KG
11366
.759

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Investigation of Errors of
West Circle. from Stokes. for
15° and 30° spaces.
July 1st 1884 to Oct 29th 1884

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July 1884

Tm PD = 0° to 15°

A	B	C	D	A	B	C	N
0 0	84	31.0	60.6	27.9	0 0	100	3.7	23.8	0.9
	35.4	31.1	50.8	28.1		5.7	2.6	22.9	0.3
	35.2	30.4	51.0	27.0		5.4	2.4	23.4	0.6
	34.6	30.1	50.8	27.9		9.4	2.1	22.4	0.7

PD = 15° — 30°

	29.4	23.0	42.7	20.2	0.8	57.4	15.8	53.0
	26.4	21.5	41.9	20.0	1.4	58.3	14.4	54.0
	25.4	21.4	41.9	20.0	1.8	53.7	14.3	53.8
	28.7	21.8	41.4	19.4	0.9	55.0	13.9	52.9

30 — 45

	42.3	33.4	53.0	34.8	18.0	9.2	30.0	11.1
	42.7	33.4	53.1	34.6	17.8	9.4	29.8	10.5
	42.8	33.9	53.4	34.4	18.0	9.2	29.9	10.4
	42.1	33.8	54.5	34.1	17.0	8.1	29.3	10.0

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45° – 60°

N				S			
Σ	R	G	N	Σ	F	G	N
37.2	28.9	48.7	30.0	13.8	3.1	24.4	8.0
37.5	29.0	48.9	30.0	12.8	2.9	24.2	7.4
37.0	28.9	48.4	29.7	12.4	2.2	23.8	7.1

60 – 75

37.2	27.2	48.3	32.0	14.9	0.7	21.2	9.9
37.1	26.9	47.5	31.3	14.4	1.0	21.3	9.9
37.9	27.1	48.2	31.8	13.9	0.5	21.1	9.1

75 – 90

49.9	36.4	56.4	45.1	25.9	10.7	33.4	21.1
49.8	36.0	55.9	45.0	25.1	9.8	33.0	20.8
50.0	37.2	56.7	45.2	25.4	10.0	33.0	21.7

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$\Phi\Phi = 90^\circ - 105^\circ$

E	F	G	H
~~28.6~~	~~34.2~~	~~46.8~~	~~30.5~~
~~35.1~~	40.4	21	52.1
57.2	41.3	39	5 20
66.7	~~41.8~~	3.1	~~52.2~~
			52.0

E	F	G	H
~~30.9~~	~~14.9~~	~~38.11~~	~~29.8~~
29.5	13.9	37.1	28.2
29.4	13.8	36.8	28.0
30.8	14.7	37.8	28.1

$105^\circ - 120^\circ$

~~41.6~~	~~28.3~~	~~46.1~~	~~39.5~~
44.6	28.8	52.2	42.1
43.5	28.1	51.7	41.6

16.7	1.5	26.7	15.4
15.8	0.4	21.9	14.8

$120^\circ - 135^\circ$

~~48.8~~	34.0	57.7	47.1
(49.0	35.1	59.0	48.8)
49.8	35.7	59.4	48.0

~~24.0~~	~~7.9~~	~~34.6~~	~~23.0~~
23.1	7.0	33.1	22.4
22.8	6.7	33.1	22.2

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135—152

2	R	G	N	2	R	G	N
474	32,2	58,8	462	19,6	5,1	84,5	218
47,8	32,2	58,0	467	19,0	4,0	84,0	208

152— 165

~~240~~	~~78~~	~~380~~	~~246~~				
309	161	46,0	316	0,7	44,6	199	56
313	16,3	46,6	319	0,4	44,6	19,4	5,5

165— 182

57,1	42,1	17,5	0,7	27,8	15,1	49,7	371
56,1	41,7	18,2	-0,3	28,1	15,2	50,0	369

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180 – 195

E	F	G	H	E	F	G	H
~~501~~	~~374~~	~~142~~	~~576~~				
514	390	158	588	228	104	471	282
508	389	152	584	219	103	460	278

195 – 210

482	375	124	540	176	83	439	238
484	382	130	540	174	90	431	231

210 – 225

391	351	70	445	107	60	400	149
388	360	72	428	97	65	392	141

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220–240

E	P	G	H
47.8	47.7	17.8	51.4
46.4	48.6	18.2	51.9

E	P	G	H	
20.8	18.0	47.6	23.5	
20.1	17.4	46.5	2	

240–265

47.9	44.1	13.7	52.1
48.9	45.3	14.4	50.9

22.8	17.4	47.4	22.3
21.7	16.8	46.0	20.8

265–280

59.1	53.2	21.4	56.4
59.5	54.1	21.9	55.8

33.2	26.5	51.7	27.7
33.2	26.4	51.0	28.2

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Q80-95

Σ	R	Ω	η
23.5	153	41.0	165

Ω R Ω η

Found that a mistake had been made in ~~Feby~~ for 15° of some point ~~after~~ a heavy

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July 3 $\Sigma = 87^\circ$ of $\sqrt{} = 50$

PD = 0–30 (51)

Σ	38.4	39.2	37.7	37.4	37.7
F	35.2	35.3	33.6	33.8	33.3
G	56.4	56.0	54.7	55.0	54.8
H	33.4	33.8	31.9	32.1	32.3
	40.85	41.08	40.00	39.58	39.52
			39.48		

52.8	52.0	52.4	51.1	51.0
44.9	44.3	45.1	43.2	44.1
6.8	6.2	6.6	5.3	5.1
46.1	46.0	46.1	45.0	45.0
52.65	52.12	52.60	51.15	51.30
40.85	41.08	40.00	39.58	39.52
+11.80	+11.04	12.60	11.57	11.76
		39.48	+11.75	
		13.12		

30 – 60 (145°)

Σ	44.0	44.3	44.2
F	36.3	36.1	35.6
G	57.9	56.3	58.1
H	37.2	37.7	37.5
	43.85	44.10	43.85

S

58.8	57.1	56.9
48.4	47.5	47.6
10.7	9.7	9.8
54.1	53.2	53.0
58.00	56.88	56.8 $\times^2$
43.85	44.10	43.85
+14.15	+13.28	+13.00 ^{2} +(13.44)

147° 127°

60 – 90

Σ	26.8	25.9	28.3	28.2	28.0
F	16.9	17.9	18.5	18.4	18.4
G	39.1	38.9	40.6	41.1	40.9
H	23.0	22.8	24.1	24.7	24.1
	26.45	26.38	27.88	28.10	27.85

43.4	42.5	42.3	43.5	43.7
28.4	27.6	28.0	28.8	28.3
52.2	51.4	51.2	52.4	52.1
41.0	39.9	39.7	40.5	40.7
41.35	40.35	40.30	41.38	41.45
26.45	26.38	26.41	27.88	27.80
14.90	13.97	13.89	13.50	13.47
			14.45	
			13.71	

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177 207
90- 120

δ

g	32.4	32.8	32.2
F	18.0	18.0	17.4
G	41.2	41.0	40.9
M	29.1	29.5	29.1
	30.42	30.40	29.90
	18		

ζ

41.9	42.0	41.9
28.2	27.9	28.2
53.2	53.1	53.1
43.1	43.0	42.9
41.60,18	41.50	41.52
30.42	30.40	29.90
11.18,42	11.10	11.62

11,30

120 – 152
207 237

g 45.8	45.8	—
F 31.7	31.9	—
G 56.9	56.9	—
M 46.4	46.1	—
45.20	45.18	

56.8	57.2	56.5
42.9	42.7	42.8
12.6	12.8	12.1
59.7	59.1	58.7
56.00	57.95	57.52
45.20	45.18	45.19
12.80	11.77	12.33

12.30

237 267
150 180

g 41.8	42.0	41.2
F 26.7	26.9	26.3
G 56.2	55.9	56.0
	43.1	43.0	42.2
M	41.85	41.95	41.68 42

48.0	47.6	47.1
34.9	34.0	33.9
9.0	8.4	9.8
55.5	55.1	54.4
51.85	51.42	50.60
41.95	41.95	41.68 42
9.90	9.47	9.38

9.50

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267 297
180 — 295

	387	390	390
	249	257	252
	593	595	598
	455	462	460
	4210	4260	4230

	454	455	458
	331	337	332
	90	90	89
	512	513	514
	4965	4972	4885
	4210	4260	4230
	755	712	735

7.41

297 327
195 — 210

	247	246	238
	123	125	116
	489	497	470
	301	307	296
	2880	2892	2800

	306	312	301
	236	243	233
	571	578	564
	373	377	370
	3715	3785	3695.70
	2880	2892	2800
	835	893	895

8.94

327 357
290 240

	374	386	382	384	381
	318	327	318	325	325
	40	48	50	50	42
	413	451	450	446	441
	4500	4572	4498.72		

	434	439	436
	413	416	410
	169	137	134
	1012	489	482
	5202	5155	5775
	4592	4512	4458
	705	643	677

6.75

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~~27~~ 27
~~38~~
3 5 7
240 – 270

Q	35.1	35.4	35.4		43.2	43.3	43.6	
F	33.1	32.2	33.7		41.0	40.3	41.0	
G	5.0	4.7	6.0		9.1	9.2	9.0	
N	40.9	40.0	40.3		46.9	46.0	46.4	
	43.30	43.07	43.85		50.05	49.70	50.00	
					43.30	43.07	43.85	
					6.75	6.63	6.15	6.38

2 7 5 7
270 – 300

Q	37.9	38.3	38.6		57.3	57.4	57.2	
F	35.3	36.2	36.4		46.9	45.6	45.8	
G	3.5	4.4	4.2		13.9	12.7	12.8	
N	40.9	41.1	41.0		50.9	50.0	49.7	
	44.40	45.00	45.05		54.25	54.92	54.88	
					44.40	45.00	45.25	
					10.60	9.92	9.53	9.76

5 7 – 8 7
300 330

Q	42.7	43.4	43.0		57.5	56.8	56.1	
F	36.6	37.9	38.1		50.2	49.4	49.4	
G	3.2	4.0	4.2		13.5	13.3	13.1	
N	41.1	41.2	41.2		57.8	57.2	57.2	
	45.90	46.62	46.62		58.25	57.42	57.42	
					45.90	46.65	46.62	
					12.35	10.77	10.80	11.32

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0 – 30 repeated

E	30.2	30.7	30.0
F	23.1	23.4	23.5
G	46.0	46.5	46.8
H	24.1	24.7	24.1
	30.85	31.32	31.20

45.0	44.3	43.9
33.2	38.1	32.6
57.5	57.2	57.1
38.5	37.3	37.3
43.62	42.98	42.72
30.85	31.32	31.20
12.77	11.66	11.52

11.98

11

11.75 +1.58 +1.58
13.14 2.90 +4.55
13.71 3.54 +8.09
11.30 1.13 +9.22
12.30 2.13 +11.35
9.50 −0.67 +10.68
7.41 − 2.96 +7.72
8.74 − 1.43 +6.49
6.73 − 3.44 +3.05
6.38 − 3.79 − 0.70
9.76 − .41 − 1.11
11.32 + 1.15 .00
10.17



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July 4 1883 87 117
0 — 30

S.

E	8.6	8.25	5.28	5.27	5.28
F	4.7	4.88	4.80	4.82	4.76
G	23.6	5.4	5.5	6.3	4.76
H	2.6	4.67	4.62	4.66	4.61
	5.52	5.35	5.310	5.345	5.365

N

	15.2	8.9	4.6	5.2	4.8
	10.1	5.72	5.68	5.72	5.55
	3.21	1.72	1.62	1.72	1.62
	13.2	5.72	5.68	5.72	5.77
	1.85	6.42	6.360	6.420	6.405
	5.52	5.35	5.320	5.345	5.365
	8.53	10.77	10.40	11.00	10.40

+1030

357 327
(240 – 270)

E	34.6	34.1	34.0	34.0
F	34.0	34.8	34.0	33.8
G	4.2	4.2	4.7	3.6
8	38.8	39.0	35.1	37.2
	171.8	172.1	171.8	168.6
	42.95	43.02	42.95	42.15

40.0	41.0	41.0	40.9
41.0	41.0	40.7	40.8
6.8	6.8	6.8	6.8
43.4	43.7	43.8	43.8
191.2	192.5	192.3	192.3
47.80	48.12	48.08	48.08

Counter pounds West end of telescope!

Entering in open tupping lapel ~~hole~~ pivots
~~ends~~ of ~~the~~ for the bearings

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Dec 4 After adjustment by Comb Sun

240. 270

∑	34.5	34.7	33.7	33.4	33.2	33.6
☿	33.2	33.1	32.2	32.8	33.1	32.6
♀	4.0	3.6	3.4	3.1	2.9	3.2
♂	35.4	3.84	38.3	37.9	38.3	38.0
	2788			167.2	167.5	167.4
	42.18	41.47	41.50	41.80	41.88	41.85

∑	41.8	41.2	41.8	41.6	42.2	42.2
☿	41.1	41.1	41.3	41.2	40.6	41.1
♀	7.4	7.1	7.4	6.5	7.6	7.6
♂	44.8	44.2	44.1	44.3	44.8	44.8
	48.78	48.65	48.65	48.40	48.80	48.92
	42.85	41.45		41.55		
	5.93	6.20		6.85		

0 — 30

∑	50.1	50.5	50.6	49.6	49.7
☿	43.2	42.1	42.8	42.8	43.2
♀	6.3	6.3	5.8	5.2	5.1
♂	44.8	45.3	45.0	43.7	43.8
	51.10	51.12	51.05	50.32	50.45

	4.8	4.0	3.6	2.8	2.6
	53.2	52.8	51.6	51.8	52.2
	17.3	16.2	15.2	16.0	16.0
	58.8	58.1	57.0	57.7	56.1
	6.352	6278	6185	6182	6172
	51.00	51.12	51.05		
	12.52	11.66	10.80		

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Sept 6 1884

Value of 1 div of micrometer
in arc by comparison on a constant
distance for two days.

Micrometer			Circle		
2	~~41.8~~	13 30.0	28	~~4.0~~	26 35.0
	41.0	38.2		4.0	35.2
	38.8	36.1		4.0	37.6
	38.0	21.0		4.1	37.0
	35.8	25.2		4.6	37.4
	154	303		17	404
2	35.08	13 30.06		14	26 38.08
		2 35.08			28 4.14
		109.95			1 26.06
					26.06

1 div = ,078"

5 28.0 10 17.2 27 18.6 26 37.3
14.8 16.1 18.8 37.0
19.8 15.2 19.2 37.0
22.3 13.1 19.1 37.0
25.6 14.9 15.0 35.0
110.5 41.0 37.06
5 22.10 10 153.0
5 22.1
493.2

27 19.14
26 37.06
42.08

1° = .085
.073
1 = .079

Adopt 1 div = .080"

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P.D. Cycle Mic.

P.D.										
0	84	8	58.2	8	52.0	8	37.2	+5.8	+3.8	49.13
30	117	8	60.5	8	54.8	8	37.0	+5.6	+1.4	50.50
60	147	8	56.0	8	54.8		38.8	+7.4	+6.8	49.87
90	177	8	55.2	8	53.0		37.6	+6.2	+2.50	48.60
120	207	8	52.3		54.0		37.4	+6.0	+3.0	47.90
150	237	8	53.2		53.2		34.2	+2.8	-2.8	46.87
180	267	8	53.5		49.3		29.2	-2.2	-3.6	44.00
210	297	8	47.0		45.0		19.8	-11.6	-2.0	37.27
240	327	8	47.0		53.0		19.8	-11.6	-8.4	39.93
270	357	8	48.8		53.0		26.8	-4.6	+3.8	42.87
300	27	8	48.3		51.3		28.2	-3.2	+0.6	42.60
330	57	8	50.8		51.8		30.0	-1.4	-1.8	44.03
0	87	8	52.0		56.6		32.2	+0.8	+1.0	46.93
			52.3		52.4		31.4			45.42

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July 7

Attached a side spring to the arm

circle				Mean	$\bar{2}$
87°	38.2	38.2	37.3	37.9 +2.0	+20
117	42.1	39.8	40.8	40.9 +5.0	+70
147	44.0	41.3	42.1	42.5 +6.6	+136
177	43.3	41.8	40.3	41.8 +5.9	+19.5
20 }	42.3	40.8	39.1	40.7 +4.8	+23.7
23 }	40.8	39.3	39.4	39.8 +3.9	+27.6
267	37.8	34.1	32.5	34.8 −1.1	+26.5
297	27.3	25.2	27.0	26.5 −9.4	+17.1
32 }	27.2	23.8	24.0	25.0 −10.9	+6.2
35 }	30.0	29.7	26.5	28.7 −7.2	−1.0
27	34.8	34.6	34.7	34.7 −1.2	−2.2
57	35.8	35.8	34.0	35.2 +0.7	−2.9
87	36.2	37.3	37.2	37.6 +1.7	−1.2
				466	
				31.9	

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dwg

87
117

				√		Σ
87	41.2	41.1	40.2	40.8	+3.0	+30
117	46.6	45.8	44.3	45.6	+7.8	+10.8
147	49.0	48.7	48.2	48.6	+10.8	+21.6
177	49.2	49.4	49.0	49.2	+11.4	+33.0
207	44.8	42.2	42.3	43.1	+5.3	+38.3
237	41.0	43.2	42.1	42.1	+4.3	+42.6
267	37.3	38.2	36.6	37.4	-0.4	42.2
297	32.5	35.8	35.8	34.7	-3.1	39.1
327	29.7	29.2	25.9	28.3	-9.5	29.6
357	23.1	23.1	22.8	23.0	14.8	+14.8
27	26.2	26.3	26.1	26.2	-11.6	+3.2
57	33.0	33.0	34.0	33.3	+4.5	-1.3
87	39.0	40.2	41.0	40.1	+2.2	+0.9

3789

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$\frac{\text{E2}}{0}$ $\frac{\text{W}}{-30}$

S		N	
34.2	34.6	6.25	6.1
28.9	29.0	5.79	5.64
51.0	51.8	20.1	19.6
28.7	28.8	0.7	0.3
142.8	144.2	26.49	26.24
2.070	2.105	6.22	5.60
35.70	36.05	20.70	21.05
		−14.48	15.45

30 – 60

40.3	39.9	39.6	
30.10	29.4	28.9	
54.5	53.8	52.9	
32.7	32.2	32.5	
158.5	155.3	154.1	
39.62	38.82	38.52	
		60–90	

28.0	28.3	28.0	27.4
15.5	16.4	15.1	14.6
40.2	41.8	35.2	35.4
24.2	25.4	23.3	23.0
107.9	111.9	105.6	104.4
26.98	27.98	26.40	26.10
39.62	38.82	38.50	38.50
−12.36	10.84	12.10	12.40

34.6	37.9		
23.0	26.0		
46.3	50.7		
30.1	33.9		
134.0	148.5		
33.50	37.12		

25.0	25.1	25.5	27.0
6.4	6.7	7.3	9.2
33.0	33.0	33.4	35.4
24.1	22.1	23.2	24.1
88.5	86.9	89.4	95.7
23.6	21.72	22.35	23.92
	33.50	33.50	37.12
	11.78	11.15	12.99

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207
90–120

41.9	35.5	39.9	42.0	27.4	32.5	24.2	25.2	27.0
24.8	24.2	22.4	28.3	10.5	16.6	6.2	6.4	12.2
50.1	51.0	54.4	56.1	38.8	49.1	38.0	39.1	42.9
38.6	41.0	42.2	42.6	29.6	34.1	29.2	27.9	29.2
155.6	156.1	169.0		106.5		95.6	98.6	111.3
38.90	39.02	42.25		26.62		23.90	24.65	27.82
				38.90		38.50	39.02	42.25
				−77.26		−150	−143	−143

237 267
22 – 15

40.3	40.0		21.8	20.4	21.0
24.9	25.1		6.3	5.2	5.5
52.1	55.5		41.7	41.2	41.6
42.1	42.0		29.1	28.7	28.1
163.4	162.6		98.9	95.5	96.2
40.85	40.65		24.72	23.88	24.05
			40.85	40.60	40.75
			164.47	160.08	161.00

269 257
150 – 180

50.4	51.3		32.5	31.8	
35.2	37.2		17.8	16.9	
11.4	12.4		55.3	54.9	
58.1	58.9		35.4	38.8	
213.7	219.8		145.4	142.4	
53.78	54.95		36.35	35.60	
			137.8	134.5	

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25?
180. 24

35.7 35.2
21.3 21.7
59.1 58.9
42.0 41.1
15 8.1 15 6.9
39.52 39.22

17.5 17.0 16.4
7.2 6.9 17.0
24.0 42.0
9.3 23.0
104.0 98.9
26.00 24.72
3.9.2 35.22
12.52 14.50

32.7 35.7
210 – 240

2 2.
30.2 40.3
28.1 32.3
3.4 6.1
44.7 47.1
173.4 185.8
43.35 46.45

18.0 17.5
12.2 12.6
47.9 48.5
24.1 23.4
102.2 102.0
25.55 25.50
43.35 46.45
18.90 20.95

240 – 270
35.7

24.5 24.2
19.9 20.2
54.3 54.7
30.2 29.5
128.9 128.6
32.22 32.15

7.0 6.0
2.1 1.3
38.4 32.0
11.4 7.09
53.9 50.2
13.48 12.55
32.22 32.15
18.74 18.60

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27 Sun

270 300

5 46.8
42.0
12.9
60.4
212.1
53.02

348 350
268 263
572 574
36.0 35.0
154.8 153.7
38.70 38.42
53.02 53.02
147.2 146.0

57 Sun

37.8 37.0
31.0 30.2
56.1 55.0
39.6 36.1
163.5 162.3
40.88 40.58

26.3 25.2 23.0
18.0 17.0 17.2
43.8 42.8 42.3
22.2 21.3 21.1
110.3 106.3 105.6
27.58 26.58 26.40
41.38 40.58 40.48
138.0 140.0 140.8

Beginning
0 — 30

24.1 23.8
15.8 16.7
41.0 41.2
19.4 19.0
100.3 100.7
25.08 25.18

13.2 12.0
0.2 5.9
27.7 26.3
7.9 6.2
49.0 163.4
12.25 40.85
2.08 25.18
124.3 143.3

54

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July 8, 1884.

Microscope South.

1st 2 readings rubber clamp pulling horizontal, 3rd - clamp diagonal.

Microscop South

Circle	Miscpe. 1	2	3	4				
87°	37.4	17.2	80.8	87.8	82.3	76.8	72.3	70.8
117°	35.2	16.1	89.0	88.8	83.8	78.2	74.8	71.5
147	34.6	16.8	92.1	92.0	85.8	81.2	78.8	74.1
177	35.8	17.2	97.1	95.2	89.4	84.3	81.7	78.0
207	38.0	20.0	1.8	96.0	90.9	85.8	83.0	80.2
237	37.8	21.2	2.2	94.2	89.9	84.1	81.3	78.2
267	38.8	20.6	1.8	95.2	90.8	85.8	82.4	78.1
297	32.6	19.7	0.8	94.8	89.1	83.1	81.5	77.2
327	28.0	13.8	95.1	89.1	82.1	78.2	76.8	71.5
357	23.0	10.8	92.0	84.2	78.0	75.8	72.1	67.2
27	22.8	9.8	92.5	86.1	80.3	76.1	73.8	69.4
57	19.7	8.2	91.8	86.2	79.0	76.3	72.8	68.1
87	17.2	5.2	87.8	82.3	76.8	72.3	70.8	67.0

+60 −60
−2.4 −5.4
+4 −8.0
+4.3 −3.5
+6.6 +3.1
+5.8 +6.9
+5.3 +11.2
+5.3 +19.5
−.8 +18.7
−4.5 +13.8
−3.3 +10.5
−3.5 +6.6
−7.3 +0.0

83.6
87.2
90.0
93.9
96.2
93.4
91.9
94.5
88.8
84.7
86.3
85.7
82.3

89.6

73.2
74.8
78.0
81.3
82.2
82.1
80.6
77.5
71.7
73.1
74.7
76.0

+3.6 −3.6 +1.1 −1.4 −0.8
+3.1 −5.7 +6.0 +1.2 +1.1
+1.1 −4.6 +10.5 +5.3 +1.4
+.4 −.2 +20.6 +12.2 +1.0
+6.1 +5.9 +25.9 +17.9 +1.4
+4.4 +10.3 +32.0 +24.1 +1.8
+5.2 +13.5 +31.1 +33.3 +1.9
+3.7 +19.2 +36.7 +25.0 +2.0
−1.4 +17.8 +42.2 +20.2 +1.8
−5.2 +12.6 +42.4 +12.5 +1.0
−3.8 +8.8 +44.1 +6.6 0.5
−2.4 +1.2 +37.6 +1.1 +.4 +0.3
−6.5 +0.0 +40.7 +0.2 +0.2

76.4

1884phae.proj.1763.

July 8 0-30

~~Microscope Host~~

87

E	28.8	28.7
R	23.0	23.5
G	44.2	45.2
M	22.9	23.5
	1190	1209
	29.78	30.22

117

	17.0	16.1
	7.4	7.2
	25.8	29.3
	10.2	9.7
	644	623
	1610	1558
	30.22	29.50
	1412	1392
	25.12	30.22
	−15.38	−16.30

30-60

117

E	43.1 47.6	38.2	38.5 38.3
R	34.0 34.7	30.1	29.5 29.1
G	56.5 60.9	51.0	51.4 51.3
M	38.5 41.0	32.2	32.2 32.2
	1881	1515	1516 1509
	47.02	37.87	37.90 37.72

147

	358	371	26.5 25.5
	26.4	26.4	16.3 15.7
	451	483	377 374
	325	331	228 221
	1431	1449	1037 1001
	35.78	36.22	25.92 25.02
	47.02	47.02	37.50 37.82
	11.23	10.80	−11.58 −12.80

147

60-90

177

E	384	391
R	287	295
G	507	514
M	352	360
	1530	1560
	38.26	39.00

	291	282
	143	131
	37.4	36.4
	263	259
	1071	1036
	26.78	25.90
	38.25	35.00
	−11.47	−13.10

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90 122

177°

E	46.7	52.8
F	32.0	38.2
G	54.7	60.9
H	43.9	50.1
	1768	2020
	44.20	50.50

207

	30.9	36.8
	16.9	22.3
	41.4	47.8
	32.3	37.3
	1215	1442
	3038	3605
	44.20	50.50
	−13.82	−14.45

207

E	30.5	29.8
F	15.4	16.7
G	41.1	40.6
H	31.9	30.8
1189	29.72	1169
		29.22

237

	140	143
	59.2	58.9
	28.7	28.9
Ex	163	16.6 Ex
(178.2	15	178.7
44.55)	29.72	44.68
	−15.17	59.8
		5.17
		146
		29.2
		14.5

237

E	37.5	37.2
F	23.1	22.9
G	52.2	53.0
H	39.9	30.1
15.21	38.18	143.2
		35.80
		38.30
	52.4	
	43.18	
	38.18	

267

	19.1	19.8
	5.6	6.4
	40.1	40.6
	24.6	28.3
92.4	2310	957
	38.18	23.78
	−15.08	38.30
		1209
		1.45

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267

Σ	351	401
	26.8	29.1
	0.4	1.2
	4.8	4.0
	43.52	176.4
17.41		44.10

297

	21.9	20.4
	9.8	8.2
	45.0	43.4
	28.7	26.9
10.54	26.35	98.9
	13.52	24.72
	2.8	4.40
	-19.17	153.8

20.0	21.3
14.9	14.2
46.7	46.8
28.3	28.7
	113.9
	28.48
	4.28
	1680

257

Σ	40.8	40.8
	28.8	29.1
	3.0	4.2
	47.4	47.0
18.07	45.18	181.1
		45.28

327

	22.0	21.3
	14.9	14.2
	46.7	46.8
	28.3	28.7
11.09	27.72	111.0
	45.18	27.75
	4.28	4.28
	-17.46	17.53

327

Σ	29.6	29.8
	23.3	24.0
	55.5	55.5
	37.1	36.8
14.5	36.38	146.1
		36.53

357

	9.9	10.0
	7.0	7.2
	39.4	39.9
	5.1	16.0
7.14	17.85	73.1
	36.38	18.28
	-18.53	36.13
		18.25

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3-7

E	264	264
F	23.8	24.6
G	56.0	56.3
H	32	319
	1383	3458
		139.2
		34.80

27

E	378	351 384
F	35.7	36.4 36.2
G	2.5	4.0 3.2
H	408	430 418
	17.68	4470
		1830 1801
		45.75 45.02

57

E	43.7	43.6
F	38.3	38.5
G	4.1	4.7
H	42.2	42.2
	18.81	47.18
		1890
		47.25

27

	104	9.3
	7.2	7.0
	368	344
	14.7	13.5
69.1	17.28	642
	34.58	16.05
	-17.30	34.80
		18.75

57

	25.2	25.5
	19.7	20.4
	463	463
	249	25.2
11.61	2502	1174
	44.20	29.35
	-15.8	45.47
		16.12

87

	316	310
	25.0	25.4
	48.2	48.8
	26.9	264
13.17	32.9	1306
	-14.26	3265
		4.725
		14.60

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0 — 30

Repeated

Fe	23.3	23.8	12.0	11.3
Ti	17.1	18.4	2.5	1.3
Ca	39.1	40.0	25.7	24.7
Mn	1.82	1.89	6.5	5.2
	97.5	101.1	46.7	42.5
	24.38	25.28	11.68	10.63

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July 8

Microscope South.

						Mean		
87°	42.8	35.8	38.0	33.5	30.8	341	+1.1	+1.1
117	45.6	38.8	39.7	38.2	36.2	380	+4.9	+6.0
147	45.8	37.2	45.2	41.3	38.2	41.86	+5.9	+4.5
177	45.6		45.8	42.2	40.5	428	+5.7	+2.96
207	40.3		40.0	39.2	35.6	383	+5.3	+2.95
237	40.7		36.3	36.1	33.2	35.2	+2.1	+3.20
267	36.1		34.2	32.1	29.9	32.1	-.4	+3.18
297	35.0		36.8	31.5	29.9	327	-.8	+3.07
327	29.9		32.8	25.4	25.2	~~27.8~~	-6.5	+2.2
357	27.8		26.6	21.4	21.8	23.3	-9.8	+2.4
27	26.3		28.8	24.0	22.3	250	-5.0	+4.4
57	29.1		32.4	29.0	28.0	29.8	-3.3	+1.1
87	32.8		33.5	30.8	31.0	31.8	-1.2	+0.0
						33.04.24		

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July 8.

South wright on.

	Microscope			North					
87°	20.3	30.2	15.0 ~~30.7~~	11.1	19.1	+6.5	+6.5	+1.1	+.38	+.32
117	18.8	29.0	15.0	9.8	18.1	+7.5	+14.0	+6.0	+10.0	+.80
147	20.2	31.5	15.3	12.0	19.8	+5.7	+19.7	+14.6	+17.3	+1.38
177	24.0	34.9	20.0	13.0	23.0	+2.6	+22.8	+24.6	+23.4	+1.97
207	33.8	47.2	29.9	22.2	33.3	+7.7	+14.6	+29.9	+22.2	+1.78
237	35.2	47.0	~~23.2~~	28.2	35.9	-1.03	+4.9	+32.0	+18.1	+1.45
267	38.1	48.0	29.8	23.0	33.5	-.79	-3.6	+31.1	+13.7	+1.10
297	28.2	49.0	23.0	21.2	30.3	-4.7	-8.8	+30.7	+11.1	+.89
327	28.8	47.8	25.3	20.8	30.7	-5.1	-13.4	+22.2	+4.4	+.35
357	25.2	43.2	20.8	14.0	25.8	-2	-13.2	+12.4	-4	-.03
27	20.3	40.8	15.1	9.1	21.3	+4.3	-8.9	+4.4	-2.2	-.17
57	21.8	39.8	15.2	11.2	22.0	+3.6	-5.3	+1.1	-2.1	-.16
87	23.0	35.0	12.2	8.2	19.6	+6.1	+1.0	+0.0	-4.0	.00

2557

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July 9 1884

Contact Nova.

Microscope North: Sun to right off.

Read-Rubber Spring Clamps

Circle							
87	69.2	71.5	71.8	72.1	78	79.0	83.8
117	58.2	66.1	68.0	69.8	75.2	84.8	87.1
147	62.0	69.1	72.7	71.2	79.1	77.1	91.0
177	73.6	75.2	77.6	78.2	83.2	84.4	92.8
207	85.6	90.7	92.2	93.7	96.8	98.4	98.8
237	90.0	92.1	93.8	92.8	98.8	97.0	98.7
267	91.0	92.3	94.8	95.2	98.6	98.4	97.2
297	84.8	87.2	88.0	87.7	93.1	92.6	92.3
327	84.6	82.8	84.3	84.6	87.8	89.7	91.2
357	77.0	80.0	81.7	81.8	86.8	84.7	86.5
27	75.0	75.2	76.4	76.1	82.8	83.7	85.8
57	73.2	74.8	73.2	74.1	78.8	81.6	83.8
87	72.5	71.8	72.1	73.8	79.0	83.8	84.8

71.8	78.9
68.0	82.4
71.0	82.4
77.0	86.8
92.2	98.0
92.9	98.2
94.1	98.1
87.6	92.7
83.9	89.2
81.2	86.0
75.9	84.1
74.0	81.4
726	82.5
80.17	87.75

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1884phae.proj.1763.

