26 \ 35.1$$

$$\begin{array}{rcl}
 \text{Par. in A.R.} & 0.267 \\
 \text{Dec.} & 2.27
 \end{array}$$

$$\begin{array}{rcl}
 \text{log. } 0.267 & = & 9.4265 \\
 & & 9.4404
 \end{array}$$

$$\begin{array}{rcl}
 \text{log. } 2.27 & = & 0.3560 \\
 & & 0.0699
 \end{array}$$

Jan. 3, 1881

Jan. 7, 1881.

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$$\begin{array}{rcl}
 \theta & 8 & 31 & 7.9^{\circ} \\
 \delta' & 5 & 49 & 36.8^{\circ} \\
 t' = (\theta - \delta') & +2 & 41 & 3.1^{\circ} \\
 \text{Log. sin } t' & & & \\
 \text{Co. log. cos. } \delta' & & & \\
 \text{Log. } (\theta - \delta') & & & \\
 (\theta - \delta') & & &
 \end{array}$$

$$\begin{array}{rcl}
 \theta & 9 & 55 & 27.4^{\circ} \\
 \delta' & 5 & 55 & 24.1^{\circ} \\
 t' = (\theta - \delta') & +4 & 0 & 3.3^{\circ} \\
 \text{Log. sin } t' & & & \\
 \text{Co. log. cos. } \delta' & & & \\
 \text{Log. } (\theta - \delta') & & & \\
 (\theta - \delta') & & &
 \end{array}$$

$$\begin{array}{rcl}
 \text{Co. log. cos. } t' & 0.1180^{\circ} & \\
 \text{log. tan } \gamma & 0.0753^{\circ} & \\
 \gamma & 49.95^{\circ} &
 \end{array}$$

$$\begin{array}{rcl}
 \text{Co. log. cos. } t' & 0.3013^{\circ} & \\
 \text{log. tan } \gamma & 0.2556^{\circ} & \\
 \gamma & 61.1^{\circ} &
 \end{array}$$

$$\begin{array}{rcl}
 (\gamma - \delta') & & \\
 \text{Log. sin } (\gamma - \delta') & & \\
 \text{Co. log. sin } \gamma & & \\
 \text{Log. } (\delta - \delta') & & \\
 (\delta - \delta') & &
 \end{array}$$

$$\begin{array}{rcl}
 (\gamma - \delta') & & \\
 \text{Log. sin } (\gamma - \delta') & & \\
 \text{Co. log. sin } \gamma & & \\
 \text{Log. } (\delta - \delta') & & \\
 (\delta - \delta') & &
 \end{array}$$

$$\delta = 29^{\circ} 37' 47.0''$$

$$\delta = 28^{\circ} 10' 15.3''$$

$$\begin{array}{rcl}
 \text{Par. in A.R.} & 0.315^{\circ} & \\
 \text{Dec.} & 2.60^{\circ} &
 \end{array}$$

$$\begin{array}{rcl}
 \text{Par. in A.R.} & 0.416^{\circ} & \\
 \text{Dec.} & 3.58^{\circ} &
 \end{array}$$

$$\begin{array}{rcl}
 \text{log. } 0.315 & = 9.4953^{\circ} & \\
 & 9.5122^{\circ} + &
 \end{array}$$

$$\begin{array}{rcl}
 \text{log. } 0.416 & = 9.6191^{\circ} & \\
 & 9.6330^{\circ} + &
 \end{array}$$

$$\begin{array}{rcl}
 \text{log. } 2.60 & = 0.4150^{\circ} & \\
 & 0.4289^{\circ} + &
 \end{array}$$

$$\begin{array}{rcl}
 \text{log. } 3.58 & = 0.5539^{\circ} & \\
 & 0.5678^{\circ} + &
 \end{array}$$

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Jan. 8. 1881

$$\begin{array}{rcl}
 \theta & 10 & 31 & 13.9 \\
 \delta' & 5 & 56 & 47.3 \\
 t' = (\theta - \delta') + 4 & 3 & 4 & 26.6 \\
 \text{Log. sin } t' & & & \\
 \text{Co. log. cos. } \delta' & & & \\
 \text{Log. } (\delta - \delta') & & & \\
 (\delta - \delta') & & &
 \end{array}$$

$$\begin{array}{rcl}
 \text{Co. log. cos. } t' & 0. & 4379 \\
 \text{log. tan } \gamma & 0. & 3952 \\
 \gamma & 68.1 &
 \end{array}$$

$$\begin{array}{rcl}
 (\gamma - \delta') & & \\
 \text{Log. sin } (\gamma - \delta') & & \\
 \text{Co. log. sin } \gamma & & \\
 \text{Log. } (\delta - \delta') & & \\
 (\delta - \delta') & &
 \end{array}$$

$$\angle \delta = 27^\circ 50' 24.2$$

$$\begin{array}{rcl}
 \text{Par. in A.R.} & 0. & 446 \\
 \text{" " Dec.} & 4. & 01
 \end{array}$$

$$\begin{array}{rcl}
 \text{log. } 0.446 & = & 9.6493 \\
 & & 9.6632 +
 \end{array}$$

$$\begin{array}{rcl}
 \text{log. } 4.01 & = & 0.6031 \\
 & & 0.6170 +
 \end{array}$$

(c)

Jan. 18. 1881.

$$\begin{array}{rcl}
 \theta & 4 & 17 & 19.5 \\
 \delta' & 6 & 8 & 53.9 \\
 t' = (\theta - \delta') & -1 & 51 & 34.4 \\
 \text{Log. sin } t' & & & \\
 \text{Co. log. cos. } \delta' & & & \\
 \text{Log. } (\delta - \delta') & & & \\
 (\delta - \delta') & & &
 \end{array}$$

$$\begin{array}{rcl}
 \text{Co. log. cos. } t' & 0. & 0537 \\
 \text{log. tan } \gamma & 0. & 0110 \\
 \gamma & 45.7 &
 \end{array}$$

$$\begin{array}{rcl}
 (\gamma - \delta') & & \\
 \text{Log. sin } (\gamma - \delta') & & \\
 \text{Co. log. sin } \gamma & & \\
 \text{Log. } (\delta - \delta') & & \\
 (\delta - \delta') & &
 \end{array}$$

$$\angle \delta = 25^\circ 14' 44.5$$

$$\begin{array}{rcl}
 \text{Par. in A.R.} & 0. & 219 \\
 \text{" " Dec.} & 2. & 81
 \end{array}$$

$$\begin{array}{rcl}
 \text{log. } 0.219 & = & 9.3404 \\
 & & 9.3543 +
 \end{array}$$

$$\begin{array}{rcl}
 \text{log. } 2.81 & = & 0.4487 \\
 & & 0.4626 +
 \end{array}$$

(c)

Jan. 20. 1881

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θ

5 55 53.8

δ'

$$t' = (\theta - \delta')$$

Log. sin t'

Co. log. cos. δ'

Log. $\delta - \delta'$

$(\delta - \delta')$

Co. log. cos. t'

Log. tan y

y

$(y - \delta')$

Log. sin $y - \delta'$

Co. log. sin y

Log. $(\delta - \delta')$

$(\delta' - \delta')$

$\delta =$ For cor. in

Parallax see

Par. in A. R. Book 25. p. 3.

