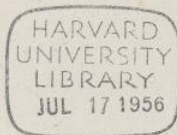


KG

11366
161

KG11366.161

KG 11366.161



Dec. 6 1875 W.T.R.

Dec. 10 1875 J.F.M.

h	m	s	h	m	s	h	m	s
21	59	203	22	24	144	22	58	300
		223			190			327
		244			233			369
		265			297			369
		286			314			380
					366			
					414			
					456			
					498			
					540			
2442			3223			3978		
2440			3264			3966		
2416						3961		
+724			-41			+10		

$$\begin{aligned}
 0 &= +24 + 26 - 4 + 20 \\
 +15 &- 2 + 0 + 10 \\
 0 &= -41 - 411 \\
 0 &= +20 + 12 \\
 0 &= +61 + 923 \\
 n &= +15
 \end{aligned}$$

$$\begin{aligned}
 dT+m &= +0.18 \\
 m &= +64 \\
 dT &= -0.82 \\
 ddr &= +72
 \end{aligned}$$

h	m	s	h	m	s	h	m	s	h	m	s
21	24	5864	21	58	2164	22	18	5366	21	28	5619
		0.92			24.12			5602			55.40
		-228			-2.48			-2.36			-2.33

$$\begin{aligned}
 0 &= -228 - 11 + 2 - 2.26 \\
 -248 &- 2 + 0 - 2.48 \\
 -3.36 &- 14 + 3 - 2.33 \\
 -2.33 &+ 1 + 0 - 2.33
 \end{aligned}$$

$$\begin{aligned}
 dT+m &= +2.35 \\
 m &= +64 \\
 dT &= -0.82 \\
 ddr &= +72
 \end{aligned}$$

h	m	s
14	40	80
14	40	29
17	19	13.0
21	20	13.9
21	23	29.7
		4.38
		+158

Dec. 12 1275 W.T.R.

h m s	h m s	h m s
1 09 44.3	2 36 44.5	2 55 40.8
56.4	47.6	42.9
58.4	49.7	41.0
57.1	51.7	47.0
2'3	53.8	49.1

3	2 36 49.66	49.668	58.24
	49.69	49.696	58.23
	53.30	53.306	2.73
	-3.66	-3.672	-4.40

$0 = -3.66 + 0.5 - 0.1 - 3.67$
 $-3.72 + 0.6 - 0.1 - 3.73$
 $0 = -4.40 - 2.65$
 $0 = -3.69 + 1.6$
 $0 = -3.1 - 3.74$
 $n = -1.9$

$dt + m = +3.70$
 $m = +.42$
 $dt = +3.28$
 $ddt = +.65$

$8.6 = 14^h 57^m 6^s$
 $14^h 57^m 9.6^s$
 $17 23 03.6$
 $21 33 16.0$
 $3 31.8$
 $21 29 44.2$
 15.8

Dec. 13 1275

h m s	h m s	h m s
0 66 22.6	1 38 43.0	1 52 42.2
24.4	45.1	46.6
26.8	47.2	49.8
28.8	49.3	53.2
30.8	51.4	56.6

26.44	47.20	49.88
26.72	47.18	49.83
30.72	51.29	53.47
-4.00	-4.11	-3.64

$0 = -4.00 + 1.2 - 2 - 3.98$
 $-4.11 + 1.4 - 0 - 4.01$
 $0 = -3.64 + 3.05$
 $0 = -4.05 + 1.3$
 $0 = +0.41 + 2.92$
 $n = -1.4$

$dt + m = +4.03$
 $m = +.42$
 $dt = +3.61$
 $ddt = +.35$

$8.6 = 14^h 59^m 1^s$
 $14^h 59^m 4.8^s$
 $17 27 03.2$
 $21 31 14.6$
 $3 31.8$
 $21 27 43.1$
 $+15.9$

Dec. 14 1875 W.D.R.

h m s	h m s
0 1 49.2	0 6 42.2
51.7	44.3
54.0	46.3
56.4	48.6
58.8	50.7

54.00	46.40
58.47	50.53
-44.7	-45.3

$n = -12$
 $0 = -44.7 + 54 - 0.7 - 4.54$
 $-4.53 + 2.6 - 0.3 - 4.56$

$dT + m = +4.53$
 $m = 4.2$
 $dT = +4.13$
 $ddT = +.52$

$S.P. = 12^h 35^m 33.0$
 $+ 4.4$
 $12^h 35^m 37.4$
 $17^h 31^m 46.7$
 $19^h 3^m 50.7$
 $3^h 7.9$
 $18^h 59^m 43.3$
 $+ 16.7$

Dec. 15 1875 W.D.R.

h m s	h m s	h m s
0 37 13.0	0 36 11.6	1 10 20.0
15.2	23.7	11 2.5
17.4	25.7	11 45.9
19.5	27.9	12 36.8
21.8	29.9	13 13.0
		14 8.0
		14 42.0
		15 27.7
		16 10.8

17.38	25.76	13 14.80
17.36	25.74	14.22
22.16	22.16	20.29
-4.80	-4.96	+6.07

$0 = -4.80 - 3.3 + 0.1 - 4.79$
 $-4.96 + 12 + 0.0 - 4.96$

$0 = -6.07 + 42.20$
 $0 = -4.88 - 1.10$
 $0 = +1.19 + 43.20$
 $n = +.03$

$dT + m = 4.77$
 $m = 4.2$
 $dT = 4.35$
 $ddT = +.22$

$S.P. = 12^h 28^m 15.5$
 $+ 5.4$
 $15^h 5^m 58.6$
 $17^h 35^m 43.2$
 $21^h 30^m 15.4$
 $21^h 26^m 46.0 + 16.0$

Dec. 19 1875

h m s
1 17 38.7
40.8
43.0
45.0
47.1

42.92
42.90
42.90
- 7.00

$$n = -12$$

$$o = -7.00 - 15 + 0.2 - 7.13$$

dt+m = +7.03
m = +42
dt = +6.61
ddt = +5.7

SC = 1 h m s
21 21 21.0
+6.6
1 21 27.6
14 51 29.5
14 29 5.1
1 13.17
7 27 49.4
+15.6

Dec. 22 1875 J. R. M.

dt = +8.22
ddt = +.13

And block = 16.3

Dec. 23/1895

Dec. 24/1895

$$\begin{aligned} dT &= +8.5^{\circ} \\ ddt &= +.60^{\circ} \end{aligned}$$

Bond Clock = 16.7 Sunday morning

$$\begin{aligned} dT &= +11.0^{\circ} \\ ddt &= +.53^{\circ} \end{aligned}$$

Bond Clock = 16.0⁵⁰

Jan 7 1976

h m s
 4 59 44.7
 49.0
 49.0
 52.6
 53.8
 55.0
 0.4
 2.6
 7.0
 8.1
 11.7

1 54.99
 2 41.39
 -13.40

$$0 = -13.40 + 3.7$$

$$dr + m = +13.40$$

$$m = +4.2$$

$$dr = +12.98$$

$$ddr = +.20$$

Jan 7 1976 I. B. M.

h m s
 6 32.3
 34.3
 36.4
 38.7
 40.8

h m s
 0 33 5.7
 9.6
 13.0
 17.2
 21.1

0 6 36.50 0 33 13.32
 50.68 27.77
 14.18 14.45

$$0 = -14.18 + 2.6 + 3 = -14.15$$

$$+14.45 + 2.48 + 1.5 = 14.30$$

$$dr + m = +14.22$$

$$m = +4.2$$

$$dr = 13.80$$

$$ddr = +.23$$

Jan 10 1876 W.R. Morning

h	m	s	h	m	s	h	m	s	h	m	s	h	m	s
13	18	20.4	14	9	40.8	15	29	6.1	15	27	49.9	3	20	26.6
	22.8				43.0			8.3			52.0			30.3
	24.7				45.1			10.7			54.0			33.1
	26.8				47.4			13.0			56.1			37.0
	28.9				49.7			15.3			58.1			40.2
														43.6
														46.9
														50.4
														53.8
246.4			45.20			10.68			54.01			40.22		
39.73			60.27			25.72			8.98			55.19		
-15.09			-15.67			-15.04			-14.97			-14.97		

$$\begin{aligned}
 0 &= -15.09 - 1.8 + 0 - 15.09 \\
 &= -15.09 + 36 + 0 - 15.09 \\
 &= -15.09 + 1.2 - 0 - 15.09 \\
 &= -14.97 + 0.9 - 0 - 14.97 \\
 0 &= -14.97 - 3.12 \\
 0 &= -15.09 + 1.2 \\
 0 &= +0.08 - 3.24 \\
 n &= +.02
 \end{aligned}$$

$$-15.04 + 12$$

$$\begin{aligned}
 dt + m &= +15.04 \\
 m &= +.42 \\
 dt &= 14.62 \\
 add &= +.24
 \end{aligned}$$

h	m	s
8.17	49	24.0
16		+146
17	49	38.6
19	18	13.8
23	31	24.8
	3	41.3
22	27	43.5
		+14.8

Jan. 12/1976 Morning: W.R.R.

h	m	s	h	m	s
14	18	26.3	14	43	40.8
		29.1			43.9
		32.0			46.5
		34.7			49.3
		39.6			42.5
		42.4			
		49.7			
		47.5			

18 37.23
18 52.11
-15.08

43 45.22
44 0.72
-15.50

29 10.20
25.74
-15.84

n = +18

0 = -15.50 - 28.45 - 15.55
-15.54 + 5.1 + 0.9 - 15.48

0 = -15.08 - 2.3.3
-15.52 + 1.2
0 = +0.44 - 2.45
n = +18

dt + m = +15.50
m = +42
dt = +15.08
dtr = +.24

S.C. = 17 h m s
38 14
+ 15.1
17 38 29.1
19 26 6.4
22 12 22.2
3 3 38.2
02 8 44.0
16.0

Jan 13 morning W.R.R.

h	m	s	h	m	s	h	m	s
12	39.2		13	12	41.0	14	9	40.0
13	22.4				32.3			42.2
14	5.8				15.5			44.1
14	53.4				58.7			46.1
15	35.7				40.2			48.4
16	17.4				24.7			
16	59.1				10.7			
17	45.7				52.0			
18	29.4				36.0			

18 34.23
12 55.28
-21.05

12 41.23
12 59.78
-18.55

44.16
60.37
-16.21

n = +0.8

0 = -16.21 + 3.6 + 0.3 - 16.18

0 = -21.05 + 42.57 n = +11
0 = -13.55 - 42.57 n = +6

dt + m = +16.18
m = +42
dt = +15.76

S.C. = 14 h m s
32 49.0
+ 15.7
14 38 47
19 30 8.5
19 3 12
0 7.3
16.1

Jan. 16 1896 A. P. M.

h m s	h m s	h m s
32 33 430	3 39 454	3 45 586
461	474	10
490	499	34
521	522	60
551	574	83

33 4906	39 4980	46 346
34 6.82	40 7.59	47 34
-17.76	-17.69	-17.88

n = +0.6

0 = -17.76 + 1.09 = -17.69
 -17.69 + .48 = 1.63
 -17.88 + .61 = 1.84

17.72

Monday Jan 17

dTm = +17.72
 m = +.42
 dr = +17.30
 ddr = +.60

20 36 28.0
 +17.7
 20 36 42.7
 19 45 49.7
 0 50 53.0

Jan 19 Morning. N. R.

h m s	h m s	h m s	h m s
14 9 544.33	14 42 378	16 21 241	17 8 258
577.56	397	264	379
579.47	421	287	400
572.40	443	310	422
59.461	464	333	443

41.74	42.10	28.70	40.04
6.59	1.36	47.57	58.77
-18.85	-19.26	-19.27	-18.73

0 = -18.85 + 36
 -19.26 - 28
 -19.27 + 80
 -18.73 + 26

n =

some trouble. Dr.
 Probably rel. co-ordination wrong.

Jan 20 1976 WSR.

Morning

h m s	h m s	wrong # h m s	h m s
14 9 372	14 43 50638	14 50 117	16 21 240
394	52538	158	263
415	54940	195	286
438	57141	236	304
460	592463	297	331
		314	
		351	
		391	
		430	
4158	4204	2743	2856
0.62	5492	5150	4766
-19.04	1.05	38.07	1910
	-19.01		

-19.04 + 36
-19.01 - 28
-19.10 - 50

n = +80

DT+m = +19.05
m = +42
DT = +18.63
dDT = +30

S.C. = 15 h 10 m 130
15 10 316
19 57 384
19 12 522
3 579
19 8 433

Jan. 22 Morning

S.C. = 17 h 31 m 880
+192
17 31 572
20 5 320
27 26 297
3 406
22 22 441
+159

Jan. 24 1946 Morning

h	m	s	h	m	s
15	28	08	16	21	22.7
		3.3			25.0
		4.6			27.3
		7.7			29.7
		10.2			32.0

5.56	21	27.34
26.19		47.79
-20.63		-20.95

$m = +1.5$
 $0 = -20.63 + 51 + 08 - 20.65$
 $-20.95 - 50 - 08 - 20.53$

$dr + m = +20.54$
 $m = 42$
 $dr = +26.12$
 $ddr = +7.3$

S.P. =

h	m	s
17	46	22.0
		20.1
17	46	42.1
20	13	25.6
21	33	16.5
	3	21.8
21	29	24.6
		15.6

Jan. 25. Morning.

h	m	s	h	m	s	h	m	s	h	m	s
14	18	20.2	14	43	30.0	14	50	29.3	15	29	06
		22.8			35.2			35.0			30
		25.6			40.3			40.2			5.2
		28.0			42.4			52.5			9.4
		30.9			44.6			0.9			10.0
		32.5									
		36.2									
		38.8									
		41.5									

14	18	30.84	40.30	45.04	5.24
		51.52	48.2	5.99	26.22
		-20.68	-20.92	-20.90	-20.98

$m = +0.4$
 $0 = -20.92 - 28 - 01 - 20.53$
 $-20.98 + 51 + 02 - 20.96$
 $0 = -20.68 - 23.3$
 $0 = -20.90 + 26.3$

$m = +0.4$

$dr + m = +20.94$
 $m = 42$
 $dr = +26.52$
 $ddr = +4.0$

Broadbrook = 16.2

Jan 26, 4 1876 W.D.K.

14 ^h 28 ^m 237 ^s	5 ^h 7 ^m 63 ^s	5 ^h 8 ^m 106 ^s
258	74	126
251	122	148
303	153	168
326	179	188

25 2810	7 1222	8 1472
49.85	33.39	35.92
-21.25	21.17	21.20

$0 = -21.28 + 29 + 0.1 = -21.27$
 $-21.17 + 6.03 + 9.1 = 21.12$
 $-21.20 - 18 - 21 = 21.21$

$dt + m = +24.20$
 $m = +42$
 $dt = +29.78$
 $addt = +.37$

$S.C. = 17^h 31^m 10.9^s$
 $+21.0$
 $17 31 31.0$
 $20 21 11.7$
 $21 10 12.3$
 $3 28.1$
 $21 6 44.2$
 $+15.8$

Jan 27 Morning 1876 W.D.K.

14 ^h 9 ^m 346 ^s	15 20 597	15 20 210
368	21	260
350	48	277
411	68	293
434	91	316

3858	442	3903
60.85	26.28	56.49
-21.87	-21.86	-21.86

$0 = -21.87 + 46 + 0.1 = -21.36$
 $-21.86 + 51 + 0.2 = -21.14$
 $0 = -21.96 + 31.2$
 $0 = -21.86 + 43$
 $0 = -10 + 26.9$
 $n = +0.4$

$dt + m = +21.45$
 $m = 42$
 $dt = 21.43$
 $addt = +.46$

Bond block = 140

Jan 31 1876 W.R.

Feb. 2 1876

4 h 28 m 5^s
21.8
24.0
26.1
28.2
30.3

5 h 18 m 5^s
0.2
2.3
4.6
7.0
9.3
4

28 2608
28 49.33
-20.25

468
2403
-2345

$$0 = -23.20 + 29.01 - 23.24$$

$$\begin{aligned} dT + m &= +23.24 \\ m &= +.42 \\ dT &= +22.82 \\ qdT &= +.44 \end{aligned}$$

$$\begin{aligned} S.C. &= 15 h 44 m 30.0 \\ &+ 23.0 \\ 15 h 44 m 53.0 \\ 20 h 41 m 10.0 \\ 19 h 3 m 51.5 \\ 8 h 44 m 4.0 \\ 18 h 59 m 4.0 \\ &+ 16.9 \end{aligned}$$

$$\begin{aligned} \#1 0 &= -23.80 \\ dT + m &= +23.85 \\ m &= +.42 \\ dT &= +23.43 \\ ddT &= +32 \end{aligned}$$

$$\begin{aligned} S.C. &= 5 h 48 m 42.2 \\ &22.1 \\ 5 h 49 m 6.6 \\ 20 h 48 m 46.6 \\ 9 h 0 m 12.0 \\ 1 h 24.5 \\ 8 h 58 m 48.5 \\ &+ 16.5 \end{aligned}$$

Feb. 3 1876 W.D.R.

Feb. 5 1876 S.R.M.

h m s
4 12 164
184
206
228
250

12 20.64
46.07
-24.43

$dT+m = +244.3$
42
 $dT = +24.01$
 $ddt = +90$

h m s
4 45 30.46
56.27
-25.79

h m s
4 57 ~~40.8~~
30.16
-25.78

h m s
5 7 128
23.26
20.98

h m s
5 8 844
26.82
-26.08

h m s
0 -25.79 +65 +07 -20.72
-20.78 +27 +03 -20.51
-20.58 +1.03 +10 -20.55
-26.08 -15 -2 -26.10
-25.86

$dT+m = +25.86$
 $m = +.42$
 $dT = 20.44$
 $ddt = +.71$

Feb. 8 1876 W.A.R.

5^h 18^m 3^s
~~56.9~~
 59.1
 76
 3.8
 6.2

18 144
 25.45
 7.01

dt+m = +2.61
 m = 42
 d1 = 26.59

ddt = +.38

S.C. = 6^h 35^m 23.0^s
 26.6
 6 35 49.6
 21 12 34.0
 9 23 18.6
 1 32.2
 9 21 4.34
 +16.6

Feb. 16 1876 W.A.R.

4 ^h 48 ^m 21.1 ^s	5 ^h 17 ^m 34.0 ^s	6 ^h 22 ^m 26.7 ^s	7 ^h 25 ^m 46 ^s
240	26.3	20.8	9.2
26.4	5.6	34.7	4.3
29.0	1.0	38.7	13.8
31.3	3.0	42.7	15.2
		46.3	
		50.3	
		54.5	
		58.6	

26.46	58.68	42.07	11.72
56.10	26.34	12.55	41.37
- 29.64	- 29.66	- 29.98	- 29.65

0 = - 29.64 + 4.5 + 0.6 - 29.58	0 = - 29.98 + 3.73
- 29.66 + 0.4 + 0.2 - 29.61	0 = - 29.65 + 4.0
- 29.65 = 0 + 0 - 29.65	0 = - 33 + 33.3
	n = +.10

dt+m = +2.61
 m = + 42
 dt = +2.19

ddt = +.33

S.C. = 19 35 56
 + 29.4
 19 36 35.4
 21 44 6.4
 21 52 23.0
 3 34.9
 21 48 44.1
 15.9

Feb. 19 1976 Morning

Feb. 20 1976 Morning

16 ^h 5 ^m 3 ^s	17 ^h 8 ^m 2 ^s	17 ^h 28 ^m 5 ^s
390.5	241	852
42.0	263	873
49.7	285	895
57.7	306	917
58 4.9	328	937
12.7		
20.3		
27.7		
35.6		
6 58 4.90	8 28.46	28 39.48
58 42.18	8 59.67	29 10.65
-37.38	-31.21	-31.17

16 ^h 21 ^m 18 ^s	16 ^h 57 ^m 5 ^s	17 ^h 8 ^m 2 ^s	17 ^h 28 ^m 5 ^s
186	410	241	852
159	484	271	873
140	561	293	895
203	43	316	917
227	-116	325	937
	182		
	278		
	350		
	426		
21 16.10	58 18.88	8 29.22	28 31.6
21 48.68	42.34	59.64	43.59
-30.58	-30.46	-30.92	30.43

$$0 = -31.21 + 2.6 + 1.02$$

$$-31.17 + 2.0 + 1.02$$

$$0 = -37.28 + 7.83 + 7.40$$

$$0 = -31.19 + 5.3$$

$$0 = -6.09 + 16.27$$

$$n = -$$

$$0 = -30.58 - 50$$

$$-30.42 + 26$$

$$-30.43 + 80$$

$$0 = -30.46 + 7.23$$

$$0 = -30.48 + 1.19$$

$$0 = + 02 + 1.14$$

$$n = .00$$

Let the collimation of -48.000 instead of 47.263

$$\text{hence } c = +7.87 \text{ dia} = +.98$$

$$0 = -31.21 + 0.8 + 1.02$$

$$0 = -30.18$$

$$dt + m = +30.15$$

$$m = +.42$$

$$dt = +29.76$$

$$\text{Bond} = +1.43$$

$$dt + m = +30.48$$

$$m = +.42$$

$$dt = +30.06$$

$$dct =$$

$$\text{Bond} = +1.58$$

Psl. 21
 4 h 28 m 138.0
 16.1
 18.2
 20.4
 22.6
 5 h 6 m 56.2
 59.2
 2.2
 5.2
 8.0
 5 h 8 m 0.7
 2.7
 4.7
 6.8
 9.0

Psl. 22 1276 morning
 17 h 8 m 24.0
 26.1
 28.2
 30.4
 32.6
 17 h 28 m 30.0
 37.1
 39.3
 41.5
 43.5

18.22 2.16 478
 49.04 32.95 35.59
 -30.82 -30.79 -30.51

17 8 28.26 17 28 39.28 18 32 12.1
 59.76 40.74 43.71
 -31.50 -31.46 -31.61

0 = -30.82 + 29
 30.79 + 1.03
 30.51 - 1.5

$n = 0$

$d\tau + m = +31.48$
 $m = +.42$
 $d\tau = 31.06$

S.C. = 17 3 m 9.0
 +30.6
 17 3 38.6
 22 3 49.1
 18 5.9 50.0
 -3 6.8
 18 55 43.4
 16.3
 $d\tau + m = +30.51$
 $m = +.42$
 $d\tau = +30.39$
 $dd\tau = +.60$

$dd\tau = +.44$

S.C. = 21 11 h m s
 4.5
 +31.1
 21 12 16.1
 22 7 40.7
 23 04 30.4
 8 46.8
 23 -0 43.6
 +14.4

Feb. 23 1896 W.R.R.