Contact North $\lambda_{04} = 70.3$

0-30

8°

42.2	42.9	42.3	
38.7	39.4	38.6	13.37
18.1	58.5	58.4	14.40
37.2	37.7	37.5	13.50
176.2	178.5	177.2	227
4405	4462	4430	13.76

11°

30.8	30.1	30.9
22.7	22.9	23.1
43.5	43.1	44.0
25.3	24.8	25.2
122.7	120.9	123.2
3068	3022	3080
4405	4462	4430
13.37	14.40	13.50

11°

30.2	30.6	30.8	
22.9	22.0	22.8	11.70
43.2	43.0	43.4	12.36
24.8	24.8	24.5	12.68
120.8	120.7	121.5	12.48
3028	3018	3048	122
8300			12.31

14°

18.4	18.3	18.0	18.5
9.1	8.5	8.5	8.3
30.6	29.4	29.7	29.9
15.8	15.1	15.0	15.3
74.3	71.3	71.2	72.0
1858	1782	1780	1802
3028	3018	3048	3048
11.70	12.36	12.68	12.48

17.7

46.2	45.9			
37.4	37.5	11.52	11.53	
57.4	57.9	12.82	12.22	
42.4	42.8	12.20	12.24	
183.4	184.1	294	295	
4585	4602	11.98	11.98	

17.7

21.8	21.8	36.2	35.9	35.6	
7.9	7.6	22.8	22.0	22.3	
29.6	30.0	44.2	43.4	43.3	
14.3	14.4	34.1	33.9	33.9	
		137.3	135.2	135.1	
		3432	3380	3378	
		4585	4602	4602	
		11.97	12.22	12.20	

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1884phae.proj.1763.

Aug 9

177

Σ 41.6 42.0
F 28.3 28.1
9 48.1 49.4
Nb 38.9 39.1

157.9 158.6
394.8 396.5

13.53
15.15
4.07
14.50
1729
+1432

207

26.2 25.0 25.7 23
14.7 13.9 12.0 13.4 13.1
37.1 36.0 34.7 36.0 35.2
29.0 28.7 26.3 22.2 24.0
106.0 103.8 98.0 102.3 100.6
259.5 245.0 255.8 251.5
354.8 394.8 396.0 396.5
13.53 15.15 35 14.50
1402
14.07

207

44.5 44.5
32.0 32.2
54.6 54.9
45.9 45.8
177.2 177.4
443.0 443.5

1315
1253
1357
65
1322

237

29.5 30.4 29.6
17.0 17.0 16.4
44.3 44.7 44.1
33.4 33.6 32.8
124.6 125.7 123.1
311.5 314.2 307.8
443.0 443.5 443.5
13.15 12.53 13.69

267

524 538 540
407 414 414
83 83 88
568 561 572
2203 2214
2810 5508 5535

1603
1665
1603
+1
1640
71
1624

348 345 291 287 353
230 222 187 163 232
551 550 480 450 551
430 431 381 349 437
1562 1548 1573
3505 3870 3932
5508 5531 5535
1608 1865 1603

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26.7

54.4 54.4
43.0 42.9
15.2 14.8
3.1 2.8
2367 2364
5892 5868

17.34
17.94
17.90
17.76
294
17.74

29.9

367 359 360 363
215 256 257
598 592 589 591
443 432 430 426
1663 1639 1634 1637
4158 4098 4092
5852 5864 5868
17.34 17.94 17.90 17.76

29.7

449 445
336 341
73 71
509 509
1969 1966
4922 4915

1684
17.20
17.33
37
17.12

32.7

246 250 247
210 200 201
508 499 494
331 329 327
295 278 1273
3238 3195 3082
4922 4915 4915
1684 1720 1638
17.33

35.7

869 870
326 331
28 30
458 452
1771 1783
4428 4458

17.70
17.58
17.64

180 185 239 231
191 172 224 224
470 478 528 527
242 245 305 298
1063 1080
2658 2700
44.28 44.58
17.70 17.58

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27

25,1 25,1 25,0
23,8 24,1 24,2
50.0 49,9 50,3
29,2 25,8 29,9
1281 1259 1264
3202 3222 3180
5168 5102 51,02
19,63 18,80 19,42

57

21,9 22,3 21,2 21,5
17,8 17,3 16,3 17,2
42,0 42,8 41,0 41,5
21,4 22,1 20,6 20,9
1031 1045 1011 1009
2578 2612 2528 2522
4018 4018 4018 3988
1440 1406 1270 1148
24,78
39,88
15,10

87

32,6 32,0 31,8
25,8 25,1 25,2
47,9 47,3 47,2
28,2 27,9 27,1
1365 1343 1333
34,12 33,57 33,32
46,52 46,48 46,48
12,40 1,299 13,16

19,63
18,80
19,42
66
19,28

14.40
14.06
14.86
15,10
242
14.61

12,40
12,91
13,16
247
12.62

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1884phae.proj.1763.

0 - 30

117

36,9	35,8	36,0		243	244	246	
31,4	31,4	31,4		147	148	148	
51,1	51,5	51,7	13.85	372	371	370	
31,2	31,4	31,9	13,52	190	197	193	
1506	1501	1570	14,22	952	960	957	23.92
3765	3752	3775	2659	2380	2400	2393	3775
			13,86	3765	3752		14,22
				13,85	13,52		

0°-30°	13.76	+ 1,31	-1,31	
30 - 60	12,31	+ 2,76	-4,07	
60 - 90	11.98	+ 3,09	-7,16	
-120	14.32	+0.75	-7,91	
-150	13,22	+1.85	-9,76	
-180	16,24	+ 1.17	-8,59	
-210	17,74	+ 2,67	-5,92	
-240	17,12	+ 2,05	-3,87	
-270	17,64	+ 2,57	-1,30	
-300	19,28	+ 4.21	+ 2,91	
-330	14.61	+0.46	+ 2,45	
-360	12,62	+ 2,45	+ 0	
~~30~~	~~13,86~~			
	60 84			
	15,07			

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July 9

Microscope North. South wing off.

End of series

87	22.0	28.3	31.2
117	20.2	27.4	33.4
147	24.4	28.9	35.0
177	32.1	36.8	39.2
207	44.0	45.1	45.0
237	48.8	48.2	50.2
267	45.8	47.8	48.0
297	42.9	42.9	44.9
327	37.8	39.1	41.2
357	36.8	36.3	36.4
27	28.8	31.3	35.5
57	32.8	34.2	36.7
87	28.3	31.2	34.4

81	15	27.1	+10.0 +10.0
81	10	27.0	+10.2 +10.2
88	3	29.4	+3.8 +3.80
81		36.0	+2 +2.7
14	1	44.7	-1.1 +1.8
2	2	49.1	-1.5 -0.1
2	6	47.2	-1.80
40		43.6	-6.3
11	8	39	74 .5
19	1	36	5
95	6	31	9 +1.0
15		34	6 -2.7
5	39	31	3 +6.0

47.79

46.9

36.76

1884phae.proj.1763.

July 10

Mon = 73°9

87

296" 293 285 287
251 259 243 245
451 448 439 439
241 247 234 258
1266 1247 1201
3165 3118 3002 1209 3022
4328 4388 4346 4846
1163 1210 1366 1323

1163
1210
1366
1323
1062
1265
1265
1208
23
1236

117

158 154 151
115 68 94
281 297 273
105 98 95
619 597 593
1548 1492 1482
2875 2900 2900
1327 1408 1418

1327
1408
1418
1153
1384

147

259 248 240 240
149 149 148 149
351 351 351 351
215 215 212 214
963 963 963 963
2408 2378 2378 2378
3315 3315 3646 3646
1177 1263 1263 1263

1177
1263
1263
643
1214

360 358
288 297
485 481
301 303
1434 1459
3585 3648

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177

26,5 26,2
18,2 17,8
39,1 38,1
24,0 23,7
107,8 105,8
26,9 26,4

13,20
13,40
14,20
8,50
12,83

17,1 16,2 16,0 16,4
2,8 1,2 1,5 2,0
23,7 23,7 24,0 24,2
14,0 14,0 13,9 14,1
55 55 48,7
13,8 5,8
26,55 13,85 14,25
13,20 26,55 26,45
13,10 12,20

207

41,2 41,7
27,7 27,6
49,4 49,5
35,2 35,0
157,5 157,8
393,8 394,5

11,83
12,83
12,55
7,21
12,40

27,9 27,0 27,3
14,2 13,2 14,0
37,1 37,1 37,2
30,0 28,9 29,1
110,2 106,2 109,6
27,55 26,50 26,50
35,35 35,25 35,40
11,83 12,83 12,51

237

49,4 49,1 33,9 33,1
39,0 39,8 21,4 25,4
0,0 0,7 44,4 43,8
50,4 50,9 36,1 35,3
196,5 198,5 135,8 133,0
49,12 49,62 33,95 33,25

12,84
12,84
13,60
11,70
11,50
11,88

35,8 30,4 35,8 21,3 21,2 20,7
21,8 6,8 22,1 17,1 7,2 6,8
50,1 50,1 36,0 35,8 35,3
38,8 38,0 35,0 25,0 24,8 24,2
197,5 197,1 89,4 89,0 87,0
36,88 36,78 22,35 22,25 21,75
49,12 39,62 33,51 33,25 33,25
22,4 28,4 13,60 11,90 11,50

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267

321	313	304
194	199	189
522	520	574
417	418	398
1449	1450	1409
3622	3625	3522
4912	4912	4542
12.64	1287	1420

425	481	
313	356	
24	24	
509	513	
1965	1977	
4912	4942	

1264	
1287	
1420	
971	
1324	

297

224	212	210
99	91	88
449	436	439
300	290	284
1072	1029	1021
2680	2572	2528
4233	4238	4216
1553	1661	1650

377	379	
268	257	
581	588	
467	468	
1693	1687	
4233	4218	

1553	
1661	
1650	
1904	
1936	

327

512	508	511	1613	336	344	344	340
411	409	403	1428	270	291	284	281
144	141	143	1457	586	05	03	598
587	582	581	1538	417	439	433	420
2254	2240	2238	1513	1609	1680	1669	1639
5635	5600	5595		4022	4225	4172	4098
				5635	5600	5595	
				1613	1425	1428	1497

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426	426	421
38,1	37,2	37,1
8,2	8,1	9,8
505	459	501
1994	1978	1971
4985	4945	4928

17,30
17,60
18,23
2336
1779

3-7

238	228	228
21,9	21,4	20,2
53,4	53,1	52,0
310	30,0	29,2
1301	1273	1242
3252	3182	3105
49,85	4945	49,28
17,33	17,60	18,23

452	458	452	450
45,1	45,9	44,9	44,7
15,4	15,9	15,0	153
518	522	511	512
2185	2498	2162	2162
5460	~~3995~~	5405	5405
138	5495		

19,12
18,25
19,34
18,77
3148
18,87

2-7

28,2	28,4	280	280
27,1	27,1	263	267
54,1	53,9	53,7	584
335	30,5	33,1	330
1433	1432	1411	1411
3563	3580	3528	3548
5495	5405	5462	5405
19,12	18,25	19,34	18,77

5-7

511	522	518	
505	524	520	
168	180	179	
560	561	568	
2344	2384	2385	
5860	5960	6217	
		5962	

1305
1462
12,55
1340
13,58
1720
1344

399	410	412	408	408
350	362	376	362	361
08	18	30	20	18
40	410	424	418	414
1662	1800	1842	1808	1801
14405				
1655	4500	4605	4520	4502
5960	5960	5860	5860	5860
305	1712			
1355	1462	1255	1340	1358

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0–30

29.2	26.8	26.9	26.8		17.4	16.3	20.3	22.7	19.5		17.3	17.5			
25.4	23.2	23.1	23.2		11.8	12.1		14.1	14.5		11.7	12.6			
51.0	48.8	48.4	48.6	11.70	33.4			36.9	36.5		33.4	33.6			
30.0	26.9	26.8	26.8	12.12	13.6			17.1	16.4		13.9	13.3			
13.56	12.57	12.52		12.52				8.88	8.71		8.56	7.68			
33.50	31.42	31.30		12.10				22.20	21.78		16.90	19.20			
				12.10				33.90	33.80		31.40	31.30			
								11.70	12.12		12.50	12.10			

1	−12.36	+1.87	+1.31	118 +1.59
	13.84	+0.35	+2.76	015 +1.57
	12.14	+2.09	+3.09	506 +2.14
	12.83	+1.40	+.75	215 +1.08
	12.40	+1.83	+1.85	+1.83
	12.57	+1.86	−1.17	49 +0.49
	13.24	+.99	−2.67	168 −0.84
	16.35	−2.12	−2.05	−2.08
	15.13	−0.90	−2.57	340 −1.74
	17.79	−3.56	−4.01	717 −3.89
	18.87	−4.64	+.41	418 −2.09
	−13.41	+.79	+2.45	324 +1.62
	50.76			
	−14.23			

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July 10

Microscope North South wright ff

87	40.0	40.0	40.2	2	40.1
117	~~40.0~~ 39.5	42.1	39.9	15	40.5
147	40.2	43.6	39.3	31	41.0
177	43.0	40.0	36.3	93	398
207	48.0	47.0	43.6	86	462
237	51.8	48.1	45.0	66	463
267	50.5	45.6	46.1	72	474
297	48.0	47.7	43.8	95	465
327	45.0	46.0	45.0		458
357	42.0	45.2	43.6	08	~~43.8~~ 43.6
27	43.8	42.8	42.8	94	431
57	41.3	42.8	41.6	59	419
87	40.0	40.2	39.7	99	400
					43.36

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July 11 1884

Microscope North

87°	(11.2)	(16.9)	(19.1)	13.7
	7.2	11.1	16.1	11.5
117	5.1	12.2	15.3	10.9
147	10.4	13.0	16.8	13.4
177	18.2	18.8	20.0	19.0
207	28.2	29.9	31.2	29.8
237	37.0	35.9	37.2	36.7
267	32.2	33.1	31.8	32.4
297	28.8	28.2	29.7	28.9
327	24.6	25.4	25.0	25.0
357	19.7	21.8	23.0	21.5
27	18.0	18.2	21.9	19.4
57	7.8	20.2	20.7	16.2
87	11.1	16.9	19.1	21.57
	(19.1)	(21.9)	(23.7)	

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1884phae.proj.1763.

July 11 1884

Microscope North

∫

87	94.3	96.1	1.7	97.4
117	88.0	96.1	98.6	94.2
147	91.5	95.0	98.5	95.0
177	0.2	98.3	0.2	99.6
207	11.0	12.5	9.0	10.8
237	18.0	18.2	18.7	18.3
267	13.7	14.0	15.0	14.2
297	12.0	12.8	12.4	12.4
327	10.0	10.0	10.1	10.0
357	4.0	4.9	7.1	5.3
27	4.5	5.9	8.0	6.1
57	99.8	2.9	8.2	103.6
87	96.1	2.3	6.2	101.5
				105.3

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July 11

1404 = 83.4

870

454	460	459	45.8	34.7	347	344	357	+11.1
426	427	424	42.6	30.4	303	302	308	12.2
112	108	112	11.1	54.2	543	540	547	16.9
458	457	458	45.8	30.9	31.1	308	308	14.9
2052	2052	2053			1504	1494	1509		
5130	5130	5133			3760	3735	3772		
					5130	5130	5133		
					13.90	1398	1356		

1370
1355
13.58
15
13.74
1216
52
1296

117

29.4	30.1	29.7	294	+10.1
19.6	200	193	195	15.5
44.9	454	450	443	13.4
24.2	247	242	236	10.8
	1202	1182	1170	
	3005	2955	2925	
	4188	4200	4200	
	1193	1245	1282	

396	394	39.5							
357	351	35.1	1193						
582	585	583	1245						
350	350	35.0	1250						
1679	1680		718						
4198	4200		1239						

440	440	418	420	441	430	335	336339	335	347	347	330	+9.5
341	341	312	320	340	32.8	22.2	218	226	224	225	222	10.6
590	590	568	573	587	57.7	47.1	470	471	473	483	471	470	10.6
383	383	360	360	370	370	30.8	307	313	310	322	321	306	6.2
1714		1658	1663	1745			1351	1349	1340				
4385		4145	4158	4362			3308	3372	3350				
3326		3312	3350	3308									

147

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177

403 413 409 40.8
30.2 306 299 30.2
544 550 544 54.6
38.2 38.0 37.9 38.0
1631 649 631
40.78 41.22 40.78

9.23
10.49
10.34
3006
1002

33.1 341 335 331 328
16.8 174 172 16.7 16.4
42.4 429 431 422 420
31.2 330 323 310 304
284 261 230 216
330 315 302 304
40.75 40.35 41.24 41.78
826 9.23 10.49 10.34

207

44.1 440 44.0
27.9 28.1 28.0
53.6 53.5 53.8
41.8 42.3 42.0
1674 1683
41.85 42.08

10.20
11.60
11.07
10.58
345
10.86

30.0 294 305 301 297 +14.0
13.9 133 145 136 137 +14.1
42.0 419 430 418 414 11.8
32.2 320 331 323 312 9.8
1266 1219 1178 1160
29.45 29.00
3165 3046 4185 4208
4185 4208 11.07 10.58
10.20 11.60

237

34.4 338 34.1
18.2 18.7 18.4
46.7 45.9 46.2
35.5 35.4 35.4
1348 1338
33.70 33.45

12.88
11.65
11.22
11.70
682
11.70

213 205 211 204 218 218 209 +12.8
43 37 48 39 43 44 38 14.1
372 358 370 363 352 380 384 9.0
246 233 243 232 256 253 258 10.8
833 872 899 895
2042 2180 2248 2238
3370 3345 3370 3345
1288 11.65 11.22 11.07

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267

33.1	32.8	33.0	35.3	35.2	+16.8	17.4		17.8	16.2	16.2	17.9				
17.8	16.7	17.2	21.0	21.1	20.1	+15.7	16.5	3.6	3.1	1.8	1.2	1.5	4.1		
49.2	48.9	49.0	52.2	52.3	52.2	+10.8	13.53	12.6	39.6	39.0	38.4	38.9	38.2	40.2	
35.2	35.0	35.1	37.8	38.0	37.9	+9.5	13.30	11.3	26.6	25.9	26.0	25.1	25.6	27.2	
1353	1334		1462	1487			1420			858	824	8024			
3388	3335		3655	3668			1428			2145	2060	2006	894		
							1357			3652	3385	3330	2235		
										1553	1325	1330	3668		
													1439		

287

48.7	48.4	48.6			17.05			31.0	31.1	31.2	30.7	17.6			
35.0	34.8	34.9			16.95			17.2	17.5	17.0	17.1	17.7			
10.8	10.9	10.8			17.38			55.4	55.4	55.7	55.0	55.4			
56.7	56.3	56.5			238			38.6	38.0	38.7	38.1	17.9			
2412	2404				1713				1430	1426	1409				
5280	5260								3557	3568	3522				
5280									5280	5260	5260				
									17.05	16.95	17.38				

327

48.5	47.7	48.1			1484			30.8	31.3	31.6	30.9	17.3			
35.2	35.2	35.2			488			22.3	22.8	22.0	22.1	12.9			
13.0	12.8	12.9			1570			57.8	58.2	58.2	57.2	45.1			
55.0	54.7	54.8			1542			39.3	40.0	39.7	38.3	55			
2417	2404				1285				1823	1809	1476				
5292	5260				1514				3808	3772	3680				
									5292	5260	5260				
									1484	1488	1570				

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1884phae.proj.1763.

357

34.2	345	357	342	338	+18.4	529	522	52.6
29.9	248	311	297	302	16.1	460	460	46.0
4.7	48	73	44	49	15.7	254	203	20.4
40.6	410	452	487	402	19.4	01	00	0.0
	1801		1690	1691		2394	2385	
	2752		2225	4275		5985	5962	
	4252		4225	5962				
	5985		5962	1687				
	1733		1737					

1733	
1737	
1687	
2157	
1715	

27

20.6	207	208	209	204	+15.4	357	362	36.0
16.3	158	168	165	163	17.1	332	337	33.4
47.1	462	480	471	471	19.8	69	72	6.9
25.2	240	260	258	246	16.2	411	417	41.4
	1061	1116	1103	1086		1767	1788	
	2652	2750	2758	2715		4418	4470	
	4418	4470	4418	4470				
	1766	1680	1660	17.55				

1766	
1680	
1660	
1755	
2861	
1715	

57

20.0	200	203	197	110		308	311	31.0
12.8	131	129	124	15.0		275	280	27.8
42.1	427	420	415	15.2		573	573	57.3
20.6	211	207	204	14.5		350	352	35.1
	969	959	937			1506	1576	
	2422	2398	2346			3765	3790	
	3765	3790	3790					
	1343	1352	1448					

1343	
1352	
1448	
1183	
1354	

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0-30

325
274
555
319

280 284 288 271
196 253 207 191
458 462 464 450
238 244 261 231
1172 1193 1264
2930 2982 3010

829 319 320
274 264 272
375 548 551
919 307 311
1469 1533
3652 3552

295 286 284 288 28.8
251 240 238 241 24.2
530 522 522 525 52.5
287 293 273 279 27.8
1363 1321 1317 1333
3408 3318 3252 3332
3302

19.8 208 197 154 151 +9.0
12.1 134 124 115 115 +12.1
37.6 384 379 370 370 +14.9
150 160 152 141 147 +12.8
886 847 820 827
2215 2118 2050 2068
3408 3302 3252 3332
1193 1184 1242 1264

1193
1184
1242
1264
873
1218

1884phae.proj.1763.

−12.96 − .35
12.39 +22
9.23 +338
10.02 +259
10.82 +1,75
11,70 +91
B57 −96
17.13 −42
15.14 −253
17.19 −4,58
17,15 454
13.94

16128
−~~2601~~
13.44

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July 15 1884

Microscope South.

87		79.4	70.2	65.8	62.7 (1)	69.5
117		78.7	70.0	64.1	60.7	68.4
147		82.8	74.1	69.3	65.0	72.8
177		84.0	75.1	70.5	69.6 (2)	73.6
207		81.0	75.0	67.0	65.2	72.0
237		79.2	73.0	68.7	65.3 (3)	71.6
267		74.1	69.1	63.8	58.2	66.3
297		72.8	62.9	61.8	56.8	63.1
327		66.4	61.0	57.8	53.1	59.6
357	#	62.8	57.9	53.0	50.0 (4)	55.9
27		66.1	59.0	57.0	54.8	59.2
57	X	70.7	65.1	61.7	56.6	63.5
87		71.1	65.8	63.2	58.5	64.7
						66.2

(4) # North magnet over joint
X South magnet nearly over joint
(1) joint just passed S mag
(2) N mag over joint exactly.
(3) Joint just passed S mag

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1884phae.proj.1763.

87 July 15

Thu = 69.9

87

E
F
G
H

26.1	27.1	31.6	32.0	32.2	31.9		21.2	21.1	21.8	21.6	+10.7
22.3	23.5	27.2	26.9	28.1	27.0		12.4	13.0	11.9	12	14.6
44.1	47.4	49.0	48.8	50	48.8	120	35.3	35.7	35.2	35.0	13.5
22.0	29.2	26.1	26.4	27.5	26.4	2.40	15.8	16.0	15.7	15.4	10.6
453		134	134	135	132	360		85.8	84.9	84	
2092		335.2	336.2	342.2		810		245	209.8	210.2	
						1202		32.2	33.6	32.2	
						12,23		120	124.0	120	

117

285	287	41.8	46.4	46.8	37	28.0	20.7	21.1	37.2		
19.8	19.1	36.7	37.2	39.5	26.4	24.6	10.7	10.1	26.3		
420	41.8	58.9	61.5	59.8	45.5	10.0	33.2	33.0	45.8		
220	223	39.7	41.0	40.1	33.8	33.8	17.0	17.2	34.5		
1125	1119	1811			1469		816	814		+47.8	
2812	2798	4528			3672	5220	2040	2030			
					46.15	3710	2812	2755	3655		
					9.46	6608	7.72		45.6		
						858		760	638		

9.46
8.58
2.72
760
823
4408
8818

147

350	355	285									
246	249	189	+9.3	11.96							
478	481	411	+14.6	11.74							
315	320	254	+13.2	11.43							
1396	1405	1139	+8.3	11.36							
3490	3512	2848		249							
				1162							

EX

268	190	193									
103	41.2	42									
354	287	277									
240	170	173									
926	682										
2316	2316										
3172	3480										
1196	1174										

268	190	193									
19.2											
103	41.2	42									
354	287	277									
27.9											
240	17.1	173									
926	682										
2316	2316										
3172	3480										
1196	1174										
	17.05	685									
	1712										
	2848										
	11.43	11.36									

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177

389 380 392 390
237 230 241 233
479 470 481 477
362 355 363 361
1484 1435 1477
3642 3618 3692

1164
1246
1340
790
1263

244 238 247 248+ 14.6
8.6 88 87 83 14.7
355 (354) 356 354 12.2
254 251 255 256 10.7
971 945 941
2428 2362 2352
3642 3648 3652
1164 1286 1340

207

417 430 429 42.5
274 282 282 27.9
532 540 540 53.7
431 441 411 43.8
1654 1690 1692
4131 4230
32

1023 45.7
1113 33.3
1085
261
1087

30.3
149
30.2 300 307+ 12.2
151 145 157 13.0
455 454 462 8.0
337 328 334 10.5
1245 1254
3112 3068 3145
4135 4230
1020 1068

287

350 390 39.0
242 241 24.1
552 544 54.8
421 415 41.8
1615 1596
4012 3971

1250
1330
1280

234 230 237 +15.6
86 82 91 13.5
446 443 449 10.2
320 318 321 9.8
1073 1098
2682 2745
4012 3971
1330 1230

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29,6 29,9 29,8
15,4 16,4 15,9
50,5 51,3 50,9
37,9 38,2 38,0
133,4 135,8
33,35 33,95

15,90
16,50
1240
16,20

12,5 12,8 12,2 +17,3
0,0 0,0 0,1 +15,9
37,2 36,9 37,4 +13,7
20,1 20,1 20,1 +17,9
69,8 69,8
17,45 17,45
33,35 33,95
15,90 16,50

35,5 36,0 34,7 35,4 35,4
24,8 24,1 22,2 22,9 23,1
58,4 60,2 58,8 59,7 59,6
41,2 42,2 41,1 42,1 41,8
162,5 156,6 160,1
40,62 39,20 40,02

16,24
14,25
15,57
16,56
15,52

17,4 17,4 17,3 +18,0
10,4 10,8 9,9 +12,7
44,5 44,2 44,8 +15,1
25,4 25,1 25,8 +16,4
97,5 97,8
24,36 24,45 24,45
40,62 39,20 40,02
16,24 14,25 15,57

32,7

41,0 42,0 41,6 41,5
35,0 36,0 35,1 35,4
7,9 9,1 8,8 8,6
48,8 50,1 49,0 49,3
194,5
48,18 49,30 48,62

15,15
15,95
16,29
17,82
17,94
15,94

23,8 23,7 23,8 +17,7
20,4 20,4 20,5 15,0
55,0 55,0 55,1 13,6
30,0 30,1 30,0 19,3
129,2 129,4
32,30 32,35 32,33
48,18 49,30 48,62
158,8 159,5 162,9

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39.2 40.6 40.0 39.9
36.8 38.1 37.5 37.5
9.9 11.7 11.3 11.0
45.5 46.8 46.4 46.2
191.4 197.2 195.2
478.5 493.0 488.0

1663
1797
1629
2089
1696

24.0 24.0 24.1 +15.9
20.8 20.9 20.8 +16.7
57.0 57.0 57.0 +20.0
29.2 29.1 29.4 +17.0
124.9 125.3 12.51
312.2 313.3 488.0
47.85 49.30 16.29
166.3 179.7

27

32.3 32.9 32.6
30.2 31.8 31.0
59.1 59.8 59.4
36.8 36.1 36.4
158.4 160.6
396.0 401.5

1322
1405
1455
1182
1394

21.8 22.2 21.8 21.5 +10.8
15.4 16.0 15.1 15.0 13.6
44.5 45.0 44.2 44.2 14.9
21.7 22.3 21.1 21.7 14.7
105.5 102.2 102.4
263.8 253.5 256.0
356.0 356.0 401.5
132.2 140.5 145.5

43.9 43.2 43.6
38.3 37.4 37.8
6.0 5.1 5.6
43.4 42.9 43.2 (188.6)
191.6 184.6 + 47.15
479.0 461.5

1305
11.93
458
1249

33.0 32.8 33.1 +10.6
26.2 26.1 26.4 +11.6
51.2 51.1 51.4 +14.4
29.6 29.4 29.9 +13.6
139.4 140.8
348.5 352.0 11.93
479.0 461.5

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0–30

42,5	420	42,2		31,8	31,8	31,5	+19.4	
31,2	35,1	35,1	12,28	20,9	21,0	20,8	+14,2	
55,4	59,2	59,3	11,84	46,5	46,1	46,5	+12,8	
38,0	37,4	37,7	4 12	27,0	27,1	26,8	+10,7	
175,1	173,7		12,06		1260	1264		
43,78	43,48				3152	3160		
					4378	4348		
					1228	11,84		

The above with side spring off

−12,15	+1,18	+1,18
8,82	+4,87	+5,6
11,62	+1,71	+7,40
12,63	+0,70	+8,11
10,87	+2,46	+10,57
12,92	+0,53	+11,00
16,20	−2,87	+8,13
15,5	−2,19	+5,94
15,94	−2,61	+3,33
16,96	−3,63	−,30
13,94	−,61	−,90
12,9	+,84	+,00
15,94		
1333		

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July 15 1884

Microscope ~~North~~ South.

			With brass spring.	
87	83.6	~~82~~ 82.8	83.2	83.3
117	81.8	82.8	86.0	84.2
147	~~85~~ 85.4	83.8	87.0	~~85~~ 85.0
177	85.4	81.5	87.6	85.0
207	84.4	80.0	85.0	84.4
237	82.8	80.4	86.1	83.8
267	79.7	78.8	83.2	79.7
297	77.6	76.0	79.2	77.0
327	78.8	77.0	78.2	77.6
357	78.0	79.8	80.0	75.0
27	81.1	78.8	82.2	78.7
57	82.0	~~80~~ 80.4	85.2	82.8
87	82.8	79.2	83.3	~~84~~ 84.0

Without brass spring.