Dec.

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Apr. 30. 1881.

1			2			3			4		
Star (d)			Star.			Diff.			Diff.		
12	24	36.6	12	20	44.0						
	25	16.3		21	34.6						
49	52.9 ^v		42	18.6 ^v		7 ⁻	34.3 ^c		3 ⁻	47.15 ^c	
31	36.3		27	35.8							
32	6.6		28	33.8							
63	42.9 ^v		56	9.6 ^v		7 ⁻	33.3 ^c		3 ⁻	46.65 ^c	
36	42.2		32	47.0							
37	19.6		33	40.0							
74	1.8 ^v		66	27.0 ^v		7 ⁻	34.8 ^c		3 ⁻	47.40 ^c	
42	10.0		38	9.8							
42	41.3		39	7.8							
84	51.3 ^v		77	17.6 ^v		7 ⁻	33.7 ^c		3 ⁻	46.85 ^c	
47	22.9		43	40.4							
48	12.8		44	20.8							
95	35.7 ^v		88	1.2 ^v		7 ⁻	34.5 ^c		3 ⁻	47.25 ^c	
52	41.0		48	55.3							
53	27.6		49	38.5							
106	8.6 ^v		98	33.8 ^v		7 ⁻	34.8 ^c		3 ⁻	47.40 ^c	
13	18	24.0	14	43.2							
	19	14.6	15	22.3							
37	38.6 ^v		30	5.5 ^v		7 ⁻	33.1 ^c		3 ⁻	46.55 ^c	

- 227.04

2^h 50^m 7.12^s = 1880.0 pos. of letter to star.

- 3 47.04

2 46 20.08^s = 1880.0 " unlettered "Mean of uncorrected sid. times of obs. = 12^h 34^m 40.2^s

$$(Diff. \equiv) (Diff. *) (Col. 5 - Col. 6) (Col. 5 + Col. 6) \left(\frac{15 \cos. dec.}{2} \right) (Dir. - Col. 9)$$

$$0^m 39^s.7 0^m 50^s.6$$

$$1^m 30^s.3$$

$$0^m 30^s.3 0^m 58^s.0$$

$$1^m 28^s.3$$

$$\text{Log. } 49.73 = 1.952938$$

$$" \quad 7.5 = 0.875061$$

$$" \cos. dec. = 9.771262$$

$$397.43 = 2.599261$$

$$889.5$$

$$492.37$$

$$246.18$$

$$0^m 37^s.4 0^m 53^s.0$$

$$1^m 30^s.4$$

$$0^m 31^s.3 0^m 58^s.0$$

$$1^m 29^s.3$$

$$1.952938$$

$$0.875061$$

$$9.770553$$

$$1^m 30^s.3$$

$$396.78 = 2.598552$$

$$889.5$$

$$493.02 = +8' 13.02"$$

$$0^m 46^s.6 0^m 43^s.2$$

$$1^m 29^s.8$$

$$0^m 50^s.6 0^m 39^s.1$$

$$1^m 29^s.7$$

$$89^s.73$$

See also
Bork 85. p. 4.

$$53^{\circ} 48' 12.5'' = 1880.0 \text{ pos. of lettered star.}$$

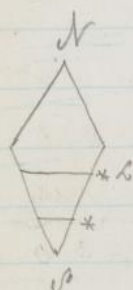
$$\begin{array}{r} + 4 \quad 6.2 \\ 53 \quad 52 \quad 18.7 \end{array}$$

$$53 \quad 48 \quad 12.5$$

$$+ 8 \quad 13.0$$

$$53 \quad 56 \quad 25.5 = \text{unlettered}$$

May 2. 1861.



	¹ Star (d)	² Star.	³ Diff.	⁴ <u>Diff.</u>
11	26 31.0	28 9.9		
	27 51.9	28 20.1		
	54 22.9 ^v	56 30.0 ^v	2 ^m 7.1 ^c	1 ^m 3.55 ^c
	28 54.5	30 33.7		
	30 16.0	30 45.3		
	59 10.5 ^v	61 19.0 ^v	2 ^m 8.5 ^c	1 ^m 4.25 ^c
	31 29.9	33 9.2		
	32 52.1	33 21.1		
	64 22.0 ^v	66 30.3 ^v	2 ^m 8.3 ^c	1 ^m 4.15 ^c
	33 42.8	35 21.8		
	35 5.5	35 34.3		
	68 48.3 ^v	70 56.1 ^v	2 ^m 7.8 ^c	1 ^m 3.90 ^c
	36 23.9	38 3.3		
	37 47.8	38 16.9		
	74 11.7 ^v	76 20.2 ^v	2 ^m 8.5 ^c	1 ^m 4.25 ^c
	38 58.0	40 37.7		
	40 22.6	40 51.8		
	79 20.6 ^v	81 29.5 ^v	2 ^m 8.9 ^c	1 ^m 4.45 ^c
	41 10.4	42 49.8		
	42 36.2	43 5.4		
	83 46.6 ^v	85 55.2 ^v	2 ^m 8.6 ^c	1 ^m 4.30 ^c
				+ 64.12 ^v

$$\begin{array}{rcl}
 3^h & 7^m & 34.17 = 1880.0 \text{ pos. of lettered } * \\
 + 1 & 4.12 & \\
 \hline
 3 & 8 & 38.29 = 1880.0 \text{ " " unlettered " " }
 \end{array}$$

mean of uncorrected sid. time of obs. = 11^h 35^m 6.5^s

$$(\text{Diff. } \equiv) (\text{Diff. } *) (\text{Col. } 5 - \text{Col. } 6) (\text{Col. } 5 + \text{Col. } 6) \left(\frac{15 \cos. \text{dec.}}{2} \right) (\text{Diag.} - \text{Col. } 9)$$

$$1^m 20^s.9^v 0^m 10^s.2^v \quad 1^m 10^s.7^v$$

$$\text{Log. } 70.30 = 1.846955^v$$

$$11 \quad 7.5 = 0.875061^v$$

$$11 \quad \cos. \text{dec.} = 9.779414^v$$

$$317.27^v = 2.501430^v$$

$$158.64$$

$$1^m 22^s.2^v 0^m 11^s.9^v \quad 1^m 10^s.3^v$$

$$1.846955^v$$

$$0.875061^v$$

$$9.779857^v$$

$$317.59^v = 2.501873^v$$

$$1^m 23^s.9^v 0^m 13^s.6^v \quad 1^m 10^s.3^v$$

$$1^m 24^s.6^v 0^m 14^s.1^v \quad 1^m 10^s.5^v$$

$$1^m 25^s.8^v 0^m 15^s.6^v \quad 1^m 10^s.2^v$$

$$70.30^v$$

$$+53^{\circ} 0' 14.5^v = 1880.0 \text{ pro } \gamma \text{ lettered } *$$

$$\begin{array}{r} -2 \quad 38.6^v \\ +52 \quad 57 \quad 38.9^v \end{array}$$

$$+53 \quad 0 \quad 14.5^v$$

$$\begin{array}{r} -5 \quad 17.6^v \\ +52 \quad 54 \quad 39.9^v = 1880.0 \text{ " " unlettered } * \end{array}$$

Nov. 27. 1880.