Feb. 25 1896 J.R.M.

h	m	s	h	m	s	h	m	s
28	12.9		48	19.2		57	39.4	
	18.2			22.0			47.0	
	17.3			24.6			54.7	
	15.6			26.6			2.7	
	21.4			29.1			-11.3	
							18.8	
							26.1	
							33.8	
							41.0	

28	17.48	48	24.26	57	10.53
28	24.01	48	36.98	57	42.70
-	31.53	-	31.73	-	32.17

$$0 = -31.53 + 29 - 02 - 31.55$$

$$-31.73 + 65 - 00 - 31.78$$

$$133$$

$$0 = -32.17 + 7.23$$

$$0 = -31.43 + 7.47$$

$$0 = -0.54 - 7.80$$

$$n = -.07$$

$$dr+m = +31.67$$

h	m	s	h	m	s	h	m	s
6	8	87	6	29	57.2	6	89	48
		12.3			57.4			72
		14.8			16			9.5
		17.2			37			11.5
		20.7			59			13.7
		23.5						
		26.6						
		29.7						
		32.8						

5	20.70	30	1.56		9.34
5	13.32		34.27		42.12
			32.71		32.78

$$dr+m = +32.74$$

$$m = +.42$$

$$dr = +32.22$$

$$ddr = +.32$$

Feb. 29 1876

h	m	s	h	m	s	h	m	s	h	m	s
5	47	49.3	6	10	21.5	6	39	30	6	40	84
		51.5		10	38.3			51		40	24.8
		53.7		10	55.0			54		40	50.2
		55.8		11	13.0			59		41	13.8
		57.8		11	29.8			11.6		41	32.3
				11	46.2					41	53.5
				12	5.7					42	18.4
				12	21.0					42	36.8
				12	47.1					43	59.1
47	53.62		11	30.187		39	7.30		41	33.26	
48	58.53		12	7.28		42	2.05		42	5.63	
	-34.91			-37.10			-34.75			-32.37	

$$0 = -34.91 + 13 - 42 - 34.93$$

$$-34.75 - 32 + 04 - 34.71$$

$$dt + m = +34.81$$

$$m = +.92$$

$$dr = +34.89$$

$$ddt = +.51$$

$$S.C. = 8^h 1^m 4^s$$

$$+34.4$$

$$8 \quad 1 \quad 28.4$$

$$12 \quad 35 \quad 21.6$$

$$9 \quad 26 \quad 16.8$$

$$1 \quad 32.7$$

$$159$$

Mar. 2 morning

h	m	s
17	28	22.0
		24.1
		26.1
		43.0
		45.2
		47.4

28	34.63
28	11.00
	-36.42
	-42

$$dt + m = +36.42$$

$$dr = +36.0$$

$$S.C. = 17^h 47^m 38^s$$

$$+26.0$$

$$17 \quad 48 \quad 6.0$$

$$22 \quad 48 \quad 14.7$$

$$19 \quad 4 \quad 51.3$$

$$3 \quad 7.6$$

$$19 \quad 0 \quad 43.7$$

$$+16.3$$

Mar. 4 1876 Morning N.R. Mar. 5 1876 N.R.

h m s
17 28 294
316
337
337
378

33.66
11.07
- 37.41

$dt+m = +37.41$
 $m = +42$
 $dt = +38.59$
 $ddt = +40$

Sc. = 18 53 320
+ 37.0
18 54 8.0
22 51 7.5
20 3 1.2
3 17.1
19 53 44.1
10.9

h m s
6 38 697
17
28
60
83

6 39 390
38 4198
- 28.08

h m s
6 40 00
297
46.5
70
284
12.0
18.7
32.0
54.9

41 25.63
42 4.04
- 35.41

h m s
7 12 22
43
66
88
11.0

12 660
44.50
- 37.95

$0 = -38.08 = 30 + 4 - 38.04$
 $- 37.90 + 41 - 0.5 = 37.99$
 $0 = -35.41 + 20.83$
 $u = -35.41 + 41$
 $u = +2.60 + 20.42$
 $m = 7.2$

$dt+m = +38.02$
 $m = 42$
 $dt = +37.60$
 $ddt = +60$

S.C. = 20 34 44
37.4
22 35 21.4
20 55 4.4
21 20 33.0
33.0
21 36 44.0
+ 16.0

May 6 1976 NAR

h	m	s
5	48	03
		47
		45.9
		26
		47
		50.1
		6.8
		52.1
		8.8
		52.2

50.06
2840
-88.38

dt+m = +38.88
m = +42
dt = +38.96

ddt = +40

S.C. = 2^h 27^m 38.0^s
38.3
2) 28 16.3
22 09 1.0
2) 25 12.3
3 24.2
2) 25 45.1
15.9

May 7 1976 NAR

h	m	s
7	32	67
		8.8
		10.8
		12.9
		15.0

h	m	s
7	37	15
		39
		6.2
		8.6
		11.0

10.84
50.10
-89.26

6.24
40.23
-39.09

dt+m = +39.26 + 10 - 39.28
+ 39.09 + 54 - 39.20

dt+m = +39.24
m = +42
dt = +38.82
ddt = +.80

S.C. = 18 3 9.0
39.1
18 3 48.1
23 2 57.0
19 0 50.6
3 6.9
18 56 48.4
+16.3

Mar. 14 1876 WSR Morning

Mar 15 1876 W.S.R.

h	m	s	h	m	s	h	m	s
18	31	56.6	19	43	57.1	20	36	22.7
		59.1			59.2			25.6
		1.8			1.3			25.6
		4.5			2.5			31.2
		7.0			5.6			34.2

h	m	s	h	m	s	h	m	s	h	m	s	h	m	s		
7	2	84.3	7	11	57.0	7	32	2.8	7	37	11.7	7	46	-	2011	1740
		36.7			8.52			4.9			140			272	545	
		39.0			1.4			6.9			169			240	35	
		41.2			3.7			8.0			189			19.0	81	
		48.6			5.9			11.1			213				131	
															177	
															220	
															26.9	
															32.0	

32	1.80	1.34	36	28.46
31	44.40	43.89		11.09
-42.60	-43.58	-42.63		

2	38.96	1.44	6.94	(146)	46.2207	1299
3	21.96	44.40	49.99		47.19.87	5633
-43.00	-42.96	-43.25		-52.20	4334	

$n = -10$
 $0 = -42.60 + 80 - 08 - 42.68$
 $-42.56 + 10 - 02 - 42.57$
 $-42.63 + 1.02 - 40 - 42.73$
 42.66

$0 = -48.00 - 48 + 0.6 - 42.84$
 $-42.96 + 41 - 05 - 43.01$
 $-43.05 + 10 - 01 - 43.06$
 $0 = -52.20 - 53.20$
 $-43.34 - 4.44$

$0 = -43.20 + 00$

$0 = -9.20 - 53.20 n = 17$
 $0 = -0.34 - 444 = 08$
 -12

$dT+m = +42.66$
 $m = +42$
 $dT = +42.24$
 $ddT = +49$

$S.P. = 20$
 40
 3.0
 422
 2040
 468
 2330
 333
 21
 10
 11.8
 3
 28.1
 21
 6
 43.8
 $+16.2$

$dT+m = +43.02$
 $m = +42$
 $dT = 42.58$
 $m = +42$
 $dT = 42.16$

$S.C. = 18$
 24
 36.0
 $+42.6$
 18
 28
 58.6
 23
 34
 28.9
 18
 50
 40.5
 3
 53
 18
 46
 43.4
 $+16.6$

Mar 15 1876

Mar 19 1876 W.A.R.

$y^h 32^m 20^s$
 41
 61
 81
 10.3
 $y^h 36^m 56.9^s$
 55.2
 1.6
 3.8
 6.1
 $y^h 45^m$
 45.387
 46.327
 47.277

$5^h 47^m 40.0^s$
 42.1
 44.2
 46.3
 48.3
 $6^h 10^m 19.4^s$
 36.8
 52.8
 12.4
 29.2
 46.4
 4.3
 21.7
 39.4
 $7^h 32^m 16^s$
 37
 57
 78
 95
 $7^h 36^m 56.9^s$
 57.7
 70
 85
 99

$32 \quad 612$
 $32 \quad 49.25$
 -438.3
 $37 \quad 152$
 45.17
 43.65
 $46 \quad 333.7$
 $47 \quad 16.06$
 $48 \quad 42.69$

$47 \quad 44.18$
 28.22
 -44.04
 $11 \quad 29.18$
 13.68
 -44.80
 $32 \quad 8.44$
 49.54
 -44.20
 $37 \quad 1.10$
 45.16
 -44.06

$dt+m = +437.4$
 $m = +42$
 $dt = +433.2$

$0 = -44.04 + 13 - 00 - 44.04$
 $44.20 + 10 - 00 - 44.20$
 $44.06 + 54 - 01 - 44.07$

$0 = -44.50 - 16.83$
 $0 = -44.10 + 26$
 $0 = -40 - 17.08$
 $n = -0.2$

$SC = 7^h 58^m 39.0^s$
 43.3
 $7^h 58^m 22.3^s$
 $23 \quad 46 \quad 19.6$
 $+49 \quad 57.3$
 $8 \quad 10 \quad 27$
 $1 \quad 20.3$
 $8 \quad 8 \quad 42.4$
 $+17.6$
 $8 \quad 37 \quad 46.0$
 43.3
 $8 \quad 38 \quad 29.3$
 $23 \quad 46 \quad 19.6$
 $8 \quad 52 \quad 9.7$
 $1 \quad 27.2$
 $8 \quad 50 \quad 42.5$
 $+17.5$

$dt+m = +44.10$
 $m = +42$
 $dt = +436.9$

$add = +37$

Mar 19 morning Grand Circle = +16.2

1876
Mar 22 Morning N.R.

18 ^h 10 ^m	12.12	18 ^h 31 ^m 52.8 ^s	39 ^m 31.3 ^s	43 ^m 53.5 ^s	48 ^m 22.8 ^s
	37.0	55.6	33.9	55.6	24.9
	55.3	58.3	38.5	59.7	27.0
	12.8	0.9	37.5	59.7	29.0
	28.2	3.6	39.7	1.8	31.1
	43.4				
	0.1				
	21.7				
	39.7				

Mar 27

Bond Clock - 116.5^s

11	28.71	58.24	35.48	57.06	26.96
	14.95	44.67	31.99	46.11	13.45
	-46.24	-46.43	-46.51	46.45	46.50

$dt+m = + 46.47^s$
 $dt = + 46.42^s$
 $dt = + 46.05^s$

Bond = 16.3^s

Mar 29 1976 W.F.R.

Mar 30 1976 W.F.R., Morning.

h	m	s	h	m	s	h	m	s
18	31	49.7	19	39	27.6	19	43	52.0
		52.3			30.0			52.1
		55.0			32.1			54.2
		57.6			34.2			56.4
		0.4			36.4			58.5

h	m	s	h	m	s
19	43	50.4	19	48	19.9
		52.5			21.8
		54.6			23.8
		56.6			26.0
		58.9			28.2

31	55.00	39	32.06	43	54.24
	44.91		22.20		49.31
	79.91		50.14		50.08

43	54.56	48	23.92
	44.34		13.67
	49.78		49.85

$n = -15$
 $0 = 49.91 + 80 - 12 - 50.03$
 $- 50.14 + 17 - 03 \quad 17$
 $- 50.47 + 15 - 02 \quad 09$

$dt + m = +49.76$
 42
 $dt = +49.34$

$dt + m = +50.10$
 $m = +42$
 $dt = +49.68$

$S.C. = 22 \quad h \quad m \quad s$
 $22 \quad 18 \quad 10.5$
 49.7
 $22 \quad 18 \quad 59.7$
 $29 \quad 41.7$
 $21 \quad 49 \quad 15.0$
 $3 \quad 34.5$

$S.C. = 19 \quad h \quad m \quad s$
 $19 \quad 24 \quad 37.6$
 49.3
 $19 \quad 28 \quad 26.3$
 $0 \quad 33 \quad 38.8$
 $18 \quad 51 \quad 48.5$
 $3 \quad 8.5$
 $18 \quad 47 \quad 42.0$
 18.0

21	54	02
		48.3
21	54	51.8
0	33	38.8
21	20	12.5
3		29.7
		42.8
		17.2

Apr. 21 1876 W.A.R.

Apr. 6 1876 W.A.R.

$\begin{array}{r} 47 \\ 48 \end{array} \begin{array}{r} 36.26 \\ 27.99 \\ - 51.73 \end{array} \begin{array}{r} 6 \\ 12 \end{array} \begin{array}{r} 22.27 \\ 18.62 \\ - 36.30 \end{array} \begin{array}{r} 6 \\ 40 \end{array} \begin{array}{r} 39.4958 \\ 41.47 \\ - 51.89 \end{array} \begin{array}{r} 6 \\ 41 \end{array} \begin{array}{r} 7.16 \\ 52.98 \\ - 45.82 \end{array}$

$\begin{array}{r} s \\ 0 = -51.73 + 13 - 09 - 51.77 \\ - 51.89 - 30 + 19 - 51.80 \end{array}$

$\begin{array}{r} 0 = -56.30 - 16.80 \\ - 115.82 + 20.70 \end{array}$

$0 = -51.81 - .08$

$\begin{array}{r} 0 = -4.54 - 16.72 \\ 0 = -7.23 - 20.62 \end{array} \begin{array}{r} \mu = -.27 \\ \mu = -.30 \end{array}$

$\begin{array}{r} dt + m = +51.98 \\ m = .42 \\ dt = +51.36 \\ ddt = +.42 \end{array}$

$\begin{array}{r} h \text{ m } s \\ 20 \text{ } 47 \text{ } 32.4 \\ 10 \text{ } 0 \text{ } 49.7 \\ 49.0 \text{ } 3.5 \\ 59.7 \text{ } 30.6 \\ 53.4 \text{ } 38.7 \\ 53.8 \text{ } 40.7 \\ 57.6 \end{array} \begin{array}{r} s \\ 51.2 \\ 53.4 \\ 55.5 \\ 57.6 \end{array}$

$\begin{array}{r} 9 \\ 21 \end{array} \begin{array}{r} 20 \\ 31.03 \\ - 54.45 \end{array} \begin{array}{r} 0 \\ 53.36 \\ 1.4788 \\ - 54.82 \end{array}$

$\begin{array}{r} 0 = -54.45 - 18 + 0.5 \\ - 54.82 + 22 - 07 - 54.50 \end{array} \begin{array}{r} m = -.80 \end{array}$

$\begin{array}{r} s \\ dt + m = 54.47 \\ m = .42 \\ dt = 54.05 \end{array}$

$ddt = +.69$

$\begin{array}{r} S.C. = h \text{ m } s \\ 20 \text{ } 12 \text{ } 14.0 \\ 20 \text{ } 13 \text{ } 52.4 \\ 1 \text{ } 1 \text{ } 14.1 \\ 19 \text{ } 11 \text{ } 54.3 \\ 1 \text{ } 3 \text{ } 58.7 \end{array}$

456

Apr. 9 1876 Morning N.S.R.

h m s	h m s
19 43 44.2	48 13.9
46.3	15.7
48.0	17.8
50.5	19.8
52.6	21.9

43 44.44	48 17.98
44 44.63	18.97
-56.23	-56.19

dt =

$n = -30$
 $0 = -56.23 + 15 - 04 - 56.27$
 $-56.19 + 12 - 04 - 56.23$

$dt + m = +56.20$
 42

$dt = +08.3$

$dat = +0.4$

S.C. = 0 h 59 m 46"

	58.9
1	00 41.9
1	13 3.8

23 48 58.1 43 40.2

Apr. 10 1876 Morning

h m s	h m s	h m s	h m s
18 31 48.3	18 39 23.8	19 39 21.4	43 48.7
45.9	45.8	23.7	45.7
47.6	7.0	25.8	47.8
51.2	25.1	27.9	49.9
53.9	44.9	30.0	52.0
	11.0		
	31.6		
	64.1		
	16.0		

28.58	49.75	25.24	47.82
45.32	49.21	22.55	44.66
-56.74	-59.46	-56.17	-56.44

$n = -12$
 $0 = -56.74 + 50 - 10 - 56.54$
 $56.51 + 17 - 2 13$
 $56.54 + 10 - 2 86$

$dt + m = +56.84$
 $m = +42$
 $dt = 56.42$

$0 = -59.46 - 20.70$
 $v = -56.53 + 38$
 $v = -26.3 - 21.1$
 $n = -12$

S.C. = 20 h 21 m 56.0
 56.4

20	22	52.4
1	17	0.3
19	5	52.1
	3	2.7
17	2	49.8
		+10.6

$i = 5^{\circ} 3'$

long i	8.94485
long 15	1.17609
	0.12094

19^4 39^{20} 210^{81}
 231
 253
 273
 294

$$\begin{array}{r} 28.22 \\ 22.58 \\ - 57.36 \\ \hline \end{array}$$

Ref. 454 (3002 488)

$\log B + 0.00616$
 $\pi - 0.068$
 $\gamma + 0.276$

 $\log a'$
$$B + 748 + 10824$$
$$\begin{array}{r} 1 \\ + 2 \overline{) 92} \\ \underline{104} \\ 115 \\ \underline{144} \\ 1188 \end{array}$$
$$n = -33$$
$$\begin{array}{rcl} 0 = -57.39 + 10 - 03 - 57.35 & 0 = -56.44 + 2.43 \\ 57.09 + 84 - 18 & 27 & 0 = -57.18 + 18 \\ 57.88 - 16 + 5 & 23 & 0 = + 74 + 2.26 \\ 67.15 + 22 - 7 & 22 & m = -33 \end{array}$$
$$dT + m = +0.36 \quad \text{at } 8h \text{ } 34^m \quad h = +0.23$$
$$\begin{aligned} \Delta T + m &= +57,36 \\ m &= +42 \\ \Delta T &= +56,94 \end{aligned}$$

$S.P. = 20^k \quad 27^m \quad 48^s$
 $\quad \quad \quad 1 \quad 20 \quad 58^s$
 $\quad \quad \quad 19 \quad 6 \quad 52^0$
 $\quad \quad \quad \quad \quad 3 \quad 7^9$
 $\quad \quad \quad 19 \quad 2 \quad 44^1$
 $\quad \quad \quad \quad \quad 45^9$

[illegible]

Apr 12, 1976

Apr 17 Morning

$$dT+m = +5^s.1$$

$$\text{Bond Clock} = +160^s$$

19 ^h 39 ^m 11 ^s	19 ^h 43 ^m 40 ^s
20.1	42.3
22.2	44.4
24.0	46.6
26.0	48.7

22.26	43 44.40
22.77	44 44.87
60.51	-60.47

$$dT+m = +60.48$$

$$m = + 42$$

$$dT = +60.06$$

S.C. = 19^h 52^m 19^s

	1 + 0.1
19	53 19.1
1	44 36.2
12	42.9
2	58.4
18	5 44.5
	10.0

Apr 19 1876 W.A.R.

May 1 1876 W.A.R.

h	m	s	h	m	s	h	m	s
11	20	296	11	22	531	11	29	318
		310			562			335
		335			585			355
		358			627			380
		378			656			401

33.60	59.48	205.2
35.55	6.78	379.3
-61.95	-67.30	-63.01

$0 = -61.95 + 0.0$
 $-62.41 = 0.0$

$0 = -67.30 + 2.75$
 $0 = -67.97 + 0.2$
 $0 = -8.33 + 2.73$

$dt + m = +61.97$
 $m = 42$
 $dt = +61.05$

S.C. = 30 h m s
 1 50 180
 20 57 188
 1 52 293
 18 58 506
 3 66
 18 54 440
 168

h	m	s	h	m	s	h	m	s	h	m	s	h	m	s
10	0	339	10	23	107	11	29	244	11	57	421	12	5	26
		360			149			265			441			74
		382			193			280			462			122
		403			237			306			483			176
		725			281			326			503			228
					324									278
					368									326
					410									378
					454									428

0 28.18	23 2842	29 2854	57 4620	5 22.62
1 4792	3831	3799	5869	32.17
-1 974	-1 989	645	969.1	9.55

$m = -0.87$
 $0 = -69.45 - 0.0 + 0.0 - 69.45$
 $-69.49 + 17 - 0.1 - 69.50$
 $0 = -69.49 + 2.75$
 $-69.55 + 4.3$

$0 = -69.47 + 0.8$

$0 = -42 + 2.67m = 15$
 $0 = -0.8 + 2.75 = 12$

$dt + m = +69.47$
 $m = +42$
 $dt = +69.05$
 $ddt = +6.2$

May 3 1876 Morning

h m s
20 36 55.7
58.3
1.2
4.3
7.1

36 132
27 128.2
1 11.50

0 + 71.50 - 08 - 71.58

dT+m = +71.58
m = + 42
dT = + 71.16
ddr = + 84

S.C. = 21 41 21.0
+ 1 11.2
21 42 32.2
21 47 41.1
18 54 51.1
3 58
18 50 45.2

May 16 1876 N.A.P.

h m s
22 58 10.0
12.2
14.3
16.5
18.6
21 58 24.04
2.0
4.6
6.8
8.7

21 58 24.80
59 35.69
- 1 21.39
57 4.58
26.07
- 1 21.43

0 = 81.39
- 81.43

dT+m = +1 21.41 2.2
m = 42
dT = +1 21.0

S.C. = 22 52 29.0
1 21.0
22 53 50.0
3 38 06.3
19 14 03.7
3 9.2
19 11 4.5

May 17 1976 W.D.R.