83.2	83.3
82.3	85.1
~~84.6~~	86.0
83.4	86.3
82.2	84.7
81.6	85.0
79.3	81.4
76.8	78.1
77.9	77.9
78.9	77.5
80.0	80.4
81.2	84.0
81.0	82.2
81.0	82.4

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Mr Clark

ground the ring concentrically
with the axis of revolution

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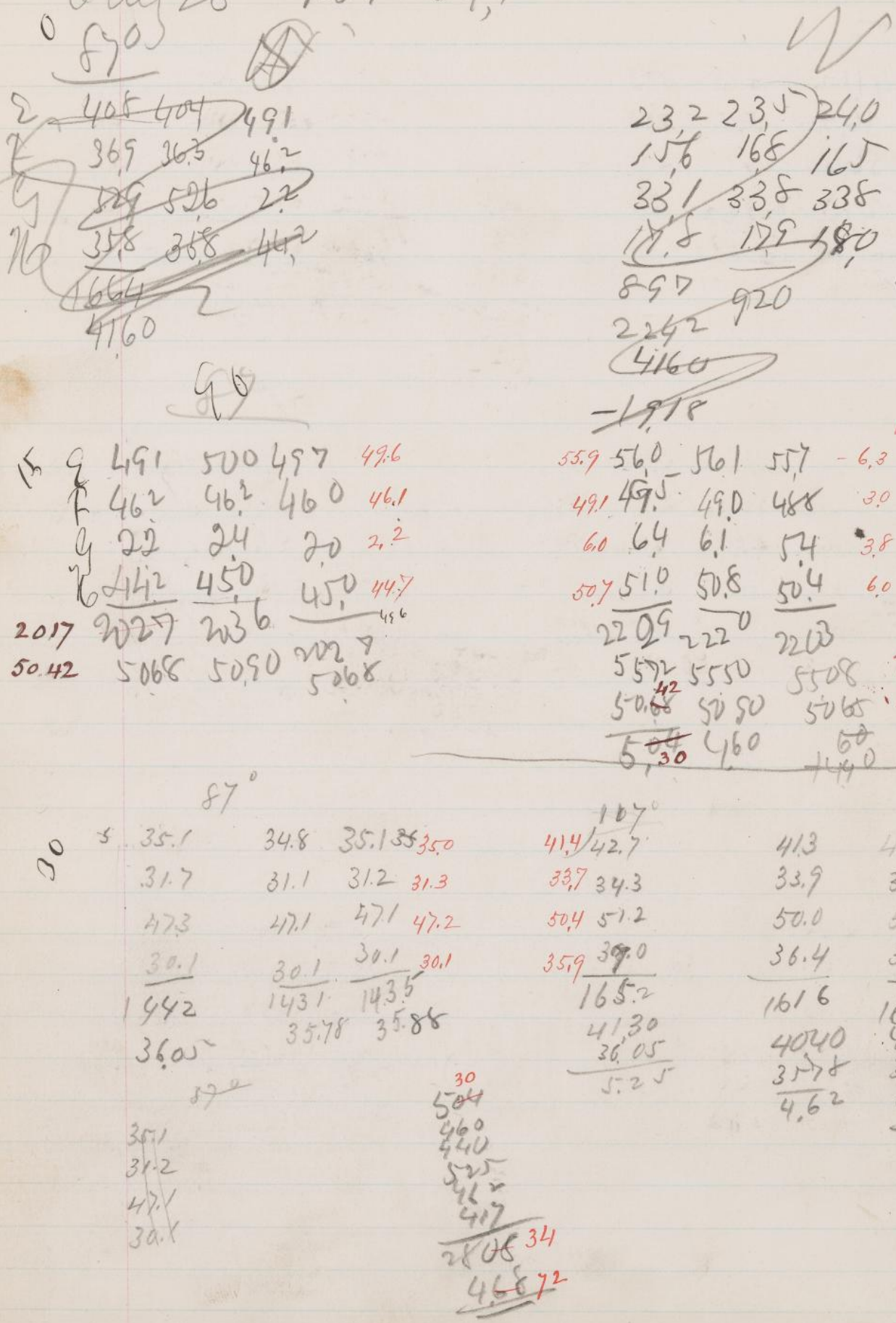
87 Aug 22

☿ 409 411
♃ 371 365
☾ 559 561
♄ 368 370
170 7
4268

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July 28 Now = 64.4



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S
177°

38.1 37.9 37.9 37.3
30.1 30.2 30.3 29.4
47.2 46.9 47.1 47.2
32.0 32.7 32.4 31.5
147.4 147.7 147.7 145.4
36.85 36.92 36.92 36.35

N
147°

43.1 43.7 43.2 43.8 -6.5
34.2 35.1 35.1 35.4 6.0
57.8 57.7 57.9 52.2 5.0
41.0 40.9 40.8 40.9 9.4
170.1 171.4 171.0 172.3
42.52 42.85 42.75 43.08
36.85 36.92 36.82 36.35
5.67 5.93 5.83 6.93

147°

37.5 36.9 37.3 37.5 37.2 37.3
28.2 28.5 29.1 28.4 29.3 28.7
45.1 44.9 45.4 45.2 45.7 45.3
33.9 33.8 35.5 34.3 34.9 34.3
144.7 144.1 146.3 145.4 147.1
36.18 36.02 36.58 36.35 36.78

177°

45.0 45.0 45.2 44.8 45.0 44.8
31.2 31.3 31.1 31.2 31.9 30.6
49.2 49.1 49.5 49.5 49.1 49.0
42.5 42.8 43.0 42.7 42.1 42.1
168.2 168.8 168.8 168.2 168.1 166.5
42.05 42.20 42.05 42.02 41.62
36.18 36.02 36.58 36.32 36.78
5.87 6.18 5.79 5.69 4.80

177°

207°

ε -7.7 7.9 7.8
H 2.5 2.9 2.7
g 3.9 4.1 4.0
H 8.2 8.9 8.6

-6.4
2.4
3.2
5.8

43.0
29.4 42.9 42.7 41.9 42.5
16.2 29.4 29.1 28.1 28.9
34.0 47.5 47.1 46.1 46.9
27.5 40.1 40.5 39.5 40.0
107.1 160.0 159.4 155.6
40.00 39.85 38.90

44.9 45.5 44.4 44.8 -2.4
32.1 32.2 31.9 32.3 3.2
51.2 51.0 51.2 51.4 4.3
46.0 46.2 45.8 46.0 6.0
174.9 173.3 174.5
43.72 43.32 43.62
40.00 39.85 38.90
3.72 3.48 4.72

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207° S

34.7	34.8	33.6	34.1	34.3	38.7	38.7	38.8	38.8	-4.5	-3.1	-3.8
21.4	21.6	22.2	22.1	21.8	25.6	26.4	25.5	25.8	3.8	2.6	3.2
41.0	41.1	42.0	41.8	41.5	49.4	50.2	49.4	49.5	7.9	7.7	7.8
35.2	36.1	36.1	36.0	35.8	42.1	42.4	42.2	42.0	6.3	4.7	5.5
1323	1336	1339	1340		1577		1550	1561			
33.08	33.40	33.48	33.50		39.42		38.75	39.02			
					33.08		3340	3348			
					6.34		558	5.58			

p.78 Mean

237° N

237°

49.0	49.0	48.8	47.8	48.4	48.6	50.1	50.2	49.9	50.1	-1.5
36.5	35.9	35.5	34.2	35.8	35.5	39.0	39.5	38.7	38.8	3.5
0.2	59.7	59.9	58.7	59.3	59.6	7.0	7.1	6.7	7.1	7.4
52.8	52.2	52.1	50.5	51.6	51.8	59.2	59.0	59.1	59.4	7.4
1985	1968	1963	1912	1946			2158	2144	2154	
49.62	49.20	49.08	47.80	48.65			53.95	53.60	53.85	
							49.62	49.14	48.20	
							4.33	4.46	5.65	

433
446
565
1444
481

267°

36.8	36.9	37.0	35.8	36.6	39.1	39.2	39.3	39.0	39.2	39.0	-2.5
24.4	25.1	25.4	25.4	25.1	28.9	28.8	29.4	28.2	28.8	29.2	3.8
53.4	54.3	53.9	53.1	53.7	59.0	59.1	59.1	58.7	59.2	58.9	5.3
45.4	45.7	45.8	44.3	45.3	46.8	47.1	46.7	46.4	47.3	48.5	1.5
1600	1620	1621	1586			1742	1745	1723	1745	1736	
40.00	40.50	40.52	39.65			43.55	43.62	43.08	43.62	43.40	
						40.00	40.50	40.52	39.65	39.65	
						355	3.12	2.56	3.97	3.75	

297°

3.55
3.12
2.56
3.97
3.75
16.93
3.39

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S. 297°

43.8 44.5 44.8 44.1 43.8
34.6 34.2 34.8 34.2 34.5
3.7 3.9 3.9 4.3 3.9
51.9 51.8 51.7 51.4 51.2
193.0 194.4 195.2 194.0 193.4
48.25 48.60 48.80 48.50 48.35

N. 327°

50.5 47.2 47.0 47.2 47.1
46.2 42.5 42.9 42.1 41.8
13.8 9.4 9.7 [13.8] 8.3
50.4 55.4 55.3 53.3 54.8
229.9 214.5 214.9 216.4 216.1
57.48 53.62 53.72 54.10 54.02
48.25 48.25 48.60 48.42 48.60
9.23 5.37 5.12 5.68 5.42

ε. − 2.8
η. − 8.0 5.2
θ. − 5.7
ι − 3.1

327°

48.2 48.0 48.4 47.8 48.1
43.8 44.1 43.8 43.1 43.7
10.5 10.2 10.1 10.8 10.4
56.1 55.8 55.4 55.4 55.7
218.6 218.1 217.7 217.1 217.9
54.65 54.52 54.42 54.28 54.48

357°

49.8 49.5 49.7 49.7 49.7
49.4 48.8 50.0 49.3 49.4
15.8 15.0 16.5 15.9 15.8
55.8 54.8 56.8 55.8 55.8
228.1 233.5 230.7
57.02 58.38 57.68
54.65 54.52 54.35
2.37 3.86 3.33

− 1.7
− 5.7
− 5.4
− 0.1

357°

ε 48.2 48.0 47.8 47.5 47.9
F 47.5 47.9 47.5 47.2 47.5
G 14.1 14.3 14.0 13.8 14.0
η 54.1 53.8 54.2 53.0 53.8
223.9 224.0 223.3 221.5
55.98 56.00 55.82 55.38
22.35
55.88

387°

50.3 51.1 50.1 50.0 49.9
50.3 51.2 49.9 50.0 50.0
12.3 13.0 12.2 12.1 12.0
55.2 55.4 55.3 54.9 55.0
230.7 227.5 227.0 226.9
57.68 56.88 56.75 56.72
55.98 56.00 55.88 55.38
1.70 0.88 0.87 1.34

1.70 1.88 1.84 1.85 1.20

− 2.4 − 4.3 − 3.3
− 2.8 − 4.8 − 3.8
+ 1.7 + 0.0 + 0.8
− 1.4 − 2.5 − 2.0

0.87

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1884phae.proj.1763.

27° S

34.1 33.5 33.8 33.1 33.6
33.8 33.0 33.2 32.8 33.2
56.8 55.8 55.9 55.8 56.1
38.2 38.1 38.2 37.3 38.0
162.9 161.4 161.1 159.0
40.72 40.10 40.28 39.75

57° N

40.2 39.8 40.8 40.0 40.1 -6.6
36.1 36.1 36.0 36.1 36.2 2.9
57.8 57.7 56.1 57.4 58.1 1.7
40.4 40.1 40.9 40.0 40.4 2.4
173.7 175.8 173.5 174.8 174.8
43.42 40.72 40.55 43.38 43.55 43.70
2.70 40.10 39.75 39.75
3.61 3.130 4.20 3.95

57°

38.8 38.8 38.4 38.1 38.5
35.0 35.2 35.0 34.4 34.9
55.7 56.0 56.2 55.7 55.9
38.4 39.1 38.2 37.6 38.3
167.9 169.1 167.8 165.8
41.98 42.28 41.95 41.45

87°

44.7 45.8 44.4 44.7 43.9 6.2
39.0 39.4 38.9 39.0 38.8 4.1
56.8 57.7 56.7 56.9 56.1 0.9
40.5 41.9 40.0 40.1 39.9 2.2
184.8 180.0 180.87 178.7
46.20 45.00 45.158 44.68
41.98 42.20 41.95 41.45
4.22 2.72 3.23 3.22

87°

34.1 33.8 34.0 33.8 33.9
29.0 29.2 29.7 30.1 29.5
46.4 46.3 46.7 47.2 46.7
30.0 29.9 29.8 30.1 29.9
139.5 139.2 140.2 141.2
34.88 34.80 35.05 35.30

10?

40.3 40.2 40.5 39.8 40.8 -6.4
31.3 31.1 31.0 31.1 31.9 1.8
50.1 50.1 50.0 49.5 50.7 3.4
35.3 34.7 35.5 35.1 36.1 5.4
156.1 155.0 155.5 156.4 159.5
39.02 38.80 38.88 39.10 39.88
34.88 34.80 34.80 35.20 35.30
4.14 4.45 3.83 4.58

44
4.45
38.0
4.58
1700
+4.06 4.25

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87		4.37	+.19	+.49	+.13	+0.13	+.07
117		6.~~93~~	+1.56	+2.05	+1.80	+1.93	+2.43
147	✓	5.~~85~~	+1.43	+3.48	+1.54	+3.44	+1.45
177		3.97	-0.21	+3.27	-.27	+3.17	-.33
207	✓	4.~~85~~	+1.56	+4.83	+.61	+3.78	+0.55
237	5.13	4.81	+0.63	+5.46	+.57	+4.35	+.51
267		3.39	-.79	+4.67	-.85	+3.50	-.91
297		5.07	+.85	+5.56	+.83	+4.33	+.77
327		3.19	-.99	+4.57	-1.05	+3.28	-1.11
357	✓	~~2.67~~	-2.51	+1.57	-1.57	+1.71	-1.63
27		3.47	-.71	+.68	-.77	+1.54	-.83
57		3.~~34~~	-.84	.90	-.90	+.90	-.96

~~5020~~

~~4.18~~ 5.16

4.24 4.30

New Reading.

147°

37.2	37.7	38.1	37.2	37.6
26.9	27.1	27.3	27.2	27.1
45.9	46.2	46.1	46.1	46.1
36.1	36.0	36.2	35.3	35.9
146.1	~~146.0~~	147.7	145.8	
36.52	37.00	36.92	36.45	

1470

36.75

6.16

~~5.75~~

5.33

6.50

23.49

5.87

177°

	5.8				
45.5	~~46.1~~	45.2	45.0	45.8	-7.9
30.0	29.9	29.8	29.9	30.3	2.9
50.2	50.0	50.2	49.7	50.7	4.1
44.8	44.0	44.8	44.4	45.0	8.9
	170.7	170.0	169.0	171.8	
	42.68	42.50	42.25	42.95	
	36.52	~~37.00~~	36.92	36.45	
	6.16	5.50	5.33	6.50	

3675

5.75

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New Readings

20°

37.2	36.8	37.0	36.8	37.3	37.1
23.5	22.2	22.8	23.2	23.6	23.0
45.1	45.0	45.0	45.1	45.9	45.2
40.9	40.7	40.2	39.8	39.8	44.1
146.7	144.7	145.0	144.3	146.6	
36.68	36.18	36.25	36.08	36.65	

4.24
4.92
4.43
4.43
20.2
4.50

5.54
4.50

5.54
9.00
14.54
14.85

23°

40.1	40.3	41.0	41.1	40.3	40.2
25.1	25.8	25.5	27.0	26.1	25.6
53.1	53.1	52.3	54.2	53.0	52.9
45.4	45.2	44.9	46.1	44.9	45.1
163.7	164.4	162.7	168.4	164.3	
40.92	41.10	40.68	42.10	41.08	
36.68	36.18	36.25	36.18	36.65	
4.24	4.92	4.43	6.92	4.43	

35°

39.7	36.8	38.2	38.7	38.1	38.8	39.5	38.6
40.8	37.4	37.4	38.9	39.0	40.2	40.1	39.1
9.2	8.8	8.2	8.8	8.2	9.1	9.3	8.8
47.5	47.1	46.4	46.8	47.1	47.2	47.1	47.0
197.2	190.1	190.2	193.2	192.4	195.3	196.0	193.5
49.30	52.52	47.55	48.30	48.10	48.82	49.00	48.38
	47.52						

2.83
3.50
3.48
3.28
4.18
2.50
2.24
22.01
3.14

3.16

9.48
1.20
10.68
2.67
2.403
6.01

27°

42.3	42.9	43.6	43.5	45.4	44.5	43.8	43.8
42.4	43.7	44.5	43.8	45.0	44.1	43.9	43.9
7.9	8.4	9.0	9.0	10.4	8.2	8.8	8.8
48.8	49.2	50.0	49.2	51.2	49.2	49.5	49.0
201.4	204.2	207.1	205.5	212.0	206.0	205.0	204.5
50.35	51.05	51.78	51.38	53.00	51.50	51.25	51.13
47.52	47.55	48.30	48.10	48.82	48.20	47.90	48.18
2.83	3.50	3.48	3.28	4.18	3.30	3.35	2.95

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-3.1

2.6

7.7

4.7

44.9 -4.8

44.1 -4.8

+0.0

8.7 -2.5

49.2

2W62

5/3M

4930

2.24

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July 29 Nov 4 = 62.9

S.

87°

33.0	33.3	32.8	32.5	32.5	32.8	
29.4	28.9	28.5	29.4	28.3	28.9	
45.8	45.2	45.0	44.9	44.9	45.2	
27.9	28.1	27.2	27.8	27.8	27.8	
136.1	135.5	133.5	134.6	133.5		
34.02	33.88	33.38	33.65	33.38		

603
604
572
527
532
27.38
574

117°

40.2	41.1	40.0	40.0	40.0	39.9	-7.4	7.9
32.7	33.8	31.9	32.9	32.8	32.2	3.8	3.4
49.4	50.1	49.8	49.3	49.1	48.9	4.2	4.9
34.2	35.2	34.0	34.2	33.8	33.8	6.4	7.2
	160.2	155.7	156.4	155.7	154.8		
	40.05	38.92	39.10	38.92	38.70		
	33.02	33.88	33.38	33.65	33.38		
	6.03	5.04	5.72	5.27	5.32		

117°

30.8	30.8	30.8	31.2	31.4	28.7	29.9	30.8
23.0	23.0	22.7	22.9	23.7	21.1	22.2	22.9
40.2	40.3	40.1	40.6	41.1	38.2	39.9	40.4
25.1	25.1	24.9	25.7	24.7	23.1	24.7	25.0
119.1	119.2	118.5	120.4	120.9	111.1	116.7	
29.78	29.80	29.62	30.10	30.22	27.78	29.18	

540

645
668
5.68 6.18
598
606
805 5.45
7.90
6.39
6.91

147°

38.0	37.8	39.7	37.2	37.0	37.0	38.8	38.4	-7.2
29.0	28.9	30.8	28.0	28.2	28.3	29.9	29.1	6.1
45.7	44.4	47.1	44.9	45.0	45.5	47.0	46.0	5.3
34.5	33.8	36.3	33.1	34.1	34.3	35.3	34.8	9.5
	144.9	153.9	143.2	144.3	145.1	151.0	148.3	
	36.23	38.48	35.80	36.08	36.28	37.75	37.08	
	29.78	29.80	29.62	30.10	30.22	29.78	29.18	
	6.45	8.68	6.18	5.98	6.06	7.97	7.90	

35.80
29.62
6.18

147°

34.2	34.0	33.8	32.8	33.1	32.9	33.5
25.1	25.0	24.0	24.1	25.0	24.8	24.7
41.5	41.9	41.4	41.4	41.9	42.0	41.7
30.3	30.9	30.8	30.3	31.0	30.3	30.6
131.1	131.8	130.0	128.6	131.0	130.0	
32.78	32.95	32.50	32.15	32.75	32.50	

832
735
802
883
740
462
47 71
7.96

177°

43.6	44.3	43.2	43.7	43.9	43.0	43.8	-10.1
30.8	30.1	29.8	30.4	30.8	29.7	29.5	5.3
47.6	48.2	47.2	47.7	48.1	47.3	47.2	5.9
40.9	41.8	41.0	40.3	41.1	40.6	40.8	10.3
	164.4	161.2	162.1	163.9	160.6	161.3	
	41.10	40.30	40.52	40.98	40.15	40.32	
	32.78	32.95	32.50	32.15	32.75	32.50	
	8.32	7.35	8.02	8.83	7.40	7.82	

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177° S.

43.5 43.7 42.9 43.5 43.7 42.9 43.3 43.4 46.4 46.8
29.9 30.1 29.5 29.8 31.0 29.4 30.1 30.0 34.0 34.2
47.9 48.2 48.0 48.2 48.2 48.0 47.9 48.1 53.9 53.9
40.7 40.8 40.2 40.6 41.0 40.1 40.2 40.5 47.7 47.7
162.0 162.8 160.6 162.1 163.9 160.4 161.5 182.6
40.50 40.70 40.15 40.52 40.98 40.10 40.38 45.65

mean −7.6
5.15 3.6
4.68
5.30 4.6
5.00
4.94 6.8
5.70
5.27
36.44
6.21

207° N.

46.3 46.5 46.4 47.0 46.7 46.7 3.2
33.9 34.0 34.1 34.3 33.3 33.9 4.0
53.7 53.8 53.7 54.3 53.9 54.0
47.6 47.5 47.9 48.1 47.4 48.0 5.8
181.5 181.8 182.1 183.7 180.8 182.6 7.2
45.38 45.45 45.52 45.92 45.20 45.65
40.70 40.15 40.52 40.98 40.10 40.38
4.68 5.30 5.00 4.94 5.10 5.27

207°

39.2 39.0 38.8 39.3 38.8 39.0 43.9
26.5 26.3 26.2 25.2 26.1 25.3 25.9 30.8
46.3 46.4 45.8 46.2 46.5 46.9 46.4 53.0
40.5 40.4 40.0 40.4 40.8 41.0 40.5 46.6
152.5 152.1 151.0 150.6 152.7 152.0
38.12 38.02 37.75 37.65 38.18 38.00

6.88
5.98
6.05
6.13
5.74
5.68
36.46
6.08

237

44.7 43.8 43.5 43.7 44.1 43.8 −4.9
32.0 30.3 30.4 30.9 30.7 30.5 4.9
55.5 55.0 55.1 54.2 54.8 54.3 8.6
47.8 46.9 46.2 46.3 46.1 46.1 6.1
180.0 176.0 175.2 175.1 175.7 174.7
45.00 44.00 43.80 43.78 43.92 43.68
38.12 38.02 37.75 37.65 38.18 38.00
6.88 5.98 6.05 6.13 5.74 5.68

237°

32.4 32.9 33.4 32.3 34.1 33.0 33.2 33.2 35.3
20.6 21.1 21.0 21.3 21.7 19.9 20.1 20.8 23.2
45.1 45.0 44.8 45.2 45.4 43.9 44.4 44.8 51.9
36.3 36.3 36.3 36.9 36.7 35.4 35.0 36.1 44.0
1341 1358 1355 1356 1379 1322 1327 1318
33.60 33.82 33.88 33.90 34.48 33.05 33.18

6.10
5.18
4.52
4.20
5.07
4.73
5.32
4.92
4.60
5.62
4.00
5.01

1357
33.92

267°

36.2 36.2 34.5 34.9 36.7 34.0 34.9 35.0
24.4 23.3 23.3 23.2 24.2 21.3 23.1 22.4
53.1 52.3 51.9 51.4 53.1 50.8 51.8 51.0
45.1 44.2 43.9 43.0 45.2 42.2 44.2 44.0
1588 1560 1536 1525 1582 1483 1540 1524
39.70 39.00 38.40 38.12 39.80 37.08 38.50 38.10
33.60 33.62 33.88 33.92 34.48 33.05 33.18 33.18
6.10 5.18 4.52 4.20 5.07 4.43 5.32 4.92

2.1
2.4
7.1
7.9
4.2
5.8
3.2
4.2
5.2
4.5

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S

267°

25.4 25.8 25.0 25.2 25.5 25.8 25.4
13.2 13.9 13.1 13.7 14.1 14.8 13.8
42.2 42.9 41.5 42.2 42.4 42.7 42.3
34.1 34.3 33.3 33.9 33.9 34.2 34.0
114.9 116.9 112.9 115.0 115.9 117.5
28.72 29.22 28.22 28.75 28.98 29.38

694
449

N.

297°

29.0 29.5 29.0 28.9 28.5 28.8 29.1 -3.6
19.4 19.9 19.3 19.1 19.7 19.0 19.2 5.6
48.5 49.1 49.0 48.9 48.5 48.8 48.8 6.2
36.3 36.8 36.3 36.1 36.6 35.8 36.2 2.3
1353 1336 1330 1333 1324 1333
3382 3340 3325 3332 3310 3332
2872 2922 2822 2875 2898 2938
5.10 4.18 5.03 4.57 4.12 3.94

297°

39.0 38.8 39.1 39.0 34.4 34.1 34.7 34.5 -4.0
28.9 28.8 29.0 28.8 24.0 23.8 24.1 24.1 9.3
58.1 58.1 58.1 58.2 53.9 54.1 54.0 53.5 54.2 7.8
46.0 46.0 46.1 45.8 41.0 41.0 40.9 41.4 4.3
1717 1723 1718 1535 1529 1532 1542
4292 4308 4295 3838 3822 3830 3855

5132
6.4 51.62
6.45

327°

41.0 43.4 43.0 42.7 42.8 39.7 38.5 37.9 37.8 -4.0
38.2 38.9 38.2 38.0 37.8 35.0 34.0 33.2 33.8 9.6
6.9 6.1 5.4 5.2 2.5 1.3 0.0 0.3 7.4
51.2 50.2 49.5 49.9 46.8 47.7 45.9 45.1 45.4 4.6
2004 1975 1960 1957 1857 1797 1762 1773
50.10 49.38 49.00 48.92 46.28 44.92 44.05 44.32
42.92 43.08 42.95 42.95 38.38 38.22 38.30 38.55
7.18 6.30 6.05 5.97 7.90 6.70 5.75 5.77

327°

31.0 31.8 30.9 31.8 32.2 31.8 31.6
26.4 27.9 26.2 27.4 27.4 26.3 26.9
53.0 53.3 52.4 54.2 54.4 53.9 53.5
38.5 38.9 38.1 39.4 35.0 35.2 38.8
1489 1519 1476 1526 1530 1512
3722 3798 3690 3820 3825 3780

2644
441

357°

34.2 35.0 34.0 33.8 33.8 34.7 34.1 -2.6
33.7 34.2 33.2 33.3 33.1 34.6 34.0 6.8
0.2 1.4 0.4 0.0 59.7 0.2 59.7 6.7
40.3 41.1 40.2 40.1 39.5 41.1 41.0 1.5
1717 1678 1672 1661 1706 1678
42.92 41.95 41.80 41.52 42.65 41.95
37.22 37.98 36.90 38.20 38.25 37.80
5.70 3.97 4.90 3.32 4.40 4.15

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357°

45.4	45.0	45.6	45.2	45.4	45.3	
45.7	45.1	45.1	45.4	45.1	45.3	
11.2	11.0	10.8	11.1	11.0	11.0	
50.9	50.9	50.9	50.8	51.5	51.0	
2132	2120	2124	2125	2130		
53.30	53.00	53.10	53.12	53.25		

2.80 3.05 2.55 3.68 2.83 13.91 2.48

N

27°

49.7	50.0	49.7	49.4	49.8	49.5	-4.4	below Mean
49.1	49.3	48.6	48.8	49.1	49.5	3.8	4.8 4.3
11.4	11.9	11.6	11.1	11.2	11.3	0.4	0.3 0.4
53.6	54.2	53.3	53.3	53.1	54.0	2.6	2.5 2.7
2254	2254	2212	2226	2222	2243		
5635	5635	5530	5565	5555			
	56.35		5310	5312			
	5330						
	3.05		2.51	2.53			

4.08 5325 2.53

2232 55.80 53.12 2,68

repeated

357°

44.4	44.5	45.2	45.0	44.8	44.8	
44.3	44.9	44.4	45.2	45.0	44.7	
10.8	11.1	11.2	11.0	11.3	11.1	
50.3	50.4	50.9	51.8	50.6	50.8	
2098	2109	2117	2130	2117		
52.45	52.72	52.92	53.25	52.92		

-4.0 9.6 7.4 4.6 3.60 3.86 3.30 2.43 16.97 3.39 6.17

27°

50.0	50.1	50.4	50.0	49.7	49.9	-5.2	
49.5	49.9	49.7	49.8	48.8	49.1	4.8	
11.4	10.9	11.7	11.3	11.1	11.8	0.3	
53.6	53.3	53.7	53.8	53.1	54.0	2.8	
2242	2255	2249	2227	2248			
5605	5638	5622	5568	5620			
52.45	52.72	52.92	53.25	52.92			
3.60	3.66	3.30	2.43				

3.28

27°

34.0	33.8	34.0	34.0	33.9	33.8	33.9	
33.8	33.0	33.8	33.8	33.4	33.8	33.6	
56.0	55.0	56.2	56.3	56.0	56.0	55.9	
38.1	37.3	38.0	37.9	37.2	37.7	37.7	
1619	1591	1620	1620	1605	1613		
40.48	39.78	40.50	40.50	40.12	40.32		

5.64 6.84 5.32 5.62 6.40 5.86 35.68 5.95

42.8	42.9	43.1	42.2	43.0	42.7	42.9	-8.9
39.6	39.1	40.0	39.1	39.4	40.2	39.9	6.0
0.1	0.2	0.4	59.9	0.0	0.4	59.7	4.2
42.4	42.3	43.0	42.1	42.1	42.8	42.2	4.7
1845	1865	1833	1845	1861	1847		
46.12	46.62	45.82	46.12	46.52	46.18		
40.48	39.78	40.50	40.50	40.12	40.32		
5.64	6.84	5.32	5.62	6.40	5.86		

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57° S.

87° N.

	36.8	36.9	36.9	38.0	37.2	36.8	37.1	45.1	45.8	44.9	45.1	44.9	45.0	44.8
	32.9	33.4	34.1	33.2	33.6	33.6	33.4	40.4	40.1	41.1	40.2	40.5	40.1	40.2
6.10														
5.72	53.9	54.1	53.8	53.7	54.1	54.2	54.0	57.2	57.3	57.5	57.8	57.0	57.2	56.5
552														
547	36.2	36.7	36.7	35.7	36.4	36.0	36.3	40.2	41.0	40.5	40.5	40.1	39.9	39.4
507	159.8	161.1	161.5	160.6	161.3	160.5	6	184.2	184.0	183.6	182.5		182.2	180.9
520	39.95	40.28	40.38	40.15	40.32	40.15		46.05	46.00	45.90	45.62		45.50	45.22
3308								39.95	40.28	40.38	40.15		40.32	40.15
3.51								6.10	5.72	5.52	5.47		5.18	5.07

87° N.

117°

	31.1	31.2	30.9	30.1	30.8	38.7	38.8	38.4	38.7	39.0		7.9
	26.3	26.9	26.6	26.2	26.5	29.9	29.9	29.2	30.1	30.3		3.4
585	43.2	43.1	43.0	42.4	42.9	47.8	48.1	47.3	47.8	48.1		4.9
5.06												
573	26.2	26.1	26.1	25.3	25.9	33.1	33.4	32.6	33.3	33.0		7.2
660	1268	1273	1266	1240			150.2	147.5	149.9	150.4		
23334	31.70	31.82	31.65	31.0			37.55	36.88	37.48	37.60		
5.84							31.70	31.82	31.65	31.00		
5.54							5.85	5.06	5.83	6.60		
45												
42												
126												

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					26 Aug 29 Σ	Σ	Δ Mean
-8.0	87	5.66	+.10	+.10	+.13		+0.11
7.0	117	6.97	+1.41	+1.51	+1.93		+1.72
3.2		7.96	+2.40	+3.91	+3.44		+3.67
3.9	637	5.21	-.35	+3.56	+3.17		+3.36
		6.08	+.52	+4.08	+3.78		+3.93
		5.01	-.55	+3.53	+4.35		+3.94
		4.49	-1.07	+2.46	+3.50		+2.98
		6.41	+.85	+3.31	+4.33		+3.82
		4.41	-1.15	+2.16	+3.28		+2.72
		3.08	-2.48	-0.32	+1.71		+0.70
		5.95	+.39	+0.07	+.94		+0.50
		5.51	-.05	+0.0	+.00		+0 0
		6.674					
		5.56					

147°

36.0	36.8	37.1
26.2	26.9	27.2
45.1	45.8	45.4
33.9	34.2	33.8
1412	1437	1435
35.30	35.92	35.88

177°

47.1	46.9	48.0
33.2	33.2	34.2
52.4	52.9	52.7
46.1	45.8	46.0
1788	1788	1809
44.70	44.70	45.22
35.30	35.92	35.88
9.40	8.78	9.34

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July 30 No 4 = ~~62~~ 72

87°

39.9 40.1 40.4 40.1 40.1 40.0 40.3
36.8 37.1 37.2 37.1 36.3 37.1 36.8
50.1 50.9 51.5 50.8 50.6 57.2 51.1
34.8 34.7 35.2 34.9 34.5 35.3 34.7
161.6 162.8 164.3 162.9 161.5 163.6 162.9
40.40 40.70 41.08 40.72 40.38 40.90 40.72

117°

47.4 46.4 46.8 47.9 47.2 42.1 74 −7.077
40.1 39.9 40.1 40.1 40.3 35.9 28 3.2 3.1
55.7 55.3 55.2 55.8 55.1 55.0 42 4.1 4.8
41.1 40.7 40.8 40.7 41.8 41.1 69 6.170
184.3 182.3 182.7 184.3 184.4 183.1
46.08 45.58 45.68 46.08 46.10 45.78
4040 4070 4108 4032 4038 4081
5.68 4.88 4.60 5.10 5.72

from bottom of page

p 91
Mean
ε −7.4
ζ 3.0
η 4.5
H 6.7

1843
4608
4072
5.36

147°

repeated

41.4 42.1 42.8 42.2 42.6 43.4 42.0 42.1
34.2 35.1 35.4 35.3 35.3 35.5 34.9 35.0
48.8 49.9 50.6 50.0 50.4 51.4 50.0 50.2
36.1 36.9 37.1 36.9 37.0 37.8 37.0 37.1
1605 1640 1659 1644 1653 1681 1639 1644
40.12 41.00 41.48 41.10 41.32 42.02 40.98 41.10

147°

51.1 50.4 50.6 52.0 51.8 52.0 51.6 49.8 47.3
43.1 43.1 43.4 44.2 43.6 44.4 44.1 40.7 39.2
58.0 57.9 57.8 59.2 58.7 58.8 59.0 58.1 53.9
47.9 47.8 47.5 48.3 47.9 49.1 48.3 44.0 44.0
2001 1992 1993 2037 2020 2043 2030 1995 1946
5002 4980 4982 5092 5050 5108 5075 4988 4865
41.12 41.00 41.48 41.10 41.32 42.02 41.04 39.90 39.53
9.90 8.80 8.34 9.82 9.18 9.06 9.71 8.55

repeated

p 91
Explicit
ε −7.9 8.5 −9.1 −8.2
ζ 6.5 8.0 8.7 7.7
η 6.7 6.9 8.3 7.3
H 11.0 10.8 11.1 11.0

147°

41.3 41.6 42.1 42.0 42.4 41.9
33.0 33.4 34.9 33.6 34.4 33.9
48.4 48.8 49.4 49.5 49.3 49.1
38.8 39.1 39.3 39.1 39.1 39.1
1618.5 1629 1657 1644 1652
40.38 40.72 41.42 41.10 41.30

177

53.0 53.8 52.2 52.0 52.3 −10.3 −10.1 Mean −10.2
39.9 40.2 41.6 39.7 39.8 40.1 6.0 5.1 5.6
55.6 56.7 57.7 56.0 55.6 55.3 6.5 6.3 6.4
49.8 52.0 54.2 49.8 49.9 49.8 10.7 11.3 11.0
1977 1973 1975
49.42 49.32 49.38
4142 4110 4130
10.36 8.00 8.22 8.08

repeated

27.0 26.8 27.2 26.8 27.2 27.0
24.4 23.8 24.9 24.7 24.1 24.4
38.0 37.2 38.2 38.8 37.9 38.0
21.9 21.4 22.0 22.2 22.1 21.9
1092 1123 1125 1123
28.30 28.08 28.12 28.08
27.30

117

34.4 34.9 34.3 34.1 34.2 −7.4
27.2 27.1 27.2 27.3 27.0 2.8
42.2 42.2 42.4 42.0 42.1 4.2
28.8 28.9 28.8 29.0 28.3 6.9
1331 1327 1324 1316
33.28 33.18 33.10 32.90
2830 2808 2812 2808
5.10 4.98 4.82

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S.