$$\log. 29.56 = 1.470704^v$$

$$" \left(\frac{15 \cos. dec.}{2} \right) = 0.644872^v$$

$$" 130.49 = 2.115576^v$$

$$65.24 = +1' 52.4^v$$

$$53^\circ 56' 35.6^v$$

$$53^\circ 54' 40.8^v$$

$$\log. 29.56^c = 1.470704^c$$

$$" \left(\frac{15 \cos. dec.}{2} \right) = 0.644683^c$$

$$" 130.43 = 2.115387^c$$

$$+2' 10.43^v$$

$$53^\circ 56' 35.6^v$$

$$app. dec. \oplus = 53^\circ 58' 46.0^v$$

$$2h 46^m 25.05^s$$

$$app. a. R. \oplus = 2h 44^m 34.13^s$$

Nov. 29. 1880.

$$\log. 45.40^c = 1.657056^c$$

$$" \left(\frac{15 \cos. dec.}{2} \right) = 0.655309^c$$

$$205.29^v = 2.312365^v$$

$$102.64^v = +1' 42.64^c$$

$$52^\circ 55' 18.4^c$$

$$52^\circ 54' 1.0^c$$

$$\log. 45.40^c = 1.657056^c$$

$$" \left(\frac{15 \cos. dec.}{2} \right) = 0.655024^c$$

$$205.15^c = 2.312080^c$$

$$+3' 25.15^c$$

$$52^\circ 55' 18.4^c$$

$$app. dec. \oplus = 52^\circ 58' 43.6^c$$

$$3h 8^m 43.42^s$$

$$-0 16.92^s$$

$$app. a. R. \oplus = 3h 8^m 26.50^s$$

June 24. 1881.
Comet 7.

H. A.	+9 ^h	48 ^m	35.0 ^s
θ	15	47	57.0
θ'	5	59	22.0
$\theta' = (\theta - \theta')$	9	48	35.0
log. sin θ'	9.	7344	+
Co. log. cos. θ'	0.	3497	+
Log. $(\theta - \theta')$	0.	8862	+
$(\theta - \theta')$	+7.	695	

Co. log. cos θ'	0.	0757	n
Log. cos γ	0.	0330	n
γ	+132.	8	

$(\gamma - \delta')$	+69.	4	
log. sin $(\gamma - \delta')$	9.	9713	+
Co. log. sin γ	0.	1345	+
log. $(\delta - \delta')$	0.	8652	+
$(\delta - \delta')$	+7.	33	

$$\approx \delta' = +63^\circ 26' 54.6''$$

Parallax R.	0.513	
" Dec.	7.33	

Orig. log. 0.513	9.	7101	
	9.	7240	+

Orig. log. 7.33	0.	8652	
	0.	8791	+

≡ June 24. 1881.

R. A.

Dec.

A.C. Pos. = 5	34	17.83'	40	14	49.9'
				-1	6.3'
Provision. =	+2	23.87'	40	13	43.6'
			90		
Pos. 1861.0 = 5	36	41.70'	49	46	16.4'
	+2	15.25'		-1	31.8'
Pos. ≡ = 5	38	57.55'	49	44	44.6'
	49°	46'			19.5
					9.5
	49	46			29.0

$$\log. \cos. " = 9.810241'$$

$$" 15 = 1.176091$$

$$0.986332$$

$$" 2 = 0.301030$$

$$0.685302$$

$$\log. 34.5 = 1.537819'$$

$$2.223121 = 167.2$$

$$\log. 21.2 = 1.450249'$$

$$2.135551 = 136.6$$

$$" 18.8 = 1.274158'$$

$$1.959460 = 91.1$$

$$" 11.1 = 1.045323'$$

$$1.730625 = 53.8$$

$$" 2.1 = 0.322219'$$

$$1.007521 = 10.2$$

$$458.9'$$

$$91.78'$$

June 24. 1881.

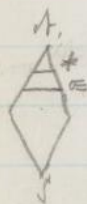
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Pos. 1881.0	5 ^h	36 ^m	41.70	+ 49°	46'	16.4"
Red. to ap. pl.			+1.76			-2.9
Ap. pl.	5	36	43.46	+ 49	46	13.5
			+ 2			- 1
Pos. uncorr.	5	38	59.31	+ 49	44	41.7
reduced for dif. ref.						

For Precession and reduction to Apparent Place
see book 85, pages 8 & 9. and Pos ~~☉~~.

June 24. 1881.

P. obs.



1 Comet.	2 Star	3 Diff.	4 <u>Diff.</u>
14 ^h 51 ^m 20.0	49 ^m 23.0		
52 16.2	49 44.4		
103 36.2 [✓]	99 7.7 [✓]	4 ^m 28.5	2 ^m 14.25 [✓]
54 56.0	52 55.3		
55 43.1	53 14.2		
110 39.1 [✓]	106 9.5 [✓]	4 29.6	2 14.80 [✓]
59 25.3	56 59.7		
15 0 0.8	57 54.0		
119 26.1 [✓]	114 53.7 [✓]	4 32.4	2 16.20 [✓]
2 54.4	15 ^h 0 32.3		
3 39.3	1 24.3		
126 33.7 [✓]	122 0.6 [✓]	4 33.1	2 16.55 [✓]
6 54.4	4 38.9		
7 53.1	5 36.7		
134 50.5 [✓]	130 15.6 [✓]	4 34.9	2 17.45 [✓]
		mean = + 2 ^m	15.85 [✓]

14^h 51^m 22.6[✓] 5.5[✓]-31 Cor. Chron.[✓]

14	57	52 [✓]	1 ^m 26.009 [✓]
6	11	53 [✓]	161 [✓]
8	45	59 [✓]	1 26.170 [✓]
	-1	26 [✓]	
8	44	33 [✓]	C. m. 5. -

5 6 7 8 9 10
 Diff. E Diff. * (Col. 5 - Col. 6) (Col. 5 + Col. 6) $\left(\frac{\text{Col. 7} \cdot \text{cos. dec.}}{2}\right)$ (Diag. - Col. 9)

56.2' 21.7' 34.5'

$$\text{Log. } 18.94 = 1.277380'$$

$$\text{" } 7.5 = 0.875061'$$

$$\text{" cos. dec.} = 9.810133'$$

$$91.74 = 1.962574'$$

$$45.87'$$

47.1' 18.9' 28.2'

$$\text{Log. } 18.94 = 1.277380'$$

$$\text{" } 7.5 = 0.875061'$$

$$\text{" cos. dec.} = 9.810247'$$

$$91.77 = 1.962688'$$

35.5' 54.3' 18.8'

44.9' 56.0' 11.1'

$$\begin{array}{r} 55.7' \quad 57.8' \quad 2.1' \\ 47.24' \quad 0' \quad 41.74' \quad 794.7' \end{array}$$

$$\text{mean} = 18.94'$$

$$+49^\circ 46' 13.5''$$

$$-0 45.9'$$

$$+49 45 27.6' \text{ mid place}$$

$$91.7 = 1.962567$$

$$+49^\circ 46' 13.5''$$

$$46 13.5 - 1 31.5'$$

$$+49 44 41.7' \text{ Pos.}$$

$$49 44 41.7' \text{ app. mid place}$$

$$9.810346$$

See top of page

June 25, 1861.1
Comet2
Star3
Diff.4
Diff.15 24 34.7^v15 23 16.0^v24 59.8^v24 21.3^v49 34.5^v47 37.3^v1^m 57.2^v58.6 0^v26 46.2^v25 28.3^v27 16.6^v26 35.2^v54 2.8^v52 3.5^v1 59.3^v59.65^v15 29 9.0^v27 50.2^v29 45.3^v29 1.3^v58 54.3^v56 54.5^v1^m 59.8^v59.90^v15 31 44.1^v30 57.4^v32 40.0^v31 27.3^v64 24.1^v62 24.7^v1^m 59.4^v59.70^v36 49.8^v35 57.0^v37 32.8^v36 25.0^v74 22.6^v72 22.0^v2^m 0.6^v60.30^v

298.15

+ 0^m 59.630^vMean of uncol.
sid. times15^h 30^m 7.8^s ^v- 28.5^s15 29 39.3^v6 15 49.7^v9 13 49.6^v- 1 30.7^v9 12 18.9^v C.M. Y.1^m 30.596^v.136^v1 30.732^v

$$v = z' / z' \vee f$$

June 25, 1881.