May 19 1976

h	m	s	h	m	s	h	m	s	h	m	s
11	29	33.3	11	31	11.8	11	34	30.1	11	43	20.0
		26.3			13.9			34.8			22.1
		39.2			16.0			39.2			24.2
		42.3			18.0			43.9			26.4
		45.2			20.1			48.2			28.5
		48.3						53.1			
		51.4						57.4			
		54.4						2.0			
		57.4						7.0			

$$dT + \Delta t = -38.17$$

$$dDT = +.23$$

24	48.31	31	15.96	34	48.41	43	24.24
24	56.1		37.73	34	12.19		45.97
	+39.70		+39.99		+36.22		+38.27
			+38.23				

$$0 = +38.23 + 0.0 - 0.0 + 38.23$$

$$+ 38.27 + .27 - 0.8 + 38.22$$

$$0 = +39.70 + 2.70$$

$$38.27 - 4.33$$

$$0 = +1.43 + 7.08$$

$$n = -2.0$$

$$dT + m = +38.22$$

$$m = +.42$$

$$dT = 38.64$$

$$S.C. = \begin{array}{r} h \quad m \quad s \\ 1 \quad 6 \quad 46 \\ - \quad 38.6 \\ 1 \quad 6 \quad 7.4 \\ 3 \quad 42 \quad 52.9 \\ 21 \quad 23 \quad 14.5 \\ 3 \quad 30.2 \end{array}$$

$$S.C. = 22 \begin{array}{r} h \quad m \quad s \\ 2 \quad 55 \quad 16.0 \\ 38.0 \\ 22 \quad 58 \quad 38.0 \\ 3 \quad 00 \quad 46.0 \\ 19 \quad 03 \quad 62.0 \\ 3 \quad 34 \\ 18 \quad 59 \quad 44.6 \\ 15.4 \end{array}$$

May 21 1876 W. R.

May 23 1876 W.S.R.

h	h'	h	h'	h	h'
22	55	22	55	22	55
16	113		113		238
36	135		135		262
56	156		156		287
77	177		177		308

$$\begin{array}{r} 0 \quad 364 \\ 59 \quad 267 \\ + 3849 \\ \hline \end{array}$$

$n = -30$ $n = 46$
 $0 - + 37.47 - 0.2 + 0.1 + 37.48 + 0.1$ 37.48
 $37.13 + 58 + 17 + 37.30 + 23$ 36
 $37.61 + 26 - 8 + 37.53 + 10$ 51
 37.43

$$\begin{aligned} dT + m &= -37.43 \\ m &= 43 \\ dT &= -37.86 \\ \Delta dT &= +16 \end{aligned}$$

S.P. = 203370
- 37.9
4149
2 2391
3 58391
22 04200
3 369
31
189

$$\begin{array}{r} 21 \ 59 \ 320 \\ \quad 2624 \\ + 3696 \\ \hline \end{array} \quad \begin{array}{r} 22 \ 51 \ 2570 \\ \quad 2915 \\ + 3652 \\ \hline \end{array} \quad \begin{array}{r} 22 \ 09 \ 2570 \\ \quad 3551 \\ + 3688 \\ \hline \end{array}$$

$n = 33$

$O = +36.96 - 0.2 \cdot 01 - 36.95$
 $+ 36.52 - 58 + 19 - 36.71$
 $+ 36.89 + 26 - 9 - 36.80$

$dA_m = -36.82$
 $m = + 42$
 $dr = -27.24$
 $ddr = + .31$

May 24 1876 N.A.R.

10 h m s	11 h m s	11 h m s	11 h m s	11 h m s	12 h m s
56 30.3	8 50	31 10.2	34 29.7	43 11.4	6 42.8
39.8	41	123	34.1	26	56.0
44.2	43	143	38.2	22.6	61
48.8	116	164	43.0	24.8	15.1
53.2	138	184	47.7	26.8	18.4
			52.0		
			56.7		
			1.1		
			5.7		

m 22 13s	m 46.8s	m 216s	m 4282s	m 1183s	m 33 24s
56 44.260	8 93.60	31 14.320	34 47.578	43 22.660	7 608
36 6.89	32.05	37.66	12.89	4.1550	29.11
+ 37.67	+ 36.51	+ 36.66	+ 39.69	+ 36.76	+ 38.97

$$\begin{aligned}
 0 &= +37.67 + 1.91 - 90 \\
 &\quad 36.81 + 39 - 19 \\
 &\quad 36.66 - 00 \\
 &\quad 36.76 + 2.7 - 15 \\
 0 &= 36.98 + 5.64
 \end{aligned}$$

$$0 = 36.98 + 5.64$$

$$0.1 + m = -36.64$$

$$\begin{aligned}
 m &= +42 \\
 0.1 &= -37.06
 \end{aligned}$$

$$0.1 + m = +1.0$$

$$\begin{aligned}
 0 &= +34.69 - 48.3 \\
 &\quad + 88.7 + 4.83 \\
 0 &= +2.28 + 9.16 \\
 m &= -4.7
 \end{aligned}$$

$$\begin{aligned}
 0 &= +22.9 + 4.97 \\
 &\quad + 1.98 + 4.19 \\
 m &= -4.6 \\
 &= 4.1
 \end{aligned}$$

$$\begin{aligned}
 2 &9 26.0 \\
 &\quad - 3.0 \\
 2 &8 49.0 \\
 2 &10 28.8 \\
 2 &1 58 20.2 \\
 &\quad 3 35.9 \\
 2 &1 54 44.3 \\
 &\quad 1.8
 \end{aligned}$$

May 25 1876 W. A. R

h	m	s	h	m	s	h	m	s	h	m	s
10	57	53.4	11	8	4.9	11	23	31.6	25	33	29.1
		57.2			7.1			34.3			36.3
		57.0			9.4			37.7			47.5
		48			11.6			40.0			56.6
		86			18.8			43.6			5.5
								46.4			
								49.6			
								52.8			
								56.3			

55	1.20	7.028	8	9.36	23	43.57	47.40
	6.36	6.56		32.56		0.23	12.88
		+38.72		+26.80		+38.34	+34.42
				n=52			

$$0 = +38.72 + 19.1 - 99 + 36.73 \quad 0 = +38.34 + 2.25$$

$$+ 36.80 + .39 - 22 + 36.60 \quad + 34.42 - 4.33$$

$$0 = +37.26 + 1.15 \quad 0 = +37.26 + 1.15$$

$$0 = +36.38$$

$$0 = + 1.08 + 1.60 \quad n = -68$$

$$0 = 2.84 + 0.48 \quad +.52$$

$$d\Gamma + m = -36.66$$

$$m = +.42$$

$$d\Gamma = -37.08$$

h	m	s	h	m	s
4	14	25.4	2	12	22.0
		-37.1			-37.1
4	13	44.3	2	11	44.2
2	11	45.4	4	13	48.3
4	14	25.4	2	11	46.6
2	15	18.5	3	12	25.9
3	35	38.8			2.9

May 29 1876 Morning N.A.R.

k m s	v m s
22 51 26.0	2 36.28
50 49.39	50 20
+36.61	+36.76

$\alpha = 40$

$$1 = +36.61 - 58 + 28 + 36.84$$

$$0 = +36.98 + 52 - 22 + 36.76$$

3 39 19.0

- 37.2

3 38 41.8

4 30 11.6

23 8 30.2

3 44.4

42.8

17.2

$$1T + m = -36.80$$

$$m = +42$$

37.2

3 47 20.0

37.2

3 36 42.8

4 30 11.6

23 16 31.2

3 48.7

12 38.5

May 30 1876 N.R.

$k \sim s'$	$k \sim s'$	$k \sim s'$
22 59 18.0	0 2 34.82	1 13 24.93
36.15	59.34	12 32.67
34.96	34.95	+ 52.26

$$0 = +34.96 + 26.10 + 34.86$$

$$+ 34.88 + 54.22 + 34.76$$

$$0 = +34.97 + 40$$

$$dt + m = +34.81$$

$$m = +.42$$

$$dt = +35.23$$

$$0 = +52.26 + 92.57$$

$$0 = +34.87 + .40$$

$$0 = +17.21 + 42.17$$

$$u = -41$$

$k \sim s'$
S.C. = 2 30 3.0
35.4
2 29 27.6
4 34 81
21 55 19.5
3 35.4
21 51 44.1
+18.9

June 1 1876 N.R.

$h \sim m$
13 19 12.8
14.8
17.0
15.0
21.1

16.96
41.84
35.72

$$m = -40$$

$$0 = +35.12 - 19.08 + 85.20$$

$$dt + m = -35.20$$

$$m = +.42$$

$$dt = -35.6$$

S.C. = 13 43 50.0	1 47 48.0
35.6	35.6
13 43 19.4	1 47 12.6
4 42 1.2	4 42 1.3
9 37 13.2	21 5 11.1
1 28.6	3 27.2
8 59 44.6	39
+15.4	+16.1

June 5 1876

14^h 3

h m s
19 19 17.47
13 18 51.82
+35.65

$\sigma = +35.65 - 19 + 0.8 + 35.73$

$dT+m = -35.73$

m = 42

$dT = -36.15$

14^h 35 42.0
S.C. 14 34 59.1
4 57 47.5
9 36 48.4
1 34.4
9 34 44.0
16.0

June 7 1876

$dT+m = -36.63$

$dT = -36.24$

S.C. - 3 8 38.0

3 8 36.8
5 5 40.6
22 2 20.6
3 36.6
21 58 44.0
+16.0

sent 15.8

June 9 1876

h m s h m s
14 51 48.8 14 57 56.02
51 10.64 19.36
+35.34 +36.66

$\sigma = +36.66 + 57 - 52 + 36.14$

$\sigma = +35.34 + 36.3$

$\sigma = -1.68 - 2.76$

$\sigma = -6.0$

$dT+m = -36.14$

m = +42

$dT = -36.56$

$dT = -1.14$

S.C. = 15 16 33.0

15 15 36.6

3 11 20.4

12 4 36.0

15 15 36.4

5 21 26.7

9 54 28.5

1-37.4

15 15 36.4

5 13 33.7

10 92 22.7

1 38.6

10 00 44.1

15.8

June 13 1976 WTR

<i>h</i>	<i>m</i>	<i>s</i>	<i>h</i>	<i>m</i>	<i>s</i>		<i>h</i>	<i>m</i>	<i>s</i>
13	11	27.6	140	13	19	179	14	10	35.0
	12	12.0	160			26.0			37.2
	12	54.8	150			22.0			39.4
	13	40.4	201			24.1			41.6
	14	22.3	222			26.2			43.8
									45.3

12 55.46	1406	19 22.02	18.06	10 39.40	44 39.98
12 54.45	444	41.77	41.77	2.66	3.75
+11.01		26.29	36.74	36.23	

$$0 = +36.29 - 19 + 0.11 + 26.40$$

$$+ 36.74 + 36 - 0.22 = .52$$

$$+ 36.23 - 28 + 17 = .10$$

$$0 = +11.01 - 42.57$$

$$0 = +36.42 - .04$$

$$0 = -25.41 - 42.63$$

$$n = -60$$

$$0 = +36.42 - .021$$

$$dHm = -36.44$$

$$m = + .42$$

$$dr = 36.86$$

$$ddr = .05$$

$$\text{Time Clock} = 16.4$$

June 15 1976 Morning

<i>h</i>	<i>m</i>	<i>s</i>	<i>h</i>	<i>m</i>	<i>s</i>
22	51	20.78	22	59	13.04
	50	50.00		58	36.67
		+35.78			+36.37

$$n = -50$$

$$0 + 35.78 - 58 + 3.5 + 36.13$$

$$+ 36.37 + 26 - 16 + 36.21$$

$$dr + m = -36.17$$

$$m = + .42$$

$$dr = 36.59$$

$$ddr = + 0.36$$

$$S.C. = 8 \begin{matrix} h & m & s \\ 8 & 50 & -36.6 \\ 3 & 7 & 28.4 \\ 5 & 37 & 13.1 \\ 21 & 30 & 15.3 \\ 3 & 31.6 \\ 21 & 26 & 43.9 \\ 161 \end{matrix}$$

1 Blowing from Steel pen
 changed the rate of the North Clock
 20.5 per day.

June 17, ¹⁸⁷⁶ Eng. J.F.M. Obs.
I.W. Rowland No.

	γ Uuc. mag	γ Bethe	α Draco	α Bootis
13 ^h	43 18.32	13 49 ^m 24.92	61 42.57	71 38.52
	42 42.02	48 49.18	61 55.61	70 2.71
T-X =	+ 36.30	+ 35.73	+ 36.96	+ 35.81

$$0 = (T-X) + \text{stand} + (AT+M)$$

$$0 = +36.30 + 1.19m + (AT+M)$$

$$= +35.73 + 0.39m + (AT+M)$$

$$= +35.81 + 0.36m + (AT+M)$$

$$\{ 0 = +35.95 + 0.63m + (AT+M)$$

$$\{ 0 = 36.96 - 2.14m + (AT+M)$$

$$1.01 = 2.77m \therefore m = +0.36$$

$$\{ 0 = +35.95 + 0.23 + (AT+M)$$

$$\{ 0 = +36.96 + 0.77 + (AT+M)$$

$$\therefore (AT+M) = -36.18$$

$$\{ (AT+M) = -36.19 \quad M = +0.42$$

$$\therefore AT = -35.76$$

Std cl

Std cl	Band cl.
18 d 6 ^h 41 ^m 51.00 = 0 ^h 52 ^m 05.00	June 15 22.9 AT = -36.59
17 13.9	17 13.9 AT = -35.76
16.8 x 0.5	18 ^h 1 = +0.85
24 -35.76	$\therefore AT = +0.07$

Signal sent 6^h 20^m -0.3

6 ^h 40 55.59	0 ^h 51 44.32
5 49 2.77	+ 15.68
51 52.82	

June 19, ¹⁸⁷⁶ Eng. J.F.M. Obs.

	α Virg.	β Virg.
13 ^h	18 ^m 41.74	13 ^h 28 ^m 24.61
T	18 17.00	28 0.06
T-X =	+ 35.26	+ 35.45

$$0 = +35.36 - 1.9m + (AT+M)$$

$$0 = +35.45 + 0.0m + (AT+M)$$

$$0 = +35.40 - 0.9m + (AT+M)$$

$$0 = +35.36 - 1.9m + (AT+M)$$

$$0 = +0.04 + 1.1m \therefore m = -0.40$$

$$0 = +35.36 + 0.76 + (AT+M)$$

$$0 = +35.45 + 0.0 + (AT+M)$$

$$AT+M = -35.44 \quad \therefore AT = -35.02$$

$$-35.45 \quad \text{dAT} = +0.37$$

Time 19. (AT+M)

(20^h 9^m 44^s circ time)

Std. cl.	Band cl.
2 ^h 51 ^m 45.00 = 20 ^h 55 ^m 0.00	June 19 13.27
+ 1.23	13.27
-35.02	

Note: 2 rate comparison made the clock error -0.6 which was sent out.

26 51 10.21	20 54 44.76
5 52 59.33	
20 58 10.88	
3 26.12	
20 51 44.76	

Signal sent -0.6

15.24

June 20. 1876.

Noobs.

Abd 6 start pens yesterday
and this Am.

Errs clock = 0.5.0

Spens removed at 7 AM.
L. 77.

$$27^h \quad 46^h \quad 49.0 = 21 \quad 46 \quad 0.0$$

- 34.5

$$27 \quad 46 \quad 14.5$$

$$5 \quad 56 \quad 55.9$$

$$3 \quad 34.5$$

$$21 \quad 45 \quad 44.1 = 21 \quad 45 \quad 44.1$$

15.9

$$\text{a later comparison} = \frac{16.1}{\text{mean} \quad 16.0}$$

June 21. 1876.

J. P. M. Drew.

β Mus. Min.

β Bootis

μ' Bootis.

$\frac{1}{x}$

14^h

51 48.17

51 10.31

+ 37.86

14 57

55.54

57

14.14

41.85

15 30

28.42

19 46.10

42.32

$$0 = +41.35 + .87x + (\Delta T + m)$$

$$0 = +42.32 + .77x + (\Delta T + m)$$

$$0 = +41.83 + .82x + (\Delta T + m)$$

$$0 = +37.86 + 3.65x + (\Delta T + m)$$

$$3.97 = 2.83x$$

$$\therefore x = +1.40$$

$$0 = +41.83 + 1.15 + (\Delta T + m) \therefore \Delta T + m = -42.98$$

$$0 = +37.86 + 5.05 + (\Delta T + m) = -42.91$$

Used 1874
Almanac by mistake
L. 77.

Time 21.1876. Evg. T.F.M. Obs.

β Mus. Min. β Bootis μ Bootis

I	14	51	48.17	14	57	55.54	15	20	27.42
x		51	10.00		57	19.26		19	57.18
			+ 38.17			+ 36.28			+ 36.24

$$0 = 36.28 + 0.87x + (AT + m)$$

$$0 = 36.24 + 0.78x + (AT + m)$$

$$0 = 36.26 + 0.82x + (AT + m)$$

$$0 = 38.17 + 0.63x + (AT + m)$$

$$0 = 1.91 + 2.81x + (0)$$

$$\therefore x = -0.68$$

$$0 = 36.26 - 0.56 + (AT + m)$$

$$\therefore AT + m = -35.70$$

$$m = +.42$$

$$\therefore AT = -36.58$$

$$-35.28$$

$$\therefore AT = -0.13$$

$$27 \quad 58 \quad 46.0 = \quad 0.0$$

$$-35.3$$

$$27 \quad 58 \quad 10.7$$

$$6 \quad 0 \quad 52.5$$

$$21 \quad 57 \quad 18.2$$

$$3 \quad 35.8$$

$$42.4$$

$$42.4$$

$$+ 17.6$$

L.V. considers this so large that he sends the signals as brought up from June 19 assuming the error of the S.C. to be $-35.5 + 1.0 = -34.5$

This means signal sent = $+0.53$

Time 22.1876, Evg. J.F.M. Obs.

α Cen. Aur. α Serpent. ϵ Serpent.

I	15	30	6.00	15	38	48.52	15	45	16.98
x		29	28.25		38	12.28		44	40.84
			+ 37.05			+ 36.24			+ 36.14

$$0 = 36.24 + 42x + (AT + m)$$

$$0 = 36.14 + 40x + (AT + m)$$

$$0 = 36.19 + 40x + (AT + m)$$

$$0 = 37.05 + 51x + (AT + m)$$

$$\therefore 0 = .86 + .41x \quad \therefore x = -2.10$$

$$0 = 37.05 - 1.07 + (AT + m)$$

$$= 36.24 - .26 + (AT + m)$$

$$= 36.24 - .20 + (AT + m)$$

$$\therefore AT + m = 35.98$$

$$35.98$$

$$35.94$$

$$AT + m = -35.97$$

Time 22	15	15.6	AT =	-35.55
	21	15.1	AT =	-35.28
	1	2	AT =	-0.27

$$June 23^d \text{ Error } 10 \text{ km.} = -35.68$$

$$\text{Signal sent} = +0.2$$

Comparison after sending signal

28	12	46.0	0.0
		35.7	
28	12	10.3	
6	4	49.0	
22	7	21.3	
	3	27.5	
22	3	43.8	43.8
			+ 16.2

ack. Tim. June 21. 28 km. Received exp. with weights in the not find any error in this work. Please exp. June 22 8.5

Note: Getting the exp. with shot in it seems to make the clock gain about 0.5 to 1.5 per hour.

1876 June 23. Evg. J.F.M. Obs.

α Leonis.