177°

	30.2	31.2	31.0	31.0	30.8
673	17.2	18.2	18.2	17.9	17.9
554					
540	33.0	34.1	34.1	33.8	33.8
498	28.1	28.8	27.9	27.2	28.2
2265	108.5	112.3	111.2	110.9	
566	27.12	28.08	27.80	27.72	

N.

207°

347	35.0	34.8	34.9	34.0	3.9
224	23.4	22.7	22.0	21.4	4.5
404	40.8	40.9	40.0	40.0	6.6
359	36.2	36.1	35.9	35.4	7.7
	1352	1345	1328	1308	
	33.85	33.62	33.20	32.70	
	27.12	27.08	27.80	27.72	
	673	554	540	498	

207°

	31.2	31.1	31.0	30.6	30.7	30.9
588	19.1	18.9	19.0	18.3	18.8	18.8
553						
572	36.2	37.0	36.3	36.0	36.4	36.4
623	32.7	32.8	32.0	31.5	31.5	32.1
478	1192	1198	1183	1164	1174	
548	29.80	29.95	29.58	29.10	29.35	

237°

355	37.0	35.0	35.4	35.8	35.8	35.3	4.6
232	24.9	23.5	22.6	23.9	23.2	23.0	4.4
452	46.8	45.2	45.0	45.4	45.2	45.4	8.8
383	39.8	38.2	38.2	38.8	38.1	38.2	6.2
	1485	1479	1412	1429	1423	1419	
	37.12	3548	3530	3572	3558	3548	
	29.80	29.95	29.58	29.10	29.35	29.80	
	7.312	5.53	5.72	6.82	6.23	5.68	

1439
35.98
29.10
6.88

237°

	29.0	29.5	30.0	29.2	29.8	29.5
	17.2	17.4	18.0	17.1	18.2	17.6
576						
483	38.9	39.1	40.1	39.3	40.3	39.5
400						
566	32.2	32.2	33.6	31.7	32.5	32.3
438	1173	1182	1211	1173	1208	
2463	29.32	29.55	30.28	29.32	30.20	
490						
493						

267°

312	32.0	31.0	31.0	31.2	31.0	1.7	
202	20.6	19.8	19.9	20.8	20.0	2.6	
470	47.0	46.8	46.8	47.1	47.2	7.5	
402	40.7	39.9	39.4	40.8	40.1	7.9	
	1403	1375	1371	1399	1383		
	35.08	34.38	34.28	34.98	34.58		
	29.32	29.55	30.28	29.32	30.20		
	5.76	4.83	4.00	5.66	4.38		

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$\eta_{04} = 62.^2$

S

267°

30.1	30.3	30.8	30.9	31.9	30.1	30.9	30.6	33.2	
19.9	19.9	20.1	19.9	19.9	19.8	19.8	19.9	23.4	
45.9	46.1	46.0	46.8	46.0	46.2	46.2	46.2	51.2	
39.2	39.2	39.4	39.5	39.4	39.3	39.0	39.3	40.4	
1357	1355	1363	1371	1362	1357	1359			
33.78	33.88	34.08	34.28	34.05	33.85	33.98			

3.22
3.00
2.57
2.84
3.03
3.70
3.07
43
8.06

N

297°

33.2	33.0	32.7	33.3	33.4	33.7	33.2	2.6		
23.3	23.1	23.0	23.3	23.6	23.9	23.3	3.5		
57.1	57.2	50.9	57.4	57.2	57.5	57.4	5.0		
40.4	40.2	40.0	40.5	40.1	41.1	40.3	1.1		
1480	1475	1466	1485	1483	1502	1482			
37.00	36.88	36.65	37.12	37.08	37.55	37.05			
33.78	33.88	34.08	34.28	34.05	33.85	33.98			
3.22	3.00	2.57	2.84	3.03	3.70	3.07			

297°

33.8	33.4	33.9	33.8	34.1	33.8	37.2	37.4		
23.8	23.9	24.1	24.8	24.1	24.1	33.0	33.0		
51.0	51.1	51.8	51.6	52.0	51.5	57.8	57.5		
40.4	40.2	40.8	40.8	40.8	40.6	44.6	44.9		
1490	1486	1506	1510	1510		1728			
37.25	37.15	37.65	37.75	37.75		43.20			
						37.25			
						5.95			

5.95
5.90
4.87
5.93
5.50
28.15
5.63

327°

37.2	36.8	37.4	37.4	-3.4					
32.8	32.0	34.1	33.0	8.9					
58.0	57.4	58.2	57.8	6.3					
44.2	43.9	45.0	44.8	4.0					
1722	1701	1747	1730						
43.05	42.52	43.68	43.25						
37.15	37.65	37.75	37.75						
5.90	4.87	5.93	5.70						

327°

27.2	28.2	28.0	27.8						
23.1	23.7	24.4	23.7						
48.7	48.8	48.5	48.7						
34.2	35.7	35.4	35.3						
1337	1364	1363							
33.42	34.10	34.08							

4.78
3.65
4.27
.70
4.23

357°

30.5	30.5	30.4	30.7	-2.7					
30.3	30.4	30.0	30.6	6.6					
54.7	54.9	54.2	55.1	6.0					
36.8	37.0	36.4	37.0	1.3					
1528	1510	1534							
38.20	37.75	38.35							
33.42	34.10	34.08							
4.78	3.65	4.27							

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S.

35.4°

	46.8	47.0	46.9	46.5	46.8	45.8	46.6
268	46.7	46.4	46.0	46.2	46.7	45.9	46.3
233	11.4	11.2	11.2	11.3	11.1	10.4	11.1
236	52.3	52.4	52.0	52.0	52.2	51.4	52.0
3.05	2172	2170	2161	2160	2168	2135	
2.02	54.30	54.25	54.02	54.00	54.20	53.38	
2.90							
3.34							
2.56							

N.

27°

	50.8	50.4	50.0	50.9	52.3	50.1	-3.8
	37.2	49.9	50.0	50.6	50.0	49.9	3.8
	11.9	11.1	10.8	11.7	10.5	10.6	0.0
	55.0	54.9	54.7	55.0	54.1	54.5	2.7
	2279	2263	2255	2282	2249	2257	
	56.98	56.58	56.36	57.05	56.22	56.28	
	54.30	54.25	54.02	54.00	54.20	53.38	
	2.68	2.33	2.36	3.05	2.02	2.90	

27°

	25.0	25.0	24.9	24.5	24.7	24.7	24.5
5.57 63	24.8	25.1	24.7	24.8	24.9	25.0	24.6
5.34	45.0	45.2	45.3	45.1	45.1	45.2	44.8
4.95							
5.00	29.0	29.0	28.9	29.1	28.7	28.5	28.1
4.52	1238	1243	1238	1235	1235	1234	1220
4.17	30.95	31.08	30.95	30.88	30.88	30.85	30.50
4.62							
3.417							
4.88							

57°

	33.2	33.5	32.8	32.7	32.2	32.0	
	41.2	30.4	29.8	30.0	29.5	29.4	29.7
	49.1	48.4	48.1	48.2	47.4	47.0	47.3
	32.8	33.4	32.9	32.5	32.0	31.5	31.5
	4613	1457	1436	1435	1416	1401	1405
	36528	3642	3590	3588	3540	3502	3512
	30.95	31.08	30.95	30.88	30.88	30.85	30.50
	5.57 63	5.24	4.95	5.00	4.52	4.17	4.62

57°

	36.0	35.9	34.9	35.6
5.12	33.0	32.4	32.8	32.7
5.04				
5.15	51.0	51.9	51.1	51.3
3.1				
5.10	35.2	35.3	34.8	35.1
	1552	1555	1536	
	38.80	38.88	38.40	

87°

43.1	43.2	43.2	42.9	-7.5
39.2	39.4	39.4	38.8	6.5
54.1	54.1	54.1	54.1	2.8
38.8	39.0	39.0	38.4	3.7
	1757	1757	1742	
	43.92	43.92	43.55	
	38.80	38.88	38.40	
	5.12	5.04	5.15	

ε -7.9
ζ 5.2
η 2.8
H 3.6

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S. 87°

5.98	44.4	44.1	44.7	44.4	44.1	43.9	44.3
5.80	41.1	40.7	41.0	41.0	41.0	41.1	41.0
5.38							
5.97	55.0	55.1	55.0	54.6	55.1	55.0	55.0
5.28	39.9	39.4	39.8	39.0	39.4	39.9	39.6
5.30	1804	1793	1805	1790	1796	1799	
391	45.10	44.82	45.12	44.75	44.90	44.98	
5.65							
5.10							
5.37							

N. 117°

52.0	52.7	52.0	52.0	52.2	51.1	51.8	-7.7
44.1	44.2	44.1	44.1	44.3	44.1	43.8	3.1
59.8	0.2	0.0	59.9	59.7	59.3	59.4	4.8
46.6	47.2	46.4	46.8	46.7	46.2	46.1	7.0
	2043	2025	2028	2029	2007	2021	
	51.08	50.62	50.70	50.72	50.18	50.28	
	45.70	44.82	45.12	44.75	44.90	44.98	
	5.98	5.70	5.18	5.97	5.28	5.30	

117°

9.08	28.7	29.0	29.1	29.0	29.2	29.4	29.1
8.10	20.3	21.2	21.4	21.1	21.2	21.1	21.0
7.82	36.8	36.8	37.2	37.0	37.2	37.7	37.1
7.96	23.0	23.9	23.4	23.4	23.4	23.2	23.4
7.67	1088	1109	1111	1105	1110	1114	
7.50	27.20	27.72	27.78	27.62	27.75	27.85	
4808					27.75		
801							
9.17							
19.16							
8.54							

147°

37.0	37.8	37.4	36.9	36.9	36.4	36.5	-7.9
27.5	28.1	27.2	27.1	27.5	27.9	27.1	-6.5
43.8	44.2	44.1	43.4	44.0	43.4	43.6	6.7
34.4	35.0	34.6	35.0	33.9	34.0	34.0	11.0
	1451	1433	1424	1423	1417	1412	-3
	36.28	35.82	35.60	35.58	35.42	35.05	
	27.20	27.72	27.78	27.62	27.75	27.85	
	9.08	8.10	7.82	7.96	7.67	7.50	

147°

34.4	33.8	34.0	34.4	35.1	34.7	34.7	34.4
9.05	25.1	25.8	26.0	25.9	26.1	25.8	25.8
8.62	40.4	41.0	41.3	41.0	41.0	41.5	41.4
7.85	30.9	31.2	30.9	31.5	31.8	31.8	31.3
7.57	1302	1320	1326	1345	1346	1338	
7.90	32.55	33.00	33.15	33.62	33.65	33.45	
4892							
8.125							
8.10							
8.11							

177°

44.5	44.4	45.0	44.3	45.0	44.5	44.0	-1.0
30.9	31.0	30.5	30.4	31.4	30.8	31.2	5.1
41.4	41.9	48.1	47.3	47.5	47.5	47.0	6.3
31.3	43.1	42.9	42.0	43.1	42.1	42.4	11.3
	1664	1665	1640	1670	1649	1646	
	4160	4162	4100	4175	4122	4115	
	32.55	33.02	33.15	33.62	33.25	33.41	
	9.05	8.62	7.85	8.13	7.57	7.70	

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	July 30		Σ	July 29	July 30	July 28		Mean
87	5.34	+.04	+.04	5.66	5.37	4.37		5.13
117	8.59	+3.26	+3.30	6.97	8.59	6.73		7.43
147	8.11	+2.78	+6.08	7.96	8.11	5.75		7.27
177	5.66	+.33	+6.41	5.21	5.66	3.97		4.95
207	5.82	+.47	+6.88	6.08	5.80	4.85		5.58
237	4.93	-.40	+6.48	5.01	4.93	4.81		4.92
267	3.06	-2.27	+4.21	4.49	3.06	3.39		3.65
297	5.63	+.30	+4.51	6.41	5.63	5.07		5.70
327	4.23	-1.10	+3.41	4.41	4.23	3.19		3.94
357	2.56	-2.77	+.64	3.08	2.56	2.67		2.77
27	4.89	+.44	+2.0	5.95	4.89	3.47		4.77
57	5.10	-.23	+.00	5.51	5.10	3.34		4.65
	63.93			66.74				
	5.33							

+1.00 11

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Aug 28	29	30	31	Aug 1	Mean	Mean	
+0.7	+1.0	+0.04	[illegible]	−1.22	−.36 −.36	+.07	+.07
+2.43	+1.41	+3.26	+2.55 +1.74	+1.54	+2.24 +1.85	+2.37	+2.14
+1.45	+2.40	+4.78	+2.25	+1.08	+1.99 +3.87	+2.21	+4.65
−0.36	−0.31	+.33	−.68	−.91	−.39 +3.48	−.12	+4.53
+0.55	+0.52	+.47	−.26	+.57	+.36 +3.84	+.51	+5.04
+0.51	−0.55	−.40	−.31	+.35	−.08 +3.76	−.15	+4.89
−0.51	−1.07	−2.27	−1.03	−.33	−1.12 +2.64	−1.42	+3.47
+0.77	+.81	+.30	+.73	+1.34	+.50 +3.14	+.64	+4.11
−1.11	−1.15	−1.10	−1.08	−.65	−1.02 +2.12	−1.12	+2.99
−1.63	−2.48	−2.77	−1.46	−1.75	−2.02 +.10	−2.29	+.70
−.83	+0.39	−.44	+.69	−.15	−.07 +.33	−.29	+.41
−.96	−0.05	−.23	−.56	+.17	−.33 +.00	−.41	+.00

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117°

	32.8	33.0	32.4	33.1	33.8	32.9	33.0	42.8	42.7	43.3	42.4	42.9	42.8	42.5	-9.8	-85
7.86	28.9	29.7	29.0	29.2	29.5	29.7	29.3	34.5	35.1	34.9	35.0	34.2	34.0	34.0	5.2	40
788	43.7	43.9	43.5	43.7	44.2	43.8	43.8	60.1	50.0	50.1	50.0	50.2	50.0	50.1	6.3	51
820																
767	27.1	26.6	26.7	26.8	27.1	27.0	26.8	36.3	36.1	36.4	37.0	35.7	35.6	36.9	9.5	76
6.95	131.5	133.2	131.6	132.3	134.6	133.4		163.9	164.7	164.4	163.0	162.4	163.5			
7.58 3	32.88	33.30	32.90	33.01	33.65	33.35		40.98	41.18	41.10	40.75	40.60	40.88			
4.50	1325				6			8	3330	3290	3308	3335	3335			
7.75	33.12							33.12	7.88	8.20	7.67	6.95	7.03			
								7.86								

117°

	39.1	40.0	39.4	39.5	40.1	40.1	39.7	50.2	50.8	50.1	50.2	51.3	50.0	50.0	-10.5	100 102
1130	31.0	30.9	30.8	31.0	31.5	31.8	31.2	40.9	41.1	41.1	41.0	41.8	40.0	40.3	9.7	78 88
10.87	46.7	47.0	47.0	47.8	47.2	47.1	47.1	56.4	56.3	56.4	56.6	57.3	55.6	56.0	9.3	87 90
11.16																
11.53	32.2	32.3	32.5	33.1	33.0	33.2	32.7	46.1	46.0	46.1	46.5	47.1	45.0	45.8	13.4	134 134
970	1490	1502	1497	1514	1518	1522		1942	1937	1943	1975	1906	1921			
4.97	37.25	37.55	37.42	37.85	37.95	38.05		4855	4842	4858	4938	4765	4802			
6453								37.25	37.55	37.42	37.85	37.55	38.05			
10.75								11.30	10.87	11.16	11.53	9.70	9.97			

147°

	31.10	30.0	31.9	32.0	32.1	32.1	32.9	32.2	45.7	44.4	45.3	45.0	45.8	45.3	45.1	45.2	-13.1	116
1053	22.0	24.0	23.1	22.3	22.9	24.1	23.1	23.1	30.5	30.8	30.2	30.2	30.5	30.2	30.2	30.1	7.1	62
11.77																		
1082	36.5	35.9	38.2	38.1	38.0	38.9	38.9	38.4	47.4	47.0	47.3	46.9	48.1	47.1	47.3	47.1	8.9	96
1027																		
10.17	27.1	26.1	27.7	27.1	27.8	27.9	28.1	27.7	42.5	41.2	41.5	40.9	42.2	41.5	41.5	41.3	13.8	124
356	1166	1137	1209	1195	1208	1230	1230		1664	1634	1660	1630	1662	1641	1641	1637		
10.71	29.15	28.42	30.22	29.88	30.20	30.75	30.75		4160	4185	4075	4165	4102		4102	4092		
									29.15	28.42	30.22	29.88	30.20		8075	30.75		
									12.25	13.43	10.53	11.77	10.82		1027	10.17		

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177°

	42.3	42.9	42.9	42.5	43.4	42.8
mean						
7.50	28.2	28.2	29.1	28.4	28.9	28.6
7.07 -.92						
6.74 .46	44.7	45.0	45.5	45.2	46.0	45.3
7.56						
6.83 .57	39.2	39.4	39.2	39.6	39.4	39.4
7.0 .86	154.9	1555	1567	1557	1577	
7.14	38.60	38.88	39.18	38.92	39.42	

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207°

	48.2	48.1	47.8	48.1	48.7	48.4	48.4
	34.3	34.1	34.2	34.1	34.8	34.1	34.4
	53.1	53.2	52.8	52.8	53.3	53.3	53.1
	49.0	49.0	49.0	48.7	49.1	49.2	49.0
		1844	1838	1837	1859	1850	
		46.10	45.95	45.92	46.48	46.25	
		3560	3888	3918	3892	3942	
		7.50	7.07	6.74	7.56	6.53	

p99 mean

5.4 5.1
5.7 5.3
7.8 8.2
9.6 9.9

mean
E 5.2
H 5.5
9 8.0
H 9.8

207°

	29.4	29.4	28.0	28.9
687	15.1	16.0	14.8	15.3
630				
748	33.6	34.1	33.0	33.6
2.65	29.4	30.1	28.3	29.3
6.88	107.5	1096	1041	
	26.88	27.40	26.02	

237°

34.7	34.8	34.8	34.4	-5.8	-6.8	-6.3
19.9	19.9	20.0	19.7	4.6	6.1	5.4
43.2	43.3	43.1	43.1	9.6	10.9	10.2
36.9	37.0	36.9	36.8	7.6	9.1	8.4
	1350	1348	1340			
	33.75	33.70	33.50			
	2688	2740	2602			
	6.87	6.30	7.48			

p99 mean

237°

new setting

mean									
12.8	36.0	35.9	34.9	26.9	26.4	26.1	25.8	25.9	26.4
5.05 6.6	22.1	21.2	21.1	12.1	11.8	12.0	11.8	11.4	11.8
5.57									
5.62 8.4	45.0	44.4	44.4	35.8	35.4	35.1	35.0	36.0	35.5
7.17									
7.08 13.1	38.7	38.0	37.1	27.8	28.0	27.1	26.7	27.3	27.4
7.90	1418	1395	1375	1026	1016	1003	993	1006	1620
7.68	35.45	34.88	34.38	25.65	25.40	25.08	24.82	25.15	40.50
753									35.45
7.85									5.05
321									
7.53									

267°

new

38.0	38.2	37.5	30.6	30.9	30.3	30.8	30.8	30.1
24.5	24.1	24.4	17.3	17.2	16.9	17.4	17.6	17.2
53.5	53.0	52.9	45.2	45.1	45.0	45.3	45.3	45.0
46.0	46.5	46.0	37.8	38.1	37.7	38.2	38.0	37.7
1620	1618	1608		1313	1299	1319	1317	1294
40.50	40.45	40.20		32.82	32.48	32.98	32.92	32.35
35.45	34.88	34.38		25.65	25.40	25.08	25.24	
5.05	5.57	5.82		7.17	7.08	7.90	7.68	

267°

30.8	
17.8	
45.1	
37.9	
1316	
32.90	
25.24	

E. 4.2
T. 5.5
9. 9.7
H. 10.4

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267°

	22.4	22.2	22.0	22.2
773				
654	9.0	9.0	9.1	9.0
667	37.0	36.9	37.1	37.0
244				
6.81	30.1	29.8	29.8	29.6
	985	979	970	
	2462	2448	2425	

N.

297°

28.6	29.0	28.4	28.2	−6.4	
16.7	17.1	16.1	16.0	7.7	
45.7	46.3	45.5	45.3	8.7	
34.4	35.0	34.1	34.2	4.8	
	1274	1241	1237		
	3185	3102	3092		
	2462	2448	2425		
	223	6.54	6.67		

297°

	33.2	33.8	33.7	33.5
885				
813	21.2	22.2	22.8	22.1
872	52.0	50.5	51.2	50.6
170				
8.57	39.4	39.3	39.1	39.3
	1438	1458	1468	
	35.95	36.45	367°	

327°

39.5	40.0	39.2	39.4	−6.0	
32.7	33.1	32.5	32.5	10.6	
39.5	59.5	59.8	59.1	8.9	
46.7	46.6	46.8	46.7	7.4	
	1792	1783	1777		
	4480	4458	4442		
	3595	3645	3670		
	8.85	8.13	8.72		

327°

	20.2	19.7	20.0	20.0	19.8	19.9
7.37	13.9	13.8	14.2	14.0	14.1	14.0
704	39.9	39.5	40.3	40.1	40.0	40.0
670						
673	27.0	26.9	26.5	26.8	26.4	26.7
670	1010	999	1010	1009	1003	
454	25.25	24.98	2525	25.22	2508	
6.7						

357°

25.0	25.0	25.0	25.1	24.9	24.8	−5.1	
22.8	22.5	22.8	23.0	23.0	22.5	8.8	
49.2	49.9	49.1	49.1	49.0	49.0	9.2	
31.1	32.0	31.2	30.6	30.9	30.8	4.4	
	1294	1281	1278	1278	1241		
	3235	3202	3195	3195	3178		
	2498	2498	2525	2522	2508		
	7.37	7.04	6.70	6.73	6.70		

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357°

	27.0	27.0	26.7	26.9
6.47	24.2	24.9	25.1	24.7
6.53				
6.15	57.1	57.0	57.0	57.0
6.38	32.4	32.9	32.0	32.4
	1347	1358	1348	
	33.68	33.95	33.70	

N.
27°

34.5	34.4	34.8	34.3	-7.6
32.2	32.1	32.2	32.3	7.5
55.1	54.9	55.8	54.5	4.1
38.9	39.2	39.1	38.3	6.5
	1606	1619	1594	
	4015	4048	3985	
	3368	3395	3370	
	6.47	6.53	6.15	

27°

8.45			new setting			
8.75	30.8	30.4	15.0	15.2	16.0	15.4
8.28	28.2	29.4	15.0	15.3	15.4	15.2
8.53	51.3	51.1	41.3	41.1	41.9	41.4
	34.1	34.2	23.5	23.8	23.1	23.5
	1444	1451	948	954	964	
	36.10	36.28	23.70	23.85	24.10	

57°

26.9	26.9	26.9	27.0	-11.5
24.7	24.2	24.9	25.1	9.5
48.0	48.1	48.8	48.0	6.6
29.7	30.0	29.8	29.4	6.2
	1302	1304	1295	
	3255	3260	3238	
	23.70	23.85	24.10	
	8.55	8.75	8.28	

57°

	37.4	38.4	39.0	39.9	39.3	39.7	39.0
8.17	35.2	35.9	35.4	37.1	37.1	36.9	36.3
7.10							
6.90	58.2	58.8	58.7	59.0	58.7	58.9	58.7
6.23	39.9	40.1	40.0	40.1	39.9	40.1	40.0
7.83	1907	1732	1737	1761	1750	1756	
7.48	42.68	43.30	43.28	44.02	43.75	43.90	
1.71							
7.28							

57°

49.1	48.8	48.7	48.2	48.4	50.5	49.9	-10.1
45.3	45.2	45.0	44.7	45.1	45.8	46.1	9.0
3.2	3.4	2.9	3.0	2.4	4.0	3.5	4.5
45.5	46.0	45.0	44.8	45.1	46.0	46.0	5.5
	2034	2016	2007	2010	2063	2055	
	50.85	50.40	50.18	50.25	51.58	51.38	
	42.68	43.30	43.28	44.02	43.75	43.90	
	8.17	7.10	6.90	6.23	7.83	7.48	

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July 31 2nd

			Mean	O		
87°	7.75	6.31	7.03	−.81	−81	
117	10.75	10.03	10.39	+2.53	+1.74	
147	10.71	9.47	10.09	+2.25	+3.99	+2.25
177	7.14	7.18	7.16	−.68	+3.31	+1.57
207	6.88	8.29	7.58	−.26	+3.05	+1.31
237	7.53		7.53	−.31	+2.74	+1.00
267	6.81		6.81	−1.03	+1.71	−.03
297	8.57		8.57	+.73	+2.44	+.70
327	6.76		6.76	−1.08	+1.36	−.38
357	6.38		6.38	−1.46	−.10	−1.84
27	8.53		8.53	+.69	+.29	−1.18
57°	7.28		7.26	−.56	+.03	−.62
			94.11			
			7.84			

−14.3
+0.31

87°

25.0 25.3 25.1 25.2 25.7 25.0 25.2

6.58 20.1 20.4 20.9 21.1 21.9 21.0 20.9
6.16
5.95 38.0 39.8 38.0 38.1 38.2 37.8 38.0
6.56
5.88 20.5 21.0 20.8 20.5 21.0 20.2 20.7
6.75 1036 1045 1048 1049 1068 1040
1.88 2590 2612 2620 2622 2670 2600
6.31

117°

337 33.8 33.3 33.4 34.0 33.7 33.8 .85

24.9 25.0 24.8 24.0 25.2 25.2 25.2 .40

43.1 43.1 43.1 42.5 43.4 43.0 43.8 .51

28.3 28.0 27.9 28.7 28.5 28.4 28.2 .76
1299 1291 1286 1318 1303 1310
3248 3228 3215 3278 3258 3275
2590 2612 2620 2622 2670 2600
6.58 6.16 5.95 6.56 5.88 6.75

117°

10.38 26.8 26.9 26.8
9.88 18.0 18.3 18.2
9.83 35.9 35.8 35.8
21.0 21.1 21.0
3009 1017 1021
10.03 2542 2552

147°

36.8 37.1 36.9 36.4 −10.0
26.0 26.4 26.1 25.5 −7.8
44.5 44.8 44.2 44.4 8.7
34.4 34.9 34.4 33.9 13.4
0
1432 1416 1402
3580 3540 3580
2542 2552 2547
10.38 9.88 9.83

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147°

1005	19.0	18.8	19.9	19.2
967	8.9	7.8	9.9	8.9
8.70				
2842	27.1	27.1	27.9	27.4
9.47	168	165	17.4	16.9
	718	702	751	
	1795	17.55	18.78	

177°

30.8	31.0	30.8	30.7	−11.6
15.1	16.1	14.2	15.1	6.2
35.0	35.1	35.0	35.0	7.6
29.3	29.8	28.9	29.1	12.4
	1120	1089	1099	
	2800	2722	2748	
	17.95	17.55	18.78	
	10.05	9.67	8.70	

177°

748	32.2	31.8	32.0	32.0
837 12	16.9	16.5	17.1	16.8
6.70	36.0	35.8	35.7	35.8
.55	30.2	29.9 4	29.3	29.8
7.18	1153	1180	1174	
	28.82	28.150	28.52	

207°

37.1	37.5	37.0	36.8	−5.1
22.1	22.9	22.0	21.4	5.3
44.0	44.8	43.7	43.4	8.2
39.7	40.0	39.8	39.3	9.9
	1452	1425	1409	
	3630	3562	3522	
	28.12	28.150	28.52	
	7.48	7.37	6.70	
		7.12		

207°

	26.1	26.3	26.4	26.4	26.5	26.4
440	10.7	12.2	12.2	12.4	12.0	11.9
728	32.5	33.4	33.1	33.0	33.3	33.1
8.35	28.2	29.0	28.3	28.0	28.0	28.3
847	975	1009	1000	998	998	
8.57	2438	2522	2500	2495	2495	
4147						
8.29						

237°

33.2	33.1	32.9	33.3	33.2	33.7	−6.8
18.0	17.7	17.4	18.0	18.8	18.8	6.1
44.0	44.1	43.5	44.1	44.1	44.1	10.9
37.4	37.8	36.2	38.0	37.6	37.5	9.1
	1327	1300	1334	1337	1341	
	3318	3250	3335	3342	3352	
	2438	2522	2500	2495	2495	
	8.80	7.28	8.35	8.47	8.57	

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82°

	43.0	43.8	44.0	43.9	43.8	44.1	43.3	43.7	53.7	53.0	52.8	53.3	53.8	53.4	54.0	-9.7	
9.03									53.4								
8.02	40.0	40.1	40.1	40.1	41.0	40.9	41.0	40.5	47.0	46.2	46.3	46.7	47.2	47.0	47.8	6.1	
7.77									46.6								
7.84	54.9	55.3	56.0	56.1	56.2	56.2	55.7	55.8	3.1	3.1	3.1	2.6	3.3	3.4	3.7	7.4	
8.33									3.2								
8.13	37.9	38.0	38.2	38.2	38.7	38.9	38.4	38.3	48.1	47.0	47.2	47.1	48.7	48.8	48.1	9.6	
8.80	17.58	17.72	17.83	17.83	17.97	18.01	17.84		21.19	20.93	20.94	20.97	21.30	21.26	21.36		
1.92	43.95	44.30	44.58	44.58	44.92	45.02	44.60		52.98	52.32	52.35	52.42	53.25	53.15	53.40		
8.28									43.95	44.30	44.58	44.58	44.92	45.02	44.60		
									9.03	8.02	7.77	7.84	8.33	8.13	8.80		

117°

	31.0	31.9	31.9	31.6	
12.40					
11.27	23.8	24.9	24.8	24.5	
11.37	40.0	40.9	41.0	40.6	
5.04					
11.68	25.8	26.1	26.1	26.0	
	120.6	123.8	123.8		
	30.15	30.95	30.95		

147°

43.0	43.0	42.9	43.1	-11.4	
35.3	35.5	35.1	35.2	10.8	
51.1	51.4	50.9	51.1	10.5	
40.1	40.3	40.0	39.9	14.1	
	170.2	168.9	169.3		
	42.55	42.22	42.32		
	30.15	30.95	30.95		
	12.40	11.27	11.37		

147°

	30.0	30.3	30.8	30.4
11.70	21.4	22.7	22.9	22.3
10.80	37.8	38.1	38.0	38.0
10.50				
3.00	27.1	27.5	27.2	27.3
11.00	116.3	118.6	118.9	
	29.08	29.65	29.72	

177°

43.1	43.1	43.1	43.1	-12.7
30.0	30.8	30.2	29.9	7.7
47.6	48.2	47.4	47.2	9.6
40.9	41.0	41.1	40.7	13.6
	163.1	161.8	160.9	
	40.78	40.45	40.22	
	29.08	29.65	29.72	
	11.70	10.80	10.50	

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147°

	27.7	28.1	27.3	27.7
9.02	15.0	15.4	14.0	14.8
8.65	32.1	32.6	31.4	32.0
8.75				
242	25.2	25.1	25.3	25.2
8.81	1000	1012	980	
	25.00	25.30	24.50	

N.