Comp. star 2 m. + 53° 957.

Pos. 1855

R. A.

Dec.

$$\begin{array}{r}
 5^h \quad 40^m \quad 10.2 \\
 \quad \quad \quad 2 \quad 7.1 \\
 \hline
 5 \quad 42 \quad 17.3 \\
 \quad \quad \quad + 59.6 \\
 \hline
 5 \quad 43 \quad 16.9
 \end{array}$$

$$\begin{array}{r}
 + 53^\circ \quad 46.1 \\
 \quad \quad \quad + .8 \\
 \hline
 + 53 \quad 46.9 \\
 \quad \quad \quad - 2.2 \\
 \hline
 + 53 \quad 44.7
 \end{array}$$

Pos. α

- For Precision Reduction see Book & v. Page 62
 " Pos of α and App. Pl. reduction see Page 63.
 " Reduction Parallax Reduction see Book & v. Page 14.

$$\begin{array}{r}
 .0002849 \\
 \hline
 68 \\
 22792 \\
 \hline
 17094 \\
 0.0193732 \\
 \hline
 46.0623 \\
 \hline
 46.08167 = w
 \end{array}$$

$$\begin{array}{r}
 .0000863 \\
 \hline
 68 \\
 6904 \\
 \hline
 5148 \\
 .0058684 \\
 \hline
 20.0607 \\
 \hline
 20.06657 = w \\
 20.0548
 \end{array}$$

$$\log. \frac{20.06657}{20.0548} = 1.302218/2$$

$$\begin{array}{r}
 9.9983723 \\
 \hline
 0.1350510
 \end{array}$$

$$\begin{array}{r}
 27.2673 \\
 \hline
 46.0128 \\
 \hline
 73.3490 = \frac{dt}{dt}
 \end{array}$$

$$\begin{array}{r}
 81 \\
 \hline
 158 \\
 \hline
 26
 \end{array}$$

$$\log. \cos. t = 8.9365986$$

$$\begin{array}{r}
 1.302218 \\
 \hline
 1.733 = 0.2388163
 \end{array}$$

$$\frac{dd}{dt}$$

$$1.5. = 1.$$

$$\log. 73.349 = 1.865394$$

$$" 26 = 1.414973$$

$$8.823909$$

$$127.1 = 2.104276$$

$$0.238816$$

$$1.414973$$

$$45.06 = 1.653789$$

June 26 - 1841.

St. obs.

1	2	3	4
Comet.	Star	Diff.	$\frac{\text{Diff.}}{2}$
15 20 13.3 ^v	18 ⁻ 55.7 ^v		
21 04 ^v	20 2.0 ^v		
41 13.7 ^v	38 57.7 ^v	2 ⁻ 16.6 ^v	1 ⁻ 8.30 ^v

23 1.2 ^v	21 46.6 ^v		
23 46.5 ^v	22 44.3 ^v		
46 47.7 ^v	44 30.9 ^v	2 16.8 ^v	1 ⁻ 8.40 ^v

25 37.5 ^v	24 24.3 ^v		
26 28.0 ^v	25 23.1 ^v		
52 5.5 ^v	49 47.4 ^v	2 18.1	1 9.05 ^v

28 24.0 ^v	27 16.2 ^v		
29 11.2 ^v	28 0.8 ^v		
57 35.2 ^v	55 17.0 ^v	2 18.2	1 9.10 ^v

31 6.0 ^v	29 54.9 ^v		
31 46.0 ^v	30 38.5 ^v		
62 52.0 ^v	60 33.4 ^v	2 18.6	1 9.30 ^v
			43.85

+ 1^m 8.770^vMean of uncor-
rected Sid.
times.

$$= 15^h 26^m 3.4^s$$

$$- 26^s$$

$$15^h 25^m 37^s$$

$$6^m 19^s 46^s$$

$$9^m 5^s 51^s$$

$$1^m 29^s$$

$$9^m 4^s 22^s = \text{C. M. S. of obs.}$$

$$1 \quad 29.285^s$$

$$129^s$$

$$1 \quad 29.424^s$$

$\sqrt{\text{diff.}}$ 6 7 8 9 10
 Diff.^* $(\text{Col. 5} - \text{Col. 6})$ $(\text{Col. 5} + \text{Col. 6})$ $\frac{\text{res. dec.}}{2}$ $\text{diag.} - \text{Col. 9.}$

$$47.1^{\circ} \quad 1^{\circ} \quad 6.3^{\circ} \quad 19.2^{\circ} = 1.283301^{\circ}$$

$$1.590982 = 77.80$$

$$45.3^{\circ} \quad 57.7^{\circ} \quad 12.4^{\circ} = 1.093422^{\circ}$$

$$1.701103 \quad 50.25$$

$$50.5^{\circ} \quad 58.8^{\circ} \quad 8.3^{\circ} = 0.919074^{\circ}$$

$$1.526759 \quad 33.63$$

$$47.2^{\circ} \quad 44.6^{\circ} \quad 2.6^{\circ} = 0.414973^{\circ}$$

$$1.022654 \quad 10.54$$

$$\begin{array}{r}
 40.0^{\circ} \quad 43.6^{\circ} \quad -3.6^{\circ} = 0.556303 \\
 46.0^{\circ} \quad 54.2^{\circ} \quad 38.9^{\circ} \quad 1.163984 \\
 \hline
 \text{Log mean} = 7.78 = 0.890980 \\
 \text{Log } \gamma = 0.875061 \\
 \text{" cos. dec.} = 9.732585 \\
 \text{" } 31.52 = 1.498626 \\
 15.76 \quad 1.498626 \\
 \hline
 \text{Log } 7.78 = 0.890980 \\
 \text{" } \gamma = 0.875061 \\
 \text{cos. dec.} = 9.732637 \\
 31.52 = 1.498678 \\
 \hline
 \text{" } 2 = 0.501030 \\
 0.501030
 \end{array}$$

$$\begin{array}{r}
 14.59 \\
 156.81 \\
 37.362 \\
 +57 \quad 18 \quad 0.7 \\
 \hline
 -14.59 \\
 +57 \quad 17 \quad 44.9 \\
 \hline
 +57 \quad 18 \quad 0.7 \\
 \hline
 -31.52 \\
 +57 \quad 17 \quad 29.2
 \end{array}$$

June 26. 1881.

imp. star.