γ Urs. Maj

11	8	8.88	11	47	57.66
	7	32.25		47	20.24
		36.63			37.42

$$0 = 36.63 + .39\pi + (27.1\mu)$$

$$0 = 37.42 + .139\pi + (1+1\mu)$$

$$\# \frac{39}{19} = \pi$$

$$0 = 35.63 - 7.0 + (1+1\mu)$$

$$0 = 37.42 - 2.98 + (1+1\mu)$$

$$\therefore (1+1\mu)\pi = \begin{matrix} -36.32 \\ -34.98 \\ -35.90 \\ -34.98 \\ -36.32 \end{matrix}$$

$$\therefore \Delta t = -34.52 \quad 35.90$$

(Chem. shift read wrongly by J.F.M.)

$$\text{June 23}^{\text{rd}} 11.5 = -35.90$$

$$22 \quad 15.6 = -35.55$$

$$20^{\text{th}} = -0.35$$

$$24^{\text{th}} = -0.0175$$

$$\therefore \text{June 23}^{\text{rd}} 28^{\circ} = \Delta t = 36.32$$

Fr. 1327

$$27^{\text{th}} \quad 47^{\text{th}} \quad 38^{\circ} 0' = (-) \quad (-15^{\circ}) \quad 0.0$$

$$27 \quad 47 \quad 1.8$$

$$26 \quad 8 \quad 45.6$$

$$21 \quad 38 \quad 16.2$$

$$3 \quad 82.7$$

$$34 \quad 43.5$$

$$+ \frac{42.5}{16.5}$$

1876 June 24. Evg. J.F.M. Obs.

β Librae

μ Bootis

γ Urs. Min. & Corvus

α Serpentes

15 ^h	10 ^m	59.54	15	20	28.22	15	21	39.38	15	30	06.04	15	38	48.88
	10	22.73		19	51.18		21	0.40		29	28.96		38	12.7
		+36.61			+37.04			+38.48			+37.08			

$$0 = 36.61 - .16\pi + (1+1\mu)$$

$$0 = 37.04 + .78\pi + (1+1\mu)$$

$$0 = 37.08 + .57\pi + (1+1\mu)$$

$$0 = 36.61 + .12\pi + (1+1\mu)$$

$$\begin{matrix} 0 = 36.83 + .31\pi + " \\ 0 = 38.48 + .12\pi + " \end{matrix} \therefore \Delta t + \mu = \begin{cases} 36.65 \\ 36.64 \end{cases}$$

$$-1.65 = 2.81\pi \therefore \pi = -0.587 \quad \therefore \Delta t = -36.22$$

$$\frac{36.9}{36.2}$$

$$-0.58 \text{ in } 24^{\text{h}}$$

$$\text{June 25}^{\text{th}} 20^{\circ} \Delta t = -36.6$$

$$25^{\text{th}} \quad 25^{\text{th}} \quad 7.0$$

$$-36.6$$

$$25^{\text{th}} \quad 24^{\text{th}} \quad 30.4$$

$$6 \quad 16 \quad 38.7$$

$$19 \quad 7 \quad 57.7$$

$$3 \quad 8.0$$

$$19^{\text{th}} \quad 4^{\text{th}} \quad 43.7 = 0.0$$

$$\therefore \text{Error Round } 394 = +16.5$$

1876 June 26. T.F.M. obs. (Erg)

β Bootis.

β Librae.

14	57	57.12	15	10	60.10
	57	57.14		10	22.72
		57.93			37.38

$$0 = 37.93 + .87x + (\Delta t + m)$$

$$0 = 37.38 - .16x + \quad "$$

$$\therefore x = -\frac{55}{103} = -.53$$

$$0 = 37.93 - .146 + (\Delta t + m)$$

$$0 = 37.38 + .08 + (\quad)$$

$$\therefore (\Delta t + m) = -37.46$$

$$\text{June 26} \therefore \Delta t = -37.04$$

$$\text{June 24} \quad \quad = -36.22$$

$$\Delta \Delta t = -.41$$

$$\text{Corr. at 10 days June 26} = -.032$$

	Red 1327	Bond 394
26	9 11.0 =	0.0
	-37.2	
26	8 32.8	
6	20 35.2	
19	47 58.6	
	3 14.6	
	44.0	44.0

$$\therefore \text{Err Bond 394} = +16.50$$

adds 1 sec per, spec.

1876. June 27. (Morn) T.F.M. obs.

α Persei

32	16 ^m	8.36
15		29.04
		+39.32

$$\text{Assume } x = -.5$$

$$0 = 39.32 - 0.6 + (\Delta t + m)$$

$$\Delta t = -38.7 + 4 = -38.3$$

$$27^z \quad 55^m \quad 25.0 = 0.0$$

$$27 \quad 54 \quad 46.7$$

$$6 \quad 24 \quad 31.8$$

$$21 \quad 30 \quad 14.9$$

$$3 \quad 31.4$$

$$43.5$$

$$\text{Err Bond 394} = +16.5$$

Removed 1 sec per.

1896 June 28. J.F.M. obs.

T	12	50	55.08	13	4	12.24	13	12	58.28
α		50	15.64		3	33.71		12	58.17
		+	39.44			+38.53			-13.67

$$0 = 39.44 + .80x + (\Delta t + m)$$

$$0 = 38.53 - .08x + "$$

$$0 = 38.98 + .36x + (\Delta t + m)$$

$$0 = -1.67 - 42.43x + (0)$$

$$\therefore x = -0.595$$

$$0 = 38.98 - .34 + (\Delta t + m)$$

$$0 = -1.67 + 40.30 + (\Delta t + m)$$

$$\therefore \Delta t + m = -38.64 + .42$$

June 28.4	$\Delta t =$	-38.22
26.4		37.04

$$\Delta t = -0.56$$

Error from 28th 20th

$$27 \quad 29 \quad 17.0 = 0.0$$

$$27 \quad 28 \quad 38.5$$

$$6 \quad 28 \quad 28.4$$

$$21 \quad 00 \quad 10.1$$

$$3 \quad 26.5$$

$$423.6$$

$$\therefore \text{Error from } 394 = +16.4$$

June 30 J.F.M. obs.

α Cor Bon	α Serp.	ϵ Serp.	5 Mus. Monj
4.3	46.9	16.5	59.6
6.6	49.0	18.5	41.0
8.9	51.0	20.6	9.3
11.3	53.0	22.6	14.6
13.6	53.4	24.6	19.3
44.7	25.53	10.28	24.9
30 81.94	38 51.06	35 20.56	49 30.0
	Ruler misplaced		35.2
	add 15		40.2
	52.06		171.1

α - I	29 28.91	38 12.26	44 40.82	48 36.85
	-40.03	-39.80	-39.74	-42.83
	39.80			
	39.74			
	119.57	-39.86		

$$0 = 39.86 + .24x + \Delta t + m$$

$$= 42.83 + 4.74x + \Delta t + m$$

$$4.5x = -2.97 \quad x = -.66$$

$$0 = 39.86 + .16 + \Delta t + m$$

$$= 42.83 + .13 + \Delta t + m$$

$$\Delta t = -40.12 \quad \text{June 30.4}$$

$$-39.06 \quad 28.4$$

$$-40.49 \quad \text{June 30.9}$$

$$\Delta t + m = -39.70$$

$$-88.22$$

June 30.9 N. Clock 21^h 49^m 10^s

S. Clock 4 29 30

N. Clock 17:00 fast of Observatory mean time.
If $\Delta t + 2m$ were used instead of Δt , we should have
N. Clock fast 16:2. As it seems by this to be losing
slowly, I do not change the weights in the pendulum.

July 1. A. S. obs.

2 Aurigan eye gear made $\Delta t = -5.59$

N. Clock 22 11 46 } makes N. Clock
S. Clock 05 55 41 } fast 17^s 2

Started chronograph, but clouds prevented any observation till transit of α Cen. Min.;
gall the wires after the middle one.

July 2 { 32. 55.3 } from this, estimated
56.4 } I 7 32. 54.2
57.4 } noted - .07
58.5 }

7 32 54.13
7 32 49.13

$\Delta t + m$ - 5.00

Δt - 5.42

N. Clock 1 19 0 } makes N. Clock
S. Clock 8 3 16 } fast 17^s 3

Took off 1 piece of lead from pendulum.

Don't know how S. Clock came to change.

July 2

Clouds prevented observations in the afternoon and evening. Still cloudy at 11^h mean time.

Compared N. & S. Clocks

N. Clock 17 56 16 N. Clock 18 8 26
S. Clock 0 43 17 S. Clock 0 55 29

These comparisons make N. Clock 15^s 8 fast, if the error of the S. Clock is assumed to be -5.42 as yesterday noon. The probability is that the S. Clock is gaining, as it was before the change. If the rate is 0.7 as before, the N. Clock is about 16.5 fast.

Replaced the piece of lead removed yesterday.

Signal sent July 2, 22^h mean time, 0.5 fast.

1876 July 2. Obs. J. F. M.

β Cassi.	ϵ Crim.	δ Crim.
5 18 29.0	29 57.1	48 29.5
34.6	59.1	34.6
34.0	30 4.2	33.8
36.2	3.3	35.8
38.6	5.4	37.8
169.4	6.1	168.5
35.88	30 12.2	33.70
27.84	29 55.70	28.61

T
L

T - α	6.04	5.52	5.69
n assumed -.66			
n tan δ	-.36	+ .01	-.09
$\Delta t + m$	- 5.68	- 5.53	- 5.60
n assumed +.42			
Δt (mean)	- 6.02		
$d\Delta t$ -.60			

N. Clock 23 6 28
S. Clock 5 54 20

This makes N. Clock 16.54 fast.

July 3 Obs. J. F. M.

γ Virg.	K Drac.
12 13 36.9	28 15.6
34.0	19.0
40.9	22.0
43.0	24.8
45.3	28.0
205.1	109.4
41.02	21.88
35.26	13.63
α	
$T - \alpha$	
57.6	8.25

$$n = -\frac{2.49}{2.82} = -.88$$

α Bootis	δ Bootis	ϵ Urs. Min.
14 10 4.2	21 1.2	27 44.6
6.5	4.6	49.2
8.6	8.0	53.8
10.8	11.4	57.8
13.0	14.8	28 2.3
43.1	40.0	6.6
8.62	8.00	11.0
14 10 2.56	1.14	15.2
6.06	6.86	19.6
		20.1

n tan δ	-.32	- 1.14	- 1.43
----------------	------	--------	--------

$\Delta t + m$	- 5.74	- 5.72	- 5.85
----------------	--------	--------	--------

$$\Delta t (\text{mean of } \gamma \text{ Virg., } \alpha \text{ Bootis, } \delta \text{ Bootis}) - 5.74 - .42 = -6.16$$

N. Clock 9 7 07 this makes N. Clock
S. Clock 15 56 31 S 16.2 fast

Put on 2 pens.

July 3.9

N. Clock 21 35 6
S. Clock 4 26 40
This makes N. Clock 16.3 fast if the
rate of the S. Clock is -.043 as indicated
by yesterday's observations.

Signal sent July 3 22.4 mean time
0.3 fast.

July 4 Obs. J. F. M.

B. Bern. y Mrs. Maj.

11 42.47.8	47 20.3
44.9	23.9
52.0	27.5
54.0	31.0
56.4	34.6
260.1	137.3
52.02	27.46
45.51	19.99
6.51	7.47

$$n = -\frac{.96}{1.12} = -.86$$

$$n \tan \delta = -.23 \quad -1.20$$

$$\Delta t + m = -6.28 \quad -6.27$$

$$\Delta t = -6.70 \quad \Delta \Delta t = -.54$$

{ N. Clock 7 6 0
S. Clock 13 59 8

{ N. Clock 7 18 20
S. Clock 14 11 30

N. Clock 16.4 fast

Took off 1 pen.

N. Clock 21 46 0
S. Clock 4 41 33

N. Clock 16.3 fast

Signal sent July 4, 22^h
mean time 0.3 fast

July 5 Obs. J. F. M.

α Boot.	β Boot.	5 Urs. Min.
14 10 5.7	21 2.8	27 46.0
7.8	6.1	50.5
10.0	9.6	54.8
12.3	12.9	59.0
14.4	16.4	28 3.4
50.2	47.8	7.7
10.04	9.56	12.2
2.54	1.09	16.8
		20.4
I-α	7.50	30.8
		28 3.42
		27 52.64
		10.78

$$n = -.88$$

$$n \tan \delta = -.32 \quad -1.14 \quad -3.58$$

$$\Delta t + m = -7.18 \quad -7.33 \quad -7.20$$

$$\Delta t = -7.67$$

$$\Delta \Delta t = .75$$

{ N. Clock 19 30 46
S. Clock 2 29 54

{ N. Clock 19 37 0
S. Clock 2 36 9

N. Clock 16.6 fast

Took off 1 pen

{ N. Clock 21 44 24
S. Clock 4 43 54

Signal sent July 5, 22^h mean time
0.6 fast

July 6 Obs. J. F. M.

Gr. 2320	- Herc.
16 6 2.0	16 6.7
4.6	9.8
10.3	12.8
13.0	15.7
15.7	18.8
18.4	
21.2	
23.9	
106.6	68.8
129.6	12.76
2.80	3.51
10.16	9.25

$$n = -\frac{.91}{1.43} = -.64$$

$$n \tan \delta = -1.59 \quad -71$$

$$\Delta t + m = -8.57 \quad -8.54$$

$$\Delta t = -8.97$$

$$\Delta \Delta t = -1.20$$

{ N. Clock 19 21 50
S. Clock 2 24 54

{ N. Clock 19 28 6
S. Clock 2 31 11

N. Clock 17.1 fast. but probably the rate of this S. Clock is not really as large as the observations make it.

Took off the cup of weights.

{ N. Clock 21 45 30
S. Clock 4 48 58

N. Clock 16.8 fast
Signal sent July 6, 22^h mean time
0.8 fast.

July 7.
N. Clock 132.0
S. Clock 836.6
Assuming S. Clock
9.7 fast, N. Clock
is 16.2 fast.
Replaced the
cup of weights

1876 July 7 Obs. J. F. M.

α Aurigae
5 7 36.9
40.0
42.9
46.0
48.9
214.7
42.94
32.53
T- α 10.39

n assumed
n tan δ - .70
 $\Delta t + m$ - 9.69
 Δt - 10.14

d Δt - .74

With this rate, the clocks
would be 0.2 slower than
assumed in the comparisons
yesterday.

{ N. Clock 22 8 52
{ S. Clock 5 16 22

{ N. Clock 22 15 0
{ S. Clock 5 22 31

N. Clock 15.8 fast
It seems to have lost a
little since the weights
were replaced.

July 8 Obs. J. F. M.

α Aurigae
5 7 37.7
39.2
40.9
42.3
43.8
45.4
46.7
48.1
49.6
393.7

43.74
From this, the S. Clock
has gained ~~0.2~~ 0.77
since yesterday.

Δt - 10.88

{ N. Clock 22 12 4
{ S. Clock 5 23 32

{ N. Clock 22 18 12
{ S. Clock 5 29 41

N. Clock 15.56 fast

Put on 2 pens.

July 9 Obs. J. F. M.

α Virg. ϵ Boot. α^2 Libra
13 18 48.0 14 39 43.1 44 9.8
52.0 45.6 12.0
52.0 47.9 14.2
54.0 50.0 16.3
56.2 52.4 18.4
260.2 239.0 70.7
52.04 47.80 14.14
 α 41.55 36.68 3.61
10.49 11.78 10.53

n = - $\frac{65}{80}$ = - .81

n tan δ + .15 - .42 + .29

$\Delta t + m$ - 10.64 - 10.76 - 10.76
Allow for rate - .05
- 10.69

Δt_n = - 10.73 - .42 = - 11.15

d Δt - .72

{ N. Clock 19 34 10
{ S. Clock 2 49 9

{ N. Clock 19 40 0
{ S. Clock 2 53 0

N. Clock 15.8 fast

{ N. Clock 21 41 40
{ S. Clock 4 57 0

{ N. Clock 21 53 34
{ S. Clock 5 8 54

Between these comparisons

the S. Clock
lost 2^s, as
was seen
before the
second comparison.
The change had
occurred within
five minutes of
the first comparison.
The comparisons,
allowing for this
change, make
the N. Clock
fast 15.8

Signal sent
at 22^h mean time
0.2 slow

July 10/1976 N.R.

h m s	h m s	h m s	h m s
9 59.7	4 28 53.5	5 4 27.8	5 18 82.0
10 49.2	57.7	8.08	85.6
11 28.0	59.8	13.7	89.7
12 9.9	2.0	46.7	46.8
12 54.2	4.1	49.6	42.5
13 38.2			
14 21.0			
15 6.7			
15 48.8			

310.9

180

490.9

12) 64.54

13 1.22

-6.68

59.82

49.28

+10.54

437.2

32.60

+11.07

38.82

25.04

+19.78

July 10.9

N.P. = 15.7

$$\begin{aligned}
 0 &= +10.54 + 2.9 - 1.1 + 10.43 & 0 &= -66.8 + 426.8 \\
 &+ 11.07 + 1.03 - 4.0 + 10.66 & 0 &= +10.80 + 0.62 \\
 &+ 10.78 + 5.74 - 2.1 + 10.57 & 0 &= -17.98 - 43.30 \\
 & & n &= -40
 \end{aligned}$$

$$0 = +10.80 + 0.62$$

$$S.C. = 5 \frac{12}{170}$$

$$dI + m = -10.55$$

$$m = +.42$$

$$dI = -10.97$$

$$5 \frac{12}{6.0}$$

$$15 \frac{47}{0}$$

$$24 \frac{16}{190}$$

$$3 \frac{35}{6}$$

$$434$$

$$+166$$

Remainder exp.

$$\text{Sent } +15.6$$

July 12 A/B

h m s	h m s	h m s	h m s
14 44 10.8	14 51 83	15 29 363	15 38 200
12.9	120	387	220
150	160	409	241
17.2	198	432	262
19.3	236	456	283
	280		
	319		
	358		
	397		

214 1504	57 23.90	219 2094	38 2414
44 13.62	57 8.38	39 2879	12.20
+ 11.92	+ 15.32	+ 12.15	+ 11.94

$$\begin{aligned}
 0 &= +1142 - 0.8 + 30 + 1172 \\
 &+ 12.15 + 0.57 + 57 + 11.64 \\
 &+ 11.94 + 6.12 = 1241.82 \\
 0 &= +1532 + 363 \\
 &= +11.54 + 0.12 \\
 &= +34.8 + 3.51 \\
 n &= -1.00
 \end{aligned}$$

$$\begin{aligned}
 dT+m &= -11.73 \\
 m &= +13 \\
 dT &= -12.16
 \end{aligned}$$

$$M.C. = 16.3$$

July 12 morning

h m s	h m s	h m s
4 28 577	6 7 400	8 435
598	430	434
20	460	476
41	488	498
6.3	578	578
		459

29 1.99	4612	8 4762	14 4094
38 49.33	3269	3531	2808
+ 12.66	+ 13.43	+ 12.31	+ 12.86

$$\begin{aligned}
 n &= 1.00 \\
 0 &= +1266 + 29 - 29 + 1237 \\
 &+ 1343 + 103 - 103 + 1240 \\
 &+ 12.31 + 1.15 + 15 + 12.46 \\
 &+ 12.86 + 0.54 - 52 + 12.32
 \end{aligned}$$

$$\begin{aligned}
 dT+m &= -12.39 \\
 m &= 40 \\
 dT &= +12.52
 \end{aligned}$$

d m s
5 26 130
- 12.8
5 26 02
7 23 401
22 2 20.1

$$435 \quad \text{Dent } 16.3$$

July 13 1876 N.S.R.

h m s	h m s	h m s	h m s	h m s	h m s	h m s
14 16 11.3	14 27 57.5	14 44 12.0	14 51 9.0	15 24 17	15 29 37.5	16 38 21.6
135	356	14.1	132	82	888	231
157	03	16.2	170	87	1421	252
180	49	18.3	209	120	495	273
201	87	20.5	250	155	468	294
	12.6		267	187		
	17.2		326	220		
	21.6		367	256		
	26.0		406	289		
				326		
				367		
				406		
				447		
				488		
				529		
				570		
				611		
				652		
				693		
				734		
				775		
				816		
				857		
				898		
				939		
				980		
				1021		
				1062		
				1103		
				1144		
				1185		
				1226		
				1267		
				1308		
				1349		
				1390		
				1431		
				1472		
				1513		
				1554		
				1595		
				1636		
				1677		
				1718		
				1759		
				1800		
				1841		
				1882		
				1923		
				1964		
				2005		
				2046		
				2087		
				2128		
				2169		
				2210		
				2251		
				2292		
				2333		
				2374		
				2415		
				2456		
				2497		
				2538		
				2579		
				2620		
				2661		
				2702		
				2743		
				2784		
				2825		
				2866		
				2907		
				2948		
				2989		
				3030		
				3071		
				3112		
				3153		
				3194		
				3235		
				3276		
				3317		
				3358		
				3399		
				3440		
				3481		
				3522		
				3563		
				3604		
				3645		
				3686		
				3727		
				3768		
				3809		
				3850		
				3891		
				3932		
				3973		
				4014		
				4055		
				4096		
				4137		
				4178		
				4219		
				4260		
				4301		
				4342		
				4383		
				4424		
				4465		
				4506		
				4547		
				4588		
				4629		
				4670		
				4711		
				4752		
				4793		
				4834		
				4875		
				4916		
				4957		
				4998		
				5039		
				5080		
				5121		
				5162		
				5203		
				5244		
				5285		
				5326		
				5367		
				5408		
				5449		
				5490		
				5531		
				5572		
				5613		
				5654		
				5695		
				5736		
				5777		
				5818		
				5859		
				5900		
				5941		
				5982		
				6023		
				6064		
				6105		
				6146		
				6187		
				6228		
				6269		
				6310		
				6351		
				6392		
				6433		
				6474		
				6515		
				6556		
				6597		
				6638		
				6679		
				6720		
				6761		
				6802		
				6843		
				6884		
				6925		
				6966		
				7007		
				7048		
				7089		
				7130		
				7171		
				7212		
				7253		
				7294		
				7335		
				7376		
				7417		
				7458		
				7499		
				7540		
				7581		
				7622		
				7663		
				7704		
				7745		
				7786		
				7827		
				7868		
				7909		
				7950		
				7991		
				8032		
				8073		
				8114		
				8155		
				8196		
				8237		
				8278		
				8319		
				8360		
				8401		
				8442		
				8483		
				8524		
				8565		
				8606		
				8647		
				8688		
				8729		
				8770		
				8811		
				8852		
				8893		
				8934		
				8975		
				9016		
				9057		
				9098		
				9139		
				9180		
				9221		
				9262		
				9303		
				9344		
				9385		
				9426		
				9467		
				9508		
				9549		
				9590		
				9631		
				9672		
				9713		
				9754		
				9795		
				9836		
				9877		
				9918		
				9959		
				10000		

$$0 = +1325 + 036 - 31 + 1294$$

$$+12.65 - 828 + 24 .89$$

$$+13.37 + 0.51 - 144 .93$$

$$+13.02 + 0.12 - 10 .92$$

$$+13.07 + 0.18$$

$$dt + m = +12.92$$

$$m = + .42$$

$$dt = -13.34$$

$$ddt = + 1.18$$

$$0 = +1668 + 408$$

$$+16.12 + 3.63$$

$$+15.57 + 3.12$$

$$0 = +362 + 391 \quad m = -93$$

$$+3.05 + 3.45 \quad -89$$

$$+2.44 + 2.94 \quad -80$$

$$\quad \quad \quad -87$$

$$S.C. = 4 \quad h \quad 40 \quad m \quad 20 \quad s$$

$$- \quad - \quad - \quad - \quad -$$

$$4 \quad 39 \quad 48.1$$

$$4 \quad 27 \quad 36.7$$

$$21 \quad 12 \quad 11.9$$

$$3 \quad 28.4$$

$$430$$

$$17.0$$

$$5 \quad 8 \quad 7.0$$

$$5 \quad 7 \quad 13.9$$

$$7 \quad 27 \quad 56.7$$

$$21 \quad 40 \quad 16.4$$

$$3 \quad 33.0$$

$$93.4$$

16.6

1876 July 14 Obs. J. F. M.

2 Ophiuchi	w Drac.	μ Herc.	v Drac/p
17 29 23.8	37 48.8	41 49.2	44 16.0
26.0	52.2	54.8	19.6
28.0	55.1	54.0	22.7
30.2	57.8	56.3	25.9
32.4	38 0.9	58.6	29.3
140.4	3.8	269.9	33.0
28.02	6.3	53.98	36.8
	9.0		39.3
	12.0		43.4
	5.9		266.0
	0.66		29.56
2 13.58	37 44.29	39.15	12.28
I-2 14.44	16.37	14.83	17.28

$$n = -\frac{4.38}{4.95}$$

$$= -.88$$

$$n \tan \delta - .19 - 2.27 - .47 - 2.75$$

$$\Delta t \tan - 14.25 - 14.10 - 14.36 - 14.53$$

$$\Delta t (2 \text{ Ophi. } \& \mu \text{ Herc.}) - 14.73$$

$$d \Delta t - 1.28$$

July 15.