207°

35.2	35.0	35.1	34.5		-7.5
22.6	22.7	23.0	22.0		7.8
41.4	42.0	41.2	41.1		9.4
36.2	36.4	36.5	35.4		11.0
	1361	1358	1330		
	3402	3395	3325		
	2500	2530	2450		
	9.02	8.65	8.75		

207°

	22.0	22.0	21.7	21.8	22.0	21.9
960						
10.10	9.1	8.9	8.4	9.1	8.8	8.9
10.68	28.1	28.6	27.4	28.0	28.8	28.2
10.88						
9.88	23.0	23.0	22.1	22.8	22.9	22.8
124	82.2	82.5	79.6	81.7	82.5	
10.25	21.55	20.62	19.90	20.42	20.62	

237°

31.0	30.8	30.3	30.4	31.0	30.4		-9.1
14.2	18.3	18.2	17.8	18.7	17.9		9.3
41.3	41.5	41.3	41.1	41.6	41.1		13.1
33.4	34.0	33.1	33.0	33.9	33.0		10.6
	1246	1229	1223	1252	1224		
	3115	3072	3058	3130	3060		
	2155	2062	1990	2042	2062		
	9.60	10.10	10.68	10.88	9.78		

237°

98				
9.78	25.4	25.9	25.9	25.7
1000	13.2	12.7	13.0	13.0
960	37.1	37.0	36.9	37.0
2933	28.3	28.1	28.0	28.1
9.78	4 1000	1037	1038	
	2600	25.92	25.95	

267°

32.1	32.2	32.1	32.0		-6.4
21.3	21.2	21.8	21.0		8.3
49.1	49.5	49.0	48.8		12.1
40.7	41.0	40.8	40.4		12.6
	1439	1437	1422		
	3598	3592	3535		
	2600	2592	2595		
	9.98	10.00	9.60		

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267°

	24.7	24.0	23.8	24.2
8.80	13.8	13.5	12.6	13.3
8.92	40.9	41.0	40.8	40.9
9.33				
05	32.7	33.1	32.9	32.9
9.02	1121	1116	1101	
	28.02	27.90	27.52	

N

297°

32.2	32.1	32.1	32.4	8.0
22.7	22.9	22.7	22.5	9.4
52.5	52.4	52.4	52.7	11.6
39.9	39.9	40.1	39.8	7.0
	1473	1473	1474	
	36.82	36.82	36.85	
	28.02	27.90	27.52	
	8.80	8.92	9.33	

297°

11.40	37.2	36.8	37.0	37.0
11.12				
10.~~48~~72	27.1	27.3	27.5	27.3
00	56.4	56.0	56.3	56.2
11.00				
	44.1	43.9	44.0	44.0
	1648	1640	1648	
	41.20	41.00	41.20	

327°

45.5	45.8	45.2	45.6	-8.5
42.0	42.3	42.9	41.7	14.7
8.2	8.9	8.3	7.5	12.0
53.1	53.4	53.1	52.9	9.1
	2104	2085	2087	
	52.60	52.12	51.92	
	41.20	41.00	41.20	
	11.40	11.12	~~10.48~~	
			10.72	

327°

	19.8	20.0	20.4	19.8	20.0
9.75	15.6	16.0	16.1	15.1	15.8
8.97					
8.69	41.9	42.1	42.7	41.3	42.0
41	27.3	27.8	28.0	26.9	27.5
9.14	104.8	105.9	107.2	103.1	
	26.20	26.48	26.80	25.78	

357°

27.2	27.9	27.3	26.5	-7.2
27.3	27.8	27.2	27.0	11.5
33.7	54.0	53.9	53.1	11.7
33.6	34.1	33.4	33.3	6.1
	1038	1418	1399	
	35.95	35.45	34.98	
	26.20	26.48	26.25	
	9.75	8.97	8.69	

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357°

	26.0	25.9	25.2	25.7
765	26.0	25.4	25.3	25.6
805	52.2	51.9	51.3	51.8
2380	32.7	32.2	31.0	32.0
7.93	1369	1354	1328	
	3422	3385	3320	

N.

27°

35.0	35.4	35.0	34.7	-9.3
35.2	35.7	35.1	34.8	9.6
56.9	57.4	56.8	56.5	5.1
39.8	40.4	39.1	39.0	7.8
	1689	1660	1650	
	4222	4150	4125	
	3422	3385	3320	
	810	785	805	

27°

980	30.1	30.0	29.3	29.8
925	29.9	30.1	29.7	29.9
953	52.1	52.0	51.8	52.0
138	34.0	34.1	33.3	33.8
9.46	1461	1462	1441	
	3652	3655	3602	

57°

42.1	42.1	42.2	42.0	-12.3
39.7	40.0	39.7	39.3	9.8
59.9	0.0	59.8	59.9	7.9
41.6	42.4	41.5	41.0	7.8
	1845	1832	1822	
	4612	4580	4555	
	3652	3655	3602	
	9.60	9.25	9.13	

57°

977	24.2	23.4	23.8	23.8
1002	21.8	21.0	21.1	21.3
980	42.0	41.5	41.1	41.5
2959	23.5	23.2	23.0	23.2
9.86	1115	1091	1090	
	2788	2728	2725	

87°

35.9	36.0	35.9	35.9	-12.1
32.3	32.6	32.3	32.0	11.0
49.3	49.9	49.6	48.5	7.8
31.8	32.1	31.4	31.8	-8.6
	1506	1492	1482	
	3765	3730	3705	
	2788	2728	2725	
	9.77	10.02	9.80	

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Aug 1 21

1st 2nd

			Σ	Mean		Σ
87°	8.28	8.90 −1.40	−1.40	8.59	−1.22	−1.22
117	11.68	11.02 +2.00	+.60	11.35	+1.54	+.32
147	11.00	10.79 +1.32	+1.92	10.89	+1.08	+1.40
177	8.81	9.00 −.87	+1.05	8.90	−.91	+.49
207	10.25	10.40 +.57	+1.62	10.32	+.51	+1.00
237	9.78	10.53 +.10	+1.72	10.16	+.35	+1.35
267	9.02	9.94 −.66	+.06	9.48	−.33	+1.02
297	11.00	11.30 +1.32	+2.38	11.15	+1.34	+2.36
327	9.14	9.18 −.54	+1.84	9.16	−.65	+1.71
357	7.93	8.20 −1.75	+.09	8.06	−1.75	−.04
27	9.46	9.86 −.22	−.13	9.66	−.15	−.19
57°	9.86	10.11 +.18	+.05	9.98	+.17	−.02

116.21
9.68

147.70
9.81

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Aug 1 1884 10:30 Att Th = 70.8

Second Series.

S

89

N — mean 11.0 6.4 7.4 10.4 p109 113 63 69 104 — 10.7 6.6 7.9 104

117 →

	25.1	25.2	25.1	25.5	25.2	24.9	25.2	35.9 36.8	36.2	36.0	35.1	35.4	35.7
9.95	20.7	22.0	21.5	22.2	21.6	21.2	21.5	28.1 28.9	27.1	28.0	28.1	28.2	28.3
8.60 8.95	38.0	38.1	38.2	38.2	38.7	38.0	38.2	46.1 46.8	45.9	46.3	45.7	46.0	45.8
8.23 8.58	20.8	21.0	20.8	21.0	20.9	20.0	20.8	31.2 31.9	31.5	31.1	30.9	31.1	30.5
9.06	104.6	1063	1056	1069	1064	1041		1444	1407	1414	1398	1407	1403
5.37	26.15	26.58	26.40	26.72	26.60	26.02		3610	3518	3535	3495	3518	3508
8.90								26.15	26.58	26.40	26.72	26.60	26.02
								9.95	8.60	8.95	8.23	8.58	9.06

mean diff — E — 10.6, 7 9.6, 9 9.6, H 13.8

p109 — 10.9, 96, 86, 14.0

mean — 10.8, 9.6, 9.1, 13.9

117°

11:50 A.M.

New readings 147° New readings

10.2 11.0 10.53	19.4	19.2	29.6	19.2	19.7	24.8	25.2	24.9	25.8	25.1	25.2 36.2	29.8	29.0	30.0	37.0	36.5	36.2	36.0	35.1
9.3 9.9 10.27	11.4	11.9	20.7	11.0	11.4	16.3	16.0	16.1	16.1	16.5	16.2 26.1	20.9	20.1	21.1	27.0	26.4	26.0	26.0	25.0
9.3 10.0 10.60	29.2	29.0	38.5	28.8	29.7	36.0	35.2	35.1	36.0	35.1	35.5 45.5	38.4	38.0	39.1	46.3	46.2	45.1	45.1	44.8
13.0 14.5 12.20	14.1	14.1	27.1	14.0	14.1	20.4	20.9	19.4	21.0	20.2	20.4 34.9	27.2	27.0	27.1	36.0	35.4	34.8	34.3	33.8
11.80		742		730	749	975	973	955	989	969		116.3	1141	1173	1463	1445	1421	1414	1381
11.64		18.55		8.25	18.72	2438	2432	2388	24.72	2422		2908	2852	2932	3658	3612	3552	3535	3468
10.63												18.55	18.25	18.72	2438	2432	2388	2472	2422
10.46												10.53	10.27	10.60	12.20	11.80	11.64	10.63	10.46
8.13																			
11.02																			

	1st	2nd	3rd readings	Mean
E	10.2	11.0	10.9	10.7
H	9.3	9.9	9.6	9.6
9	9.3	10.0	8.6	9.3
H	13.0	14.5	14.0	13.8

1470 New readings 177° New readings p109

11.22	35.9	36.0	35.1	34.8	34.9	34.8	35.2	47.8 48.9	48.0	47.4	47.2	48.0	47.0	— 12.6	13.0
10.24	27.5	27.8	26.0	24.9	25.4	25.7	26.1	33.6 35.2	34.3	33.5	32.4	33.1	33.1	7.5	7.0
10.45	44.4	44.3	43.9	43.4	43.9	44.0	44.0	53.4 54.4	53.4	52.9	53.3	53.6	52.8	9.4	9.7
10.98 11.20	33.8	33.4	32.8	33.0	32.7	32.0	33.0	46.8 48.0	46.8	45.8	47.1	47.0	46.1	13.8	14.0
10.63	141.6	1415	1378	1361	1369	1365		1865	1825	1796	1800	1817	1790		
4.72	3540	3538	3445	3402	3422	3412		4662	4562	4490	4500	4542	4475		
10.79								35.40	3538	3495	3402	3422	3412		
								11.22	10.24	10.45	10.98	11.20	10.63		

Mean — 12.8, 7.2, 9.6, 13.9

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S.

177°

	44.9	45.0	44.0	44.6
950	30.5	30.8	30.2	30.5
870				
880	49.4	49.8	49.7	49.6
00	43.1	43.0	42.1	42.7
9.00	167.9	168.6	166.0	
	41.98	42.15	41.50	

N.

207°

51.6	52.1	51.7	51.0	— 7.0
38.3	38.8	38.2	38.0	7.8
59.6	0.1	59.7	59.1	10.0
53.9	54.9	53.8	53.1	11.2
	205.9	203.4	201.2	
	51.48	50.85	50.30	
	41.98	42.15	41.50	
	9.50	8.70	8.80	

207°

	49.8	49.8	49.6	49.7
11.07	36.8	3 36.8	36.1	36.6
982				
1030	57.8	57.9	57.3	57.7
3119	51.9	51.8	51.1	51.6
1040	196.3	196.3	194.1	
	49.08	49.08	48.52	

237°

58.7	59.9	58.3	57.9	— 9.0
45.3	45.8	45.0	45.2	8.7
10.8	11.7	10.3	10.4	13.1
2.3	3.2	2.0	1.8	10.7
	240.6	235.6	235.3	
	60.15	58.90	58.82	
	49.08	49.08	48.52	
	11.07	9.82	10.30	

237°

	24.0	23.6	23.8	23.8
1070	10.5	9.2	10.0	9.9
1090				
1020	36.0	36.0	36.1	36.0
160				
1053	28.0	27.3	27.1	27.5
	98.5	96.1	97.0	
	24.62	24.02	24.25	

267°

30.5	31.0	30.7	29.9	6.7
18.9	19.2	19.2	18.3	9.0
49.3	49.9	49.0	48.9	13.3
40.6	41.2	40.8	39.9	13.1
	141.3	139.7	137.0	
	35.32	34.92	34.25	
	24.62	24.02	24.25	
	10.70	10.90	10.00	

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267°

	23.8	22.9	23.0	23.2
10.15	11.1	10.5	11.9	11.2
9.80				
9.58 68	41.3	41.0	41.0	41.1
2983	33.0	32.3	32.1	32.5
9.94	109.2	106.7	108.0	
	27.30	26.68	27.00	

N

297°

32.0	32.9	31.4	31.7	-8.8
22.0	22.1	22.0	21.9	10.8
53.2	53.8	52.8	53.0	12.1
40.3	41.0	39.7	40.1	7.8
	149.8	145.9	146.7	
	37.45	36.48	36.68	
	29.30	26.68	27.00	
	10.15	9.80	9.68	
			6	

297°

	26.0	25.8	27.9	27.0	27.0	27.3
11.04	15.7	16.1	18.6	16.6	17.8	17.7
11.17	46.9	47.0	49.0	47.3	48.1	48.1
11.10						
91						
11.30	34.8	34.1	36.0	34.1	34.9	35.0
	123.4	122.3	131.5	125.0	127.8	
	30.85	30.75	32.88	31.25	31.95	

327°

36.8	36.9	36.7	37.0	36.0	36.2	-9.1
32.0	32.0	31.8	32.3	31.8	31.9	14.3
59.6	60.9	60.9	60.6	59.5	59.7	11.5
45.0	45.7	46.0	45.8	44.8	44.4	10.0
	175.5	175.4	175.7	172.1	172.2	
	43.88	43.85	43.92	43.02	43.05	
	30.85	30.75	32.88	31.25	31.95	
	13.03	13.10	11.04	11.77	11.10	

327°

	28.0	28.8	28.9	28.6
9.68	24.0	24.1	24.7	24.3
9.22	51.7	51.8	52.4	52.0
8.63				
.53	36.4	36.5	36.9	36.6
9.18	140.1	141.2	142.9	
	35.02	35.30	35.72	

357°

36.1	35.9	36.4	35.9	-7.5
35.8	35.3	35.2	35.3	11.0
3.5	3.8	3.4	3.2	11.5
43.3	43.8	43.1	43.0	6.7
	178.8	178.1	177.4	
	44.70	44.52	44.35	
	35.02	35.30	35.72	
	9.68	9.22	8.63	

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S.

357°

37.0 37.4 36.9 36.4 36.4 36.8
36.2 36.4 36.0 35.8 36.1 36.1
3.9 4.0 3.7 3.1 3.5 3.5
43.8 43.8 42.7 42.8 42.5 43.1
180.9 181.6 178.8 178.1 178.3
45.22 45.40 44.70 44.52 44.62

8.23
7.65
8.28
8.30
8.46
10.2
8.20

Or.

27°

46.1 46.4 46.1 46.0 46.0 46.1 −9.3
45.9 45.3 45.5 45.4 45.9 −9.5
9.7 9.0 9.0 8.8 9.1 −5.6
52.2 51.8 51.4 50.8 51.2 −8.4
214.2 212.2 211.9 211.0 212.3
53.55 53.05 52.98 52.75 53.08
45.22 45.40 44.70 44.45 44.62
8.33 7.65 8.28 8.30 8.46

27°

32.8 32.7 32.7 32.7
32.2 32.2 31.9 32.1
55.3 55.0 55.3 55.2
87.5 87.6 86.8 87.3
157.8 157.5 156.7
39.45 39.38 39.18

10.13
4.84
9.62
24.59
9.86

57°

45.5 45.8 45.6 45.0 −12.8
41.6 42.1 41.8 40.9 9.5
3.8 4.0 3.8 3.7 8.6
45.9 46.4 45.7 45.6 8.6
198.3 196.9 195.2
49.58 49.22 48.80
39.45 39.38 39.18
10.13 9.84 9.62

57°

18.0 17.5 17.7 18.0 17.8
15.0 14.7 14.5 14.5 14.7
35.8 35.6 35.2 36.0 35.6
16.5 16.9 18.0 17.9 17.6
86.3 84.7 85.4 86.4
21.58 21.18 21.35 21.60

10.72
10.70
9.60
32.102
10.14 34

87°

30.7 30.9 31.0 30.1 −12.9
25.8 25.9 26.1 25.3 11.1
43.9 44.1 44.1 43.4 8.3
26.8 27.5 27.0 26.0 9.2
128.4 128.2 121.8
32.10 32.05 31.20
21.38 21.35 21.60
10.72 10.70 9.60

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Aug 1 Repeated.

S. 87°

	32.1	32.8	33.0	33.2	33.2	32.9	
9.03	29.9	30.1	29.9	30.3	29.9	30.0	
8.52	47.9	48.1	48.1	48.1	48.0	48.0	
8.50	27.5	28.1	28.0	28.4	28.3	28.0	
8.80	1374	1391	1390	1400	1394		
8.67	34.35	34.78	34.75	35.00	3485		
3.52							
8.70							

N. 117°

44.2	43.8	43.8	43.9	44.8	44.5	-11.3	
36.3	36.2	36.7	36.1	36.2	36.3	6.3	
54.9	55.4	54.7	54.2	55.4	54.8	6.9	
38.4	38.1	38.0	38.8	38.8	38.5	10.4	
	1735	1732	1730	1752	1741		
	43.38	43.30	43.25	43.80	43.52		
	3435	3478	3475	3500	3485		
	9.03	8.52	8.50	8.80	8.67		

117°

44.4	45.2	16.9	16.1	16.2	16.4	26.8		
36.4	37.1	7.8	7.2	7.3	7.4	17.0		
55.3	55.1	27.0	26.4	26.4	26.6	35.0		
39.0	38.7	19.2	9.1	9.3	9.2	23.4		
1751	1761	609	58.8	59.2				
43.78	44.02	15.22	14.70	14.80				
10.94	10.28	10.85	10.78					
10.28								
10.85								
10.78								
2.85								
10.71								

147°

Mean of diffs

55.8	26.6	26.9	26.8	-17.4	10.4	-10.9		
46.0	17.0	16.8	17.2	9.6	9.6	9.6		
4.2	35.0	35.0	35.0	6.9	8.4	8.6		
52.9	23.4	23.5	23.3	13.9	14.2	14.0		
218.9	102.0	102.2	102.3					
54.72	25.50	25.55	25.58					
43.8	15.22	14.70	14.80					
10.94	10.28	10.85	10.78					

147°

26.0	26.5	25.4	26.0	
15.9	15.4	16.2	15.8	
33.9	33.9	34.1	34.0	
22.8	22.1	21.2	22.0	
98.6	97.9	96.9		
24.65	24.48	24.22		
10.33				
9.97				
2.60				
10.83				

39.0	38.6	38.2	40.1	-13.0
22.8	22.3	22.0	24.2	7.0
43.7	43.6	42.4	44.0	9.7
36.0	35.4	35.2	37.4	14.0
	139.9	137.8	145.7	
	34.98	34.45	36.42	
	24.65	24.48	24.22	
	10.33	9.97	12.20	

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Angel Mean = 71.0

87

351	356	357	358	39.5	
362	369	364	360	36.4	4.03
555	551	557	561	55.6	3.77
36.1	364	359	360	36.1	3.35
1679	1652	1672	1679		3.68
41.72	4230	4180	4198		3.37
					21
					+3.54

354
542
856
448

452	452	457	449	457	5.7
380	381	380	380	378	1.6
580	587	581	581	587	2.96
408	410	408	409	40	4.7
					35+33
1830	1826	1819	1814		
4572	4565				
4176	4230	4548	4535		
		335	4180	4198	
			368	337	
4.03					

46.1 457 45.4
36.9 358 36.0
1.0 0.2 0.1
43.0 41.6 42.0
1870
46.75

1833
4582
1835
4588

547
603
475
1625
542

404	407	418	418	417	418	
338	344	353	349	348	350	
530	544	547	545	546	547	6.57
362	363	371	397	372	37.3	7.08
1634	1658	1693	1684	1685		6.67
4085	4140	4233	4210	4213		

117

407	420	421	418	423	420	
336	350	350	344	355	350	
554	545	554	551	554	551	
359	374	378	375	379	376	
		1703	1688	1706		
1689						
422	4258	4220	4270			

483	488	487	463			mean
407	405	410	407	5.7	6.6	6.2
0.2	0.2	0.2	0.2	5.5	5.9	5.7
463	461	468	460	9.0	9.9	9.4
		1956	1967	1952		
		4890	4518			
		4233	4210	4213		
		650	708	667		

494	490	499	501			-7.6
411	411	410	422	422		-6.6
1.0	0.1	0.4	1.7	2.0		5.9
475	482	479	479	479		2.9
1978	1945	1915	2016	2022		
4945	4938	5043	5055			
4222	4258	4220	4270			
723	680	820	780			

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147

~~40 40~~

38.0	39.0	38.5	38.5	46.7	47.4	46.8	45.8	8.2
30.1	31.1	28.9	30.0	33.8	34.3	33.3	33.7	3.8
48.8	49.3	49.1	49.1	54.1	55.0	54.2	53.0	5.0
36.2	37.2	36.7	36.7	45.6	46.0	45.8	45.0	8.9
1531	1566	1532		1827		1801	1775	
38.28	39.15	~~40.80~~ 38.8		4868 3825		4502 3915	4438 3880	
				7.40		5.87	5.58	

177

~~332~~

~~30.5~~	33.2	34.3	33.8	33.8	37.5	38.0	37.3	37.1	3.7
~~177~~	20.8	21.2	20.9	21.0	25.4	26.1	25.0	25.0	4.4
	40.7	41.3	41.1	41.0	47.1	48.1	46.4	46.8	6.1
	32.6	33.1	32.3	32.7	39.9	40.8	39.3	39.5	7.2
	1273	1299	1281		1530	1480	1484		
	3182	3248	~~3249~~ 3202		3825	3700	3710		
					31.52	3248	3202		
					6.43	4.52	5.08		

64.3
4.52
5.08
1603
534

207

35

35.0	35.1	34.0	34.7	40.7	41.2	40.4	40.4	6.0
23.0	22.4	22.4	22.6	27.8	28.1	27.3	28.0	5.2
44.6	44.7	43.9	44.4	54.6	55.2	54.4	54.3	10.2
37.8	37.0	36.3	37.0	44.8	45.1	44.5	44.7	7.8
140.4	139.2	136.6		169.6		166.6	167.4	
35.10	34.80	34.15		4240		4165	4185	

7.30
6.81
7.70
21.81
7.28

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.237

17.8 17.3 17.2 17.4 — 20.2 20.8 20.0 19.9 2.8
4.9 4.8 4.9 4.9 — 8.7 9.7 8.5 8.0 3.8
31.0 31.2 31.0 31.1 — 40.5 41.2 40.5 39.9 9.4
21.7 21.5 21.1 21.4 — 30.8 31.1 30.1 30.1 9.4
7 8 4 748 742 — 1028 991 979
18,70 18,55 — 2570 2478 2448
18,85 — 1870 1855
6,08 593
18,85
6.85

85
608
193
1861
620

2.67

19.0 19.0 18.8 18.9 — 24.9 24.9 25.2 24.7 — 6.0
7.3 7.2 7.0 7.2 — 14.9 15.2 15.1 14.4 7.7
39.1 39.2 37.9 38.7 — 47.4 47.9 47.4 47.0 8.7
29.5 28.8 27.9 28.7 — 32.6 33.2 32.6 32.1 3.9
4
979 941 916 — 1212 1203 1182
23.72 — 3030 3008 2955
23,55 2290 — 2448 2355
6,43 660 — 584
5 — 23.72
6.58

6.58
643
660
188
628

.297

22.0 22.0 22.7 22.2 31.3 31.7 28.5 28.7 28.9 28.3 -6.3 38.2 -6.8 31.5 38.3 38.4 -6.6
11.9 12.2 12.5 12.2 22.5 24.0 24.0 23.9 23.9 24.2 -11.8 35.8 12.8 23.2 36.0 36.1 12.3
44.5 45.0 44.9 44.8 55.9 59.7 54.2 52.4 52.3 54.0 -9.4 8.0 8.6 59.3 7.9 7.8 9.0
29.5 29.4 30.1 29.7 41.0 42.0 37.3 37.1 37.8 37.0 -7.6 47.5 6.3 41.5 47.8 47.9 7.0
1079 1086 1102 1537 1574 1441 1449 1435 1898
2698 2715 2755 3842 3935 3602 3623 3587 4745
2658 2715 3935

9.04
602
2644
8.81
4755
820

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~~32~~

327

20.5 22.0 21.0 21.2 | 26.1·26.8 26.0 25.4 — 4.9

16.2 17.1 17.1 16.8 | 25.6 26.0 25.8 25.0 8.8

46.1 46.4 46.2 46.2 | 55.6 56.0 55.9 54.9 9.4

29.4 30.1 29.7 29.7 | 32.6 33.5 32.8 31.4 2.9

1122 1156 1140 | 1423 1405 1367

28.05 28.90 28.50 | 3558 3512 3418

28.05 28.90 28.50

7.53 6.22 5.68

7.13 6.22 5.68

1943

~~485~~ 647

357

38.2 37.9 38.0 49.0 48.8 ~~48.8~~ 48.9 | 44.3 43.8 ~~44.9~~ 44.0 | 55.5 56.0 55.8 | 55.8 -6.0 — ~~5.9~~ 6.9 — 6.4 mean

38.0 37.5 37.8 47.8 49.0 46.4 48.4 | 43.2 43.0 ~~46.3~~ 43.1 | 56.3 56.4 56.5 | 56.4 5.3 ~~10.1~~ 8.0 6.6

8.3 8.2 8.2 19.8 20.0 19.4 19.7 | 11.1 10.2 ~~11.1~~ 10.6 | 22.9 22.3 22.1 | 22.4 2.4 ~~6.3~~ 2.4 2.6

45.0 44.2 44.8 55.2 56.5 56.0 ~~55.6~~ 56.1 | 50.1 49.5 ~~53.3~~ 49.8 | 1.8 1.0 1.1 | 1.0 5.0 ~~7.7~~ 5.4 5.2

~~1.1 44.8 5.5~~ 5791 | ~~6105~~ 5858 5790 | 5162 4938 4792 | ~~5.4~~ 5.2 | 6392 6385 | 6538 5750 | 5.34 5.95

4938 4908 | 5858 4 | 484 4.80 | 367 | ~~6.7~~ 6.1 | 5.34 | 1746 439 5.82

27

~~7.6~~ 6.6 | 35.4 35.8 36.0 35.9 | 46.0 46.9 46.4 45.7 — 10.1

~~12.3~~ 12.3 | 35.8 36.1 35.7 35.9 | 42.6 44.8 43.0 42.3 6.7

~~9.0~~ 9.0 | 2.2 2.1 2.2 2.1 | 7.2 7.8 7.4 7.1 5.1

~~7.0~~ 7.0 | 41.0 41.0 40.4 40.7 | 46.2 47.1 46.3 46.1 5.5

1744 1750 1743 | 2016 2031 2012

46.10 43.75 43.58 | 50.40 5078 5030

4577 4.58

703 6.72 155 681

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57

B

30.9	31.0	30.3	30.7	39.9	40.1	40.2	39.3	-9.2
28.1	27.4	27.5	27.7	35.3	36.0	35.0	34.8	7.6
52.4	52.4	52.1	52.3	56.7	57.8	56.3	56.1	4.4
31.8	31.3	31.0	31.4	36.3	37.0	36.3	35.5	4.9
1432	1421	1409		1709	1678	1657		
35.80	35.52	35.22		42.72	41.95	41.42		

6.52
6.43
6.20
15.5
6.52

3.52 6.52
3.52 6.43
3.52 6.20

3.27

3.27

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87

													mean of diffs
48.5	46.4	28.8	29.4	29.4	29.2	35.5	35.8	35.5	35.1	−6.3	69	−6.6	
44.1	44.4	24.1	24.4	24.8	24.4	27.0	27.9	26.4	26.8	2.6	29	2.8	
3.9	4.0	44.2	44.6	44.5	44.4	48.1	48.9	48.4	46.0	4.0	37	3.8	
44.3	44.3	23.9	24.0	24.2	24.0	30.8	31.3	30.9	30.1	6.8	62	6.5	
2008	~~201~~	1210	1224	1229			1439	1412	1400				
56.20	~~50.28~~	30.25	30.60	30.12			35.98	35.30	35.00				
							~~30.28~~	30.60	30.12				
							~~5.93~~	4.70	4.28				

87

29.4	28.8	28.2	28.8	35.7	35.8	35.8	35.5	−6.9		
25.1	25.0	24.2	24.8	27.7	28.1	28.0	26.9	2.9		
45.4	45.0	44.1	44.8	48.5	49.0	48.2	48.4	3.7		
24.8	25.0	23.9	24.6	30.8	31.1	31.0	30.3	6.2		
1247	1238	1204			1440	1430	1411			
31.18	30.95	30.10			36.00	35.75	35.28			
					31.18	31.95	30.10			
					4.82	4.80	5.18			

117

30.0	30.0	30.1	30.0	38.2	37.9	38.4	38.2	−8.2		
21.3	21.2	22.2	21.6	27.9	28.0	28.2	27.5	6.3		
42.8	43.0	43.0	42.9	49.6	49.2	50.3	49.4	6.7		
25.2	25.3	25.0	25.2	36.2	35.9	36.4	36.4	11.0		
1193	1195	1203			1500	1533	1575			
29.82	29.88	30.08			37.50	38.32	37.88			
					29.82	29.85	30.05			

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147

37.1 37.8 37.5 37.5
27.3 28.9 26.0 28.1
49.0 52.0 49.5 49.5
35.7 36.0 35.4 35.7
1491 1527 1504
37.28 38.18 37.60

47.4 47.8 47.3 47.2 9.9
38.2 33.1 33.2 33.3 5.1
55.8 56.0 55.8 55.6 6.3
46.3 46.3 46.1 46.4 10.6
1832 1824 1825
45.80 45.60 45.62
37.28 38.18 37.60
8.52 7.42 8.02

8.52
7.42
8.02
23.96
7.99

177

~~45.9~~
45.9 45.4 45.0 45.4
31.0 30.9 30.2 30.7
54.1 53.1 52.8 53.3
44.2 43.8 43.3 43.8
1752 1732 1713
43.80 43.30 42.82

48.5 48.6 48.7 48.1 -3.1
35.0 35.3 35.5 34.3 4.3
59.4 6.0 59.4 58.9 6.1
51.4 51.6 51.4 57.2 7.6
1957 1950 1825
48.92 48.75 48.12
43.80 43.30 42.82
5.12 5.45 5.30

5.12
5.45
5.30
15.87
5.29

207

35.7 35.7 35.5 35.6
23.1 22.2 22.4 22.6
46.2 46.7 46.2 46.4
39.0 38.3 37.9 38.4
1440 1429 1420
36.00 35.75² 35.50

42.0 42.3 42.0 41.8 -6.4
27.9 27.2 28.1 28.3 5.3
57.1 57.0 57.4 57.0 10.7
46.3 46.5 46.3 46.0 7.9
1730 1738 1731
43.25 43.45 43.28
36.00 35.75² 35.50
7.25 7.73 7.78

7.25
7.73
7.78
22.76
7.58

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237

41.2	40.8	41.2	41.1	44.6	45.1	45.0	43.8	−3.5	−3.4
26.1	27.9	27.9	28.0	32.2	33.2	32.4	31.1	4.2	4.0
57.0	57.4	58.5	57.6	7.1	7.9	7.0	6.3	9.5	9.0
45.2	45.0	45.1	45.1	55.2	56.0	55.1	54.4	10.1	9.7
1715	1711	1727		2022	1995	1956			
42.88	42.78	43.18		50.55	49.88	48.90			
				42.88	42.78	43.18			
				7.67	7.10	5.72			

mean of last 3

237

42.7	42.1	41.9	42.2	45.5	46.0	45.4	45.2	−3.3
29.3	29.0	29.1	29.1	32.8	33.1	32.3	33.0	3.7
58.2	58.3	58.2	58.2	6.7	6.7	6.6	6.8	8.5
45.4	45.1	45.4	45.5	54.8	55.1	55.0	54.4	9.3
1756	1751	1746		2009	1993	1994		
43.90	43.78	43.65		50.22	49.82	49.85		
				43.90	43.78	43.65		
				6.32	6.04	6.20		

6.32
6.04
6.20
5.6
6.19
6.83
5.2
6.51

267

20.0	18.8	19.1	19.3	24.6	25.0	24.2	24.3	−5.3
6.8	6.9	6.9	6.9	13.5	14.2	13.4	13.0	6.6
39.8	39.9		39.7	48.0	48.8	47.6	47.4	8.3
29.0	28.8	28.0	28.6	32.9	33.5	32.5	32.6	4.3
1156	1144	1135		1215	1179	1173		
2990	2860	2838		3034	2948	2932		
				2390	2360	2338		
				608	588	594		

6.48
5.88
5.94
1830
6.10

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Mean of Diffs
E: −5.7
F: 11.0
G: 8.4
H: 6.4

297

41.2 41.9 41.9 41.7 32.3 33.5 32.9 47.1 47.5 46.8 46.9 38.9 38.4 −5.4 −6.0 39.4
30.5 31.1 31.5 31.0 24.8 24.4 24.6 41.4 41.3 41.5 41.3 36.2 36.2 10.4 11.6 36.3
4.5 5.2 5.8 5.2 59.8 59.2 59.5 13.6 14.0 13.7 13.1 8.0 7.8 8.4 8.5 8.1
49.2 50.4 50.0 49.9 41.9 41.9 41.9 56.1 56.3 55.9 56.0 48.6 48.7 6.6 6.7 46.5
1854 1886 1892 1588 1590 2191 2179 2173 1911 1923
46.35 47.15 47.30 39.70 39.75 3978 3946 3932 4778 4808
39.75
8.33

5475 5448 5432 3970
46.35 47.15 47.30 6.08
8.40 7.55 7.02

7.33 7.02 7.58

327

34.4 33.2 33.3 33.6 38.1 38.2 37.8 38.3 −4.5
27.8 27.8 29.0 28.2 36.9 37.1 36.7 37.0 8.7
6.1 5.9 5.5 5.8 8.4 8.8 8.3 8.1 8.6
42.7 42.4 42.1 42.4 46.6 46.0 45.2 45.7 3.2
1650 1633 1639 1901 1880 1891
41.25 40.82 40.98 47.52 47.00 47.28
41.25 40.82 40.88
6.27 6.18 6.30

6.27
6.18
6.30
6.25

357

39.0 38.2 38.1 38.5 44.5 44.8 44.5 44.3 −6.0
37.8 37.8 37.3 37.6 42.9 43.2 42.5 43.0 5.3
9.0 8.5 8.8 8.8 10.6 11.1 10.3 10.5 1.8
45.8 45.0 45.3 45.4 50.6 51.1 50.2 50.6 5.2
1916 1895 1895 2102 2075 2084
47.90 47.38 47.38 5255 5188 5210
47.90 47.38 47.38
46.1 45.0 47.2

4.65
4.12
4.72
4.47
4.16.2

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27

37.3	37.8	38.1	37.7	47.2	47.6	47.2	46.8	9.5
36.9	37.0	37.8	37.2	43.4	44.3	43.0	42.9	6.2
3.3	3.4	3.4	3.4	8.8	9.1	8.3	8.1	5.4
42.4	43.1	42.4	42.6	48.5	49.2	46.0	46.2	5.9
1799	1813	1817			2102	2065	2060	
4498	4532	4542			5255	5162	5150	
		45.42			44.95	45.52	45.92	
					7.57	6.10	6.10	

7.57
9.10
6.10
19.77
6.59

57

22.9	23.1	23.0	23.0	32.3	32.3	32.7	32.0	9.3
19.2	19.4	19.1	19.2	26.7	26.9	27.0	26.1	7.5
45.2	45.5	45.2	45.3	49.8	50.3	50.1	49.1	4.5
24.1	23.6	23.3	23.7	29.5	29.9	29.7	29.0	5.8
1114	1116	1106			1394	1395	1362	
2785	2790	2765			3485	3488	3405	
					2785	2790	2765	
					700	698	640	

7.00
6.98
6.40
20.36
6.79

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Aug. 5. 1884.