P.M. +57° 922

$$\begin{array}{r}
 5^h \ 44 \ 39.0 \\
 +2 \ 10.6 \\
 \hline
 5 \ 46 \ 49.6
 \end{array}$$

$$\begin{array}{r}
 +57^\circ \ 17.1 \\
 +.3 \\
 \hline
 57 \ 17.4
 \end{array}$$

D.A. 6297.

$$\begin{array}{r}
 5^h \ 45 \ 30.71 \\
 3 \ 15.94 \\
 \hline
 5 \ 46 \ 46.65
 \end{array}$$

$$\begin{array}{r}
 +57^\circ \ 17' \ 13.8 \\
 +54.6 \\
 \hline
 +57 \ 18 \ 8.4
 \end{array}$$

Pos. * 1881.0 =

$$\begin{array}{r}
 5 \ 46 \ 46.65 \\
 1 \ 6.77 \\
 \hline
 5 \ 47 \ 53.42
 \end{array}$$

$$\begin{array}{r}
 +57 \ 18 \ 8.4 \\
 -37.4 \\
 \hline
 +57 \ 17 \ 31.0
 \end{array}$$

Red to ap. place.

$$\begin{array}{r}
 5 \ 47 \ 53.42 \\
 +1.80 \\
 \hline
 5 \ 47 \ 55.22
 \end{array}$$

$$\begin{array}{r}
 +57 \ 17 \ 31.0 \\
 -3.5 \\
 \hline
 +57 \ 17 \ 27.5
 \end{array}$$

Pos. 1881.0 =

$$\begin{array}{r}
 5^h \ 46 \ 46.65 \\
 +1.80 \\
 \hline
 5 \ 46 \ 48.45
 \end{array}$$

$$\begin{array}{r}
 +57^\circ \ 18' \ 8.4 \\
 -3.5 \\
 \hline
 +57 \ 18 \ 4.9
 \end{array}$$

Red. to ap. pl.

$$\begin{array}{r}
 5 \ 46 \ 48.45 \\
 1 \ 8.77 \\
 \hline
 5 \ 47 \ 57.22
 \end{array}$$

$$\begin{array}{r}
 +57 \ 18 \ 4.9 \\
 -37.4 \\
 \hline
 +57 \ 17 \ 27.5
 \end{array}$$

E - *

$$\begin{array}{r}
 5 \ 47 \ 57.22 \\
 \hline
 5 \ 47 \ 57.22
 \end{array}$$

$$\begin{array}{r}
 +57 \ 17 \ 27.5 \\
 \hline
 +57 \ 17 \ 27.5
 \end{array}$$

9^h 4^m 22^s C. M. S.

For precession see book 79 page 58.

For Pos 70 see book 79 " 59

June 26. 1881.

203

$$\delta = +57^{\circ} 18' 4''.3$$

f.	+ 2. 545				
Log. g.	1. 2247 +	✓	Log. g.	1. 2247 +	✓
" sin (G+H)	9. 9982 +	✓	" cos (G+H)	8. 9634 m	✓
" tan. δ	0. 1925 +	✓	" sum	0. 1881 m	✓
" sum	1. 4154 +	✓	$2y$	- 1. 54	✓
" 15	1. 1761 +	✓	" h	1. 3103 +	✓
" result	0. 2393 +	✓	" cos (H+H)	9. 1607 m	✓
$2y$	+ 1. 735	✓	" sin δ	9. 9251 +	✓
" h	1. 3103 +	✓	" sum	0. 3961 m	✓
" sin (H+H)	9. 9954 m	✓	$2y$	- 2. 49	✓
" sec. δ	0. 2674 +	✓	" h	9. 8903 +	✓
" sum	1. 5731 m	✓	" cos. δ	9. 7326 +	✓
" 15	1. 1761 +	✓	" sum	9. 6229 +	✓
" result	0. 3970 m	✓	$2y$	+ 0. 42	✓
$2y$	- 2. 495	✓	$\delta' - \delta$	- 3. 61	✓
$\delta' - \delta$	+ 1. 785	✓			

$$\begin{array}{lcl}
 G = 0^h 34.2^m & H = 11^h 39.8^m & \\
 \delta = 5 46.9^{\circ} & \delta = 5 46.9^{\circ} & \\
 (G+H) = 6 21.1 & (H+H) = 17 26.7 &
 \end{array}$$

-14 day.

June 26, 1881. 2d obs.



1	2	3	4
Comet.	Star.	Diff.	Diff.
17 ^h 28 ^m 49.5 ^s	27 ^m 15.0 ^s		
29 4.0 ^s	30.0 ^s		
57 53.5 ^s	54 45.0 ^s	3 ^m 5.5 ^s	1 ^m 32.75 ^s
31 48.0 ^s	30 19.5 ^s		
32 5.5 ^s	31.5 ^s		
63 56.5 ^s	60 51.0 ^s	3 5.5 ^s	1 ^m 32.75 ^s
		Mean = +1 ^m	32.75 ^s

Same comp. star as in previous set on this date.

1881.0	5 ^h 46 ^m 46.65 ^s	+57	18	8.4 ^s
Red to ap. pl.	+1.80 ^s			-3.5 ^s
ap. pl. *	5 46 48.45 ^s	+57.0	18	4.9 ^s
	+1 32.75 ^s		+16	44.9 ^s
Pos. ♂	5 48 21.20 ^s	+57	34	53.8 ^s
Cor. for ref.	-0.12			+3.7
Cor. pos. ♂	5 48 21.08	+57	34	57.5

17 ^h 30 ^m 27.50 ^s	1	49.763 ^s
-26. Chr. cor.		.044 ^s
17 30 2 ^s	1	49.807 ^s
6 19 46 ^s		
11 10 16 ^s		
1 50 ^s		
11 8 26 ^s = C. m. 5. obs.		

— * cor. for refraction = 1^m 32.63^s + 16^m 52.6^s

$$\begin{array}{cccccc}
 5 & 6 & 7 & 8 & 9 & 10 \\
 \text{Diff.} = & \text{Diff.} * & (\text{Col. 5} - \text{Col. 6}) & (\text{Col. 5} + \text{Col. 6}) & \frac{15 \text{ Col. 5} + \text{Col. 6}}{2} & \text{Diff.} - \text{Col. 9}
 \end{array}$$

$$14.5^{\circ}$$

$$12.0^{\circ}$$

$$26.5^{\circ}$$

$$\begin{array}{r}
 20.5^{\circ} \\
 17.5^{\circ} \\
 \hline
 12.0^{\circ}
 \end{array}$$

$$\begin{array}{r}
 32.5^{\circ} \\
 59.0^{\circ} \\
 \hline
 29.5^{\circ}
 \end{array}$$

$$\log. 29.5 = 1.469822^{\circ}$$

$$\log. \cos. \delta = 9.732585^{\circ}$$

$$15. = 1.176091^{\circ}$$

$$2.378498^{\circ}$$

$$\log. 2. = 0.301030^{\circ}$$

$$119.5^{\circ} = 2.077468^{\circ}$$

$$\begin{array}{r}
 889.8^{\circ} \\
 1009.3^{\circ} \\
 \hline
 504.6^{\circ}
 \end{array}$$

$$504.6 = 8' 24.6''$$

$$57.18 0.7^{\circ}$$

$$\log. \cos. = 57 26 25.3 = 9.730926^{\circ}$$

$$\log. 15 = 1.176091^{\circ}$$

$$\log. 29.5 = 1.469822^{\circ}$$

$$2.376839^{\circ}$$

$$\log. 2. = 0.301030^{\circ}$$

$$119.1 = 2.075809^{\circ}$$

$$889.8^{\circ}$$

$$6. / 1008.9 (16' 48.9''$$

$$\begin{array}{r}
 60 \\
 408 \\
 760 \\
 \hline
 48.9
 \end{array}$$

2nd times

For Pos. see book on page 10.