N. Clock 4 34 16
S. Clock 12 10 30

N. Clock 16.6 fast.

July 15. Obs. J. F. M.

1 Aquilae	2 Lyrae	β Lyrae
18 28 42.0	32 15.9	45 44.0
44.0	33 0.7	46.4
46.2	3.5	49.0
48.5	6.2	51.6
50.5	8.6	54.0
231.2	16.9	245.0
46.24	3.38	49.00
30.77	32 47.23	32.93
15.47	16.15	16.07

$$- .13 - .70 - .48$$

$$- 15.34 - 15.45 - 15.59$$

$$- 15.88$$

$$- 1.10$$

{ N. Clock ~~22~~ 22 28
S. Clock 5 39 35

{ N. Clock 22 6 33
S. Clock 5 45 41

N. Clock 16.1 fast

Put a brass cube into the
cup of weights.

July 16 Obs. J. F. M.

1 Aquilae	2 Lyrae	β Lyrae
18 28 43.0	32 15.9	45 44.0
45.3	33 1.6	47.6
47.3	4.4	50.0
49.4	6.8	52.5
51.6	9.8	55.0
236.6	21.5	250.0
47.32	33 41.30	50.00
30.77	32 47.23	32.93
16.55	17.07	17.07

$$- .13 - .70 - .48$$

$$- 16.42 - 16.37 - 16.59$$

$$- 16.88$$

$$- 1.00$$

{ N. Clock 19 30 40
S. Clock 3 13 20

{ N. Clock 19 36 46
S. Clock 3 19 27

N. Clock 15.9 fast

Signal sent July 16, 22^h mean time
0.1 slow

July 17 1896 N.H.

h m s	h m s	h m s	h m s	h m s
13 18 53.4	16 22 40	14 51 13.3	15 29 42.0	
56.5	62	17.0	44.3	
58.7	8.6	21.0	46.7	
0.7	13.9	25.0	49.0	
2.9	13.1	29.0	51.2	
		32.7		
		36.7		
		40.4		
		44.3		

12 56.07	18 58.64	22 80.6	51 28.82	29 46.64
13 15.65	18 41.47	51.56	51 8.20	28.73
-19.78	+17.17	+17.01	20.62	17.91

$$\begin{aligned}
 0 &= +17.17 - 1.9 \quad n = -85 \\
 &+ 17.01 - 4.9 + 42 \quad 17.43 \\
 &+ 17.91 + 51 - 43 \quad 17.48
 \end{aligned}$$

$$0 = +17.36 - 0.6$$

$$\begin{aligned}
 dT + m &= +17.42 \\
 m &= +1.20 \\
 dT &= -18.62 \\
 ddt &= -1.03
 \end{aligned}$$

$$\begin{aligned}
 0 &= -19.78 - 42.67 \\
 &+ 20.62 + 3.63
 \end{aligned}$$

$$\begin{aligned}
 0 &= +37.14 + 42.61 \quad n = 83 \\
 &+ 3.26 + 3.69 \quad = 88
 \end{aligned}$$

$$\begin{aligned}
 \text{Sent} &= 16.2 \\
 \text{S.C.} &= 5 \quad 40 \quad 10 \\
 &\quad 19.1 \\
 &\quad 5 \quad 39 \quad 41.9 \\
 &\quad 7 \quad 43 \quad 28.0 \\
 &\quad 21 \quad 56 \quad 18.5 \\
 &\quad 2 \quad 15.5
 \end{aligned}$$

$$b = +3.2$$

$$\begin{aligned}
 b \text{ error} &= +99 \\
 m \text{ error} &= -76
 \end{aligned}$$

$$\begin{aligned}
 m - b \text{ error} - m \text{ error} &= +14 + 76 \\
 &= +90
 \end{aligned}$$

New value of m.

July 18 1876 No. R. Morning.

h m s	h m s	h m s
470	506	5- 18 432
200	525	455
529	546	466
558	566	503
588	588	527

7	5290	8	5462	18	4794
	32.91		35.41		28.21
	+19.99		+19.21		+19.73

5
 $0 = +19.99 + 13 = 18 + 19.17$
 $+19.21 - 18 + 12 + 19.33$
 $+19.73 + 54 + 43 + 19.30$

5
 $dt + m = -19.27$
 $m = +1.20$
 $dt = -20.47$
 $ddt = -1.30$

$h m s$
 $5.0 = 6 38 57.0$
 -20.5
 $5- 33 26.5$
 $7 47 19.5$
 $21 46 17.0$
 $3 34.0$
 43.0
 17.0

$h m s$
 $5- 40 59.0$
 -20.5
 $5- 40 38.5$
 $7 47 19.5$
 $21 53 19.0$
 $3 35.1$
 43.9
 $+16.1$

July 19 1876

h m s	h m s
16 58	17 9 18.2
524	213
59	223
83	245
150	266
237	
312	
388	
460	2285
492	

59	2870	9	2288
58	49.23	9	22.40
	+28659		+19.98

$0 = +26.87 + 7.33$
 $0 = +19.99 + 2.5 - 23 + 19.75$
 $0 = +18.88 + 70.8$
 $m = +9.2$

$h m s$
 $5.0 = 2 52 29.0$
 -21.4
 $2 52 7.6$
 $7 51 16.1$
 $19 00 51.5$
 $3 6.9$
 446
 $+18.4$

Aug 21

$$\begin{array}{r}
 0 = +22.03 + 10 + 09 \quad 22.12 \\
 + 21.56 - 49 + 45 \quad 22.01 \\
 + 23.09 + 1.17 - 96 \quad 22.13
 \end{array}$$

$$\begin{array}{r}
 \Delta T + m = 22.09 \\
 m = +1.20 \\
 \Delta T = 23.29
 \end{array}$$

$$\begin{array}{r}
 S.B. = 17^h 39^m 52.0^s \\
 \quad \quad \quad - 23.3 \\
 \hline
 17^h 39^m 28.7^s \\
 \quad \quad \quad 1^m 59^s 6.2^s \\
 \quad \quad \quad 9^m 40^s 19.0^s \\
 \quad \quad \quad 38^m 44.5^s \\
 \hline
 15.5
 \end{array}$$

Adjusted

$$\begin{array}{r}
 S.C. = 5-14 \quad 57.0 \\
 \quad \quad \quad - 21.5 \\
 \hline
 5-14 \quad 29.5 \\
 7-5-1 \quad 16.1 \\
 21-23 \quad 13.4 \\
 3 \quad 30.2 \\
 \quad \quad 45.2 \\
 \quad \quad 16.8
 \end{array}$$

$$\begin{array}{r}
 2-28 \quad 53 \\
 \quad \quad 21.5 \\
 \hline
 5-23 \quad 31.5 \\
 7-5-1 \quad 16.1 \\
 21-32 \quad 15.4 \\
 3 \quad 31.7 \\
 21-28 \quad 43.7 \\
 \quad \quad 16.3
 \end{array}$$

July 24 1176 Morning RAR July 26 Morning.

h	m	s	h	m	s
5	8	9.975725	48	523	
		120 58.4		525	
		130 58.5		545	
		161 8.5		566	
		182 5.7		588	

h	m	s	h	m	s	h	m	s
5	8	9.975725	48	523		5	8	586
		120 58.4		525				588
		130 58.5		545				589
		161 8.5		566				590
		182 5.7		588				591

5 f 1492 144 5-48 5454
 35.60 35.60 28.25
 +25.84 +26.29

5 120 9 284 18 5622
 7 33.32 8 33.65 18 2800
 +28.98 +26.99 +28.72

5' n=50
 $0 = +25.84 - 15 - 43 + 28.97$
 $+26.29 + 14 - 13 + 26.6$

n=-80
 $0 = +27.88 + 1.53 - 82 + 27.16$
 $+26.99 - .15 + 12 + 27.11$
 $+27.72 + .54 - 43 + 27.29$

dt+m=-2 26.07
 m=+ 1.24
 dt=- 27.31

dt+m=-27.19
 m=+1.20
 dt=-28.39
 ddt=-.54

S.P. = 6 31 520
 - 27.3
 6 31 247
 8 10 589
 22 20 2588
 3 39.6
 22 16 462

This date should be 13.8 instead of 15.8

Adjusted
 S.P. = 5 23 350
 - 284
 5 23 66
 8 18 320
 21 04 146
 3 27.1
 21 02 47.5
 +12.5

1876 July 27 (morning) J. F. M. obs.

β Tauri & Can. Maj.

5 18 52.4	6 40 5.1
54.8	7.2
57.1	9.4
59.3	11.5
61.7	13.7
289.3	46.9
57.16	9.38
218.53	39 41.34
28.63	28.04
- .43	+ .24
+ 1.20	+ 1.20

$I - \alpha$
($n = -80$) $n \tan \delta$
m

At

- 29.40 - 29.48

{ N. Clock 21 53 48 }
{ S. Clock 6 20 25 }

{ N. Clock 22 18 0 }
{ S. Clock 6 44 41 }

N. Clock fast 16.8

No signal sent this morning.

Took off the cup of weights at 23^h mean time.

Adjustment

6 2 380	8 09 590
6 2 - 280	- 284
8 18 520	8 9 306
21 43 176	8 18 520
3 305	8 546
21 40. 44.1	23 46 240
+ 159	+ 160

July 28 J. F. M. obs.

η Mrs. Maj. η Boot. & Boot.

13 43 4.1	149 130	14 10 26.8
7.3	15.3	28.9
10.6	17.5	31.0
13.7	19.6	33.2
16.19	21.8	35.5
52.6	87.2	155.4
43 10.52	49 17.44	10 31.88
42 41.10	48 48.74	10 2.26
29.42	28.70	28.82
- .95	- .27	- .29
+ 1.20	+ 1.20	+ 1.20

- 29.67 - 29.63 - 29.73

Mean - 29.68

{ N. Clock 5 48 10 }
{ S. Clock 14 16 6 }

{ N. Clock 5 54 18 }
{ S. Clock 14 22 15 }

N. Clock fast 15.9

Replaced cup of weights.

July 28.

Improving

19^h 10^m mean time
While looking at the South Clock, intending to compare it with the North Clock, I saw it stop for about 25^s; the second hand swinging back and forward over the same space. It then went on.

{ N. Clock 19 35 16 }
{ S. Clock 4 5 0 }

{ N. Clock 19 41 30 }
{ S. Clock 4 11 15 }

From these comparisons the S. Clock probably lost 28^s, so as to be 2^h fast instead of 30^s, as it would have been by its rate.
N. Clock probably 16.3 fast.
Took off 3 pens.

1876 July 29 J. F. M. obs.

of Uro. Mar.

131.42 36.9

40.3

43.4

46.7

49.4

217.0

43.40

41.08

2.32

- .95

+ 1.20

Δt

- 2.57

2 Bootis

14 9 59.6

10 1.8

11.0

6.2

8.4

20.0

10 4.00

2.25

1.75

- .29

+ 1.20

- 2.66

{ N. Clock 5 47 12 }
{ S. Clock 14 18 37 }

{ N. Clock 5 53 22 }
{ S. Clock 14 24 48 }

N. Clock fast 16.3

July 29, (morning) 19^h mean time.

Put on one pen, as the North Clock is probably losing. The rate of the South Clock being doubtful, a comparison does little good without some observations.

July 30 (morning)

No observations since Saturday afternoon; weather cloudy.

{ N. Clock 21 42 50 }
{ S. Clock 6 20 50 }

{ N. Clock 21 49 6 }
{ S. Clock 6 27 7 }

This makes the difference between the clocks 12.2.

It is probable that the S. Clock is as much as 4^s fast, as there is reason to think that it started on Saturday with a large rate; but as nothing is known about it, I send no signal this morning.

July 31 Morning M.S.R.

h	m	s	h	m	s
5	18	28.7	5	48	29.0
		3.10			3.10
		33.9			33.1
		35.7			35.1
		38.1			38.2

5	18	33.38	5	48	33.08
18	28.65			28.65	
	+ 4.70			+ 4.93	

$s' m = +50$
 $0 = +4.73 + 54 + 43 + 4.30$
 $+ 4.93 + 13 - 10 + 4.33$

$dT + m = -43.1$
 $m = +1.20$
 $dT = -58.1$

$S.B. = 6.24.58.0$
 5.1
 $6.27.52.0$
 $8.38.34.8$
 $21.48.17.7$
 $3.34.3$
 $21.44.43.2$
 $+ 14.8$

Adjusted
 $S.C. 6.36.00.0$
 5.5
 $6.25.54.5$
 $8.28.34.8$
 $21.57.18.7$
 $-8.38.8$
 $21.53.48.9$
 16.1

Aug 1 1876 W.A.R.

h	m	s	h	m	s	h	m	s
16	58	28.0	17	9	31	17	28	14.3
		30.7			3.3			16.5
		44.1			3.9			17.6
		51.0			9.5			20.7
		54.4			11.6			22.8
		6.9						
		14.1						
		21.0						
		39.4						
58	58.67		9	7.38		28	14.58	
58	47.37		9	2.32			13.48	
	+ 11.30			+ 5.06			+ 8.09	

$0 = +5.06 + 25 - 22 + 4.84$
 $0 = +5.09 + 2.20 - 19 + 4.90$

$0 = +11.20 + 7.33$
 $0 = +5.07 + 2.3$
 $0 = 6.23 + 7.1$
 $m = -88$

$dT + m = -4.87$
 $m = +1.20$
 $dT = 6.07$

Aug 1, 1976 Morning M.R.

h m s	h m s
2 55 51.0	5 7 33.9
03.0	36.6
15.0	39.8
28.1	42.6
14.2	45.4

55 55.06	7 39.66
49.80	38.45
10.26	+6.21

$$0 = +5.26 + .06 - 0.4 + 5.21$$

$$+ 6.21 + 10.3 - 9.1 + 5.21$$

$$m = -88$$

$$d\tau + m = -5.21$$

$$m = +1.20$$

$$d\tau = -6.41$$

$$dd\tau = -.90$$

S.B. = 6	h m s
	17 54.0
	-6.4
	6 17 48.6
	8 42 81.3
	21 35 16.3
	3 38.2
	21 31 44.4
	+ 15.8

Aug 2, 1976 Morning M.R.

h m s	h m s	h m s	h m s
5 7 54.6	5 18 30.8	5 48 30.9	6 39 43.0
37.6	38.1	33.0	45.3
40.5	38.4	35.0	47.6
48.6	38.8	37.1	49.6
46.4	46.1	38.1	58.9

7 40.54	18 35.42	48 35.01	39 44.87
38.48	38.72	28.71	41.46
+4.05	+6.71	+6.30	+6.02

$$0 = +7.05 + 1.23 - 9.3 + 8.12$$

$$+ 6.71 + 5.4 - 4.8 + 6.28$$

$$+ 6.30 + 1.3 - 1.0 + 6.18$$

$$+ 6.02 - 3.0 + 2.7 + 6.29$$

$$n = -80$$

$$d\tau + m = -6.24$$

$$m = +1.20$$

$$d\tau = -7.44$$

S.C. = 6	h m s
	47 55.0
	-7.4
	6 47 49.6
	8 46 25.9
	22 01 19.7
	3 26.5
	21 57 43.12
	+ 16.8

Jan Aug 3 1976 Morning H.R.

Aug 4, 1976

h m s	h m s	h m s	h m s
4 28 58.1	5 47 35.7	5 18 31.7	5 48 31.9
53.2	388	340	390
54.3	417	364	366
59.5	446	380	381
61.7	476	42.1	402

28 57.31	7 41.68	18 36.44	48 36.04
49.99	33.53	28.74	25.71
7.37	8.15	7.70	7.33

$n = 50$
 $0 = +4.27 + 29 - 26 + 7.41$
 $+18.10 + 1.63 - 93 + 7.22$
 $+7.70 + 54 - 49 + 7.21$
 $+7.33 + 13 - 12 + 7.21$

$dt + m = -7.19$
 $m = +11.20$
 $dt = -8.39$
 $ddt = -.94$

$S.P. = 16.50$
 $h m s$
 $6 50 44.6$
 $8 50 24.4$
 $22 0 26.2$
 $3 36.3$
 $21 56 43.9$
 -116.1

$S.P. = 6 54 6.10$
 $6 54 -2.4$
 $8 54 21.0$
 $22 00 20.6$
 $3 36.3$
 $21 56 44.3$
 $+15.7$

Aug 6 1896 No. 6.

18 ^h 11 ^m 41 ^s	18 ^h 28 ^m 36 ^s	18 ^h 32 ^m 52 ^s	18 ^h 41 ^m 12 ^s
54.2	38.4	55.7	33.0
11.6	40.6	57.8	34.0
33.8	42.7	0.3	
-50.1	44.8	3.0	
8.3			
26.0			
43.3			
0.8			

12 50.91	28 40.56	32 57.76	18 41 33.00
12 23.39	28 30.76	32 47.08	41 40.26
+27.52	+9.78	+10.68	-11.26

$$0 = +9.78 - 14 + 14 + 9.92 \quad 0 = +27.52 - 16.88$$

$$+10.68 + 80 - 82 + 9.86 \quad -11.26 + 20.51$$

$$0 = +10.23 + 33$$

$$0 = +17.29 + 17.21 m = -1.04$$

$$+21.49 + 20.18 \quad -1.06$$

$$-1.03$$

$$dt + m = -9.89$$

$$m = +1.20$$

$$dt = -11.09$$

8.0 = 185947.0

h m s

18 59 38.9

9 2 14.1

9 57 21.8

1 07.8

2 55.440

W A Rogers

1875

station of occultation of Saturn
correlat. with his 6th in equatorial.

correlat. 23.6

$$\begin{array}{r} h \quad m \quad s \\ 20 \quad 14 \quad 25.0 = 23.6 \\ +1 \quad 37 = 23.6 \text{ fast} \\ 20 \quad 13 \quad 21.3 = \text{South Clocks} \end{array}$$

$$\begin{array}{r} 20 \quad 16 \quad 4.0 = 23.6 \\ -1 \quad 37 = 23.6 \text{ fast} \\ 20 \quad 15 \quad 0.3 = \text{South Clocks} \end{array}$$

$$\begin{array}{r} 20 \quad 45 \quad 8.0 = 23.6 \\ -1 \quad 37 = 23.6 \text{ fast} \\ 20 \quad 44 \quad 4.3 = \text{South Clocks} \\ \text{South Clocks} = 11.1 \text{ fast} \end{array}$$

ad. Mean Time

$$\begin{array}{r} 11 \quad 9 \quad 6.0 \\ 0 \quad 11 \quad 10 \quad 44.8 \\ 0 \quad 11 \quad 39 \quad 43.9 \end{array}$$

by Aug McConnell with field glass
11^h 9^m 20^s

M. Time =

Aug 6 1876. Observations of occultation of Saturn.
 Observation by L. Provelot with his 6" equatorial.
 Power =

Immersion By Chronometer 23.6
 Beginning 20 14 28.0
 End. 20 16 40

h m s
 20 14 28.0 = 236
 + 1 37 = 236 part.
 20 13 21.3 = South Clock

Emersion

End 20 45 80

20 16 40 = 236
 - 1 37 = 236 part.
 20 15 0.3 = South Clock

Sidereal time corrected. Mean Time

Immersion Beginning 20 13 10.0 11 9 60
 End 20 14 49.0 11 10 48
 Emersion End. 20 43 53.0 11 39 43

20 45 80 = 236
 - 1 37 = 236 part.
 20 44 43 = South Clock = 11.1 part.