		New focus	New focus	New focus
72.1	71.3	8.8	8.9	11.1
72.8	70.7	9.9	9.9	13.0
71.8	74.1	8.7	10.1	12.2
69.4	74.2	7.0	12.2	12.8
69.6	71.8	5.0	11.6	15.8
69.8	72.1	7.9	10.6	16.1
66.0	75.8	8.9	12.8	15.6
69.4	73.8	10.8	13.2	14.7
70.3	70.9	10.7	13.8	17.2
71.8	72.0	10.8	13.3	16.1
70.37	72.67	8.85	11.64	14.16

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ℓ

Σ.

Σ 0 40.0 0 10.0 30.4 13.0
P 46.5 17.8
G 55.1 40.4
16 34.2 32.9

0 34.7 Φ 60.4
26.6
41.9
26.0

28.9 640
19.3
38.2
25.1

31.0 56.5
16.7
38.0
29.0

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Aug 5. Comparison with microscope A. B on
the vertical circle. A B = 30°

87

		A	
E	0	364 237	197
F		323 154	4 23.8
G		520 392	
H		319 198	
		3261	
		3815 ~~2302~~ 2552	

117) 357 241 / 150
268 162 4 49.2
464 359
287 185
1379 947
~~3798~~ 2388
3448

147) 372 232 0 33.6
282 140 4 25.8
484 341
447 206
1485 919
3712 2298

177) 370 228 ~~0~~ 150
225 72 5 26.6
439 295
842 201
1376 802
3440 2005

207) 371 237 0 378
281 188
464 332 4 18.0
387 259
1453 1016
3632 2540

237) 372 262 0 886
231 121 3 5 4.7
513 409
411 301
1527 1093
3818 2732

267) 347 235 1 5.0
219 117 4 3.9
543 445
437 334
1546 1127
3865 2818

297) 342 204 1 7.6
231 99 4 41.9
562 440
412 286
1547 1029
3868 2572

327) 318 193 / 42.2
268 149
570 460 5 12.0
400 280
1556 1082
3890 2705

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3571

289 164 203,1
254 164 ∫ 26,6
590 469
360 231
1523 1028
38,08 25,700 ~~51,1~~

334 209 051,1
329 201 4 9,2
583 460
370 253
1619 1123
40,46 28,08

~~23~~ 246 234
317 183 4 ∫ 2,2
554 421
352 221
1569 1049
39,22 26,22
Bey

240 4 02,2
195
090
197
1022
25,55

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~~287~~ 280

281	245	242	43331
189	201	195	241
384	399	393	243
193	201	198	815
997	1046	1028	272
24,92	26,15	25,70	

117

247	240	245	4 51,7
150	151	155	48,6
359	363	366	48.8
190	188	197	1491
941	942	963	4 49,7
23,52	23,55	24,08	

147

213	209	228	4 49,7
114	111	129	51,3
327	308	334	46,1
191	185	189	1491
845	823	890	4 49,0
21,12	20,58	22,25	

177

231	210	222	5 26,4
72	58	71	326
303	278	289	363
220	193	200	953
826	739	782	318
20,65	18,48	19,55	

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237 207 232 207 4 381
64 54 90 418
331 330 329 431
255 260 253 1230
917 921 894 410
2292 2302 2235

237 237 252 257 4 280
84 101 118 101
343 381 352 60
266 288 298 447
950 1022 1065 147
2375 2555 2662

267 240 242 238 4 243
101 110 109 190
431 441 440 187
332 339 338 615
1104 1132 1125 205
2760 2830 2812 4

297 208 210 216 4 462
94 97 103 448
404 402 457 490
287 285 291 15,2
1023 1024 1047 120
2558 2560 2618 4 440

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327)

~~188~~	198	192	5 27,2
141	139	~~130~~	237
443	457	440	221
279	280	270	130
1051	1038	1032	5 232
26,28	25,95	25,80	

357

165	175	167	6 5 20
154	162	158	440
458	467	460	472
240	242	237	262
1017	1046	1022	5 487
25,42	26,15	25,55	

27)

210	219	207	4 263
192	204	189	146
449	462	454	202
250	263	251	611
1101	1148	1111	4 204
27,52	28,70	27,78	

~~59~~)

222	223	220	4 557,5
183	182	179	565
423	427	433	550
225	221	224	193
1053	1053	1056	4 564
26,32	26,32	26,40	

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87)

23,0	23,0	23,0	4 42,2
18,0	18,2	18,1	44,1
38,0	38,3	38,2	63
18,9	15,5	19,4	4 43,1
879	994		
21,98	24,85		

Volume of one dimple

0 23,0	1 38,0		4 44,1
18,2	34,4		2 15,0
38,3	58,3		
19,9	34,2		
994	1599		
24,85	39,98		

1 22,1	0 51,8	0 21,4	5 0,0	
17,3	47,1	16,2	10 0,0	
36,9	6,5	31,9	15 0,0	
17,2	47,0	16,7		
933	2124	902		30,42
2338	5310	2255		6,08
	30,28	30,15		Idiv. 10 1/2

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Aug 4 5 1884

Runs

E		F		G		H	
5 0 6.1	0 0 5.0	6.4	6.1	30.2	30.1	7.7	8.2
6.8	5.0	5.7	6.6	30.6	30.3	8.0	7.8
6.9	5.0	5.8	6.7	31.2	30.4	8.6	8.0
6.8	5.0	6.1	6.3	31.1	30.7	8.3	8.1
6.4	5.0	6.2	6.2	31.1	30.8	8.7	7.8
30	5.00	2	19	42	23	3	49
6.60		6.04	6.38	30.84	30.46	8.06	7.98

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Oct 27 1884

W+R, Jr.

S

84U

E	15.2	17.8	16.6	16.4	16.5
F	10.7	11.8	9.3	9.8	9.6
G	23.6	23.7	23.2	23.4	23.6
H	5.6	6.7	5.7	5.7	5.6
	54.5	60	54.8	55.0	
	13.625	15.0	13.70	13.75	
			8.45	12.75	
			13.70	13.75	

117

E	18.4	17.8	18.6	18.3
F	6.1	6.7	7.3	6.7
G	8.15	22.0	22.7	22.2
H	5.6	5.9	6.6	6.0
	51.9	52.4	55.2	
	12.975	13.1	13.8	
		13.8		
		12.975		
		39.875		
		13.29		

147

E	15.7	16.0	16.0	15.9
F	3.5	3.8	3.2	3.5
G	17.3	17.9	17.0	17.4
H	6.8	7.1	7.1	7.0
	43.3	44.8	43.3	
	10.8	11.20	10.83	
		10.8		
		10.83		
		32.83		
		10.94		

N

117°

25.0	25.8	25.4	25.4	8.5
13.2	13.2	13.2	13.2	3.6
29.4	29.7	29.8	29.7	5.8
12.8	13.0	12.5	12.8	7.2
	80.9	79.9		
	20.23	19.95		
	13.70	13.75		
	6.53	6.20		

26.2	26.1	26.2	26.2	7.9
14.2	14.1	14.6	14.4	7.5
29.6	29.7	29.5	29.6	7.4
18.6	18.8	18.5	18.6	12.6
	88.7	88.8		
	22.175	22.2		
	22.2			
	.375			
	22.19			

26.2	26.4	26.0	26.2	10.3
8.2	8.0	8.3	8.2	4.7
24.3	24.7	23.9	24.3	6.9
18.2	18.3	18.1	18.2	11.2
	77.4	76.3		
	19.35	19.08		
	19.08			
	19.22			

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177

22,1 23,2 22,8 22,2 23,2 227 29,4 30,2 29,1 28,9 28,4
5,0 5,0 5,4 5,6 4,5 5,1 11,7 12,3 13,2 13,3 13,4
22,4 23,2 23,0 23,0 23,2 23,0 31,8 32,4 31,1 31,6 30,7
14,1 14,0 15,0 14,7 14,4 14,4 25,1 25,8 25,0 24,3 24,4
63,6 65,4 66,2 65,5 65,3 98,0 100,7 98,4 98,1 96,9
15,90 16,35 16,55 16,38 16,33 24,50 25,18 24,60 24,53 24,23
15,90 16,38 24,50 24,60
32,25 16,33 49,68 24,23
16,13 126 24,84 136
16,42 24,45

207

35,0 35,0 34,7 34,9
19,8 19,0 18,2 19,0
36,0 37,1 36,4 36,5
29,5 29,9 30,0 29,8
120,3 121,0 119,3
30,08 30,25 29,83
29,83
30,08
90,16
30,05

237

31,4 31,2 31,3
13,4 14,1 13,8
37,2 37,2 37,2
27,8 27,8 27,8
109,8 110,3
27,45 27,58

2757

8,7
5,8
20,4
11,1

Σ −6,5
7 7,7
9 8,5
14 10,5

837

436 43,9 43,5 43,5 8,7
26,8 26,5 27,0 27,0 7,8
49,6 50,3 48,6 50,0 13,1
41,0 41,5 40,0 41,4 11,2
167,2 159,1 161,9
40,55 39,78 40,48
40,51
40,48
120,81
40,27

39,7 39,8 39,6 8,4
22,9 23,0 22,8 9,1
51,6 51,6 51,6 14,4
42,0 41,4 42,7 14,2
155,8 156,7
38,95 39,18

3906

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267

ε	8.7	9.2	9.6	9.2	17.6	17.8	17.3	8.4
F	51.8	53.2	53.8	52.9	2.5	2.2	2.8	9.6
g	20.4	20.6	20.2	20.4	32.2	32.4	32.1	11.8
H	11.1	11.1	10.9	11.0	19.2	19.7	18.7	8.2
	292.0	294.1	294.5		72.1	70.9		
	680	92.	94.1		1802		1772	
			93.0	686	17.72	143.0		
	8.00		280.6		1154	71.50		
		6852			17.87			
		862			8.38			
		804			9.49			
		114						
		8.38						

257

ε	14.7	16.1	15.4	23.9	24.0	24.9	23.8	8.5
F	0.0	1.0	0.5	13.5	13.3	15.0	13.7	13.0
g	28.8	29.9	29.4	4.01	40.2	42.1	40.0	10.7
H	15.4	16.7	16.0	25.2	24.8	27.2	25.6	9.2
	58.9	63.7			102.3	109.2	103.1	
	14.73	15.93			25.58		25.78	
		14.73				4566		
		30.66				1533		
		15.33				4099		

327

	20.9	21.3	21.3	21.2	29.7	30.2	29.2	29.7	8.5
	10.1	12.6	11.8	11.5	23.8	24.2	23.7	23.5	12.3
	37.3	39.1	39.2	38.5	50.1	50.2	50.4	49.6	11.6
	22.3	22.0	21.7	22.0	29.6	30.7	29.2	28.9	9.6
	90.6	95.0	94.0			135.3	132.5	131.7	
	2265	2375	2352			3382	3312	3292	
			265				3252		
			325				1882		
			990				986		
			2330				3329		
							2330		
							999		

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35 7°

E	23.1	22.9	23.0
F	16.8	17.7	17.2
G	43.3	44.1	43.7
H	21.8	21.6	21.7
	105.0	106.3	
	26.25	26.58	
		26.25	
		83	
		26.42	

32.8	33.6	33.0	31.8	9.8
27.4	27.8	27.5	26.8	10.2
49.8	50.7	49.7	48.9	6.1
30.7	31.4	31.3	29.3	9.0
	143.5	141.5	136.8	
	35.88	35.38	34.20	
		35.88		
		34.20		
		105.46		
		35.15		
		26.42		
		8.73		

27°

E	23.2
F	21.2
G	42.4
H	23.2
	112.0
	28.00

20.1	41.8	40.0	40.2	11.9
30.4	33.1	31.3	31.4	9.2
52.4	54.7	52.8	52.1	10.0
34.0	36.3	34.1	33.8	10.8
	165.9	158.2	157.5	
		39.55	39.38	
		39.38		
		93		
		39.47		
		28.00		
		+ 11.47		

57°

E	8.6	9.3	9.0
F	0.3	0.8	0.6
G	22.7	23.2	23.0
H	2.0	1.7	1.8
	33.6	35.0	
	8.40	8.5	
		8.4	
		16.9	
		8.45	

21.9	23.4	21.6	22.2	12.9
13.4	13.8	13.2	13.6	12.8
30.8	31.8	30.7	30.8	7.8
12.2	14.4	12.0	12.3	14.4
	83.4	77.5	78.9	
		19.38	19.73	
		73		
		111		
		19.56		
		8.45		
		+ 11.11		

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Second Series

87°

E	17.2	17.8	17.5
F	9.0	9.1	9.0
G	26.0	27.2	26.6
H	7.7	7.4	7.6
	59.9	61.5	
	14.98	15.38	
	15.28		
	3036		
	15.18		

30.2	30.6	29.7	12.7
17.5	17.2	17.8	8.5
36.6	37.4	35.8	10.0
19.9	20.1	19.7	12.3
	105.3	103.0	
	26.33	25.75	
	25.75		
	52.08		
	26.04		
	15.18		
	+10.86	+6.3	+4.5

117°

E	28.2	28.0	28.1
F	15.0	14.6	14.8
G	34.2	33.7	34.0
H	16.7	17.1	16.9
	94.1	93.4	
	23.53	23.35	
		53	
		88	
		23.44	

40.2	40.7	39.7	12.1
25.3	25.2	25.4	10.5
45.2	45.6	44.9	11.2
32.8	33.3	32.4	15.9
	144.8	142.4	
	36.2	35.6	
		36.2	
		71.8	
		35.9	
		23.44	
		+12.46	8.90

147°

E	9.4	10.1	9.8
F	-4.3	-2.4	56.6
G	14.3	15.2	14.8
H	-1.6	-2.1	58.2
	23.7	25.3	
	-5.9	4.5	
	17.8	20.8	
	4.45	5.2	
		4.45	
		9.65	
		4.83	

21.2	22.4	21.3	21.1	11.4
2.7	4.0	3.2	2.2	6.1
23.0	25.0	23.0	22.9	8.2
14.2	16.1	14.2	14.2	16.0
		61.7	60.4	
		15.43	15.1	
			.43	
			.53	
			15.27	
			4.83	
			+10.44	+2.2

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177°

E	21,1	21.6	21.3
F	2,8	3,6	3.2
G	23.3	23,0	23.2
H	14.4	14,1	14.2
	61.6	62.3	
	15.4	15.58	
		98	
		15.49	

27.8 29.6 27.4 28,1 6.5
100 11.6 10,0 9.9 6.8
32.7 33.5 32,1 33.3
24.6 27.0 24,2 25,1 9.5
101.7 93,7 96.4 10.4
25.43 23.43 24,1
24.1
47.53
23.77
15.49
+ 8,28

+311 +630 +1084 906 451
+341 850 +1246 1284 356
-341 828 1044 1165 2,16
837 828 1023 3,41
10.22 10.35

0 2

10,31 -11 -11
12,38 +1,56 +1,85 2,07
11.06 +0.64 +2,49 -1,32
8.32 -2,10 +,39 -2,94
10.30 -0,12 +,27 +1,58
11,35 +1,13 +1,40 +1,25
9.49 -,93 +1,47 -2,06
10,33 -,09 +,38 +,84
9,99 -,43 -,25 -,55
8,73 -1,69 -1,74 -1,26
11,47 +1,05 -,69 +2,94
11,11 +0,69 +,00 -,96

1042 12502

207°

E	34.7	35.0	34.8
F	17.8	19.1	18.4
G	43.9	44.9	44.4
H	33.7	33.3	33.5
	130.1	132.3	
	32.53	33,08	
		32,30	

213

42.3 44.3 42,0 42.6 7.5
25.0 26.1 24,6 25.5
57.0 59.2 57,0 57.0 6.6
46.2 49.2 46,2 46.3 12.6
169.8 171.4 12.7
42.45 42.85
85
4265
3230
1035

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138

601 23

Th 57.0

87°

26.1	45.6	45.6	45.8	46.1	45.8	54.6	53.8	53.4	54.8	54.5	10.8
12.0	30.0	29.2	30.1	29.8	29.8	35.5	35.2	34.9	35.8	36.0	7.7
32.4	50.1	49.7	50.1	51.1	50.0	57.3	56.6	57.4	57.8	57.4	9.3
13.0	29.0	30.1	31.0	31.2	30.3	37.7	38.6	37.4	37.4	37.3	9.4
8 3 5	1547	1546	1570	1582				1851	1858	1852	
20.4	38.68	38.65	39.25	39.55			46.05	46.28	46.45	46.30	
	38.65						46.27				
	39.25						46.45				
	39.55						46.30				
	3613						108				
	39.03						46.27				

+2.0

117°											
26.6	54.3	53.8	54.3	54.1							
6.3	35.0	35.2	35.3	35.3							
29.0	56.6	56.9	56.8	56.8							
11.2	40.0	39.4	39.7	39.7							
131	1859	1853	1861								
18.28	46.48	4622	46.52								
			46.45								
			22								
			12 2								
			46.41								

67.2	59.6	67			5.1	11.8					
49.1	44.8	44.7			44.8	9.5					
16.2	5.6										
32.3	53.2	53.2			6.1	9.0					
24.1	53.2	53.2			53.1	13.5					
66.4	230 2	53.5			1091						
					57.28						
					57.43						
					4641						
					11.02						

Addends

147°

21.4	21.0	22.2	21.8	13.65	34.7	34.9	34.5	30.9	12.9	24.75	
1.6	0.8	1.0	1.3	12.82						24.95	
22.0	21.5	81.7	21.8	13.52	9.5	9.4	9.6	5.3	5.2	170	
9.6	8.9	9.2	9.4	99	32.3	32.0	32.6	17.1	10.5	24.85	
546	53	541		13.34	22.9	22.7	23.1	9.1	13.5	13.34	
13.65	12.82	13.52			990		998			+11.55	
					24.75		24.95				

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177°

30.9	30.1	29.7	30.0	30.2		37.0	37.0	37.3	36.8	3 – 6.8	
5.3	6.4	5.7	5.5	5.7		13.9	14.0	14.2	13.5	8.2	29.37
27.1	28.6	28.4	27.7	28.0	20.60 21.10	37.7	37.8	37.7	37.6	9.1	29.50 29.25
19.1	19.3	19.3	19.1	19.2	20.78 24.58	29.2	29.7	28.5	29.1	10.0	112
824	844	831	823		3.06		1175	1180 29.50	1170		29.37
20.60	21.10	20.78	20.58		20.76		29.37	39.20	29.25		20.76
											8.61

207°

18.2	18.3	18.2			28.0	28.6	28.3	-10.1		
54.8	55.0	54.9	25.95		4.3	4.3	4.3	9.4		21.80
19.0	18.8	18.9	25.70		32.1	32.1	32.1	13.2		21.92
11.8	10.7	11.2	165		22.8	22.7	22.8	11.6		172
28.38	28.28		25.41		872	877				21.86
20.95	20.70				21.80	21.92				10.90
10.95	10.20									9.55
										11.16

237

237°

17	19.6	19.6	19.6		26.2	26.6	25.8	6.6		
36.7	54.8	54.8	54.8	28.96	3.0	3.0	2.9	8.2		2254
4.0	22.6	22.8	22.7	98	36.4	37.0	35.8	13.7		1242
57.4	12.6	12.6	12.6	194	26.2	26.6	25.8	13.6		1012
9.73				28.97						
2432	2896	2898				932	903			
	7240	7245				2330	2258			
							58.8			
	1240						22.94			
	1245									
	1242									
	1242									

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267°

28.0 29.6 28.9
4.9 6.1 5.5 24.50
37.4 38.8 38.1
27.7 28.1 27.9
2780 2826
9.50 10.65
015
10.08

37.4 37.3 37.5 8.5
15.8 15.6 15.9 15.3
50.0 49.9 50.1 11.9
35.9 36.2 35.6 8.0
3190 3191
19.75 19.78

15.76
10.08
9.68

297°

20.4 21.6 22.6
32.8 0.4 1.5
18.9 34.0 36.1
19.7 20.6
7.03 2557 2608
20.10 3.92 5.20
5.08 9.12
4.56

30.2 30.0 30.3 8.6 21.6
13.8 13.5 14.0 13.4
44.4 44.8 44.1 10.4
28.0 28.0 28.1 9.3
2963 2965
4.08 4.12

14.10
4.26
9.84

327°

21.8 21.7 21.8
6.0 5.6 5.8
37.4 37.2 37.3
19.7 20.7 20.2
2649 2652
6.23 6.30

31.2 30.9 31.5 9.4
19.6 18.9 20.2 13.8
50.0 49.4 50.6 12.7
28.7 28.8 28.6 8.5
308.0 310.9
17.50 17.73

17.61
6.26
11.35

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357°

26.1	26.0	26.0
14.7	14.7	14.7
45.6	45.2	45.4
23.3	23.6	23.4
2897	2895	
12,43	12,38	

36.6	36.8	36.5	10.6
26.0	26.1	25.8	11.3
51.9	52.0	51.8	6.5
32.1	32.2	32.1	8.7
	3271	3262	
	21,78	21,55	

2166
12,40
9,26

387°

28.7	28.5	28.6	8.61	-1.61	43.3	-.87	45.8	44.6	24.56	5.64	5.64	1.80
18.1	18.6	18.4	11.16	+.94	27.2	-.03	28.0	27.6	13.48	3.70	3.72	9.2
43.1	43.1	43.1	10.52	+.30	53.8	+.17	53.8	53.3	+.14	10.56	.86	9.2
23.8	24.0	23.9	9.65	-.54	34.2	-.47	34.7	34.8		-.85	-.85	10.9
2937	2942		9.54	-.68	3374		3423				+1.66	
13,42	13,55		10.35	+.13	24,35	+.22	25,58				-1.08	
			9.26	-.96		-.28	1393				+.44	
			11.67	+1.26		-.67	2486					
			12.26	+2.04							+1.65	
											+1.92	

417

35.0	35.0	35.0	
19.1	21.0	20.0	
44.9	44.4	44.6	
25.6	25.1	25.4	
3046	30.55		
1615	1638		
	13		

12267
1032

49.6	49.6	-14.6	2852
34.0	33.2	13.2	16,26
54.7	54.0	9.4	+12.26
37.0	36.1	10.7	
3553	3529		
28,82	28,23		
1615	1055		
	1173		
	11.97		

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142

Before beginning 2° Series reversed telescope with current on.

Clamped radius by driving nails in wood

7.24 Oct 23

2 Series

87°

25.0 25.0 25.0
8.8 9.0 8.8 18,58
28.7 29.2 29.0 18,70
11.8 11.6 11.7 18,64
743 748
18,58 18,70

41.2 42.6 41.3 41.2 16.2 + p146
20.6 21.6 20.0 21.2 11.8 32.60
43.5 44.1 43.0 44.0 14.5 33.35
26.6 27.0 26.1 27.0 14.9 32.97
1893 1304 1334 18.64
34.92 3260 33.35 +14,33
18,58 18,70
14.02 14,65

117°

17.8 13.1 13.7 14.6 15.0 14.1
-2.6 -6.8 -5.7 -5.0 -5.1 54.5 5.65
15.9 15.0 16.8 16.7 17.2 16.4 6.85
-0.0 -0.9 -0.7 -0.4 +0.3 59.6 6.01
280 305 313 325
-77 -54 -51
203 226 259 274
5.08 5.65 6.48 6.85

34.8 34.1 30.8 30.9 30.9 30.9 31.0
13.6 12.9 9.9 10.8 10.1 8.7 10.0
35.1 35.0 31.2 30.8 31.9 30.8 31.8
24.0 23.6 19.5 19.2 19.6 19.0 20.7
1075 1064 917 925 894 935
26.88 26.60 2292 23.13 22.35 23.38
7.78 7.78 508 565 648 655
18.10 18.82 1784 1746 1587 1653

147°

23.6 23.3 23.4
3.0 3.1 3.0 15
23.0 24.2 23.6
11.1 12.2 11.6
607 628
15.18 15.70

40.6 40.9 40.3 17.2
14.9 15.4 14.4 11.9
38.9 38.6 39.2 15.3
31.0 31.2 30.7 19.4
1261 1246
3152 3115
1.14 1550
16.14 15.45

1635

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Oct 23

177°

22.7	35.6	35.1	35.3	48.6	48.2	49.1	13.3
2.8	11.3	11.2	11.2	24.2	24.0	24.4	13.0
24.0	35.4	34.8	35.1	49.6	49.4	49.9	14.5
12.2	26.1	26.7	26.4	42.6	42.8	42.4	16.2
559	1084	1078			1644	1658	
2.8					4110	4145	
531	27.10	26.95			2710	26.95	
13.25					14.00	14.50	

207°

30.0 16.7	27.0	26.3	26.6	40.5	40.1	40.9	13.9
10.0 15.4	3.2	2.4	2.8	15.6	15.1	46.1	12.8
30.8 14.8	27.6	28.7	28.2	45.0	44.7	45.3	16.8
14.0 19.9	20.2	24.6	20.4	36.3	36.0	36.7	15.9
898	780	780			1359	1390	
2245	19.50	19.50			3398	34.75	
663					19.50	19.50	
1582					14.48	15.25	

237

24.4	43.1	43.3	26.9	25.9	25.4	52.1	52.6	35.8	36.7
0.0	20.0	19.1	2.9	1.6	2.2	28.8	29.3	12.2	12.5
28.8	47.6	48.0	31.3	30.9	31.1	3.0	3.0	46.3	46.6
19.7	38.8	38.8	21.7	20.7	21.2	53.2	52.8	36.2	37.3
729	1495	1492	428	851		2571	77	1305	1331
16.23	37.38	37.30	2070	21.28		64.28		3263	32.28
								2070	21.48
								11.53	10.80

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267°

14.2	20.1	19.2	19.6	19.4	29.0 29.5	29.0	28.7	28.6	9.6
50.3	57.1	−58.0	−3.0	57.5	6.5 7.0	7.1	5.9	6.1	9.0
24.0	30.2	30.9	31.8	31.4	42.0 42.8	41.8	41.7	41.5	10.6
14.3	20.7	20.7	20.7	20.7	28.3 29.2	28.0	28.0	28.0	7.6
2828	1881	3689	721		1085	1059	1043	1042	
9070	3203	9240	−30 691		27.12	2648	2608	2605	
		17.18	17.28		10.70	10.20	10.28	10.42	
					16.42	15.78	15.80	15.63	
							8.80	15.36	8.83
									883

297°

15.8	17.3	17.8	18.0	17.5	27.6 28.2	28.2	27.0	27.0	10.1
− 5.2	− 3.6	− 2.7	−1.1	56.8	12.8 11.0	10.8	10.0	9.6	16.0
29.7	31.8	31.9	32.−	31.1	42.5 43.4	43.3	41.8	41.4	11.4
15.6	17.0	16.8	17.7	16.8	26.9 27.8	28.0	26.0	25.7	10.1
611	667	665	689		1104	1103	1048	1037	
−52	−36	−27	−11						
559	625	638	678		27.60	27.58	26.20	25.93	
13.98	15.62	15.95	16.95		13.98	15.62	15.95	16.95	
					13.62	11.96	10.25	8.98	
								10.25	
								11.56	
								13.62	
								44.81	
								11.20	

327°

19.0	18.6	14.8	18.8		27.0 27.6	27.1	26.8		8.2
3.0	1.8	2.4	2.4		13.8 14.8	13.8	13.7		11.4
33.8	33.8		33.8		45.3 46.1	45.4	45.2		11.5
18.3	18.1		18.2		24.3 25.0	24.3	24.3		6.1
741	723				1135	1106	1100		
18.53	18.08				28.38	27.65	27.50		
						18.53	18.08		
						9.12	9.42		
									927

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357°

14.8	14.6	15.0	14.8
2.4	2.4	2.6	2.5
34.7	34.0	34.1	34.3
13.3	13.0	11.6	12.6
652	640	633	
16.30	16.00	15.83	

25.6	25.3	25.8	10.8
13.9	13.8	14.0	11.4
41.2	41.1	41.3	6.9
22.8	22.8	22.7	10.2
	1030	1038	
	25.75	25.95	
	16.30	16.00	
	9.45	9.95	
		9.50	

387°

28.6	29.0	28.8
17.4	17.5	17.4
44.7	44.2	44.4
24.6	25.0	24.8
11.53	11.57	
28.83	28.93	

44.8	44.0	45.5	16.0
28.4	27.0	29.9	11.0
55.0	54.6	55.4	10.6
35.8	35.5	36.2	11.0
	1611	1670	
	40.28	41.75	
	26.83	28.93	
	11.45	12.82	
		11.45	
		1.37	
		12.13	

417°

20.4	21.4	21.6	21.1
4.9	5.8	06.6	5.8
30.9	32.1	30.7	31.2
11.8	13.3	12.1	12.4
680	726	810	
17.00	18.15	20.25	

37.1	37.2	37.0	16.0
20.7	20.2	21.2	14.9
43.0	42.8	43.2	11.8
25.4	25.2	25.6	14.0
	1254	1270	
	31.35	31.75	
	17.00	18.15	
	14.35	13.60	
		14.35	
		.75	
		1398	

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Oct 23

0

87

19.8	20.3	20.0	35.8	36.6	35.3	36.3	15.8
2.4	3.7	3.0	15.0	15.0	14.9	15.2	12.0
24.9	25.9	25.4	39.0	40.1	38.6	39.3	13.6
8.0	7.2	7.6	23.3	24.6	23.0	23.7	16.7
551	571			1163	1118	1145	
13,78	14,28			29,05	27,95	28,63	
					1378	14,28	
					14.17	14.35	

14,36 −60	+8,73	−1,10	−110
16,71 −55	11,21	+1,98	+66
16,29 −50	11,39	+1,96	+264
14,25 −45	10,35	+1,32	+356
14,86 −40	10,86	+1,43	+539
11,28 −35	9,88	−1,55	−384
10,13 −30	9,53	−1,60	+229
11,20 −25	8,70	−0,73	+151
9,27 −20	9,27	−2,16	−65
9,26 −15	8,20	−1,23	+82
11,13 −10	10,83	+1,40	+48
9,98 −0	9,98		+48
	119,23		
	+9,43		