June 28, 1881.

Pos. 1842.	5^h 51^m 32.18	+63° 26' 59.4
	+3 44.25	+27.5
Pos. 1881.0 =	5 55 16.43	63 27 26.7
Red. to ap. pl.	+1.75	-4.5
Pos. ap.	5 55 18.18	63 27 22.2
$\Delta t =$	+4 3.95	-23.1
Pos. \oplus	5 59 22.13	+63 26 59.1

S. J.

mean	23^m 34.5^s	= 9^h 33^m 0.0^s	= M. J.
0	+5 24.4^s	-18 10.1^s	
0	18 13.1^s	9 14 49.9^s	= C. M. J.
	-3.0^s		
0	18 10.1^s		

Sid time glob. 15^h 47^m 57.0^s = 1st series,

For position \oplus see book 79 page 61.

June 28. 1881.

207

$$\delta = +63^\circ 27' 21.9''$$

f	+ 2.566	✓			
Log. g	1.2283 +	✓	Log. g.	1.2283 +	✓
" sin(H+t)	9.9964 +	✓	" cos(H+t)	9.1069 m	✓
" tan. d	0.3014 +	✓	" sum	0.3352 m	✓
" sum	1.5261 +	✓	2y.	- 2.16	✓
" 15	1.1761 +	✓	" sh	1.3100 +	✓
" result	0.3500 +	✓	" cos(H+t)	9.1436 m	✓
2y.	+ 2.239	✓	" sin d	9.9516 +	✓
" sh	1.3100 +	✓	" sum	0.4052 m	✓
" sin(H+t)	9.9958 m	✓	2y.	- 2.54	✓
" sec. d	0.3498 +	✓	" i	0.0206 +	✓
" sum	1.6556 m	✓	" cos. d	9.6502 +	✓
" 15	1.1761 +	✓	" sum	9.6708 +	✓
" result	0.4795 m	✓	2y.	+ 0.47	✓
2y.	- 3.016	✓	$\delta' - \delta$	- 4.23	✓
$\delta' - \delta$	+ 1.789	✓			

$$L = 0^\circ 34.1' \quad H = 11^\circ 32.7'$$

$$t = 5 \quad 55.3' \quad t = 5 \quad 55.3'$$

$$L+t = 6 \quad 29.4' \quad H+t = 17 \quad 28.6'$$

-13' day.

June 28. 1861.



1	2	3	4
Comet.	Star.	Diff.	$\frac{\text{Diff.}}{2}$
0 4 21.6 ^v	0 ^h 0 ^m 24.2 ^v		
0 6 17.2 ^v	2 16.7 ^v		
10 4 P. F ^v	2 40.9 ^v	8 ^m 7.9 ^v + 4 ^m 3.9 ^v	

 $1 \frac{1}{11}$ series.

$$\log. 6.9 = 0.838849^v$$

$$" \cos. dec. = 9.650212^v$$

$$" 15 = 1.176091^v$$

$$\underline{1.665152^v}$$

$$" 2. = 0.301030^v$$

$$2/23.13^v = 1.364122^v$$

$$11.56$$

$$+63^\circ 27' 17.4''^v$$

$$\underline{-0 11.6''^v}$$

$$+63 27 6.1''^v$$

$$\log. \cos. dec. = 9.650261^v$$

$$" 6.9 = 0.838849^v$$

$$" 15. = 1.176091^v$$

$$\underline{1.665201^v}$$

$$" 2. = 0.301030^v$$

$$- 23.13^v = 1.364171^v$$

A zero was assumed on the chron. sheet and subsequently a comparison was made with Bond 394 in terms of said assumed zero, as follows, viz:

From sheet.

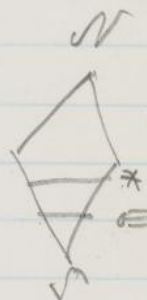
$$0^h 23^m 37.5^s$$

Bond 394.

$$9^h 33^m 0.0^s$$

⁵ Diff. \approx ⁶ Diff. \times ⁷ (Col. 5 - Col. 6) ⁸ (Col. 5 + Col. 6) ⁹ $\frac{15 \cos. dec.}{2}$ ¹⁰ Day - Col. 9

⁵ 1-45.6" ⁶ 1^m 52.5" ⁷ 6.9"



$$\log. 26.9 = 1.567026$$

$$\log. \cos. dec. = 9.650194$$

$$" 15 = 1.176091$$

$$2.393311$$

$$" 2 = 0.301030$$

$$2.092281$$

$$\begin{array}{r} 2123.7 \\ 61.8 \end{array}$$

$$\begin{array}{r} 63 \quad 27 \quad 22.7 \\ -1 \quad 1.8 \\ \hline 63 \quad 26 \quad 20.4 \end{array}$$

$$9.650413$$

$$1.567026$$

$$1.176091$$

$$2.393570$$

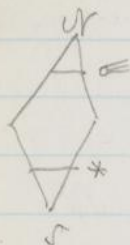
$$0.301030$$

$$2.092540$$

$$123.7$$

$$2' \quad 3.7$$

June 28. 1880.



1	2	3	4
Correct.	Star.	Diff.	Diff.
18 ^h 45 ^m 45.4 ^s	48 ^m 47.3 ^s		
47 5.5 ^s	49 53.9 ^s		
92 50.9	98 41.2	5 50.3 ^s	2 55.5 ^s
50 24.4 ^s	53 13.6 ^s		
51 28.0 ^s	54 25.9 ^s		
101 52.4	107 39.5	5 47.1 ^s	2 53.5 ^s
55 5.0 ^s	57 48.1 ^s		
55 59.2 ^s	59 13.1 ^s		
111 4.2	116 49.4	5 45.2 ^s	2 52.6 ^s
59 27.0 ^s	2 11.6 ^s		
0 19.4 ^s	3 17.2 ^s		
119 46.4	125 28.8	5 42.4 ^s	2 51.2 ^s
8 53.2 ^s	11 19.6 ^s		
9 21.9 ^s	12 31.9 ^s		
132 15.1	143 51.5	5 36.4 ^s	2 48.2 ^s
			- 2 52.14 ^s

Mean of
uncorr. sid.
times

$$\begin{aligned}
 &= 18^h 56^m 22.9^s \\
 &\quad - 23.0^s \\
 &\hline
 &18 55 59.9^s \\
 &\quad 6 27 39.4^s \\
 &\hline
 &12 28 20.5^s \\
 &\quad - 2 2.6^s \\
 &\hline
 &12 26 17.9^s \text{ C. M. S.}
 \end{aligned}$$

$$\begin{aligned}
 &2 2542^s \\
 &\quad .056^s \\
 &\hline
 &2 2598^s
 \end{aligned}$$