Observation of beginning of emersion by Aug McConnell with field glass
 M. Time = 11 9 20

Aug 6 1876

Observation of occultation of Saturn by W. A. Rogers

Winn's Clock (11.1 fast)

Sidereal Time.

Immersion	Beginning	South Clock	South Clock	Mean Time N.P.O.	Duration.
		^h _m ^s	^h _m ^s corrected.	^h _m ^s	^m ^s
Beginning	End.	20 13 0.9	13 49.8 ^s	11 8 45.9	on 5
End.		20 14 36.1	14 25.0	11 10 20.8?	1 34.9

Emersion

Beginning
End.

20 44 34.6

44 23.5

11 40 14.3

20 45 39.6

45 46.5

11 42 39.0

2 29.7

Observed

Computed (Rain)

Diff.

11 8 45.9

11 9 43.0

+

57.1

11 10 40.8

11 12 1.0

+1

40.2

11 40 14.3

11 39 8.0

-1

63

11 42 39.0

11 41 24.0

-1

15.0

Aug. 7 1876 P.M. R Morning

Aug. 8 Morning.

5 ^h 7 ^m 5 ^s	5 ^h 18 ^m 5 ^s
403	364
434	387
464	410
493	434
523	458

5 ^h 7 ^m 5 ^s	5 ^h 18 ^m 5 ^s	5 ^h 18 ^m 5 ^s
403	417	377
434	447	400
464	477	423
493	506	446
5	536	470

7	18
4634	4106
33.65	28.54
12.69	12.12

7	18
47.66	4232
33.73	28.90
13.93	13.42

$n = -100$
 $0 = +12.69 + 103 - 102 + 1.166$
 $+ 12.12 + 54 - 54 + 1.58$

$0 = +13.93 + 1.03 - 1.03 + 12.90$
 $+ 13.42 + 54 + 54 + 12.91$

$dT+m = -11.62$
 $m = +1.20$
 $dT = -12.82$
 $ddr = -1.15$

$dT+m = -12.90$
 $m = +1.20$
 $dT = -14.10$
 $ddr = -1.08$

S.C. = 6 58 42.0
 $- 12.8$
 6 58 29.2
 7 6 10.7
 21 52 10.5
 3 34.5
 21 48 45.2 + 16.8

Sb. = 7^h 5^m 40^s
 $- 14.1$
 7 5 25.9
 9 10 7.2
 21 33 18.7
 3 38.5
 21 51 43.2
 $+ 16.8$

Aug. 9 1896 Morning N.O.R.

h m	-15	m s	h m	s
5 7	437	18 388	5 48	389
	468	410		410
	498	435		430
	526	455		450
	557	481		471

7 4972	18 4346	218 1300
23.77	2889	2880
+1495	+1482	+1480

$\delta = +1495 + 103 + 103 - 1392$
 $+1452 + 54 - 84 - 1398$
 $+1410 + 13 - 13 1397$

dt+m = 13.96	h m s	Let. N.B.
m = +1.20	5 0 360	7 9 380
dt = 15.16	- 182	15.2
ddt = -1.06	7 0 208	7 9 228
	5 14 38	9 14 38
	21 46 180	21 55 190
	3 34.0	3 38.5
	21 42 43.0	21 57 43.5
	17.0	+16.5

Aug. 10 1896 Morning

h m	s	h m	s
4 28	14	5 7	439
	30		469
	86		500
	77		529
	97		560

28 5.56	7 4994
27 56.22	3881
-15.34	+ 16.13

$\delta = +16.13 + 1.03 + 18.10$
 $+15.34 + 29 15.05$

dt+m = 15.07	h m s
m = +1.20	S.P. = 7 11 36.0
dt = 16.27	- 16.3
ddt = -1.07	7 11 19.7
	7 18 0.3
	21 53 194
	3 35.7
	4 43
	+ 15.3

Aug. 12 1876 Morning.

Began a series of comparisons
of the East-arm the sun circle
to be continued 2 months.

h	m	s	h	m	s	h	m	s
5	46	4	5	48	3	5	48	2
	49	4		51	3		44	6
	52	3		53			46	8
	55	2		55	4		49	3
	58	3		56			51	7

$$\begin{aligned}
 S.C. &= 4^h 20^m 0^s & S.P. &= 18.41 \text{ feet} \\
 E.C. &= 4^h 19^m 14^s & & 43.2 \\
 E.C. \text{ fast } & S.C. & & 61.6 \quad "
 \end{aligned}$$

July 13 1976

18	h	m	s	18	h	m	s	18	h	m	s	18	h	m	s
12	22.3			33	05			41				45	34.8	46.7	
	39.0				32				21.6				37.2	49.0	
	56.9				59				49.0				39.7	51.5	
	15.2				86				65.7				42.1	53.5	
	31.0				11.1								44.7	56.0	

18	12	56.88	33	5.56	41	43.77	45	37.2	51.50
		-2.117	32	46.99	41	46.80	45	38.3	52.77
		+38.71		+18.89		-3.03		62.5	+18.73

$$\begin{aligned} 0 &= +35.71 + 16.88 \quad m = -10.5 \\ 0 &= -3.03 - 20.51 \quad -1.03 \end{aligned}$$

$$\begin{aligned} 0 &= +18.87 + 0.80 - 83 + 18.04 \\ &+ 18.73 + 0.61 - 67 + 18.06 \\ 0 &= +18.20 + 0.72 \end{aligned}$$

$$\begin{aligned} dt+m &= -18.05 \\ m &= +1.20 \\ dt &= 19.25 \\ ddt &= -1.19 \end{aligned}$$

$$S.C. = 23 \quad 000$$

$$E.C. = 22 \quad 16.5$$

$$S.C. \text{ part of } S.B. = 43.5$$

My eye and ear.

Let book 2

S.C. =	6	26	17	170	6	34	170
			193	198			198
	6	25	18.3	53.2	6	33	58.2
	9	29	58.6	54.0	9	29	50.0
	20	56	8.0	7.2	21	04	8.2
		3	28.8	25.8		3	24.7
			38.9	41.4			1.11
				18.6			

Aug 14 1876

18 ^h 45 ^m 43.5	18 ^h 50 ^m 27.3	19 ^h 0 ^m 56.5
46.6	31.0	55.2
48.8	35.2	1.3
52	38.8	3.6
53.7	43.6	5.6
	48.6	
	51.0	
	53.7	
	59.0	
18 45- 48.82	24.322	1.128
32.76	23.53	4.082
+16.06	+19.29	+15.76

$$O = +16.06 + 65 - 15.41$$

$$+ 15.76 + 24 = 11.72$$

$$O = +19.29 + 3.78$$

$$+ 15.91 + 44$$

$$+ 33.8 + 35.0$$

$$u = +1.00$$

$$d/r + m = -15.46$$

$$m = +1.20$$

$$d/r = +16.66$$

48 230
198
48 32
29 500
19 132
8 290
43.7
16.3

$$O.C. = \begin{matrix} 9 & 5 \\ 9 & 20.0 \\ 33 & 17.2 \\ 33 & 28 \\ 33 & 46.5 \\ 33 & 16.3 \\ 31 & 22.3 \\ 31 & 44.0 \\ 31 & 16.9 \end{matrix}$$

Note.
From these observations it appears
that the sun's clock has again
dropped 4^s.
This must have taken place
about 19^h Sid. Time.
Let the sun's clock forward 4^s.
During all of Aug 14, the meridian
clock signals were sent 4^s
slow.

Aug. 15-1876 W.S.R. morning with East Clock.

h	m	s	-1.5	h	m	s	-1.5
5	8	35.6		5	49	31.7	
		38.6				33.6	
		41.6				35.6	
		44.6				37.7	
		47.5				39.8	

8	40.58	49	34.68
7	34.02	48	29.06
+1	6.56	+1	5.62

$n = 5$ $n = -100$
 $0 = +1.6 \times 5.6 + 1.53 - 46.53$
 $+1.56.6 \sim +13 + 65.49$

$dt + m = -1^m 6.51$
 $m = +1.20$
 $dt = -1^m 6.71$
 $ddt = -1.83$

h m s
 $E. b. = 7$ 33 9.0
 1 6.8
 7 32 2.2
 5 37 43.1
 20 54 18.1
 3 35.8
 21 50 43.8
 16.2

Note.

The east-clock puts in
 one brook for 59^s. Hence
 the beginning of the minute is the
 best following

Sent the South Clock to Bond
 and Sons for repairs.

Aug. 16 1976

W. A. R. Wini
East Clock.

$17^h 42^m 40.3$
 428
 448
 453
 494

$17^h 54^m 47.3$
 505
 537
 569
 64

42
 41
 $+1$

54
 53
 $+1$

$0 = +1.711 + 47 - 47 + 1.654$
 $+1.778 + 1.20 - 1.25 + 1.652$

$d\tau + m_i = +1.653$
 $m = +1.20$
 $d\tau = -1.203$
 $d\tau = -1.94$

$E. C. = 7^h 26^m 06.6$
 -1.89
 $7^h 24^m 51.1$
 $19^h 41^m 39.7$
 $21^h 43^m 19.4$
 $3.33.5$
 $21^h 39^m 43.9$
 $+11.1$

β Scorpion 80 plinck. 5 Hercules 2 Scorpion
 59 27.18 16 9 4.54 17 15.04 23 2.00
 16.16 53.25 2.57 57.16
 1 11.02 1 10.77 1 12.47 1 12.84

$2 + .12m - .03 + \Delta + m$
 $2 - .37m - .01$
 $9 - .06m + .01$
 $4 - .49m + .03$

$89 - .20m + (4 + m)$
 $47 + 1.07m + 0.2 + (4 + m) \therefore m = -\frac{160}{127} = -1.26$

Aug 19^d 16^h 1 $\Delta t = -71.56$

Band 312

36 31.00 = 0 38 0.0
 73.02
 35 17.98
 57 21.9
 37 52.1
 0 6.2
 37 45.9

$\therefore$ Error int. = +14.5

Aug. 15 1876 No. R. more

1876. Aug 17. (S. W.)

h	m	-1.5	h	m	-1.5
5	8	35.6	5	49	31.7
		38.6			33.6
		41.6			35.6
		44.6			37.7
		47.5			39.8

8	10.58	49	24.68
7	34.02	48	29.06
+1	6.56	+1	6.62

$\eta = 5$ $\eta = -100$

$0 = +1.64.6 + 1.03 + 6.5.3$
 $+1.56.62 + 13 + 6.5.49$

$dt + m = -1.5$
 $m = +1.20$
 $dt = -1.6.71$
 $ddt = -1.83$

$E. b. = \gamma$

h	m
7	32
5	37
21	54
	3
21	50

Bond 312 (cis.)

mt.

7	30	4.0	=
	-1	9.1	
7	28	54.9	
9	45	26.2	
21	43	18.7	
	3	23.5	
21	40	45.2	

0.6

Error mt = +14.8

1876. Aug 18. J.F.M. obs.

		α Saphir	β Saphir
t	16	9 2.64	23 0.12
d		7 52.27	21 57.18
		1 9.37	1 8.94

$$0 = +69.37 - .06w + (\Delta t + m)$$

$$0 = 68.94 - .49w + \dots$$

$$0 = 0^s.43 + .43w \therefore w = -1^s.00$$

$$-69.37 - .06 - .42 = \Delta t = -69.85$$

$$-68.94 - .49 - .42 = \Delta t = -69.85$$

at 18^h 16^m 2^s

Band 312			
18	49	56.0 =	0:0
	1	10	
18	48	46.0	
9	49	32.8	
8	59	12.2	
	1	28.3	
8	57	44.9	$\therefore$ Error mt. = <u>+15.1</u>

1876. Aug 19

		α Saphir	β Saphir	γ Saphir	δ Saphir	ϵ Saphir	ζ Saphir
15	39	23.18	59	27.18	16	9	4.54
	38	11.76		16.16	17	15.04	23 2.00
	1	11.42	1	11.02	1	10.27	1 12.47
							1 10.84

$$0 = 71.42 + .12w - .03 + \Delta t + m$$

$$71.02 - .37w - .01$$

$$70.29 - .06w + .01$$

$$70.54 - .49w + .03$$

$$0 = 70.89 - .20w + (\Delta t + m)$$

$$0 = 72.47 + .107w + .02 + (\Delta t + m) \therefore w = -\frac{160}{127} = -1^s.26$$

$$\text{Aug 19 } 18^h 16^m 1^s \Delta t = -71^s.56$$

Band 312			
10	36	31.00 =	0 38 0.0
		73.02	
10	35	17.98	
9	57	25.9	
0	37	52.1	
	0	6.2	
0	37	45.9	

$$\therefore \text{Error mt.} = +14^s.8$$

1876. Aug 20. (P.m.)

t	β Boötis	β Librae	γ Ursa Min.
14 ^h	58 22.28	11 35.20	22 18.30
x	57 18.15	10 22.19	20 57.09
	1 14.13	1 13.01	1 16.23

$$0 = 74.13 + .87m + (A + m)$$

$$73.01 - .16m$$

$$0 = 73.57 + .85m + "$$

$$76.23 + 3.12m + "$$

$$0 = 2.66 + 2.77m \therefore m = -0.96$$

$$0 = 73.57 - .34m + .42 + \Delta t$$

Aug 20. 1872. $\Delta t = -73.65$

Bund 312		
20	5	5.0 = 0.0
	1	14.1
20	3	50.9
9	57	25.9
10	6	25.0
	1	39.3
10	4	45.7

$$\text{Error int} = +14.3$$

1876. Aug 20. about 11 P.m.

Bund 312		
21	5	15.0 = 0.0
	1	14.1
21	4	0.9
9	57	25.9
11	6	35.0
	1	49.2
11	4	45.8

$$\text{Error int} = +14.2$$

added 5 steel pens at 11 P.m.

1876. Aug 20. about 7.45 Am.

Bund 312		
5	37	39.0 = 0.0
	1	14.8
29	36	24.2
9	57	25.9
19	38	58.3
	3	13.1
	35	45.2

$$\therefore \text{Error int} = +14.8$$

added for 1.3 two silver quarter dollar pieces.

Bund 312		
6	58	52.0 = 0.0
	1	14.9
30	57	37.1
9	57	25.9
21	0	11.2
	3	26.8
20	57	44.4

$$\therefore \text{Error int} = +15.6$$

1876. Aug 20.

Band 312

7 53 0.0 z 05.0

-1 15.0

31 51 45.0

9 57 25.9

21 54 19.1

2 35.3

21 50 43.8

Aug 20. (9.45 Am)

1. Err ml = + 16.5.2

1876 Aug 21 N.A.R.

h m s	h m s
17 10 12.7	17 30 23.9
148	280
150	282
152	304
213	32.5

10 17.00	30 28.20
9 206	29 13.27
+1 1494	+1 1493

$\mu \approx 5$
 $dt + m = -1 \ 1470$
 $m = + \ 6.20$
 $dt = -1 \ 1590$

$n = -100$
 $n \approx 5$
 $0 = +1 \ 1494 + 25 - 25 + 1 \ 1469$
 $+1 \ 1493 + 22 - 22 + 1 \ 1471$

$E.C. - 19 \ 10 \ 52.0$
 $-1 \ 15.9$
 $19 \ 11 \ 36.1$
 $10 \ 21 \ 24$
 $9 \ 10 \ 13.7$
 $1 \ 30.1$
 $9 \ 8 \ 43.6$
 $+16.4$

Aug. 21 morning

h	m	s	h	m	s	h	m
8	44		9	59	47	19	400
	47.2			46.4			423
	49.5			45.2			447
	53.0			43.3			480
	56.0			41.3			494

8	5004	10	366	538	19	4468
7	3477	8	3638	3639		29.34
+	1577		2827	1458	1	15.34

$0 = +1 \ 1577 + 103 - 103 + 1 \ 1474$
 $+1 \ 1459 - 15 + 15 \ (15.74)$
 $+1 \ 15.34 + 54 - 54 \ 1480$

$(T+m) = -1 \ 1477$
 $m = + \ 1.22$
 $DT = -1 \ 15.87$

$\Sigma . C. = 7 \ 42 \ 55.0$
 $-1 \ 16.0$
 $7 \ 41 \ 39.0$
 $10 \ 01 \ 22.4$
 $21 \ 40 \ 16.6$
 $3 \ 28.0$
 43.6
 16.4

Aug. 22 1876

		^{+2.0}			^{+2.0}
h	m	s	h	m	s
17	8	11.2	17	30	224
	10	13.3			243
		15.3			264
		17.4			285
		19.6			30.6

10	1837	30	2844
7	2.00	29	13.25
1	15.32	1	15.19

$0 = +1 \ 1832 + 2.25 - 2.25 + 1 \ 13.08$
 $+1 \ 15.19 + 22 - 22 \ 12.94$

$DT+m = -1 \ 15.12$
 $m = + \ 7.22$
 $DT = +1 \ 16.22$

Aug. 22 1876 Morning

Aug. 23 1876 P.M.

h m s	h m s	h m s
27 588	34 01	38 56.3
56.3	31	58.7
58.7	31	59
12	32	53
35	33	57

h m s	h m s	h m s	h m s
17 10 13.4	17 30 24.0	18 13 31.3	18 40 41
15.6	26.7	4.4	26.7
17.8	28.8	5.8	45.0
19.8	31.0		5.7
21.9	33.2		31.2

27 5890	34 4.96	39 0.98
27 4256	34 49.95	39 45.18
1.16.14	1.18.01	1.15.80

10 17.70	28.84	13 4.50	42 4.57
9 2.02	13.24	17.57	41 5.14
+1 16.68	+15.60	+1 30.99	+56.40

$C = 1.00$
 $0 = +1.16.14 + 56 = 55.11.55$
 $1.15.01 + 0.9 = 0.9 (1.5.92)$
 $1.15.80 + 47 = 47.15.33$

$m = -92$
 $0 = +1.15.68 + 2.5 = 23.75.05$
 $+1.15.60 + 2.2 = 20.77.40$

$m = 5$
 $0 = +1.30.99 + 16.68$
 $+0.56.40 = 20.57$

$0 = +1.15.60 + 2.4$

$0 = +1.15.35 + 16.66 = -92$
 $+19.24 + 20.73 = -93$

$dt + m = -1.15.46$
 $m = +1.20$
 $dt = -1.15.66$

$m = 8$
 $dt + m = -1.15.42$
 $m = +1.20$
 $dt = -1.16.62$

E.P. = 7 57 54.0
 $-1.16.7$
 $7.56.37.3$
 $10.05.19.0$
 $21.51.18.3$
 $3.34.8$
 $21.47.53.5$

E.P. = 7 52 50.0
 $-1.16.6$
 $7.51.33.2$
 $10.09.15.5$
 $21.42.17.8$
 $3.33.3$
 $21.38.44.5$
 $58.51.0$
 $-1.16.9$
 $7.57.34.1$
 $10.9.15.5$
 $21.48.18.6$
 $3.34.0$
 $21.44.44.3$
 $1.15.7$

Aug 24 1870 W.A.R.