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Oct 24

87°

72. 50.6

12.7	10.4	12.1	12.8	12.6	13.0	13.4	12.8	26.1	26.6	25.7	26.2	26.2	23.4	23.2
58.8	56.1	57.6	58.4	58.2	57.7	58.8	58.3	7.1	9.8	6.1	6.8	7.4	5.0	5.1
15.4	14.0	15.5	15.3	15.2	14.7	16.0	15.4	26.2	26.0	25.8	26.1	26.5	24.0	24.3
0.1	58.0	59.0	59.1	59.9	59.0	0.4	59.6	12.0	13.1	11.0	11.1	11.8	9.6	10.2
70	85	2642	2656	2659	2644	2686		714	775	686	702		620	627
		6.05	6,40	6,48	6.10	7.15								
								17,85	19.38	17,15	17,55		15.50	15.68
								6,05	6.40	6.48	6.10			
									98	10,67	11,45			

Mean 87° see p 151
E. −15.0
J. 10.8
Y. 12.4
H. 13.80
117

350
+17
3210
1070

23.4	23.2	24.1	24.3	23.8	36.5	36.4	36.8	36.0	−12.7	
5.0	5.1	5.2	7.1	5.6	18.3	17.7	18.6	18.6	12.7	
24.0	24.3	25.0	24.1	24.4	36.1	35.8	36.4	36.2	117	+17
9.6	10.1	10.0	10.2	10.0	26.0	26.1	25.9	26.0	16.0	
620	627	643	657			1164	1177	1168		
15,50	15,68	16,08	16,43			2910	2943	2920		
						15,50	15,68	16,08		
						13.60	13,75	13,12		

147
13.49

147°

20.9	22.0	22.3	22.2	37.4	38.0	36.8	−15.2		
2.8	2.9	3.2	3.0	14.2	14.6	13.9	11.2		
21.2	20.6	21.2	20.9	33.6	34.1	33.2	12.7	+17	
11.1	11.0	12.0	11.5	27.5	28.0	27.0	16.0		
545	565	587			1147	1109			
1370	1413	1468			28.68	27.73			
		+3			14,13	14,68			
					14,55	13.05			
						60			

14,40

531

13.80

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177°

05.0	04.4	14.7 ~~14.7~~		15.8	16.0	15.7	11.1
52.9	52.7	~~52.8~~		4.2	4.9	3.6	11.4
11.5	10.8	11.2		25.8	25.9	25.7	14.6
5.7	5.0	5.4		19.4	19.4	19.3	14.0
651	629				662	643	
16.28	15.73				16.55	16.08	
					6.28	5.73	
					10.27	10.35	

207°

23.4	23.3	22.8	23.1	33.4	34.6	33.1	33.7
2.9	2.0	3.3	3.1	12.0	13.0	12.2	11.9
23.5	23.5	23.6	23.6	36.0	36.8	35.8	36.2
17.1	17.0	17.7	17.4	28.6	30.0	29.0	28.2
669	628	674				1101	1100
16.73	15.70	16.85				27.52	27.50
						16.53	16.50
						10.99	10.65
							1071

237°

10.4	10.9	10.6		19.4	19.8	19.0	8.8
49.7	49.8	49.4		58.5	-0.2	-1.8	19.1
13.6	13.7	13.6		27.7	27.8	27.6	14.1
6.7	6.2	6.4		19.6	19.6	19.7	13.2
2604	2599				672	663	
5.10	4.98				-1.2	-1.8	
					660	645	
					16.50	16.13	
					5.10	4.98	
					11.40	11.15	

11.27

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267°

21.0	21.2	21.1	
0.1	0.1	0.1	
29.4	29.0	29.2	
21.0	21.3	21.1	
715	716		
17.88	17.90		

29.5	29.6	29.5	− 8.4
10.9	10.6 40.7	11.2	10.8
41.0	28.4	41.2	12.8
28.8		29.1	7.7
	1093	1110	
	27.33	27.75	9.65
	17.88	17.90	
	9.45	9.85	

297°

18.7	19.8	19.2	19.2
− 1.1	1.0	− 0.7	19.2
29.9	30.9	30.0	30.3
− 17.8	19.1	18.1	18.3
664	708	673	35
− 1.1		− 0.7	17.17
653	~~1770~~	666	
16.33	17.70	16.65	

29.8	29.5	30.0	− 10.6
15.7	15.8	15.6	16.5
43.4	42.8	44.1	13.1
29.4	29.1	29.7	11.1
	1172	1194	
	29.30	29.85	12.82
	16.33	17.17	
	12.97	12.68	

327°

20.9	20.9	20.9	
6.9	6.0	6.4	
34.7	35.0	34.8	
19.2	20.2	19.7	
817	821		
20.43	20.53		

29.0	29.6	28.4	8.1
19.3	19.5	19.2	12.9
46.6	47.2	45.9	11.8
26.4	26.9	26.0	6.7
	1232	1195	
	30.80	29.88	
	20.43	20.53	
	10.37	9.35	9.86

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357

22.7 23.8 22.0 22.8
12.2 13.3 12.3 12.6
40.4 40.7 39.7 40.3
19.7 20.2 19.0 19.6
950 980 930
2375 2450 2325
2450
4775
2388

336 33.8 33.3 — 10.8
23.0 23.1 22.8 10.4
47.0 47.2 46.8 6.4
29.8 30.0 29.7 10.2
1341 1326
33.53 33.15
23.75 23.88
9.78 9.27 9.52

387

23.8 22.6 23.8 23.4
14.7 12.3 14.0 13.7
37.1 36.0 37.2 36.8
20.0 17.9 19.3 19.1
956 888 943
2390 2220 2358
2220
578
2289

37.0 37.0 37.0 — 13.6
23.6 23.4 23.9 9.9
45.6 45.9 45.4 8.8
28.6 28.3 29.0 9.5
1346 1353
33.65 33.83
23.90 22.89
9.75 10.94 069 10.34

417

12.6 12.8 11.9 12.4
— 0.7 — 0.9 — 1.8 58.9
21.3 20.6 20.0 20.6
4.2 3.7 3.8 3.9
381 371 357
— 7 — 9 — 18
374 362 339
9.35 9.05 8.48
905
1753
8.76

28.8 28.8 28.8 — 11.4
14.4 14.2 14.7 15.5
32.8 32.3 33.3 12.2 — 10
16.0 16.1 15.9 12.1
914 927
2285 2318
9.35 8.76
13.50 14.42 > 52
1356

2 — Comet

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Oct 24 — 2° Series

67°

23.8	21.6	22.7	39.4	39.5	39.4	−16.7		
10.8	8.0	9.4	22.0	22.7	21.3	12.6		
27.6	26.8	27.2	40.8	41.0	40.7	13.6	16.5	11.0
12.2	10.7	11.4	26.8	27.3	26.3	15.4		
744	671			1305	1277			
18,60	16,78			32.63	31,93			
				18,60	16.78			
				14,03	15.15			

117°

−42	10.70	−42
155	13.49	+37 195
	13.80	+26 463
	10.35	−77 386
1181	10.71	−41 345
	11.27	+15 355
	9.65	−147 218
	12.82	+170 388
	9.86	−126 256
	9.52	−160 +96
	10.34	−78 +8
	10.86	−08
	12) 133 47	
	11,12	

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2° Series

152

Oct 24

87°

22.1	21.3	21.3	20.9	21.4	40.3	41.7	40.0	39.7	39.8	-18.9	-19.6 -19.2
10.7	9.2	9.2	8.7	9.4	22.1	22.1	21.9	21.8	22.6	12.7	15.9 -14.3
26.0	26.1	26.1	25.3	25.9	41.4	42.6	42.0	40.4	40.7	15.5	16.5 -16.0
10.8	8.6	9.3	9.2	9.5	26.4	27.2	26.7	25.8	26.0	16.9	18.9 -17.9
696	652	659	641		1336	1306	1277	1291			
16.68	16.30	16.48	16.03		3340	3265	3192	3228			
15.40					15.40	16.30	16.48	16.03			
					16.00	16.25	15.44	16.16			

16.25
16.23
16.00
16.06
24
16.06

117°

20.0	20.2	20.1		39.3	39.0	39.6	-19.2
2.0	1.1	1.6		20.6	20.2	21.0	19.0
21.6	21.7	21.6		39.2	39.2	39.2	17.6
6.2	6.7	6.4		29.0	29.0	29.0	22.6
498	497			1274	1288		
12.45	12.43			31.85	32.20		
				12.45	12.43		
				19.40	19.77		

19.58

147°

23.1	21.8	21.8	22.2	41.8	42.1	41.4	-19.6
4.8	3.6	4.0	4.1	19.2	19.7	18.7	15.1
22.1	22.6	22.1	22.3	39.2	39.7	38.6	16.9
12.7	11.1	11.8	11.9	33.0	33.6	32.3	21.1
627	591	597		1351	1310		
15.68	14.78	14.93		33.78	32.75		
		14.78		15.68	14.86		
		171		18.10	17.89		
		14.86					

~~17.99~~
18.00

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1884phae.proj.1763.

Oct 21

177°

23,5	23.6	23.6	38.2	38.4	38.0	−14.6	
0,3	0.7	0.5	15.9	16.2	15.6	16.4	
20.9	21.0	21.0	38.5	39.2	37.8	17.5	
14.9	13.8	14.4	33.0	33.1	33.0	18.6	
596	591			1269	1244		
14,90	14,78			31,73	31,10		16.58
				14,90	14,78		
				16,83	16,32		

207°

25.3	26.3	24.1	25.2	39.8	39.9	39.6	−14.6	
3.7	2.8	2.0	2.8	17.5	17.2	17.8	14.7	
25.8	24.8	25.0	25.2	43.1	43.1	43.1	17.9	
19.8	18.4	18.7	19.0	36.1	36.1	36.1	17.1	
746	723	698		1363	1366			15.90
18,65	18,08	17,45		3408	34,15			
		18.08		18.65	17.77			
		35.53		15.43	16.38			
		17.77			15.43			
					31.81			

237°

13.7	13.8	13.8	25.4	25.3	25.4	−11.6		
51.5	51.5	51.5	3.3	3.7	3.0	11.8		
16.8	16.3	16.6	34.4	34.5	34.4	17.8		
9.6	9.7	9.6	26.8	27.1	26.4	17.2		
271.6	271.3			906	892			14.61
7.90	7.83			22,65	22,30			
				7.90	7.83			
				14,75	14,47			

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267°

21.4	21.8	22.2	21.8	34.8	34.9	34.7	13.0
−0.2	+0.7	0.8	0.4	15.0	15.8	14.2	14.6
31.2	30.8	30.0	30.7	46.7	47.2	46.2	16.0
22.9	21.9	22.1	22.3	34.6	35.0	34.2	12.3
755	752	751			1329	1293	
−2							
753	1880	1878			3323	3233	
18.83					18.83	18.79	
21.33					1440	1354	1397

297°

20.9	21.0	19.6	21.0	21.9	21.6	20.9	33.6	33.0	30.1	30.8	31.6	30.9	30.7	33.3	9.8		
1.1	0.7	0.7	2.0	3.3	3.0	1.6	18.0	17.9	17.8	17.2	17.8	18.1	18.0		16.4		
32.3	32.7	34.0	34.2	35.0	34.8	33.6	48.1	47.3	47.6	46.0	46.1	47.1	47.0		13.4		
19.7	20.0	19.1	20.0	21.6	20.9	20.1	33.1	33.2	30.8	31.2	30.1	31.7	31.7		11.6		
740	744	734	772	818	1073		1338	1314	1263	1252	1256	1278	1460				
18.50	18.60	18.35	19.30	20.45			33.45	32.85	31.58	31.30	31.40	31.95					
							16.50	18.60									
							14.95	14.25									
								95									
								120									

327°

23.9	24.1	24.0	36.1	35.8	36.0	12.0
9.1	9.6	9.3	25.8	26.0	25.9	16.6
38.2	38.3	38.2	52.7	52.1	54.4	14.2
23.3	23.7	23.5	35.0	34.8	34.9	11.4
945	957		1516	1507		14.02
23.63	23.92		37.90	37.68		
			23.63	23.92		
			14.27	13.76		
				27		
				503		

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357°

18.4	17.6	18.0	
7.6	6.8	7.2	
36.1	35.6	35.8	
15.0	14.9	15.0	
771	749		
19.28	18.72		

32.9	33.4	33.1	−15.1
22.3	22.9	22.6	15.4
47.2	47.3	47.2	11.4
29.9	29.7	29.8	14.8
1323	1333		
33.08	33.32		
19.28	18.72		
13.80	14.60		
	80		
	40		

14.20

387°

22.6	21.9	22.2	21.8	22.1	
12.4	11.3	12.6	13.2	12.4	
37.1	35.1	37.2	36.7	36.5	
19.0	17.0	17.8	17.3	17.8	
911	853	898	890		
22.78	21.32	22.45	22.25		
	22.78				
	9.10				
	22.03	22.35			

42.4	41.8	40.1	41.8	−18.8	
27.7	28.4	27.1	27.9	15.1	
51.6	51.2	49.1	50.2	13.1	
34.7	35.0	31.4	33.4	14.4	
1564	1564	1477	1533		
39.14	39.10	36.92	38.32		
22.78	21.72	22.0	22.8		
16.32	17.38	14.87	15.52		
	32		14.87		
	60		1084		
			15.42		

417°

30.4	29.7	30.3	29.1	29.9
16.6	16.1	16.8	16.1	16.4
39.6	39.1	39.6	39.1	39.4
21.8	22.0	22.3	21.0	21.8
1084	1069	1090	1053	
27.10	26.72	27.25	26.32	
	27.10		7.25	
	182		13.67	
	27.91		26.78	

47.8	50.3	50.6	47.8	47.5
34.3	36.6	36.6	34.8	33.8
52.8	55.1	55.4	53.6	52.1
36.5	38.8	39.1	37.2	35.8
1808	1819	1734	1692	
45.20	45.48	43.35	42.30	
27.10	24.72	27.91	26.78	
18.10	18.76	15.44	15.52	
	86			

17.9
17.9
13.4
14.7

15.46

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3d Series

Oct 24

~~297°~~ 0
87

h 61.2°

18,7	18.6	18.6	18.0	18.5	38.1	38.4	37.9	38.6	37.4	19.6
4.0	4.0	5.0	5.2	4.5	20.4	20.8	19.9	20.6	20.2	15.9
24.1	23.0	23.3	23.7	23.5	40.0	41.4	41.9	40.7	39.9	16.5
8.6	7.0	8.0	7.1	7.7	26.6	27.0	27.6	25.8	25.9	18.9
554	526	549	540			1276	1273	1257	1234	
13,85	13,15	13,73	13,50			31,90	31,82	31,42	30,85	
						13,85	13,15	13,73	13,50	
						18,05	18,67	17,69	17 35	

18 67
17 69
17 35
3,76
17.94

17.94

16.06 +.35 +35
19.58 +3.87 422
18.08 +2.37 659
16.58 +0.87 742
15.90 +.19 563
14.61 −1.10 651
13.97 −1.74 685
14.60 −1.11 368
14.02 −1.69 +42
14.20 −1.51 +048
15.42 −.29 +19
15.48 −0.23 +6.700
+15.71
685.0
15.71

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Oct 28 T = 51.0°

-17.0	25.4	21.0	20.8	21.8	21.2
13.1	14.5	7.0	7.0	7.0	7.0
14.5	38.7	24.3	23.6	24.2	24.0
16.3	12.2	7.7	8.0	8.2	8.0
		600	594	612	
		1500	1485	1530	

38.2	38.5	38.1	37.9	
20.1	20.7	20.1	19.4	
38.5	39.0	38.4	38.1	
24.3	25.0	24.0	23.8	
	1232	1206	1192	
	3080	3015	2930	
	1540	1485	1530	
	15.40	1530	14.00	
		1540		
		1510		
		1517		

	22.0	21.4	22.6	22.0
	2.4	2.4	2.8	2.5
	21.9	21.6	22.6	22.0
	7.4	7.2	8.4	7.7
	537	526	564	
	1342	1315	1410	

38.2	38.4	38.2	38.1	16.2
19.6	19.7	19.0	20.1	17.1
37.0	37.2	36.6	37.2	15.0
27.3	28.1	26.8	27.0	19.6
	1234	1206	1224	
	3085	3015	3060	
	1342	1315	1410	
	17.43	17.11	16.50	
			2093	
			16.98	

	20.6	21.0	21.5	21.0
	2.0	2.0	1.9	2.0
	19.7	19.9	19.7	19.8
	10.0	11.2	9.9	10.4
	523	541	530	
	1343	1352	1325	

39.9	39.6	40.2		18.9
16.0	16.1	16.0		14.0
35.6	35.7	35.6		15.8
29.1	29.2	29.0		18.7
	1206	1208		
	3015	3020		
	1343	1338		
	1672	1682		
		1677		

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87° After No. 2

27.6	27.6	27.6	
12.9	13.0	13.0	
29.9	29.7	29.8	
13.0	14.1	13.6	
83 4	84 4		
2085	2110		

44.1	43.6	44.6		16.5
	25.2	25.7		12.4
25.4	44.0	44.2		14.3
44.1	29.2	30.0		16.0
29.6	142 0	144 5		
	3550			
	2085	3612		
	1465	2110		1484
		1502		
		1445		
		567		

87° After No 5

37.0	36.3	34.9	36.1	36.4
21.8	22.6	21.8	21.3	22.0
39.9	40.7	39.1	39.8	40.2
22.5	24.0	22.6	23.2	23.6
1184	1236	1184	1204	
2970	3050	2960	3010	

55.0	55.2	55.1	54.9	18.6
37.8	39.8	37.9	37.8	15.8
58.4	58.2	56.8	56.1	16.2
41.1	42.1	41.6	40.7	17.5
193 3	1981	1914	1895	
4833	4985	4785	4738	
2970	3050	2960	3040	
1863	1935	1825	1698	
			1696	

After No 9

22.3	22.3	23.5	22.2	22.3	35.3	37.7	36.1	35.0	34.7	13.0
0.8	1.2	1.9	1.4	1.1	15.6	17.8	16.8	15.4	14.7	14.6
30.0	29.8	30.7	29.8	29.9	44.9	47.7	46.1	44.4	44.3	15.0
22.0	21.4	22.8	22.0	21.8	32.8	34.7	33.2	32.8	32.4	14.0
75.1	74.9		75.4				132 2	127 6	126 1	
1895	1865		1885				3305	3150	3152	
							1865	1875	1887	
							1440	1325	1267	
								1440		
								1267		
								1031		
								1344		

After No 12 p163

87°			p163		mean 87°	
E	17.0	16.5	14.6	13.0	14.6	16.9 E
7	13.1	12.4	15.8	14.6	14.6	14.9 7
9	14.5	14.3	16.2	15.0	17.6	15.5 9
H	16.3	16.0	17.5	11.0	19.3	16.2 H

1684		
1887		
1696		
13.44	3077	
17.26	1654	
3009		
1526		

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16.6	16.8	17.8	18.1	18.0
54.8	53.6	54.8	55.3	55.0
13.9	12.8	14.7	14.2	14.4
7.0	5.8	7.0	7.0	7.0
2714	2690	2743	2746	
6785	6725	6858	6865	

31.4	31.8	31.3	31.2	31.4
10.0	9.9	10.9	9.2	15.0
30.2	31.9	29.8	30.8	15.8
26.0	27.0	25.9	25.1	19.0
	1006	974	963	
	2515	2435	2408	
	781	838	865	
	1730	1640	1543	
		1147	2059	
		1553	1488	

24.4	24.8	25.7	25.7	25.1
3.2	2.8	4.1	4.1	3.6
23.8	23.2	24.8	24.1	24.0
18.4	18.3	18.9	18.2	18.6
696	691	735	721	
1745	1728	1838	1805	

39.3	38.8	39.1	39.4	14.2
16.5	16.1	15.9	17.0	12.9
40.4	40.4	39.9	41.0	16.4
24.1	34.0	34.1	34.1	15.5
	1293	1290	1315	
	3232	3225	3288	
	1945	1728	1820	
	14.8	14.9	14.68	
			57	
			52	
			14.84	

31.7	
7.8	
32.1	
26.1	
977	
2442	

43.8	12.1
21.1	13.3
51.8	19.7
44.7	18.6
161.4	
40.35	
2442	
1553	

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7.0	6.8	6.9	
45.1	44.8	45.0	
14.8	14.3	14.6	
7.7	6.6	7.1	
74.6	72.5		
1865	6312		
6365			

20.0	19.9	20.0	−13.1
0.5	0.2	0.8	15.5
31.4	31.4	31.3	16.8
19.8	20.2	19.4	12.7
	71.7	71.5	
	1752	1788	
	365	312	
	1427	1476	1451
		03	

30.0	30.5	30.2	
9.6	9.4	9.5	
40.9	40.7	40.8	
28.7	28.6	28.6	
1092	1092		
2730	2730		

42.0	42.3	41.6	−11.8
26.8	26.9	26.8	17.3
55.3	55.8	54.8	14.5
41.2	41.7	40.7	12.6
	1667	1639	
	4168	4098	
	2730	2730	
	1438	1368	
		1438	
		806	
		1403	

34.0	33.6	34.6	34.1	
19.1	18.4	18.9	18.8	
46.1	46.4	45.9	46.1	
32.1	31.0	32.3	31.8	
131.3	1294	131.7		
3282	3235	3292		
		1,35		
		129		

	+2.00		+2.00	
46.0	43.6		44.3	−11.9
35.4	33.1		33.8	16.6
3.1	1.1		1.1	✓ 17.0
34.4	41.3		41.6	11.6
	1179.1		1808	
	4425		4520	
	3282		3263	
	1143		1257	
			1193	
			450	
			1425	

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32.8	33.0	32.9	
20.5	20.2	20.3	
48.8	50.0	49.4	
29.7	30.2	30.0	
181.8	1334		
2965			
3295	3335		

47.3	47.8	46.8	-14.4
36.8	36.8	36.8	-16.5
	0.3	59.4	
59.8	44.3	43.1	13.7
43.7			
	189.2	1861	
	4730	4652	
	3255	3335	
	1475	1317	
		1413	
		75	
		13576	

21.8	22.0	21.9	
9.8	10.7	10.2	
34.2	33.6	33.9	
18.0	17.1	17.6	
83.8	83.4		
2195	2085		

40.6	41.1	40.1	-18.7
25.9	26.0	25.8	15.7
48.0	48.4	47.7	14.1
33.2	33.3	33.0	15.6
	148.8	1466	
	3650	3615	
	6500	2085	
	3920	1550	
	2195	25	
	1725	105	
		1552	

16.1	16.1	16.1	
1.1	1.5	1.3	
22.8	22.5	22.6	
8.4	7.8	8.1	
48.4	479		
3210	1198		
1210			

35.2	34.8	35.6	-19.1
20.0	19.9	20.0	18.7
38.2	38.1	38.4	15.6
23.8	23.6	24.1	15.7
	116.4	1181	
	2910	2952	
	1210	1198	
	1700	1754	
		17.27	

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After No 12

16.6	17.1	16.9	16.9
2.3	2.2	2.1	2.2
19.3	19.0	18.2	19.2
4.7	4.8	4.1	4.5
42.9	43.1	42.3	
10.72	10.78	10.58	

36.5	36.9	36.1	19.6
16.8	17.1	16.6	14.6
36.8	37.1	36.6	17.6
23.8	23.3	24.3	19.3
114.4		113.7	
2850		2842	
10.72		10.68	
2038		1774	
17.78		17.76	

15.17	-1.35	-0.14					
16.88	+0.46	+1.67	+0.29	15.75	16.15	15.95	+0.22
16.77	+0.25	+1.46	+1.32	16.58	16.00	17.49	+1.76
16.52	-0.68		+1.76	16.77	17.58	17.37	+1.64
16.78	+0.44		+1.34	15.53	16.00	15.97	+0.80
15.34	-3.98		-6.00	14.54	15.28	15.06	-1.41
15.93	-0.59	+6.2	-5.41	15.93	14.91	15.12	-0.62
14.84	-1.68	-.40	-2.08	14.91	12.59	13.75	-2.18
15.53	-0.99	+6.2	-1.86	14.43	13.99	14.00	-1.93
14.57		-.80	-2.79	14.25	14.33	15.29	-0.64
14.03		-1.28	-1.47	13.76	14.62	14.19	+1.54
14.25		-3.96	+.54	15.52	17.49	16.79	+0.74
13.76		-.80	+1.81	17.27	17.65	17.46	+1.73
15.52		+.21	+1.80000			15.66	
17.27		+1.96					

1577	-24	-21
16.58	+1.57	+33
16.77	+1.36	269
15.53	+.52	321
14.84	-.53	268
15.93	+.52	320
14.57	-.90	230
14.03	-1.38	+.52
14.25	-1.16	-24
13.76	-1.65	-1.69
15.52	+.11	+.98
17.27	+1.86	+1.09
6496		
15.41		

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2nd Series

from 287° to 87° Order reversed

87

thermion 52.0

15.5	15.7	16.6	34.6	34.8	34.8
2.4	2.0	2.8	15.7	15.8	17.2
18.7	18.0	18.9	33.3	35.0	35.0
2.6	2.4	2.3	20.9	20.9	22.2
39.2	38.1	40.8	104.5	106.5	109.2
9.80	9.52	10.20	26.12	26.62	27.30
			8.80	9.52	10.20
			163.2	17.10	17.10

1632
1710
1710
2)5.2
1684

87 − 57

31.7	33.2	33.0	33.0	53.8	52.7	51.9	
19.2	20.6	19.9	20.5	40.8	38.9	39.9	52.8
39.8	41.3	41.1	41.4	57.0	55.2	55.2	39.1
22.8	23.1	23.3	24.0	41.0	40.2	40.1	55.1
1435	1182	117.3	118.9	182.6	1870	1871	39.7
2838	2955				4675	4628	186.7
					2838	2955	
					1837	1673	
					18.37	1837	
						1530	
						1765	

57 − 27

26.4	26.8	57.8	57.7		
27.6	28.0	44.9	45.0		
50.7	51.0	6.0	5.1		
30.6	32.0	48.3	48.2		
1453	1478	217.0	216.0		
3632	3695	5425	5400		
		3602	3655		
		175.3	17.05		
			17.49		

27 − 357

13.6	21.1	21.9	38.0		
4.4	12.4	13.0	28.0	38.1	
32.1	39.9	40.7	51.9	28.8	
12.17	18.0	18.7	33.1	51.8	
91.4	94.3		151.0	33.0	
2985	2358		3775	1517	1462
			2265	3792	
			(510	2358	
			34	434	
			17		

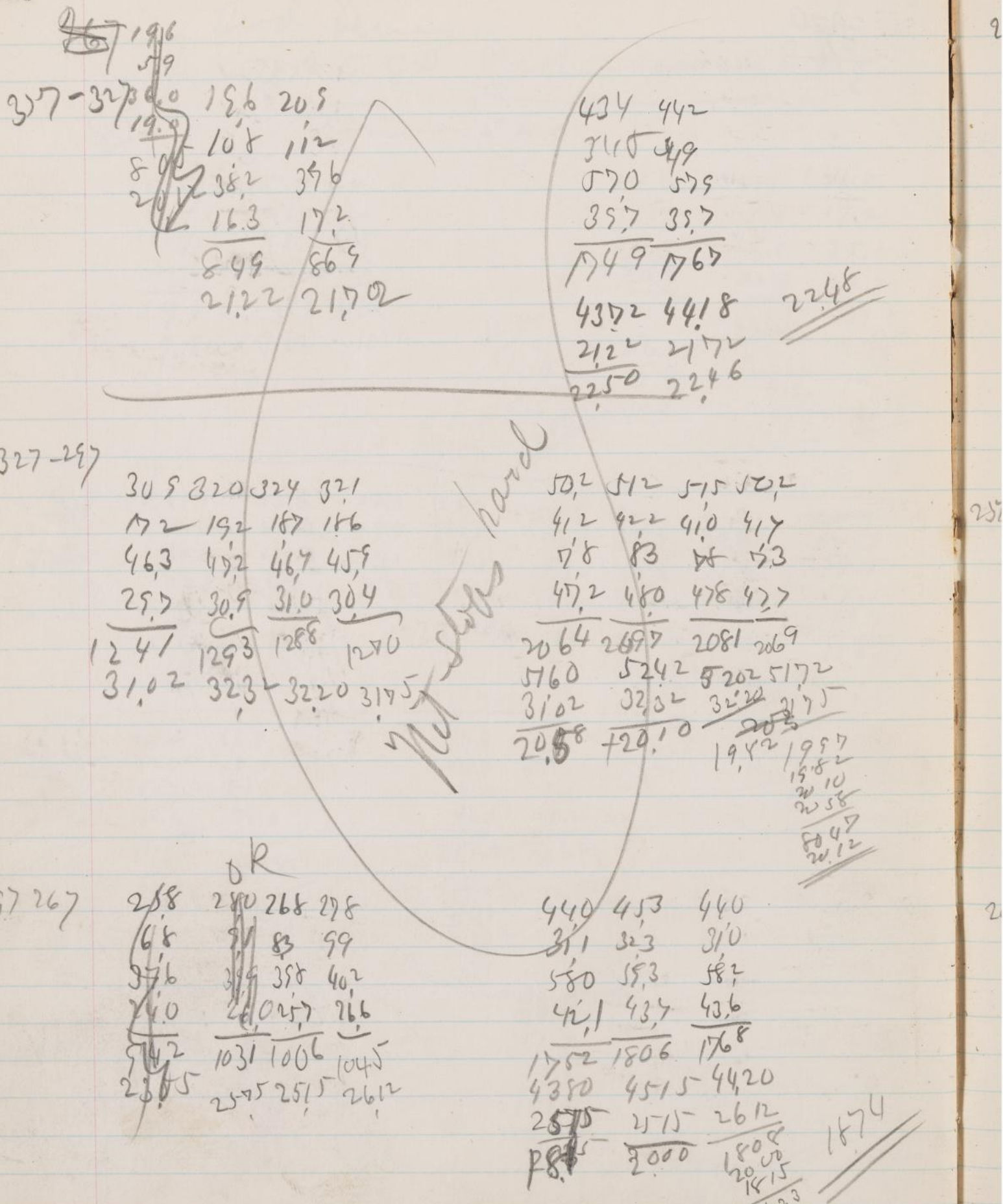
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267-237

38.5	318	32
11.2	11.8	12.0
40.8	42.1	42.1
30.8	33.0	33.0
1133	1187	1193
2832	2968	2982

509	520.4
33.4	32.1
1.8	1.8
4.88	4.88
1545	1931
4802	4828
2832	2975
2090	1853
	2040
	0853

1946

1684

— 6.N

2415	1800
2143	1528
1946	1331
1754	1259
2012	1397
2241	1633

257.207

37.0	38.2	37.6
16.2	16.0	16.6
41.2	41.6	41.1
32.8	33.7	30.6
1272	1315	1289
3180	3288	3225

56.7	56.2
36.1	35.7
5.1	5.1
17.7	17.4
2156	2134
5350	5382
3180	3256
2210	2076
	2210
	4286
	2143

2143

207 167

30.0	33.8	31.2
9.2	14.4	14.0
33.0	36.2	35.1
25.2	30.4	28.7
994	1155	1120
2435	2888	2800

54.2	18.4	57.7
33.7	36.6	36.4
5.81	1.0	0.8
17.04	53.6	54.0
1958	2096	2093
4895	5240	5232
2435	2800	2888
2460	2440	2344
		2440
		2460
		244
		2415

2415

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Oct 28 1884 T = 60.1

84

24.1	22.6	23.4
7.9	9.0	9.1
28.0	28.2	28.0
10.0	10.4	10.0
70.0	70.2	70.5

20.9	21.4	22.1	21.5	47.2	47.4	47.1	25.7	
6.6	8.1	7.4	7.4	28.6	28.5	28.6	21.2	
25.9	26.7	26.2	26.3	49.8	50.2	49.4	23.5	
8.7	9.0	8.8	8.8	33.4	33.2	33.7	24.6	
62.1	65.2	64.5			159.3	188		
1525	1630	1612			5980	4627		2404
					15+25	5970		
					1851	1621		
					26.55	1622	23.45	

117

29.2	29.6	27.2	27.1	26.4	26.9				
9.9	10.8	6.6	7.2	7.2	7.0				
31.0	31.7	27.7	27.2	25.0	24.6	52.4	52.3	52.4	25.5
14.7	15.2	12.1	12.8	12.1	12.3	32.7	32.5	32.6	25.6
84.8		73.6	74.3	73.7		52.5	52.4	52.4	24.8
		1840	1868	1842		40.8	41.2	41.0	26.7
				1850		178.4	178.4		
						4460	4460		
						1840	1850		
						2620	2610		

147

23.1	23.2	24.0	23.4	50.5	50.2	50.4	50.8	27.1
3.0	2.9	3.2	3.0	25.4	25.0	25.5	25.8	22.4
22.0	22.8	23.2	22.7	46.4	46.2	46.8	46.3	23.7
12.0	12.1	11.9	12.0	40.3	40.0	40.8	40.1	28.3
60.1	61.0	62.3			161.4	163.5	163.0	
15.03	15.25	15.58			40.35	40.88	40.75	
					15.03	15.25	15.58	
					25.32	25.63	25.17	

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87° after the 5th

35.5	34.2	35.2	35.4 35.1	1.2 4	0.0	0.7	1.2 26.0
21.1	21.0	21.0	20.9 21.0	44.3 43.4	42.8	44.1	42.6 22.4
39.7	40.9	40.8	40.7 40.5	4.4 4.2	4.1	4,0	4.1 23.7
21.6	21.6	21.9	22.3 21.9	48.8 47.4	46.2	47.7	46.8 25.5
117.9	117.7	118.9	119.3	99.9	93.1	96.5	94.7
29.48	29.43	29.73	29.83	24.98	23.28	24.13	23.68
24.98	23,28	24,13	23,68				
4.50	6.15	5.60	6.15				

2402

after 57°

19.8	20.8	20.6 20.4	46.9	47.1	46.1	47.4 26.5
2,7	4,8	4,1 3,9	25.4	26.1	24,2	25,8 21.5
24.0	24,1	23.8 24.0	48.1	48.0	47.8	48.6 24.1
6,2	7,2	7.6 7.0	33.5	34,1	32,1	34,2 26.5
52.7	56.9	56.1		155 3	150 2	156,0
13,18	14.22	14.02		3882	37.55	39.00
				1318	1422	1402
				2564	2333	2498
					2465	

~~Report of record~~

2404
2402
2461
2399
2248
1518
2384

87°

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1884phae.proj.1763.

