

KG  
11366  
v.523

Flexure *As*  
Collimation  
Runs  
From Feb. 10, 1881 to Sept 20 1881





Feb 10, 1881—

















Feb. 10, 1881

20<sup>h</sup> 30<sup>m</sup>

Long Collimator

20<sup>h</sup> 40<sup>m</sup>N.CS.C

44	60.6	5	2	25.3	24.3	25.9	44	79.2	47.1
	58.0			30.2	30.7	31.9		78.3	48.1
	57.3			35.4	36.1	37.2		79.1	47.7
	56.8			26.1	26.1	27.7		79.7	48.2
	58.0			37.0	37.2	42.7		79.2	49.8
	40.7			29.25	29.30	30.67		45.5	40.9
44	58.14							79.10	48.18

48.18

12728

Seeing bad.

44 63.64

63.9

7.5

44 63.7

Set at 63.7

Level

Time

N.

—

S

—

N-S

C

40

2

14.6

F

14.2

G

21.0

H

13.2

60.0

15.0

Feb. 10, 1881

3

<u>20<sup>h</sup> 35<sup>m</sup></u>		<u>Runs</u>		<u>G</u>		<u>H</u>	
<u>E</u>		<u>F</u>					
5-0 25.0 <sup>0.0</sup> 24.1		27.4 27.2		33.5 33.8		26.3 25.6	
24.9 24.1		27.1 26.7		33.6 33.3		25.7 25.8	
25.5 24.1		27.3 26.9		33.7 33.3		25.8 25.7	
25.0 24.7		27.4 27.3		33.8 33.6		25.3 25.3	
25.4 24.1		27.5 27.0		33.3 33.1		25.7 26.1	
8 11		17 1		29 21		38 35	
25.16 24.22		27.34 27.02		33.58 33.42		25.76 25.70	



4

2h PSL 13 1481

V.C. S.C.

44 795 538

511 531

791 537

791 541

784 538

462 185

7924 5370

5370

13294

66.47

Set-off 63.9

Sony Coll.

2h 10m

44 598 5 2 172 176

60.1 235 232

61.1 267 273

61.5 189 189

60.7

3032

6064

Level.

2h 10m

795V 187 402 186

801S 174 369

V-S +1.3 250

180

825

2062

-1.3

193

Feb. 13, 1881

Long Coll.

184 45<sup>m</sup>

44	68.2	20.4	20.6	19.3
	68.0	24.0	24.6	23.0
	67.6	23.4	23.4	22.0
	67.8	14.8	15.0	14.0
	71.8	26	36	38.3
434	20.65	20.90	19.67	
68.68	20.97			

Seeing very bad

N.C. S.C.

184 50<sup>m</sup>

44	<del>80.2</del>	
	78.0	65.1
	77.9	65.1
	77.8	65.7
	75.3	66.0
	78.0	66.8
	370	287
	77.40	65.74
	65.74	
	314	

44 71.57

~~Set at 44 71.6~~

Flexure

184 55<sup>m</sup>45<sup>m</sup>

	E	F	G	H
<del>45</del> 2	20.1	21.7	21.2	14.8
	20.1	21.7	21.7	14.7
	19.7	21.4	20.9	14.7
	19.6	21.6	21.3	15.0
	20.0	21.6	21.4	14.7
	995	30	15	39
	19.90	21.60	21.30	14.78
	21.60			
	21.30	19.39		
	14.78	18.09		
	37.58	1.30		
	19.39	0.65		

	E	F	G	H
	26.8	37.6	43.8	30.1
	27.0	37.0	43.5	30.1
	27.4	36.8	43.6	29.3
	27.1	36.8	43.8	29.2
	27.2	37.3	44.0	29.9
	5	5	37	36
	27.10	37.10	43.74	29.72
	34.41	37.10		
	16.32	43.74		
	18.09	29.72		
	17.66			
	34.41			

Probably  
set on wrong  
wire B.



Feb. 13, 1881

Adjusted focus of collimators before observation

19<sup>h</sup> 0<sup>m</sup> Long Coll.  
N.C. S.C.

44 79.8 44.1

81.3 44.0

81.5 43.0

82.1 42.0

80.0 41.8

47 149

80.94 42.98

42.98

12392

44 61.96

Set at 44 63.6

Level.