17 h 8^m 14.1
16.2
18.3
20.2
22.5

17 30 25.3
27.4
29.6
31.7
33.8

8 18.30
7 2.01
1 16.29

29.56
13.23
14.33

$m = -50$

$$d = +116.29 + 25 = 22 + 116.09$$

$m = 5$
 $d\tau + m = -1 16.07$
 $m = + 120$
 $d\tau = -1 17.27$
 $dd\tau = -0.65$

El. - 19 58 48.0
- 1 17.3
19 52 30.7
10 13 12.1
9 39 18.6
9 37 28.7
16.3

7 50 46.0
- 1 17.6
7 49 28.4
10 13 12.1
21 36 16.3
3 39.3
44.6
16.0

Aug. 26 1876 Morning N.P.R.

h m s.	h m s.	h m s.
5 8 44.5	5 19 43.2	5 49 42.3
50.3	45.5	45.3
53.2	47.8	47.3
56.1	50.1	49.2
59.0	52.5	51.4

5 8 53.22	19 47.82	49 47.10
11 10.72	18 47.0	48 11.83
34.49	29.51	29.38
+1 18.73	+1 18.31	+1 18.72

n = -90
 $0 = +1 \begin{matrix} 18.73 & +1.03 & -93 & +1.780 \\ 18.31 & +54 & -49 & 12.82 \\ 17.72 & +13 & -12 & 17.60 \end{matrix}$

n 9
 $d\tau + m = -1 \ 17.74$
 $m = +1 \ 1.20$
 $d\tau = -1 \ 18.94$

$dd\tau = 70.83$

$\Sigma C =$

h m s.
10 12 30
- 1 19.0
10 10 44.0
10 21 52
23 49 38.8
3 54.2
23 45 44.6
+15.4

Aug. 27 1876 Morning N.P.R.

h m s.	h m s.
6 40 53.9	7 33 44
58.1	63
0.1	85
2.3	105
4.6	127

41 020	33 8.48
39 42.03	31 50.04
+1 18.17	+1 18.44

n = -90
 $0 = +1 \begin{matrix} 18.17 & -30 & +2 & +1 \ 18.44 \\ +1 \ 18.44 & +09 & -08 & +1 \ 18.36 \end{matrix}$

$d\tau + m = -1 \ 18.40$
 $m = +1 \ 1.20$
 $d\tau = +1 \ 19.60$
 $dd\tau = -64$

$\Sigma C =$

h m s.
6 10 39.0
- 1 19.6
8 09 19.4
11 25 18
21 44 17.6
3 33.6
31 40 44.0
160

Aug. 28 1876 Morning.

yk	h	m	s	yk	h	m	s
34	46			39	00		
	67				23		
	88				47		
	109				50		
	130				54		

34	880	7	39	4.68
32	50.09		07	14.33
1	10.71		11	19.35

n = -90
 $0 = +115.71 + 0.9 - 0.8 + 1.1563$
 $+ 119.35 + 47 - 42$ 18.93

dt+m = -1 11.50
 m = + 1.20
 dt = -1 20.00
 ddt = 0.40

h m s
 $\Sigma C = 8$ 15 36.0
 -1 20.1
 8 14 18.9
 10 28 38.4
 21 45 15.5
 3 33.8
 21 41 43.7
 +16.3

Aug. 29 1876 Morning

6h	h	m	s	7h	h	m	s	7h	h	m	s
40	56.6			39	50			39	53		
	58.8				52				26		
	0.8				52				50		
	3.0				11.3				53		
	5.2				13.3				57		

41	088	34	920	27	4.98
39	42.11	32	50.12		15.36
71	18.77	+1	19.08	+1	19.60

n = -90
 $0 = +1 11.77 - 30 + 27 + 19.04$
 $+ 1 19.08 + 0.9 - 0.8 19.00$
 $+ 1 19.62 + 47 - 42 19.20$

dt+m = -1 19.58
 m = 1.20
 dt = +1 20.28

ddt = -28
 $\Sigma C = 8$ 16 33.0
 -1 20.3
 8 15 12.7
 10 30 54.9
 21 42 17.8
 3 33.3
 21 39 44.5
 +15.5

Aug. 30 1976 NOK.

h m s	h m s	h m s	h m s	h m s
11 12 16.1	18 34 14	18 42 11.8	19 46 30	19 50 32.3
32.1	3.9	32.7	5.3	34.4
51.6	6.7	54.3	8.3	36.7
10.0	8.2	11.3	9.4	38.7
26.3	11.8	36.1	11.5	40.7

13 54.2	34.660	42 54.04	46 7.30	50 36.56
12 46.69	32 46.69	41 54.53	4 54.6	49 16.43
+ 36.72	+ 18.81	+ 59.87	+ 20.42	+ 120.13
			1.20.29	

m s
 $0 = +1.1991 + 80 - 50 + 1.19.11$
 $+ 1.20.24 + 1.5 - 1.19.09$
 $+ 1.20.13 + 1.1 - 1.19.02$

$0 = +1.20.09 + 35$

$0 = +96.72 + 16.88$
 $+ 59.51 - 20.51$

$0 = +16.63 + 16.53$ $n = +1.01$
 $+ 20.58 + 20.86$

m s
 $dT + m = -1.19.07$
 $m = +1.20$
 $dT = +1.20.27$
 $ddT = .00$

h m s
 8 21 30.0
 -1 20.3
 8 20 08.8
 10 36 51.4
 21 43 18.3
 3 33.5
 21 39 44.8

Aug. 31 Morning

With Louth Clocks

7 h 33 m 42 s	7 h 37 m 38.7 s
6.3	18
8.3	42
10.4	65
12.5	90

17 83.4
 50.16
 + 18.18

38 4.24
 45.42
 + 18.82

-18.4
 -19.6
 $8 15 13.0$
 $10 40 45.6$
 $21 34 23.6$
 $+ 18.18 - 09$
 $+ 18.82 - 47$
 $+ 18.35$

$dT + m = -18.22$

$dT = -1.20$

$dT = -18.54$

$ddT = -1.57$

Changed the position of the
 Van. Clocks several seconds.

Removed 2.8 min. shot at 8 h

Sept. 2 1976

1st 2nd 3rd 4th 5th 6th 7th 8th 9th 10th 11th 12th 13th 14th 15th 16th 17th 18th 19th 20th 21st 22nd 23rd 24th 25th 26th 27th 28th 29th 30th 31st

1st 2nd 3rd 4th 5th 6th 7th 8th 9th 10th 11th 12th 13th 14th 15th 16th 17th 18th 19th 20th 21st 22nd 23rd 24th 25th 26th 27th 28th 29th 30th 31st

1st 2nd 3rd 4th 5th 6th 7th 8th 9th 10th 11th 12th 13th 14th 15th 16th 17th 18th 19th 20th 21st 22nd 23rd 24th 25th 26th 27th 28th 29th 30th 31st

1st 2nd 3rd 4th 5th 6th 7th 8th 9th 10th 11th 12th 13th 14th 15th 16th 17th 18th 19th 20th 21st 22nd 23rd 24th 25th 26th 27th 28th 29th 30th 31st

33.70
33.80
33.79
33.88
33.88
33.97

$b = +31$
 $n = -1.00$
 $\sec \varphi = +0.419$
 $\tan \varphi = -0.912$
 $m = +1.33$

242.2
12 48.44
12 13.50
2-2 34.94
ntand 16.88
18.06

266.0
41 53.20
41 55.94
- 2.74
+ 20.68
17.94

411.3
40 42.85
40 24.85
18.00
- .18
17.82

24.8
45 4.96
44 47.02
17.94
- .15
17.79

556.0
36 40.55
37 14.95
18.89
- .99
17.90

502
33.84
251
- 17.84
At - 19.17

Feb. 17 1976
20 41 24
20 40 00
1 24

Sept. 3 1876 Morning

6 ^h 32 ^m 53 ^s	7 ^h 26 ^m 56 ^s	7 ^h 33 ^m 33 ^s	7 ^h 37 ^m 58 ^s
571	587	574	600
553	11	74	32
14	36	95	56
8.6	59	11.6	<u>5.0</u>

39 5928	27 1.08	33 7.44	38 3.08
39 4225	26 42.88	32 50.21	45.47
+17.03	+18.20	+17.23	+17.61

$\delta = +17.03 - 30 + 30 + 17.23$
 $(+15.20 + 55 - 55 + 12.65)$
 $+17.23 + 49 - 49 + 17.14$
 $+17.61 + 17 - 47 + 17.14$

$\alpha = -90$
 $-27 + 17.30$
 $+08 + 17.15$
 $+42 + 17.19$

$d\Gamma + m = -17.21$
 $m = +1.20$
 $d\Gamma = -18.41$

$dd\Gamma = +0.33$

$\delta.l.b. = 8$
 $17 36 04$
 $17 35 00$
 $1 04$

$\delta.l.b. = 8$
 $24 11.0$
 -18.4
 $8 23 52.6$
 $11 52 37.6$
 $21 31 15.0$
 $3 31.5$
 $21 27 32.5$
 $+16.5$

Sept. 4 1876 Morning

7 ^h 26 ^m 56 ^s	8 ^h 28 ^m 28 ^s	8 ^h 37 ^m 58 ^s
582	570	576
68	70	28
81	50	51
<u>57</u>	<u>11</u>	<u>96</u>

27 078	33 6.98	38 2.84
26 42.94	32 50.25	45.54
+17.84	+16.73	+17.30

$\delta = +17.84 + 6.3 - 63 (17.21)$
 $+16.73 + 10 - 10 16.63$
 $+17.30 + 54 - 54 16.76$

$d\Gamma + m = -16.69$
 $m = +1.20$
 $d\Gamma = -17.89$

$\delta.l.b. = 8$
 $43 11.0$
 18.4
 $8 42 52.1$
 $10 56 34.2$
 $31 46 17.9$
 $21 3 34.0$
 $42 43.9$
 $+16.1$

$\Sigma.C. = 7$
 $41 55.0$
 $80 7 48 60$
 61.0

Sept. 6 1876

h	m	s	h	m	s	h	m	s
18	32	580	19	44	590	19	49	285
		07			10			306
		35			33			326
		60			52			347
		87			74			368

h	m	s	h	m	s	h	m	s	h	m	s
18	33	388	19	45	322	19	49	32.14	18	12	44.10
	32	46.83		44	46.98		49	16.36		12	11.96
		+16.85			+16.24			+16.28			32.14

$$\begin{aligned} 0 &= +16.85 + 80 - 92 \\ &+ 16.24 + 15 = 14 \\ &+ 16.28 + 11 = 10 \end{aligned}$$

$$0 = +16.46 + 35$$

$$\begin{aligned} dT + m &= -16.13 \\ m &= +1.23 \end{aligned}$$

$$E.L. = 0.58$$

$$dT = +17.36$$

$$ddT = +0.35$$

$$\begin{aligned} 0 &= +32.14 + 16.88 \\ &- 2.14 = 20.80 \end{aligned}$$

$$\begin{aligned} 0 &= +15.68 + 16.53 \\ &+ 18.60 + 21.15 \end{aligned}$$

$$\begin{aligned} E.L. &= 8.57 \\ &8.58 \\ &11.4 \\ &31.82 \\ &3.349 \\ &21.48 \\ &+ 16.4 \end{aligned}$$

$$b = +31$$

$$\begin{aligned} m &= b \sec \varphi - n \tan \varphi \\ &= +141.82 = +12.3 \end{aligned}$$

Sept. 7. 1876.

S.W.

Flnds. 1327			Bnd 394.	
8 ^h	8 ^m	51.0 = 20 ^h	57	0.0
+ 24		-16.9		
32	8	34.1		
44	8	23.2		
44	2	20.8		
	-3	26.8		
20	59	04.0		
21	0	10.2		
	3	26.4		
20	53	43.8 =	57	0.0

$\therefore$ Bnd 394 = Fact 16.32

Sept. 8. 1876

S.W.

Flnds 1327			Bnd 394	
32 ^h	52 ^m	54.0 =		0.0
		16.6		
32	52	37.4		
11	12	20.0		
21	40	17.4		
	3	23.0		
21	46	44.4		

+ 15.6

Adapted Sun + 15.8

Adapted 1 sent per.

Sept. 9. 1876. J.P.M. obs.

α Cygni			δ Cygni		
24.0			45.2		
26.9			48.0		
29.9			50.9		
32.7			53.4		
35.8			56.1		
mean	37	29.86	mean	52	50.92
20	37	29.86	20	52	50.92
α		14.84			35.72
$t-\alpha$		+ 15.02			+ 15.20

$$\{0 = 15.02 + 1.002v + (4t + 14)$$

$$\{0 = 15.00 + .86w + "$$

$$0 = +.02 + .142v \quad \therefore \underline{2v} = +.29 - \frac{1}{7} = -0.315?$$

$$15.02 + 0.14 + 1.23 = -4t \quad \therefore 4t = -16.91$$

$$15.00 + 0.12 + 1.23 = -4t \quad \therefore 4t = -16.51$$

Using old value of n we have

$$15.02 - .9 + 1.23 = -4t \quad \therefore 4t = -15.35 \quad \left. \begin{array}{l} 15.0 \\ 15.4 \end{array} \right\}$$

$$15.00 - .77 + 1.23 = -4t \quad \therefore 4t = -15.46$$

which owing to only 2 stars having been obtained I shall use

Signal sent = Fact 16.4 according to comparison —
Comparison afterwards —

Flnds 1327			Bnd 394	
10 ^h	11 ^m	57.09 =		0.0
		+ 14.9		
10	11	42.1		
11	20	13.5		
22	51	28.6		
	3	44.7		

$\therefore$ Bnd 394 = fact 16.1

assuming $48t = +0.35$

Sept. 11. 1876. J.T.M. obs.

	Blupae	o Sagitt	3 Aquilae
+ 18 ^h	45 45.76	47 50.46	59 58.40
	32.29	38.83	45.20
+ α	+ 13.47	12.43	13.20

$$0 = 13.47 + .65n + 4t + m$$

$$12.43 - .50u$$

$$13.20 + .24w$$

$$n = -.92 \quad m = +1.23$$

$$0 = 13.47 - .59 + 1.23 + 4t$$

$$12.43 + .45$$

$$13.20 - .22$$

Sept. 11.3 ∴ Δt = -14^s.15

$$6.3$$

$$50a = + 3.21$$

$$10a = + 0^s.64$$

	Photo	Bund 394
7	30 26.0 =	0.0
24	-13.8	
31	30 12.2	
11	24 10.1	
20	6 2.1	
	3 17.6	
20	8 44.5	

8	12	38.0	44.6
32	12	-13.8	+15.4
11	24	27.2	
20	48	10.1	
		29.1	
		24.5	
		44.6	

Added 1/2 dollar piece
for 3rd try and compared as follows:

Sept 12. 1876. S.W.

	Aws 1327	Bund 394
9 ^h	16 38.0	
	-13.5	
33	16 24.5	
11	28 6.6	
21	48 17.9	
	3 24.3	
20	44 43.6 =	0.0

∴ Bund 394 is fast 16^s.4

Sept. 13. 1876.

	Aws 1327	Bund 394
9	15 33.0	
	-13.2	
33	15 19.8	
11	32 3.2	
21	43 16.6	
	3 33.5	
21	39 43.1 =	0.0

∴ Bund 394 is
16^s.9 fast.

In the absence of any time observations, the
signal was set at 16^s.8.

Cup pens removed from the pendulum.
S.W.

Sept. 14. 1876

Fonds 1327			Bond 394		
9h	11	31.0			
		12.9			
33	11	18.1			
11	35	59.7			
21	35	18.4			
	3	32.2			
	31	46.2 =	0.0		

Pendulum checked for two beats
(accidentally tied there too long)

9	37	34.0			
		12.9			
34	37	21.1			
"	35	59.7			
22	01	21.4			
	3	36.5			
	57	44.9 =	0.0		
					Bond Post 15.1

Sept. 15. 1876.

1 Pegasi			3 Aquarii			3 Cephei			3 Aquarii			1 Pegasi		
T	21 ^w	16 ^m 24.54	25 ^m	15.30		27 ^m	18.20		31 ^m	22.54		38 ^m	19.16	
hourly rate	-	.02		.01			.00			.01			.02	
2		24.26		5.39			5.54			12.60			9.08	
t-x		+10.26		+09.90			+12.66			+9.95			+10.10	
O = 10.26 + .35w			[= .34] = 9.92											
9.90 - .11			+ .11 = 9.91											
9.95 - .15			+ .15 = 10.10											
10.00 + .16			- .16 = 9.94											
mean O = 10.05 + 0.06w + Δt + w														
12.66 + 2.75w														
- 2.61 - 2.69w ∴ w = <u>- .97</u>														

$$O = 10.05 - .0582 + \Delta t + w \quad \therefore \Delta t = - \frac{10.05 - 9.97}{1.25} = \underline{\underline{11.522}} \quad \text{Sept 15.4}$$

$$\begin{aligned} \text{Sept. 16.4} &= -17.36 > 1.25 & \Delta t &= 0.42 \\ &= -16.11 > 1.96 & &= 0.98 \\ &= -14.15 > 2.93 & &= 0.98 \\ &= -11.22 & &= 0.79 \end{aligned} \quad \left. \begin{array}{l} \\ \\ \\ \end{array} \right\} 6.14 \quad \text{Sat} = 0.68$$

Sept. 16.0 ∴ Δt = -10.56

Fund 1327.			Bond 394			East 14.2		
12	6	53.0	72	6	42.4			
		-10.6						
36	6	42.4	11	43	52.9			
12		42.7	0	22	49.5			
18	44	22.7			-3.7			
20	22	19.7						
	3	20.2						
20	18	29.8	0	22	45.8			

Sept. 16. 1876. (Eve.)

Fr 1327

Bond 394

19 37 4.0

10.5

19 26 53.5

11 43 52.9

7 53 0.6

1 17.5

7^h 52^m 43.1 = 0.0

∴ Bond 394

Fast = 16^s.9

Removed the half dollar

3 pens.

1876. Sept. 16. Evg.

u aquarii

v lygni

6 llyg.

3 llyg.

2 ceph

paquan paph.

3 aqua

3 Pa

6.3

40.1

28.1

47.3

41.3

10.3

4.8

17.5

8.4

42.9

31.0

49.6

46.0

12.4

11.5

19.7

10.5

46.0

33.6

52.0

50.0

14.5

17.3

21.8

12.1

48.7

36.1

54.5

54.5

16.6

23.4

24.0

14.9

51.2

38.7

57.0

58.6

18.8

29.3

26.3

8

52.2

28.8

167.5

26.0

250.4

72.6

86.3

109.3

12

10.4

45.7

33.5

52.0

50.0

14.5

17.2

21.8

α

46.1

1.23

35.6

23.3

42.3

39.5

25.3

5.5

$$0 = +9.11 - 0.17w$$

$$10.16 + .86w$$

$$10.13 + .78w$$

$$9.69 + .57w$$

$$39.09 + 2.04w$$

$$0 = 9.77 + .51w$$

$$= 10.55 + 1.88w$$

$$- 1.78 = 1.37w$$

$$\therefore w = -1.33$$

$$\therefore w = -1.33$$

$$\therefore w = -1.33$$

$$\therefore w = -1.33$$

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$$\therefore w = -1.33$$

$$\therefore w = -1.33$$

$$0 = 9.14 - .11w$$

$$9.27 - .15w$$

$$9.25 + .16w$$

$$27.66 - .12w$$

$$0 = 9.33 - .04w$$

$$= 11.76 + 2.75w$$

$$- 2.43 = 2.79w$$

$$\therefore w = -.89$$

$$\therefore w = -.89$$

$$\therefore w = -.89$$

$$\therefore w = -.89$$

$$\therefore w = -.89$$

$$\therefore w = -.89$$

$$\therefore w = -.89$$

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$$\therefore w = -.89$$

$$\therefore w = -.89$$

$$\therefore w = -.89$$

$$\therefore w = -.89$$

Fr 1327

8^h 45^m 16.5

10.2

8 45 02.8

11 43 52.9

21^m 1^m 09.9

3 26.6

43.3 = 0.0 ∴ Bond 394 Fast 16^s.7 9 Ave. Sunday.

mm

Epigae

17.5
19.7
21.8
24.0
26.3
109.3
21.86
12.59

14.2
16.2
18.3
20.4
22.5
9.6
18.32
9.07

1876. Sept. 17 (Mond. am.)

Fr. 1327. Bnd 394.
8 59 11.00
- 9.55
32 59 1.45
11 47 49.42
21 11 12.03
3 38.25
8 43.78 = 0.0

∴ Bnd 394 is Fast 16.2

Added 2 steel pens.

1876. Sept. 18. am.

1327
9 21 10.0
- 8.9
9 21 1.1
11 51 45.9
21 29 15.2
3 31.2
44.0

Added 2 steel pens.

1876. Sept. 19 am.

Fr 1327 Bnd 394
9 35 7.0
- 8.2
33 34 58.8
11 55 42.5
21 39 16.3
3 32.8
43.5 = 0.0

Removed 4 steel pens.

1876. Sept. 22.

2 Synac
47.5
50.1
52.8
55.4
58.2
52.80
x 46.7
6.63

J. Tim. obs.

β Synac
34.0
36.2
38.7
41.3
43.8
38.80
32.06
6.74

$$0 = 6.63 - .72 + 1.23 + \Delta t.$$

$$6.74 - .58 + 1.23$$

$$0 = 6.03 + 1.23 + \Delta t; \Delta t = -6.03 - 1.23 = -7.26$$

Sept. 20 am.

9 34 3.0
- 7.5
33 23 55.5
11 59 29.1
21 24 16.4
3 32.0
31 44.4 = 0.0

Added 4 steel pens.

Sept 21. Bnd man up and

cleaned and started the clock
which had stopped from want of
oil in small wheel pinions.
Started and set by Bnd's man
with what was unknown time.

L. W.

1876. Sept. 24 (Sunday)

Fr 1327
12 48 30.0
- 7.0
13 47 23.0
12 15 26.2
1 31 57.8
0 15.0
31 42.8

I think the clock

to be losing and
therefore added
the 1/2 dollar. The
time 42.8 which
Mr. McConell was required
attach importance to.

Sept. 24. / Monday

Fr 1327
9 43 42.0
- 5.9
9 43 36.1
12 15 25.2
21 28 10.9
3 31.0
21 24 39.9

Removed every thing.

No signal sent.

1876. Sept. 25.

Fr. 1327
 82 23 27.0
 - 5.3
 32 23 21.7
 12 19 21.8
 20 3 59.9
 20 3 17.2
 0 42.7

Fr. 1327

10 53 52.0
 5.2
 34 53 46.8
 12 19 21.8
 22 34 25.0
 3 41.8
 31 43.2

1876. Sept. 26.

Fr. 1327

12 35 9.0
 - 5.2
 12 35 3.8
 12 23 18.4
 11 45.4
 1.9
 43.5

1876. Sept. 26.9 (Wednesday)

i un. Maj. (Sun. obs) x 1748 @ un. Maj.