177°

27.0	26.2	26.9 26.7	49.4	49.1	49.6	49.4
2.0	2.3	2.3 2.2	26.4	26.8	26.2	26.1
22.8	23.1	23.4 23.1	48.6	48.9	48.2	48.7
16.2	15.6	15.9 15.9	43.1	43.7	42.8	42.9
68.0	67.2	68.5		168.5	166.8	167.1
17.00	16.80	17.13		42.13	41.70	41.78
				17.00	16.80	17.13
				25.13	24.90	24.65

207 ° skipped

(237)

21.8	23.1	22.4	47.4	46.8	48.0 25.0
58.2	0.8	59.2	22.6	22.3	22.8 23.4
20.9	22.1	21.5	50.0	50.0	50.0 28.5
16.1	16.3	16.2	43.2	42.8	43.7 27.0
97.0	61.8			161.9	164.5
~~5540~~	154			4048	4112
7425				1425	1543
				26.23	25.6

25.9

237°

(267)

23.8	24.1	24.0	47.1	46.2	47.4	47.8
59.1	1.4	0.2	27.1	26.0	27.6	27.8
35.2	35.6	35.4	2.4	1.8	3.0	2.4
26.6	26.2	26.4	48.5	48.0	48.7	48.8
324.7	~~87~~ 7.3			182.0	186.7	186.8
~~81.18~~	~~2183~~			45.50	46.68	46.70
81.56	21.82			21.18	21.82	21.82
8.49				243	24.86	24.88
21.18						

246

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22.7
24.2
25.5
27.2

267°

25.2	25.2	25.2	49.4	49.1	49.7	- 24.2		
4.6	4.2	4.4	34.1	34.0	34.3	29.7		
39.6	40.0	39.8	5.6	5.1	6.2	25.8		
25.8	25.8	25.8	49.3	48.9	49.7	23.5		
95.2	95.2			197.1	199.9			
23.80	23.80			~~34.28~~	~~34.97~~			
				4928	4998			
				23.80	25.80			
				25.48	26.18	25.83		

247°

24.8	26.1	25.1	25.3	46.7	47.4	48.0	- 22.1	
9.9	10.K	9.2	9.8	36.4	36.0	36.2	37.0	26.6
41.9	40.8	40.7	41.1	6.5	5.9	6.3	7.2	25.4
24.8	26.2	24.1	25.0	45.6	44.8	45.2	46.8	20.6
101.4	103.5	99.1		193.4	195.1	199.0		
25.35	25.88	24.78		~~33.30~~	~~33.78~~	~~34.76~~		
				4835	4871	4951		
				21.35	21.88	24.78		
				23.00	22.97	24.97		
						23.61		

23.1
26.9
27.0
22.1

327°

21.0	21.8	21.4	46.8	46.4	47.2	- 25.4		
9.8	10.3	10.0	35.0	34.3	35.8	25.0		
39.2	40.2	39.7	0.6	0.2	1.0	20.9		
18.4	19.9	19.2	42.4	42.1	42.7	23.2		
88.4	92.2			180.0	186.7			
22.10	23.05			~~30.75~~	~~31.68~~			
				4575	4668			
				2210	2805			
				2365	2363			

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357

(27)

27.0	23.3	22.7	23.2	23.1	50.1	50.3	50.8	49.9
8.1	10.0	11.0	12.1	11.0	34.8	35.1	34.8	35.6
35.1	36.8	36.8	37.2	36.9	59.0	59.3	59.8	59.1
17.0	18.2	18.1	18.6	18.3	41.0	41.3	41.8	41.1
87.2	88.3	88.6	91.1		184.9		187.2	185.7
20.30	22.08	22.15	22.78		46.22		46.80	46.42
					2208		2215	2278
					2414		2465	2364

2414

57°

58.0	9.9	12.5	12.0	12.3	39.0	39.5	40.8	29.2	37.7
14.1	12.3	57.2	57.8	56.1	22.8	23.1	23.1	22.8	21.0
58.8	57.1	18.4	21.3	19.2	42.2	43.1	44.8	43.0	41.0
22.4	21.2	0.7	3.2	1.6	26.0	27.1	28.2	27.4	25.8
14.0	2.7								
273.0	273.3	263.2	274.8	268.9	130.0	132.8	136.9	132.4	125.5
67.17	68.32	65.80	68.70	67.22	32.50	33.20	34.22	33.10	31.38
					8.32	8.70	7.22	7.22
					2223	2488	2552	2588	2416
					2418				

2492

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27.2
24.1
22.4
23.0

26.9
25.6
22.2
24.4

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Oct 28 2nd Series

87°

-25.4	20.1	20.7	20.4
21.1	4.1	3.7	3.9
23.5	23.1	24.0	23.5
26.1	5.8	5.3	5.6
	53.1	53.7	
	1328	1342	

48.8	45.1	46.9	45.4
25.0	24.1	25.8	25.0
47.0	47.2	47.9	46.0
31.7	31.2	32.6	31.2
	147.6	153.2	147.6
	3650	3830	3650
	1328	1342	1342
	2362	2488	2348
			2395

117°

	20.2	21.3	20.7
	0.3	0.7	0.5
	21.2	22.4	21.8
	6.2	7.0	6.6
	47.9	51.4	
	11.98	12.85	

41.5	47.6	47.5	26.8
25.4	25.1	25.8	24.9
46.4	46.4	46.3	24.6
36.4	36.8	36.0	29.8
	155.9	155.6	
	38.98	38.90	
	11.58	12.85	
	27.00	26.15	
		26.57	

147°

	33.8	34.3	34.0
	13.0	13.5	13.2
	33.3	34.1	33.7
	22.8	23.6	23.2
	102.9	105.5	
	25.72	26.38	

2.7	2.3	3.1	28.7
35.4	35.0	35.8	22.2
59.2	58.8	59.7	25.5
53.1	53.1	53.2	29.9
	209.2	211.8	
	52.30	52.95	
	25.72	26.38	
	26.58	26.57	

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After 57°

(b) 52.0
30.4
52.8
38.4

26.5 25.1 26.0 25.9 51.2 50.9 51.3 51.3 −25.3
9.6 9.1 8.6 10.0 9.1 30.1 30.4 29.6 30.4 21.0
30.0 29.4 29.7 31.6 29.7 52.8 52.8 52.7 52.8 23.1
11.9 ~~30.4~~ 13.0 13.0 12.6 38.1 37.6 39.2 38.2 38.6 25.5
13.0
80 76.6 77.3 81.6 1717 171.8 1731
19.50 19.15 19.32 20.40 4292 (6) 52.0 42.95 43.28
1950 (a) 1911 19.32
2342 2380 2396

(a) 27.6 (b) 27.0
10.1 10.9
30.8 31.8
13.8 14.0
823 883
2058 2052

517 520 2342
308 804 2380
526 528 2396
380 384 2270
2248
1731 1736 1636
4328 4040 2327
2058 2052
2270 2248

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177°

29.0	28.8	28.9
2.8	1.8	2.3
25.0	25.6	25.3
17.8	18.0	17.9
74.6	74.2	
18.65	18.55	

52.5	52.6	52.4	-23.6
26.1	25.7	26.6	23.8
52.6	52.8	52.4	27.3
47.0	46.8	47.1	29.1
	177.9	178.5	
	44.48	44.62	
	1865	1855	
	2583	2607	
		2585	

207°

18.8	19.1	19.0
53.8	54.9	54.4
17.9	19.3	18.8
13.1	12.9	13.0
253.6	286.2	
25.90	26.65	
70.50	71.55	

46.1	46.1	46.2	-27.1
20.4	20.0	20.8	26.0
49.4	49.2	49.7	30.6
41.9	41.7	42.1	28.9
	157.0	158.8	
	39.25	39.70	
	10.90	11.55	
	2835	2885	
		2825	

237°

23.1	25.6	24.3
57.2	0.0	59.3
26.0	27.7	27.0
18.2	20.2	19.0
3045		309.6
76.12		77.40

47.1		47.6	-23.3
22.5		22.7	23.1
58.2		57.3	30.3
48.8		49.2	30.2
176.6		176.8	
44.15		44.20	
16.12		17.40	
2803		2650	
		2741	

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26.7°

21.7	22,4	22,1	22.2	48.2	48,3	48,0 −26,0
5.0	58,8	58,6	58.7	25,0	25.3	24,8 26.3
30.7	32.1	31,9	32,0	0.4	0,3	0.4 28.4
23.0	23.0	23.0	23.0	48.0	48.0	48,0 25.0
3114	3163	315.6				
79.85	79,08	78,90				

181.9 181.2
45.47 45.30
19.08 18.99
226 21.3
2262
2639 2631
2685

29.7°

24,1	24,6	24.3	50,4	50.0	50.9	−26.1
0,4	1.0	0,7	32.6	32,1	33.0	31.9
34.3	35.4	34.8	4.9	4,8	5.0	30.1
22,8	22,7	22,8	49.9	49.7	50,1	27.1
81.6	83.7					
2040	20,92					
+5,0	+5.10					

186.6 199.0
49.15 49.75
2040 2092
2885 2883
23.75 2383
2875

32.7°

19.2	20.0	19.6	43.8	43.8	43.8	−24.2
1,8	2.3	2.0	30.5	30.2	30.8	−26.3
33.8	34.1	33.9	2.4	2.4	2.4	−28.5
18.7	18.8	18.8	42.1	42.1	42.1	23.3
735	75,2					
9838	9880					

178.5 179.1
4962 4978
2338 2380
2624 2598
26.11

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1884phae.proj.1763.

357°

37.2	38.2	38.2	38.8	38.1	30	3.8	4.0	2.6	1.8
23.8	26.1	25.3	26.1	25.3	49.9	50.1	51.4	49.2	49.0
55.7	56.8	56.1	57.3	56.5	17.2	18.1	18.6	16.4	15.8
34.0	36.6	36.2	35.9	35.7	59.3	0.0	0.3	58.8	58.2
150.7	157.7	155.8	158.1			2520	2543	2470	2448
37.67	39.42	38.95	39.52			63.00	63.58	6175	6120
						37.67	39.42	38.55	38.52
						2533	24.16	22.80	21.68

2349

387°

41.0	42.3	41.6	8.8	8.4	8.6	-27.0	
28.7	28.6	28.6	52.7	52.9	52.8	24.2	
54.9	53.8	54.3	18.2	17.9	18.0	23.7	
37.1	37.7	37.4	1.1	1.0	1.0	23.6	
161.7	162.4		260.8	260.2			
40.42	40.60		65.20	65.05			
			40.42	40.60			
			24.78	24.45			

2461

57°

15.0	15.7	14.9	15.2	41.0	41.1	41.0	25.8
58.8	1.0	0.0	59.9	24.2	24.2	24.3	24.3
23.7	25.0	24.0	24.2	47.0	46.9	47.0	22.8
6.1	7.0	5.9	6.3	29.8	29.7	30.0	23.5
283.6	48.7	44.8		141.9		142.3	
70.90	12.18	11.20		35.47		35.58	
		338		10.50		1165	
		165		2457		23.55	

24.23

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1884phae.proj.1763.

Sum

I	II
2354	2384
2615	2657
2537	2657
2489	2595
2595	2825
2469	2640
2583	2635
2480	2379
2361	2611
2364	2349
2414	2461
2492	2423
5783	6652
2482	2553

I	II	II	II
-.58	-.58	-1.71	-1.71
+1.33	+.05	+1.02	+.66
+.55	+.90	+1.02	+.33
+.07	+.57	+.40	+.73
+1.13	+2.10	+2.70	+3.43
-.13	+1.97	+1.25	+4.68
+1.01	+2.98	+.80	+5.48
-.02	+2.96	-1.76	+3.72
-1.21	+1.75	+.56	+4.28
-1.18	+.57	-2.06	+2.22
-.68	-.11	-.94	+1.28
+.10	+.01	-1.32	.01

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180

Oct 29 $T = 51.0^\circ$

8/0

~~32.5~~	34.6	34.0	35.0	34.5	54.8	54.9	54.6	55.0	−20.3
~~18.7~~	19.8	19.0	18.8	19.2	36.1	35.7	36.3	36.2	16.9
~~34.8~~	35.7	35.9	36.2	35.9	54.6	54.8	54.6	54.7	19.3
~~19.0~~	20.6	20.6	20.4	20.5	40.7	40.8	40.1	41.2	20.2
	1107	1095	1104			1862	1856	1871	
	2768	2738	2760			4655	4640	4678	
						2768	2738	2760	
						1887	1902	1918	

1899

117°

28.5	28.0	28.2	28.2	49.5	49.2	49.7	49.6	−21.3
8.2	8.7	10.0	9.0	30.0	29.8	30.2	29.9	21.0
27.0	27.2	27.1	27.1	47.9	47.8	47.8	48.2	20.8
13.2	13.0	13.0	13.1	38.0	37.8	38.1	38.1	24.9
769	769	763			1646	1658	1658	
1921	1922	1958			4115	4145	4145	
					1522	1922	1958	
					2153	2223	2158	

2201

147°

22.1	21.4	21.9	21.8	44.4	44.1	44.1	45.1	22.6
2.1	2.4	2.0	2.2	20.5	20.5	20.8	20.2	18.3
21.1	20.9	20.0	20.7	40.1	40.0	40.2	40.2	19.4
10.6	10.2	9.8	10.2	33.6	33.3	33.5	33.9	23.4
549	549	537			137.9	1386	1394	
1355	1372	1342			3448	3465	3485	
					1355	1332	1342	
					2093	2093	2143	

2099

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After 57°

23.4	22.7	23.8	23.3
8.8	8.8	9.8	9.1
25.8	25.2	25.2	25.4
9.8	9.1	9.6	9.5
678	658	684	
1695	1645	1710	

45.3	44.7	45.8	45.1	44.9	22.0
27.2	25.9	27.3	27.0	27.2	18.1
46.2	44.8	46.1	46.2	46.4	21.2
31.8	31.3	32.0	32.1	31.3	22.3
		1512	1504	1488	
		3780	3760	3745	
		1695	1645	1710	
		2085	2115	2035	

20.78
1885
3585
1589

21.24

19.88	−1.61	+.61
22.01	+.51	−1.10
20.99	−.57	−1.61
2077	−.73	−2.34
2253	+1.03	−1.31
2283	+1.33	+.02
2245	+.90	+.52
2186	+1.36	+2.28
2075	−.75	+1.53
1888	−2.62	+.09
2188	+.49	−.60
2209	+.59	+.01
5804		
2150		

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1884phae.proj.1763.

177°

24.2 24.3 25.9 23.9 23.8 25.8 26.0 44.6 44.1 44.8 43.9 44.1
0.8 0.3 2.4 1.4 1.1 2.8 2.0 22.8 22.8 23.4 23.0 22.6
19.1 18.8 21.0 19.4 20.8 21.1 20.9 43.0 42.9 44.0 42.8 42.8
13.2 13.1 14.8 12.8 12.8 14.8 14.7 37.1 36.9 38.2 37.2 36.4
56.3 56.5 57.3 67.1 64) 636 147.5 150.4 146.9 146.4
142.6 143.2 142.8 161.2 159.0 368.8 376.9 366.2 365.4
25.8 157.2 157.2
2.1 221.6 220.0 205.4
21.4 209.6
13.7
157.5
161.2
159.0
159.2

20.77

207°

48.6 48.8 48.3 48.6 9.7 9.4 9.7 9.9 −21.1
25.6 25.8 27.6 26.3 45.2 47.7 48.2 48.7 21.9
47.6 47.3 47.1 47.3 11.6 11.2 11.4 12.2 24.3
41.4 41.1 41.2 41.2 4.1 4.1 4.1 4.0 22.9
163.2 163.0 164.2 252.4 253.8 254.8
408.0 407.5 410.5 681.0 683.5 637.0
404.0 407.5 410.5 226.0 226.0 226.5
22.3 22.6 22.5

22.53

237°

31.0 30.5 31.0 30.8 57.8 50.9 50.9 50.6 −20.0
8.8 9.1 9.2 9.0 29.7 30.0 30.0 29.0 20.7
32.8 32.4 33.8 33.0 58.5 58.7 58.1 58.6 25.5
24.8 25.1 25.9 25.3 57.5 50.1 50.8 50.7 25.2
97.4 97.1 95.1 189.7 189.8 188.9
243.5 242.8 245.8 474.2 474.5 472.2
243.5 242.8 245.8 243.5 241.5 245.8
23.07 23.17 22.24

22.53

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1884phae.proj.1763.

267°

33.1	33.2	34.2	33.8	34.9	55.1	54.6	54.9	−21.1
12.2	11.9	11.8	12.0	35.3	36.1	34.8	34.6	23.3
40.9	40.1	41.1	40.7	5.7	6.0	6.0	5.0	25.0
32.7	32.3	33.1	32.7	52.9	53.0	52.6	53.0	20.2
118.9	117.5	120.2				208.4	207.5	
29,75	29,38	30,05			2102			
					5255	5210	5188	
					25,75	25,38	3005	
					2280	22,53	2180	
							2245	

297°

31.5	30.8	30.4	30.9	51.7	51.2	52.1	51.9	−20.8
10.8	11.0	11.1	11.0	37.0	37.0	36.9	37.1	26.0
41.0	41.3	40.9	41.1	4.9	4.6	4.9	5.1	23.8
29.1	29.1	27.7	28.6	49.7	49.9	49.9	49.4	21.1
1124	1132				2027		2035	
2810	28,30	27.5			5068	2538		
					2810	5085	5088	
					2258	2530	2552	
						2267	2336	
							2256	

327°

19.1	19.1	19.4	19.2	38.4	38.6	38.2	38.5	−19.2
4.4	4.4	4.1	4.3	27.5	27.9	27.8	26.8	23.2
31.4	31.5	31.8	31.6	54.5	54.8	54.4	54.3	22.9
16.9	16.8	17.4	17.0	34.7	35.0	34.7	34.4	17.7
918	918				1563	1551	1540	
17,50	17,51	1818			3908	3875	3852	
					1750	1737	1818	
					2113	2080	2034	
							2075	

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1884phae.proj.1763.

357°

30.9	31.1	30.8	30.9
20.4	19.1	19.8	19.8
46.9	45.9	46.8	46.5
27.2	27.0	26.8	27.0
125 4	123 1	124 2	
3135	30.75	3105	

50.2	51.1	49.7	49.8	-	19.3
41.1	41.0	40.6	41.8		21.8
3.1	3.8	2.4	3.1		16.6
45.3	45.7	45.0	45.1		18.3
	201 6	199 7	199 8		
	5040	4995	4995		
	3135	3075	3105		
	1905	1870	1850		

18.88

27°

47.2	47.7	46.8	47.2
36.6	37.2	37.1	37.0
59.4	59.5	59.1	59.3
41.8	42.3	41.6	41.9
185 0	186 7	184 6	
4625	4665	4615	

11.9	~~14.1~~	12.4	12.4	11.0	- 24.7
58.8	~~9.8~~	59.2	58.8	58.5	21.8
20.3	~~21.9~~	21.0	19.8	20.0	21.0
2.3	~~4.1~~	2.8	2.5	1.7	20.4
		2054	~~1935~~	2712	
		6881	6538	6780	
		4625	4665	4615	
		2260	2173	2165	

21.89

57°

36.0	36.2	35.8	36.0
22.5	22.2	22.2	22.3
43.9	43.8	44.0	43.9
26.0	27.0	27.0	26.7
128 4	125 2		
3210	3230	0225	

0.8	1.5	59.0	59.6	1.2	24.8
46.6	46.8	46.8	46.2	46.8	24.3
3.3	4.1	2.8	2.3	4.1	19.4
47.5	47.8	46.7	46.2	48.4	20.8
	220 2	218 3	214 3	220 5	
	~~2505~~				
	5505	5458	5358	5572	
	3210	3230	3230	3225	
	2295	2125	2128	2257	

22.09

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1884phae.proj.1763.

Oct 29 T Second Series T = 13.2.

57°

18.8	18.9	19.8	19.9	19.4	42.3	42.8	43.1	42.7 – 23.3
6.0	5.8	6.2	5.8	6.0	28.3	28.8	29.0	28.7 22.7
26.0	26.8	28.1	27.5	27.6	45.1	45.7	46.0	45.6 18.0
8.6	8.4	8.8	8.0	8.4	29.0	29.6	29.2	29.1 20.7
594	599	629	612				1473	
1485	1498	15.72	15.30		1457	1463	36.82	
					3645	3658	1130	
					1485	1454	21.52	
					21.60	21.60		
							21.57	

27°

33.8	34.0	34.9	34.2	59.8	59.7	59.8	0.0	-25.6
24.2	24.7	25.6	24.8	46.7	46.0	47.4	46.8	21.9
48.7	48.7	48.9	48.8	8.1	7.4	8.6	8.2	19.3
28.8	28.6	28.8	28.7	50.0	49.7	50.3	50.0	21.3
1355	1360	1382			2228	2261	2250	
3386	3400	34.55				56.52	56.25	
					5570	5650	16.52	5625
					3386	3400	34.55	34.55
					21.82	2250	2.17	2.17
						2201		

35.7°

28.8	29.0	29.0	28.9	51.1	51.6	51.0	50.6	-22.2
19.8	20.1	20.3	20.1	42.2	42.4	42.0	42.1	22.1
48.7	48.0	47.8	48.2	4.8	5.0	4.7	4.7	16.6
26.0	25.8	25.8	25.9	46.0	45.6	46.3	46.2	20.1
1233	1229	1229			2046	2040	2036	
3082	3072	30.72			5115	5100	50.90	
					3082	3072	30.72	
					2033	2028	20.1	
							20.26	

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1884phae.proj.1763.

87°

Before Commencing 2nd series

23.0	22.4	23.1	22.8	45.1	44.8	44.8	45.6	-22.3	
7.6	8.6	9.1	8.4	26.3	26.1	26.0	26.8	17.9	
24.2	24.8	25.2	24.7	44.6	44.2	44.1	45.4	19.9	
9.2	8.2	9.1	8.8	31.2	31.0	30.5	32.1	22.4	
640	640	665			1461	1454	1495		
1600	1600	1662			3652	3635	3738		
					1600	1600	1662		
					2052	2035	2076		

After the Series:—

36.8	37.6	39.0	37.8	58.2	58.7	58.1	57.9	20.4	
24.7	24.6	24.9	24.7	40.6	40.2	40.8	40.8	-15.9	
43.1	43.1	42.6	42.9	0.6	0.6	0.7	0.5	17.7	
24.9	25.0	24.7	24.9	44.8	44.8	45.0	44.6	19.9	
1295	1303	1312			2043	2046	2038		
3238	3258	3280			5108	5115	5095		
					3238	3258	3280		
					1870	1857	1815		

17.47

Fri 87°

~~20.17~~

19.35

16.55
~~20.18~~
20.56
17.47
17.19

96 91

19394

1884phae.proj.1763.

327°

28.2	29.0	30.1	30.1	29.4 49.4	49.1	50.0	48.8	49.9
14.7	15.7	16.6	16.6	15.9 39.7	39.2	40.7	38.8	40.0
44.1	44.1	45.2	45.7	44.8 7.8	7.6	8.2	7.2	7.4
27.4	27.6	28.3	28.2	27.9 46.0	45.1	47.2	45.7	45.9
1144	1164	1202	1206		2010	2061	2005	
2860	2910	3005	3045		5025	5152	5001	5040
					2860	2510	3005	3015
					2165	2292	1996	2065

-200
23.8
23.0
18.1
2082

21.17

297°

22.3	22.9	23.9	23.0	424	41.2	44.0	43.0	43.0
4.3	4.7	4.8	4.6	29.0	29.1	30.7	28.8	29.1
36.2	36.3	36.8	36.4	575	57.8	59.3	57.5	57.3
20.8	21.2	23.0	21.7	41.0	41.1	42.2	41.0	41.0
836	851	885			1692		1703	1704
2050	2128	2212			4230		4218	4260
					2050		2128	2212
					2140		2140	2048

-19.4
24.4
21.1
19.3

1243

267°

25.9	26.1	27.2	26.4	46.4	45.9	46.1	47.1	-200
4.6	5.0	5.5	5.0	27.4	28			
36.3	36.9	37.2	36.8		27.4	27.3	27.5	22.4
25.6	26.1	27.5	26.4	58.8	58.7	58.8	58.8	22.0
915	941	974		45.3	45.4	45.7	44.7	18.9
2288	2352	2435			1774	1775	1781	
					4431	4448	4452	
					2288	2352	2435	
					2147	2096	2017	

20.87

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23.7°

20.0	38.2	39.7	39.5	39.5	39.2	58.1	58.2	58.0	58.2	-18.9
23.8	16.7	18.6	18.2	19.6	18.3	37.2	37.3	37.0	37.3	18.9
23.0	44.0	45.0	44.2	45.0	44.5	8.1	8.0	8.1	8.3	23.6
18.1	34.0	35.4	35.2	35.8	35.1	58.6	58.5	58.7	58.7	23.5
	1329	1385	137	1399			2220	2218	2225	
	3322	3468	3428	34.98			5540	5541	5565	
							3322	3468	3428	
							21.98	20.77	21.37	

21,31

20.7°

-19.4	33.6	34.5	34.0	34.0	55.2	55.9	54.0	55.7	-21.2	
24.4	13.3	12.5	12.5	12.8	34.0	34.0	34.7	33.4	21.2	
21.1	36.8	36.1	35.8	36.2	59.8	0.0	59.5	59.9	23.6	
19.3	28.7	28.1	28.7	28.5	51.1	51.0	51.0	51.2	22.6	
	1124	1112	1110			2009	1992	2002		
	2810	2780	27.75			5022	4580	5005		
						2810	2580	2795		
						22.12	22.00	22.30		

22,14

17.7

	24.8	25.3	26.4	25.5	44.5	44.4	44.4	44.6	-19.0	
	3.2	2.9	3.4	3.2	22.8	22.5	23.0	22.9	19.6	
	24.8	25.0	24.7	24.8	44.9	45.0	44.8	44.8	20.1	
	15.7	15.0	16.0	15.6	37.9	38.0	37.8	37.8	22.3	
	185	682	705			1499	1500	1501		
	1712	1705	17.62			3748	3712	3752		
						17.12	17.80	17.62		
						2032	2012	1750		

20,24

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147°

35.3	39.5	40.2	40.6	40.1
22.4	22.5	24.0	22.8	23.1
43.1	43.4	42.8	42.9	43.0
30.0	29.8	30.7	30.7	30.4
1348	1352	1377	1370	
3370	3380	34.42	34.25	

41.8	41.6	42.2	42.2	43.1
42.8	42.2	42.8	42.7	43.0
2.9	2.7	2.8	2.8	3.0
54.8	55.2	54.7	54.7	54.9
2287	2245	2244		2260
5718	5612	5610		56.50
2380	5580	5442		34.25
20.46	22.32	21.68		2225
				2208

117°

32.0	31.8	33.0	32.3
14.9	14.2	16.9	15.3
35.8	35.5	36.8	36.0
19.2	19.2	19.9	19.4
1019	1007	1066	
2548	2518	26.65	

53.2	53.7	52.9	53.1	20.9
36.0	36.7	35.9	35.8	20.7
55.1	55.6	55.1	54.7	19.1
42.9	43.1	42.8	42.9	23.5
	1891	1867	1862	
	4728	4668	4655	
	2548	2518	26.65	
	2180	21.50	1950	
				2107

87°

35.0	36.5	36.3	37.7	37.0	37.0
21.9	23.2	23.1	24.0	24.2	23.8
41.8	42.1	43.1	43.2	42.1	42.8
22.8	23.8	24.1	25.0	24.0	24.4
1217	1248	1266	1299	1273	
3038	3120	3165	3248	3185	
	31.42				

59.2	59.7	57.8	57.0	20.4
43.8	43.0	40.7	40.2	16.6
3.8	3.2	0.0	59.3	16.8
47.9	46.2	44.0	43.9	19.1
2948	2121	2025	2004	
5370	5302	5062	5010	
3038	2120	3248	3185	
2332	2182	1814	1825	
				1819

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1884phae.proj.1763.

24.7
19.7
19.9
24.4

~~18~~ 0012,9

		2
19.39	-1.74	-174
21.07	-06	-140
22.08	+95	-85
20.24	-89	-174
22.14	+1.01	-74
21.31	+18	-56
20.87	-26	-78
21.43	+30	-48
21.17	+04	-44
20.26	-87	-131
22.05	+92	-39
21.57	+44	+05

20.54

13.8

21.13

0012.7	0012.8	-29	29	mean	
-24	-58 -1.71	-1.61	-1.74	-1.26	-1.26
+1.57	+1.33 +1.02	+.51	-06	+0.87	-.39
+1.36	+.55 +1.02	-51	+.95	+0.67	+28
+.52	+.07 +.40	-.72	-.89	-0.12	+16
-.53	+1.13 +2.70	+1.03	+1.01	+1.09	+1.25
+.52	-.13 +1.25	+1.33	+16	+0.63	+1.88
-.50	+1.01 +.80	+.50	-.26	+0.30	+.18
-1.38	-.02 -1.76	+1.36	+.30	-0.30	+1.88
-1.16	-1.21 +.56	-.75	+.04	-0.50	+1.33
-1.65	-1.18 -2.06	-2.62	-.87	-1.68	-.35
+.11	-.68 -.94	+.46	+.92	+0.00	-.37
+1.66	+.10 -1.32	+.59	+.44	+0.23	+.10

20.4
16.6
16.8
19.6

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Reduction to the Mean of the first
five 30° spokes to the mean of the 12 30° spokes

−.89″
−.81
−1.38
−.61
−.20
−.05
−.01
−1.08
−.69
−.31
−.69
−.42
−.53
+.26
+.15

−6.97
41
7.25
−0.48

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Nov. 28 1882 See next book

15^d

870 –

OK

44.3 46.2 48.8 49.2 45.2
26.8 29.0 30.2 32.0 27.9
35.8 36.1 39.8 29.2 36.0
22.8 23.0 25.6 27.6 22.9
139.7 144.3 154.4 148.
34.93 36.08 38.60 37.

54.9 56.8 55.0 54.8 56.0 −9.1
35.3 26.9 35.0 35.7 39.1 7.5
42.3 45.9 42.1 48.6 44.8 6.3
30.8 32.8 30.8 30.8 32.6 7.1
162.9 162.9 169.5
40.73 40.73 42.38
3498 3608 3700
421 225
6.80 4.50 6.12
538
612
1218
6.09

44.8 37.2 36.8 37.0
29.7 16.6 16.6 16.6
37.2 28.0 28.0 28.0
24.8 14.7 15.0 14.8
138.5 96.5 96.4
34.63 24.13 24.10

42.3 40.1 42.5 42.1 −5.3
26.0 23.4 25.9 26.0 9.1
32.5 30.2 32.7 32.3 4.5
20.6 19.1 20.7 20.6 5.8
121.8 121.0
30.45 30.25
24.13 24.10
6.32 6.15

32.8 34.2 33.5
12.6 13.4 13.0
21.2 21.4 21.3
8.4 9.7 9.0
75.0 78.7
18.75 19.68

39.4 39.8 39.0 −5.9
18.2 18.2 18.2 5.2
27.0 27.2 26.9 5.7
17.0 17.1 17.0 8.0
102.3 101.1
25.58 25.28
18.75 19.68
6.83 5.60

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-9.7
7.4
6.3
7.9

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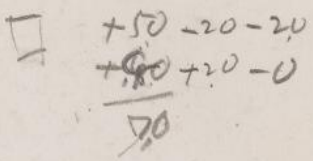
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