~~1st~~
2d series.

$$\overset{5}{\text{Diff.}} \equiv \overset{6}{\text{Diff.}} \times (\overset{7}{\text{Col. 5 - Col. 6}}) (\overset{8}{\text{Col. 5 + Col. 6}}) \frac{\overset{9}{15 \text{ cos. dec.}}}{2} (\overset{10}{\text{Sig. - Col. 9}})$$

$$1^- 20.1^{\circ} \quad 1^- 6.6^{\circ} \quad 2^- 26.7^{\circ}$$

$$1 \quad 3.6 \quad 1 \quad 12.3 \quad 2 \quad 15.9^{\circ}$$

$$0 \quad 54.2 \quad 1 \quad 13.2 \quad 2 \quad 7.4^{\circ}$$

$$0 \quad 52.4 \quad 1 \quad 5.6 \quad 1 \quad 13.2 \quad 1 \quad 58.0^{\circ}$$

$$\begin{array}{r} 0 \quad 28.7^{\circ} \quad 1 \quad 12.3^{\circ} \\ 0 \quad 55.80^{\circ} \quad 1^{\circ} \quad 10.00^{\circ} \end{array}$$

$$\begin{array}{r} 63^{\circ} 40' 47.8'' \\ + 3 \quad 55.8'' \\ \hline 63 \quad 44 \quad 43.6 \end{array}$$

$$\begin{array}{l} \text{log. cos.} = 9.645776 \\ " \quad 125.8 = 2.099681^{\circ} \\ " \quad 15 = 1.176091^{\circ} \\ \quad \quad 2.921548^{\circ} \end{array}$$

$$\begin{array}{l} " \quad 2. = 0.301030^{\circ} \\ 417.4^{\circ} \quad 2.620518^{\circ} \\ 889.8^{\circ} \\ \hline 472.4^{\circ} - + 7' 52.4^{\circ} \end{array}$$

$$\begin{array}{r} 43.6 \quad 1 \quad 41.0^{\circ} \\ \hline 629.0^{\circ} \end{array}$$

$$\text{log. } 125.8^{\circ} = 2.099681^{\circ}$$

$$" \quad \text{cos. dec.} = 9.646781$$

$$" \quad 15 = 1.176091^{\circ}$$

$$\quad \quad 2.922553^{\circ}$$

$$" \quad 2. = 0.301030^{\circ}$$

$$\quad \quad 418.3^{\circ} = 2.621523^{\circ}$$

$$889.8^{\circ}$$

$$\begin{array}{r} 2471.5^{\circ} \\ \hline 235.8^{\circ} \end{array}$$

June 28. 1840.

Comp. star DM. $+63^{\circ} 640$.

Comet in northern half of field - star in southern.

DM. 1855 $6^h 0^m 32^s +63^{\circ} 41.3$ (9.3)

Or. A. 1842	$5^h 59^m 17.52$	$+63^{\circ} 40' 56.0$
	3	$+2.4$
Pos. 1851.0	$6^h 3^m 2.74$	$+63^{\circ} 40' 58.4$
Red. to ap. pl.	$+1.75$	-4.5
Ap. Pos.	$6^h 3^m 4.49$	$+63^{\circ} 40' 53.9$
	-2	$+7$
Pos. \equiv	$6^h 0^m 12.35$	$+63^{\circ} 48' 46.4$

For precession see page 12 Book 55.

" Reduction to Apparent Place. see page 11 Book 55.

" Pos \equiv see page 11 Book 55.2d series

$$\begin{array}{r} 18.1 \\ 18.4 \\ \hline 21.9 \\ 19.5 \end{array}$$

$$\begin{array}{r} .000.2849 \\ 19.5 \\ \hline 14245 \\ 28641 \\ 2849 \\ \hline .00555555 \\ 46.0623 \\ \hline m = 46.0679. \end{array}$$

$$\begin{array}{r} .000.263 \\ 19.5 \\ \hline 4315 \\ 7767 \\ 863 \\ \hline - .00168285 \\ 20.0607 \\ \hline n = 20.0596 \end{array}$$

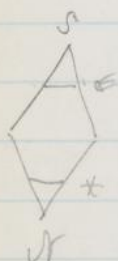
$$\begin{array}{r} 5^h = 75 \\ 14 \ 45 \\ \hline 4 \ 23 \\ 29 \ 49 \ 23 \end{array}$$

$$\begin{aligned} \log. n &= \log. 20.0596 = 1.3023093 \\ " \sin. t &= 9.9999979 \\ " \cos. \delta &= 0.3054310 \\ 40.5544 &= 1.6080382 \end{aligned}$$

$$\begin{array}{r} 46.0679 \\ 40.5544 \\ \hline \log. 86.6223 = 1.9376294 \\ " \quad 15 = 1.1760913 \\ 5.775 = 0.7615344 \\ " \quad 39 = 1.5910646 \\ 225.22 = 2.3526030 \end{array}$$

$$\begin{aligned} \log. n &= 1.3023093 \\ \log. \cos. t &= 7.4897136 \\ - 0.0619 &= 8.7920229 \\ \log. 39 &= 1.5910646 \\ 2.42 &= 0.3830845 \end{aligned}$$

June 29. 1881.



1	2	3	4
Comet.	Star.	Diff.	Diff.
0 ^h 45 20.3 ^v	42 58.2 ^v		
46 11.1 ^v	43 50.3 ^v		
91 31.4 ^v	86 48.5 ^v	4 ⁻ 42.9 ^v	2 ⁻ 21.45 ^v
49 16.9 ^v	46 59.1 ^v		
50 17.2 ^v	47 49.7 ^v		
99 34.1 ^v	94 48.8 ^v	4 45.3 ^v	2 22.65 ^v
53 17.0 ^v	51 2.6 ^v		
54 26.4 ^v	51 52.5 ^v		
107 43.4 ^v	102 55.1 ^v	4 48.3 ^v	2 24.15 ^v
57 53.0 ^v	55 43.4 ^v		
59 13.1 ^v	56 32.2 ^v		
117 6.1 ^v	112 15.6 ^v	4 50.5 ^v	2 25.25 ^v
			+ 2 23.38

mean on $\alpha = 0^h 51^m 59.4^s$

0 ^h 58 ^m 33.05 ^s	=	15 ^h 42 ^m 4.5 ^s
0 51 59.4 ^v		- 23.2 ^v
0 6 33.6 ^v		15 41 44.3 ^v
		- 6 33.6 ^v
		15 35 10.7 ^v
		6 31 35.9 ^v
		9 3 34.8 ^v
		- 1 29.1 ^v
		9 ^h 2 ^m 5.7 ^s = C. M. T.