44.2
 47.3
 50.4
 53.6
 56.5
 2.0
 t 50.40 35.12 41.00
 x 45.21 31.04 35.55
 t-x 5.19 4.08 5.45

$$0 = 5.19 - 1.02 + 1.23 + \Delta t.$$

$$4.08 + .13$$

$$5.45 - 1.15$$

$$- 5.40 = \Delta t$$

$$- 5.44 = \Delta t$$

$$- 5.53 = \Delta t$$

$$- 5.46 - \frac{1.07}{5.49} = \Delta t \text{ on } \underline{\underline{26.9}}$$

Fr. 1327
 9 51 39.0
 - 5.5
 9 51 33.5
 33 23 18.4
 12 28 15.1
 21 3 32.9
 45.7

Fr. 1327
 10 8 41.0
 - 5.5
 34 8 35.5
 12 23 18.4
 21 45 17.1
 3 33.8
 21 42 43.3 = 0.0

Fr 1327

9 1 30.
 - 5.5
 9 1 24.5
 12 23 18.4
 20 38 6.1
 3 22.8

$$43.4 = 0.0$$

1876. Sept. 27.^d 4

Lun 3241 (S.W.)			β Cephei J.E.m.	ϵ Aquarii J.E.m.
20 ^h	30	39.08 32.59 6.49	11.84 05.06 6.78	16.64 12.51 4.13
0 =			- 2.79	
0 =			6.78 - 2.47 + $\Delta t + m$	
			4.13 + .14	

Repeat Lun. 3241 since it introduces the
permal variation of S.W. different from J.E.m.

$$0 = 4.29 + 1.23 + \Delta t \therefore \Delta t = -5.52$$

Sept. 27.9		
q ^h	15 ^m	28.5
		- 5.1
33	15	22.9
12	27	15.6
20	48	7.9
	3	24.5
20	44	43.4

add 2 star pen.

1876. Sept. 28.^d 9

Fr. 1327		
q ^h	53	30.
		- 4.6
33	53	25.4
12	31	11.5
21	22	13.9
	3	30.1
	19	43.8

Removed 1 star pen.

1876. Oct. 1.^d 9

α Hydr		θ Uro. maj.	
+	33 ^s 38	+	39.74
2 q ^h 21	31.14	24	35.68
	2 ^s 24		8 ^s 56

$$0 = 2.24 + .14 + \Delta t + m$$

$$= 3.56 - 1.16 + \Delta t + m$$

$$\therefore \Delta t = -3.62$$

q ^h	40 ^m	17.0 =	0.0
		- 3.6	
33	40	13.4	
		1.2	
12	43	12.2	
20	56	25.8	
	3	46.4 =	
	52		

Fr 1327.		
34 ^h	51	27.0
12	43	4.8
22	8	22.2
	3	37.6
22 ^h	4 ^m	44.6

Signal sent slow 0.6.

Oct-3 1976 Morning N.A.R.

y	h	m	s	y	h	m	s	y	h	m	s
32	49	1		37	49	2		6	41	6	9
	51	1			46	6			28	4	
	53	2			49	0			50	1	
	55	1			51	3			13	6	
	55	2			53	7			36	9	
									54	5	
									15	4	
									37	0	
									58	5	

32 53.14
51.03
+2.11

37 48.96
46.40
+2.56

42 33.37
42 11.84
+21.53

$\sigma = +2.11 + 1.0 - .09 + 2.02$
 $+ 2.56 + .54 - .49 + 2.07$

$\left(\sigma = +2.149 + 2.80 \right)$
 $+ 2.33 + .32$

$\sigma = +9.16 + 20.98$
 $n = -45$

$dT + m = -2.05$
 $m = +1.24$

$dT = -3.29$

S.C. = 10 h 42 m 21.0
-3.3
10 42 17.7
12 46 57.7
21 55 20.0
3 35.4
21 51 44.6
45.4

Oct-3 1976 W.A.R.

h m s	h m s	h m s	h m s	h m s	h m s
18 30 48.52	20 37 17.08	21 15 42.58	21 25 32.12	21 27 9.16	18 10 17.68
45.87	19.35	39.01	35.78	4.79	12 0.35
+2.65	+2.73	+3.57	+ ~~2.66~~ -2.66	+4.37	+17.33

$\phi = +2.65 + 20 - 40 + 1.91$	$\phi = -2.66 - 27.5 \mu = .82$
$+2.73 + 100 - 92 \quad 1.81$	$+4.37 + 2.75 - .91$
$+3.57 + 1.88 - 1.72 \quad 1.85$	$+17.33 + 16.70 \quad .93$

$\phi = +2.69 + .90$

h.

.92

$dT + m = 7.86$
 $m = +1.24$
 $dT = -3.10$

S.C. = 10 h m s
 51 180
 - 28
 10 51 167
 12 50 043
 22 0 208
 8 363
 21 56 440
 168

1876 Oct. 7 J. F. M. obs.

o Ceph. & Rise. i Rise. w Rise.

23 13 27.8	21 40.7	33 34.6	52 56.6
32.6	42.8	36.5	58.7
38.3	45.1	38.6	53 1.0
43.7	47.0	40.7	2.9
49.0	49.2	42.8	5.1
191.4	224.8	193.2	4.3
38.28	44.96	38.64	0.86

α 23 13 35.90 21 44.24 33 38.05 0.34

$T-\alpha$ 2.38 0.72 0.59 0.52

$n = -92$
 $\tan \delta$ -1.40 -0.9 -0.8 -0.10

$n = -1.5d$
 0.98 -0.83 +0.51 0.42

$\tan \delta$ -2.13 -0.13 -0.16

$\Delta t + m$ -0.25 -0.26 -0.36 -0.03

$m =$ -0.41 +1.24

Δt -1.65

Oct. 8 J. F. M. obs.

o Ceph. & Rise. i Rise. w Rise.

23 13 27.6	21 40.6	33 34.0	52 56.5
32.9	42.6	36.4	58.7
38.2	44.9	38.4	53 0.8
43.3	46.9	40.6	2.8
49.3	48.8	42.3	4.8
191.3	224.7	191.7	3.6
38.26	44.94	38.64	0.72

23 13 35.88 21 44.24 33 38.05 0.34

2.38 +0.29 0.28

-1.40 -0.8 -0.10

0.98 0.21 -0.18
 $n = -1.7d$

-2.35 -0.16 -0.19

-0.03 -0.13 -0.09

-0.11 +1.24

-1.35

{ 21 47 32 N. Clock } N. Clock 21 53 30
 { 11 1 30 S. Clock } S. Clock 11 57 29
 N. Clock 15^h last at 22^h Oct. 8
 Put on 4 pens.

Oct-9 1246 W.A.R.

18 h m s'	20 h m s'	18 h m
32 41.3	37 4.3	12
440	121	
464	100	
480	180	
517	210	

18 32 46.48	37 15.08
45.73	14.21
+0.75	+0.87

$$0 = +0.75 + .80 - .60 + .010$$

$$+0.87 + .99 - .81 + .006$$

$$0 = +0.81 + .90$$

$$dT+m = -0.08$$

$$m = +1.24$$

$$dT = -1.32$$

h m s	h m s
18 12 12.20	18 42 0.20
11 57.64	42 15.67
+14.56	-15.47

$$0 = +14.56 + 16.28$$

$$-15.47 - 20.51$$

$$0 = +13.75 + 15.98 \quad m = .86$$

$$+16.28 + 21.41 \quad .76$$

S.C. = 21 h m s	h m s
14 38.0	10 38 48.0
-1.3	13
21 18 36.4	10 38 47.7
13 14 33.6	13 14 33.6
8 0 31	21 24 14.1
1 18.6	3 30.4
7 58 44.5	21 20 43.7
15.5	+16.3

Oct-10 1016 W.A.R.

h m s
7 37 42.1
446
468
492
516

7 37 46.86
57 46.67
0.19

$$0 = +0.19 + .51 - .41 - .022$$

$$dT+m = +0.22$$

$$m = +1.24$$

$$dT = -1.02$$

$$ddt = +0.30$$

S.L. = 10 h m s
46 46
-10
10 46 45.0
13 18 30.1
21 28 19.8
3 31.0
21 24 43.9

16.1

Oct 11 1976

h	m	s	h	m	s
18	32	406	19	44	419
		43.2			44.0
		46.0			46.0
		47.6			48.1
		51.1			52.3

32	459.5	44	46.06	18	12	105.0	18	42	1.78	19	47	56.90	19	40	83.46	44	45.76	47	54.87
	456.8		46.47		11	56.72			16.74		47	15.23		29.26		46.95	47	16.78	
	+0.27		-41			+13.78			-14.96			+38.17		-0.80		-0.69		+38.09	

$$n = 7.5$$

$$0 = +0.27 + 10 - 63 - 0.36$$

$$-0.41 + 1.5 - 12 - 0.88?$$

$$0 = -0.08 + 4.8$$

$$d\tau m = +0.44$$

$$m = +1.24$$

$$d\tau = -0.82$$

$$dd\tau = +0.3$$

$$0 = +13.78 + 16.88$$

$$-14.96 - 20.70$$

$$+35.17 + 53.70$$

$$0 = +13.86 + 16.40$$

$$+14.88 + 21.88$$

$$+38.09 + 53.32$$

$$S.C. = 11$$

h	m	s
38	50.0	
		-0.6
11	38	49.2
13	22	26.7
22	16	22.5
	-3	35.5

Oct 12 1976 W.A.R.

h	m	s	h	m	s
19	40	19.2	44	41.6	
		21.4		43.7	
		23.5		45.8	
		25.6		47.8	
		27.6		49.9	

$$0 = -0.80 + 1.13 - 0.92$$

$$-0.69 + 1.5 - 12 - 0.81$$

$$0 = +38.84 + 53.64$$

$$0 = -0.75 + 1.6$$

$$n = 7.3$$

$$d\tau + m = +0.87$$

$$m = +1.24$$

$$d\tau = -0.37$$

$$d\tau = +0.42$$

$$S.B. = 11$$

h	m	s
33	45.0	
		0.2
11	33	44.8
13	26	23.2
22	07	21.6
	3	87.4
22	03	44.2
		18.8

Oct-15 1876 Morning N.R.

Oct-16 1876 N.R.

7^h 32^m 45^s
 47.0
 49.0
 51.1
 53.2

19^h 44^m 33^s 20^h 37^m 64^s 21^h 59^m 47^s
 35.7 9.1 67.37
 37.8 12.1 69.57
 39.9 15.1 70.77
 42.0 18.0 72.98

32 49.06
 32 51.42
 -2.36

24 37.80

37 12.14
 19.63
 -1.89

59 25.74
 28.74
 28.18
 -2.44

19 47 52.30
 47 11.50
 +40.80

$$v = -2.36 + 10 - .07 - 2.43$$

$$v = -1.89 + 10 - 50 - 2.68 - 2.44 - .02 + 02 - 2.42$$

$$v = +42.97 + 53.31$$

$$n = -.80$$

$$\begin{aligned} dr + m &= +2.43 \\ m &= 1.24 \\ dr &= +1.19 \\ ddr &= +.53 \end{aligned}$$

$$\begin{aligned} dr + m &= +2.57 \\ m &= +1.34 \\ dr &= +1.33 \end{aligned}$$

OCT. 17 1876 N.A.R.

h	m	s
10	1	40.7
		42.8
		45.0
		47.2
		49.2

10	1	44.98
	1	46.17
		- 3.19

$$dt = +3.9 + 2.2 - 1.5 - 3.39$$

$$dt + m = +3.31$$

$$m = 1.24$$

$$dt = +2.10$$

S.C. = 10

h	m	s
36	13	
	21	
10	36	15.1
13	46	6.0
20	50	8.1
3	26	8
20	46	46.3
		+ 15.7

OCT. 18 1876 N.A.R.

h	m	s	h	m	s
7	32	43.4	7	37	38.7
		45.5			41.0
		47.7			43.5
		49.8			45.9
		51.8			48.3

7	32	47.62
	32	51.51
		- 3.89

37	43.48
	46.95
	- 3.47

$$n = 70$$

$$u = -3.89 + 1.0 - 0.7 - 3.86$$

$$- 3.47 + 5.4 - 3.8 - 3.85$$

$$dt + m = +3.90$$

$$m = +1.24$$

$$dt = +2.66$$

S.C. = 11

h	m	s
36	18	
	20.7	
11	36	20.7
13	50	2.6
21	46	18.1
3	26	34.0
42	44.1	
		15.9

CC 191076 N.R.

19 h 40 m 15.9	19 h 44 m 88.0
15.0	403
20.1	423
22.3	446
24.3	466

10 h 0 m 37.7
89.8
42.0
44.1
46.2

19 40 2012	44 4228	19 h m s
24.24	46.44	47 49.80
-4.12	-4.16	47 7.67
		+88.13

10	41.98
1	48.37
	-6.39

5'
 $v = -4.12 + 1.8 - 14 - 4.26$
 $-4.16 + 1.8 - 12 - 4.28$

5' 5'
 $v = +34.13 + 53.88$

$v = -4.14 + 1.6$

$v = +41.27 + 53.67$

$m = -4.7$

S.E. = 11 16 10.0
 11 16 13.4
 13 5.2 59.1

$b = 13.5$

$m = \text{angle} p + b \times c p$
 $= +70 + 47 = 117$

$dt + m = +4.24$
 $m = +1.17$
 $dt = +3.10$
 $ddt = +6.0$

21 22 14.3
 3 30.0
 44.3
 21 18 15.7

$0 = -6.39 + 2.2 - 1.5 - 6.54$

$dt + m = +6.54$
 $m = +1.17$
 $dt = +5.37$

I S.E. = 10 h 49 m 42.0
 +5.4
 10 48 48.4
 14 13 41.8
 20 36 8.5
 3 22.5
 43.0

II h m s
 S.E. = 12 9 50.0
 14 36 17.0
 12 10 0.4
 15 1.5
 14 13 41.8
 13 41.8
 21 56 15.0
 3 55.6
 43.2
 16.3

Oct 25 1876 W.A.R.

Oct 26 1876 W.A.R.

h	m	s	h	m	s
32	50	39.7	58	27	4
		42.1			29.7
		44.6			31.8
		47.0			33.9
		49.4			36.0

44.86	31.76
57.83	38.36
-7.07	-6.60

$n = -80$

$0 = -7.27 - 58 + 46 - 6.81$
 $-6.60 + 26 - 21 - 6.81$

$dr + m = +6.81$
 $m = +1.17$
 $dr = +5.64$
 $ddr = +.80$

I.S.C. = h m s
 10 43 28.0
 8.9
 10 43 43.9
 14 17 38.8
 84.6
 20 26 05.4
 3 20.9
 20 22 44.5
 $+15.5$

II S.C. h m s
 11 58 50.0
 5.9
 11 58 58.9
 11 17 38.8
 21 41 18.4
 3 38.1
 21 37 44.3
 15.7

h	m	s	h	m	s
9	21	20.2	10	1	37.0
		22.1			39.1
		24.1			41.2
		26.3			43.2
		28.1			45.2

9	21	24.38	1	41.12
21		31.84		48.43
		~~7.46~~		~~7.01~~

$n = -80$

$0 = -7.46 - 16 + 12 - 7.34$
 $+7.31 + 22 - 17 - 7.48$

$dr + m = +7.40$
 $m = +1.17$
 $dr = +6.23$

S.C. = h m s
 10 29 31.0
 $+6.2$
 10 29 37.2
 14 21 35.0
 20 8 2.2
 3 17.5
 20 4 44.3
 $+16.6$

12	1	46.0
		6.3
12	1	52.3
14	21	35.0
21	40	19.3
	3	33.0
		44.3
		+15.7

Oct. 28 1876 N.A.R.

h m s
21 59 15.4
19.2
19.4
21.3
23.7

59 1940
59 28.05
- 8.65

m = -80

$\Delta = -86.02 + 0.2 - 86.3$

$dI + m = +86.3$
m = +1.17
 $dI = +74.6$

$ddI = +.80$

h m s
S.P. = 22 12 17.0 22 18 18.0
+ 7.5
22 12 24.5 22 18 25.5
19 29 28.1 14 29 28.1
7 42 36.4 7 48 39.4
1 15.8 1 16.8
4.6 46 40.6
15.4 19.4

Oct 29 1876 N.A.R.

h m s
9 21 18.3
20.6
22.7
24.7
25.0

9 21 22.62
31.93
9.31
1.2
9.9
1.17
80.2

$dI + m = +80.2$

S.P. = 10.35 18.0
F.V.
10 35 26.0
14 33.267
20 02 13
3 16.5
19 58 44.4
15.2

Oct-30 1876 N.H.K.

h	m	s	h	m	s
22	50	350	22	58	232
		8.5			253
		402			270
		423			296
		451			317

50	1025	58	2444
50	51.77		38.31
	-11.49		-10.87

$n = -80$

0 = -1149	-58	+46	-11.03
-10.87	+2.6	-21	-11.08

$\Delta T + m = +11.06$
 $m = +1.17$
 $\Delta T = +9.89$

$\Delta dt = +1.01$

S.C.	h	m	s	h	m	s	h	m	s	h	m	s	h	m	s		
12	5	28.0	12	11	29.0	12	17	29.0	12	21	27.0	12	24	27.0	12	26	28.0
		10.5			10.5			10.5			10.5			10.5			10.5
12	05	38.5	12	11	38.5	12	17	38.5	12	21	35.5	12	24	32.5	12	26	38.5
14	37	21.2	14	37	21.2	14	37	21.2	14	37	21.2	14	37	21.2	14	37	21.2
21	28	17.3	21	34	18.3	21	40	18.3	21	44	16.3	21	44	16.3	21	49	18.3
	3	31.0		3	32.0		3	32.0		3	33.7		3	33.6		3	34.5
21	24	46.3	30	46.3	40.3			40.3			42.6			42.7	21	45	43.8
		13.0			13.0			13.0			15.0			15.0			15.0

from the N.H.K.

Oct 31 1896 4.12 R.

10 ^h 0 ^m	3 ^s	14 ^h 9 ^m	5 ^s	13 ^h	~~11^h 57^m~~
32.1		45.0		11.53.5	
34.4		47.2		12.41.8	
36.4		49.0		13.23.5	
38.6		51.6		14.10.0	
40.6		53.8		14.53.0	

1. 36.40	49.40	13 13 24.20
1. 48.58	1.59	14 6.13
-12.18	-12.19	-4.93

$$\begin{aligned}
 0 &= -12.18 + 2.2 - 15 - 12.03 & 0 &= -41.93 - 42.57 \\
 &-12.19 + 36 - 25 - 12.44 & 0 &= -12.18 + 2.25 \\
 & & 0 &= -29.75 - 42.86 \\
 & & u &= -70
 \end{aligned}$$

$$\begin{aligned}
 dt + m &= +12.39 \\
 m &= 1.17 \\
 dt &= +11.22 \\
 ddt &= +0.88
 \end{aligned}$$

$$\begin{aligned}
 SC &= 15 - 47 - 29.0 & 15.53.59.0 \\
 & & 51.4 \\
 & & 15.54.10.4 \\
 & & 14.45.14.3 \\
 & & 1.08.56.1 \\
 & & 11.3 \\
 & & 1.08.44.8 \\
 & & +15.2
 \end{aligned}$$

Nov. 2 1976 WVR Nov. 3.

h	m	s	h	m	s
~~19~~ 27	8.00		~~19~~ 37	2.62	
~~10~~	19.61		~~10~~	~~18.58~~	
	-11.61			-10.96	

$n = 70$
 $O = -11.61 + 0.18 - .13 - 11.74$
 $-10.96 + 1.00 - .70 - 11.66$

$ST + m = +11.70$
 $m = 1.17$
 $dt = +10.53$ $ddr = -0.45$

S.E. = h m s
 12 6 10.0
 11.3
 ~~12 6 2.7~~
 12 6 23.3
 14 49 10.7
 21 17 12.4
 3 29.2
 48.2
 $+15.8$

h	m	s
16	21	37.40
	21	50.22
		-12.82

$O = -12.82 - 50 - 35 - 12.47$

$dt + m = +12.47$
 $m = +1.17$
 $dt = 11.30$

S.C. = h m s
 18 43 18
 11.3
 18 43 28.3
 14 53 7.5
 3 50 21.8
 0 37.7
 44.1
 10.9

h	m	s
12	23	12.0
		11.6
12	23	23.6
14	53	7.5
21	30	16.8
	3	31.4
21	26	43.7
		15.3

Nov 11 1976 ZWLR

$$\begin{array}{rcl}
 h & m & s \\
 20 & 37 & 1.41 \\
 37 & 13.55 & \\
 \hline
 & & -12.07
 \end{array}
 \qquad
 \begin{array}{rcl}
 h & m & s \\
 20 & 45 & 478.2 \\
 46 & 0.86 & \\
 \hline
 & & -12.86
 \end{array}$$

$$\begin{array}{r}
 s' \\
 0 = -12.07 + 1.00 - 70 - 12.77 \\
 -12.86 - .14 + 10 - 12.76
 \end{array}$$

$$\begin{array}{rcl}
 dI+m & = & +12.76 \\
 m & = & 1.17 \\
 dI & = & +11.59 \\
 d\alpha & = & +13.0
 \end{array}
 \qquad
 \begin{array}{r}
 h - s' \\
 S.P. = 12 \ 17 \ 41.0 \\
 \hline
 11.8 \\
 12 \ 17 \ 52.8 \\
 14 \ 57 \ 4.0 \\
 \hline
 21 \ 20 \ 48.8 \\
 3 \ 29.9 \\
 \hline
 21 \ 17 \ 18.9
 \end{array}$$

$\Delta t = \text{Corr. Fr. 1327.}$

Sept 6. 4 = -17.36
9. 4 = -16.11^{.42}
11. 4 = -14.15^{.98}
15. 4 = -11.22^{.73}
16. 4 = -10.57^{.65}
22. 4 = -7.26^{.55}
26. 9 = -5.46^{.40}
Oct 1. 9 = -3.62^{.37}

$\Delta \Delta t = +0.68$