19<sup>h</sup> 40<sup>m</sup> 21<sup>h</sup> 40<sup>m</sup>

N 17.9 17.7

S 19.9 19.1

N-S -2.0 -1.4

E 20.1 19.9

W 21.1 22.0

S 20.3 21.3

H 15.6 14.0

371 372

19.27 19.30

+2.0 +1.4

21.3 20.7

21.00

Feb. 14, 1881

Long Coll.

22<sup>h</sup> 05<sup>m</sup>

~~44~~ 69.1 5 2 24.6 23.4 23.2  
 69.0 28.7 27.8 27.3  
 69.1 27.3 26.6 26.1  
 68.3 19.3 18.6 17.8  
 67.0 19.9 16.4 14.4  
 42.5 24.97 24.10 23.60  
 68.50 24.22

N.C.

S.C.

22<sup>h</sup> 05<sup>m</sup> 74.7 42.5  
 78.8 41.1  
 77.1 41.5  
 76.7 42.4  
 76.0 42.8  
 31.3 10.3  
 76.26 42.06  
 42.06  
 118.32

44 59.16

Set at 44 59.2

Level

22<sup>h</sup> 30<sup>m</sup>

N 21.0 18.2  
 S 16.8 19.0  
 N-S +4.2 - .8  
 E 40 2 24.8 20.0  
 H 25.8 21.6  
 G 26.0 22.0  
 H 19.8 16.1  
 16.4 79.7 79.7  
 24.10 15.4  
 -4.2 15.2  
 19.9 20.7

20.30



Feb. 14, 1881

18" 50 Long Coll.

44 63.0 28.5 23.0 24.0  
 67.5 26.4 26.1 27.5  
 65.0 25.1 24.9 25.9  
 64.8 17.6 17.7 17.5  
 64.0 126 117 149  
 243 23.15 22.92 23.72  
 64.86 23.26

N. C. S. C

18" 50 79.3 36.6  
 79.2 37.0  
 79.2 37.0  
 79.8 37.0  
 79.0 38.1  
 15 7  
 79.30 37.14

37.14

116.44

44 58.22

Set at 44 59.2

Level

2 21" 55"  
 N 21.2  
 S 16.4  
 N-S +4.8  
 E 27.5  
 W 27.8  
 S 27.8  
 H 21.0  
 24.1  
 26.02  
 -4.8  
 21.22

Feb. 15, 1881

Song Coll.  
224 pm

Unable to read it.

Level

22 10

N	176
S	198
N-S	<u>-22</u>
E	20.2
F	22.1
G	20.9
H	15.0

38.2

19.55

+22

21.75



Feb. 16, 1881

0<sup>h</sup> 55<sup>m</sup>N.C. S.C.

77.2 45.0

76.0 44.8

77.0 45.0

76.1 44.7

76.2 45.0

325 245

76.50 44.90

44.90

121.40

44 60.70

Set at 44 59.2

16<sup>h</sup> 55<sup>m</sup> N.C. S.C.

74.0 44.8

74.0 44.0

73.0 44.3

74.1 45.8

75.6 45.0

207 239

74.14 44.78

44.78

118.92

44 59.46

Long Coll.

1<sup>h</sup> 35<sup>m</sup>

56.1 20.0 19.0 20.7 21.4 20.1

57.1 25.2 24.7 25.0 26.4 25.3

57.8 24.7 23.6 24.8 26.0 24.7

57.0 16.9 15.6 16.7 18.7 17.0

57.5 68 9 72 71

5 21.70 21.80 21.77

57.10 21.76

Feb, 16, 1881

	<u>1<sup>h</sup> 45<sup>m</sup></u>	<u>2 30</u>	<u>3<sup>h</sup> 20<sup>m</sup></u>	<u>2240<sup>m</sup></u>
N	19.0	159	160	20.0
S	16.7	198	199	17.2
N-S	+ 2.3	-39	-39	+2.8
E	21.3	15.7		24.1
W	23.8	17.4		25.1
G	24.0	18.2		25.3
H	18.6	13.0		18.3
	877	243		928
	2492	16.07		2320
	23	39		28
	<u>19.6</u>	<u>20.0</u>		<u>20.4</u>

2<sup>h</sup> 7<sup>m</sup> 1980

Long Coll.