Bond 236 is 23.2/100

$$\overset{5}{\text{Diff. } \alpha} \quad \overset{6}{\text{Diff. } *} \quad \overset{7}{(\text{Col. 5} - \text{Col. 6})} \quad \overset{8}{(\text{Col. 5} + \text{Col. 6})} \quad \overset{9}{\frac{1}{2} \cos. \text{dec.}} \quad \overset{10}{(\text{Diag.} - \text{Col. 9})}$$

50.8^v52.1^v102.9^v60.3^v50.6^v110.9^v69.4^v49.9^v119.3^v

$$\begin{array}{r} 80.1^v \\ \hline 65.15^v \end{array}$$

$$\begin{array}{r} 48.8^v \\ \hline 50.35^v \end{array}$$

$$\begin{array}{r} 128.9^v \\ \hline 462.0^v \end{array}$$

$$\log. \text{mean. } 115.5^v = 2.062582^v$$

$$\text{" cos. dec.} = 9.606725^v$$

$$\text{" } 15. = 1.176091^v$$

$$2.844998^v$$

$$\text{" } 2. = 0.301030^v$$

$$349.9^v = 2.543968^v$$

$$\begin{array}{r} 889.8^v \\ \hline 2539.9^v \\ \hline 2629.7^v \end{array}$$

$$\begin{array}{r} 66 \quad 10 \quad 29.3^v \\ -4 \quad 30.0^v \\ \hline 66 \quad 5 \quad 59.3^v \end{array}$$

$$\log. \text{cos. dec.} = 9.604610^v$$

$$\text{" } 115.5^v = 2.062582^v$$

$$\text{" } 15 = 1.176091^v$$

$$2.846283^v$$

$$\text{" } 2. = 0.301030^v$$

$$351.0^v = 2.545253^v$$

$$\begin{array}{r} 889.8^v \\ \hline 2539.9^v \\ \hline 2629.7^v \end{array}$$

216

June 29. 1881.

Comp. star = 2 m. +66° 435.

Pos. 1855 = 6^h 0^m 52^s +66° 10' (2.0)Day 6564-5
Pos. 1842.~~5^h 59^m 32.24~~~~+66° 10' 39.0~~~~+3 57.85^v~~~~-5.2^v~~

1881.0

~~6 3 30.09^v~~~~+66 10 33.8^v~~

Red. to app. pl.

~~+1.76~~~~-4.7^v~~

app. pl. *

~~6 3 31.84~~~~+66 10 29.1~~~~+2 23.32^v~~~~-8 58.8^v~~

Pos. =

~~6 5 55.22~~~~+66 1 30.3~~

1881.0

6^h 3^m 30.09^v+66° 10' 33.8^v

Red. to app. pl.

+1.76^v-4.7^v

True pos *

6 3 31.85^v+66 10 29.3^v

= - *

+2 23.32^v-8 58.8^v

Pos =

6 5 55.23^v+66 1 30.5^v

39 yrs June 29. 1841.

217.

$$\text{Pos. 1842. } 5^h 59^m 32.24^s + 66^\circ 10' 39.0''$$

$$89^\circ 53' 3.60''$$

$$\text{Log. } \frac{m}{15} = 0.126142^v$$

$$\text{" sin } t = 9.999999^v$$

$$\text{" tan } D = 0.355048^v$$

$$+ 3.0282^v = 0.481189^v$$

$$+ 3.0704^v$$

$$+ 6.0986^v = 0.785230^v$$

$$19.5 = 1.290035^v$$

$$118.92^v = 2.075265^v$$

$$5^h 59^m 32.24^s$$

$$+ 1 \quad 58.92^s$$

$$6 \quad 1 \quad 31.16^s$$

$$90^\circ 22' 47.40''$$

$$\text{Log. } \frac{m}{15} = 0.126101^v$$

$$\text{" sin } A = 9.999990^v$$

$$\text{" tan } D = 0.355053^v$$

$$+ 3.0279^v = 0.481144^v$$

$$+ 3.0708^v$$

$$+ 6.0987^v = 0.785237^v$$

$$39 = 1.591065^v$$

$$237.45^v = 2.376302^v$$

$$5^h 59^m 32.24^s$$

$$+ 3 \quad 57.85^s$$

$$\text{Pos. 1841.0. } 6^h 3^m 30.09^s$$

$$\text{Log. } m = 1.302234^v$$

$$\text{" cos } t = 7.305056^v$$

$$\text{" } 19.5 = 1.290035^v$$

$$+ 0.79^v = 9.897325^v$$

$$+ 66^\circ 10' 39.0''$$

$$+ 0.8^v$$

$$+ 66 \quad 10 \quad 39.8^v$$

$$\text{Log. } m = 1.302193^v$$

$$\text{" cos } A = 7.821465^v$$

$$\text{" } 39 = 1.591065^v$$

$$- 5.18^v = 0.714723^v$$

$$+ 66^\circ 10' 39.0''$$

$$- 5.2^v$$

$$+ 66^\circ 10' 33.8^v$$

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June 29. 1881.

$$\delta = +66^{\circ} 10' 33.2'' \checkmark$$

f.	+ 2.576	✓			
Log. g.	1. 2300 +	✓	Log. g.	1. 2300 +	✓
" sin G+t	9. 9941 +	✓	" cos. (G+t)	9. 2119 n	✓
" tan. d.	0. 3550 +	✓	" sum	0. 4419 n	✓
" sum	1. 5791 +	✓	Ly.	- 2. 77	✓
" 15	1. 1761 +	✓	" h	1. 3099 +	✓
" result	0. 4030 +	✓	" cos H+t	9. 0749 n	✓
Ly.	+ 2. 529	✓	" sin. d	9. 9613 +	✓
" h	1. 3099 +	✓	" sum	0. 3461 n	✓
" sin(H+t)	9. 9969 n	✓	" Ly.	- 2. 22	✓
" sec. d	0. 3937 +	✓	" sin. d	0. 0726 +	✓
" sum	1. 7005 n	✓	" cos. d	9. 6063 +	✓
" 15	1. 1761 +	✓	" sum	9. 6789 +	✓
" result	0. 5244 n	✓	Ly.	+ 0. 48	✓
Ly.	- 3. 345	✓	$\delta' - \delta$	- 4. 51	✓
$\delta' - \delta$	+ 1. 76	✓			

$$G = 0^h 34.0^m \checkmark$$

$$t = 6 \quad 3.5^m \checkmark$$

$$(G+t) = 6 \quad 37.5^m \checkmark$$

-14 day.

$$H = 11^h 29.2^m \checkmark$$

$$t = 6 \quad 3.5^m \checkmark$$

$$(H+t) = 11 \quad 32.7^m \checkmark$$

3942.

June 28 1881.

219.

O.C.A. 1842 5^h 59^m 17.52 +63° 40' 56."0

89° 49' 22."50

Log. $\frac{m}{15} = 0.126142$

Log. $m = 1.302234$

" sin $t = 9.999998$

" cos $t = 7.489839$

" tan. $\delta = 0.305731$

" 19.5 = 1.290035
= 0.082108

+2.7032 = 0.431871

+3.0704

+5.7736 = 0.761447

19.5 = 1.290035

= 2.051482

8.45

8.8

 $\frac{7}{6}$ 8.45
8.57.1

6

7

 $\pi =$

$$\begin{array}{r} 28 \\ 9 \\ \hline 37 \\ 145 \end{array}$$

$$\begin{array}{r} 28 \\ 8 \\ \hline 10 \quad 28 \\ 2 \quad 44 \\ \hline 7.44 \end{array}$$

17^h 24 (3)

(b. x + z)

(b + x) inner portions

(x) outer wall)

162034a, proc. 19432