16<sup>h</sup> 50<sup>m</sup>

<del>55.0</del>	55.8	22.3	22.6	22.1
	58.0	28.0	26.9	25.9
	59.2	26.0	25.7	25.3
	58.5	18.0	17.7	17.4
	62.2	143	129	107
	437	23.57	23.22	22.67
	58.74	23.09		



Feb. 17, 1881

## Long Coll.

22<sup>h</sup> 15<sup>m</sup> 59.2 22.1 21.9 22.6  
 61.3 26.0 25.8 26.8  
 58.4 24.7 24.9 25.7  
 58.8 17.7 17.0 18.2  
 57.9 105 96 133  
 456 22.62 21.92 22.66  
 59.12 22.40

## Flexure

22 <sup>h</sup> 25 <sup>m</sup>	E	F	G	H	E	F	G	H
45 2	19.1	21.1	20.1	15.0	25.3	35.6	43.0	29.1
45 2	19.6	21.2	20.1	14.7	25.7	35.1	43.0	29.0
	19.2	20.7	20.1	14.6	25.1	35.1	43.0	28.8
	19.2	20.7	20.1	14.5	25.7	35.1	43.1	29.0
	19.0	21.1	20.2	14.7	25.8	35.2	43.1	29.2
	11	48	6	35	26	11	2	1
	19.22	20.96	20.12	14.70	25.52	35.22	43.04	29.02
	20.96				35.22			
	20.12				43.04		33.20	
	14.70				29.02		14.88	
	35.00				12.80		16.32	
	18.75				33.20			
	16.88							
	1.87							
	0.93							

Setting on wrong wire

Feb. 17. 1881

22<sup>h</sup> 30<sup>m</sup> N.C S.C

70.1 44.4

71.0 44.1

70.2 44.0

70.8 44.9

71.5 44.9

36 24

70.72 44.48

44.48

11 5 20

44 57.60

Set at 44 59.2

Flexure

E F S H

9.0 19.1 26.8 12.2

9.0 19.0 26.7 12.1

8.7 19.7 26.5 12.8

9.0 19.4 26.5 12.8

9.4 19.3 26.8 12.8

1 15 33 27

9.02 19.30 26.64 12.54

19.30

26.64

12.54

27.52

16.88

N

18.3 178 178 16.4 16.6

S

18.2 184 182 20.0 20.0

N-S

-0.0 -4 -3.6 3.0

E

20.9 16.6

F

22.7 19.0

S

22.6 20.9

H

17.0 13.8

32

303

20.80

20.80

17.57

21.4

21.2

21.2 21.0



Long Collar

22<sup>h</sup> 20<sup>m</sup>

144 620 228 221 229  
641 262 261 263  
595 248 252 264  
573 177 179 182  
613 915 913 938  
~~2888~~ 2282 2345  
2305

215  
~~W.C. SC~~  
W.C. SC

44	767	<del>64</del> 7451
	7413	<del>65</del> 1433
	733	<del>68</del> 1440
	740	448
	744	444
	227	<hr/> 216
	7459	4432

Collimation was left at last  
reaching of Long Coll. by mistake.  
~~Collimation was left~~

	15943	22 <sup>h</sup> 10 <sup>m</sup>	Del-H-574 593	5 <sup>h</sup> 15 <sup>m</sup>
N	180	176	200	172
S	191	191	157	180
N-S	-11	-15	+49	-8
	202	203	248	200
	218	210	253	212
	209	203	252	224
	154	150	204	170
	783	766	170	806
	1948	1915	2425	2015
			-49	+8

$\angle 45^\circ$ 

60.2	218	216	219
62.8	278	266	272
64.0	271	264	278
64.3	190	186	193
64.4	957	932	962
	2392	2330	2405
		23.76	



Feb. 21, 1881

12<sup>h</sup> 15<sup>m</sup> Long Coll.

44	58.1	29.9	22.4	21.3
	58.8	25.8	26.4	25.0
	58.0	24.8	25.9	24.1
	59.1	16.9	18.1	16.3
	60.0	94	128	67
440	22.35	23.20	21.67	
58.80		22.41		

N.C.    S.C.

17 <sup>h</sup> 20 <sup>m</sup>	44	74.1	41.5
		74.0	42.8
		74.9	42.0
		75.0	41.5
		74.0	42.0
		220	98
		74.40	41.96
		41.96	
		116.36	

44 58.18

Set at 44 64.3

	<u>h m</u>	
	<u>18 45</u>	<u>21 10</u>
N	201	191
S	181	181
NS	+2.0	+1.0
	21.0	20.5
	21.6	21.9
	22.9	22.3
	16.1	14.7
	81.6	79.4
	20.40	19.85
	18.40	18.8



Feb. 22, 1881

Long Coll.

22<sup>h</sup> 35<sup>m</sup>

59.0	23.1	22.3	22.7
64.5	26.9	26.7	26.2
61.8	25.7	25.1	25.8
59.7	18.2	18.4	18.1
57.2	139	125	128
22	23.47	23.12	23.20
60.44		23.26	

1<sup>h</sup> 35<sup>m</sup> N.C

57.8	74.0	23.2	23.0	23.7
56.8	73.3	29.0	28.1	29.0
59.8	73.8	28.9	28.6	29.0
61.0	73.2	20.5	20.4	20.6
60.5	75.8	216	201	223
459	201	25.40	25.02	25.57
59.18	74.02		25.33	

22<sup>h</sup> 50<sup>m</sup>

N.C

S.C

74.0	40.8
73.3	40.9
73.8	41.3
73.2	42.0
75.8	42.1
20.1	71
74.02	41.42
41.42	
115.44	

44 57.72

Set at 44 57.7

Feb. 22, 1881

	<u>Level.</u>									
	23	4 <sup>m</sup>	23	26	0	30	2	30	2	45
N	178	170			144		184		188	
S	187	181			211		168		163	
N-S	-1.9	-2.1			-6.7		+1.6		+2.5	

E	17.2	17.2	12.2	18.2	14.6
F	18.2	18.2	13.3	20.4	20.2
G	18.4	18.0	12.6	21.8	21.9
H	13.7	13.7	8.1	16.0	16.1
	27.5	27.1	46.2	76.4	76.8
	16.87	16.78	11.55	19.10	19.20
	17.8	18.9	19.2	17.5	16.7
	23 15			2 37	
	18.35			17.10	



20

Feb. 22, 1881

224 40m

Runs

	<u>E</u>	<u>F</u>	<u>G</u>	<u>H</u>
50	45.6 00 43.8	46.2 45.8	45.7 45.1	41.2 39.1
	45.3 43.4	46.7 45.8	45.1 45.2	41.1 39.3
	45.2 43.1	46.4 45.8	45.6 45.3	41.3 39.3
	45.6 43.7	46.2 45.6	45.9 45.4	41.4 39.0
	45.0 43.1	46.6 46.2	46.4 45.3	41.1 39.2
	17 21	21 42	37 13	11 9
	45.34 43.42	46.42 45.84	45.74 45.26	41.22 39.18

Fluxure

224 45m	<u>E</u>	<u>F</u>	<u>G</u>	<u>H</u>	<u>E</u>	<u>F</u>	<u>G</u>	<u>H</u>
45 1	19.1	21.0	20.7	15.1	7.4	18.1	25.9	12.3
	18.9	21.0	20.9	15.2	7.6	17.8	25.3	12.0
	19.5	20.3	20.4	15.2	7.8	17.1	25.4	12.5
	19.7	20.5	20.3	15.2	7.9	17.8	25.7	12.2
	19.9	20.3	20.6	15.2	7.7	17.9	25.4	12.3
	21				7.68	17.74	25.34	12.26
	19.42	20.62	20.58	15.18	17.74			
	20.62				25.34			
	20.58				12.26			
	15.18				15.81			
	18.95							
	15.81							
	3.14							
	1.57							





Feb. 23, 1881

19<sup>h</sup> 40<sup>m</sup>Long Coll. too unsteady  
for reading19<sup>h</sup> 40<sup>m</sup> N.C S.C

44 74.1 38.0

~~78.4~~

74.8 34.0

73.3

73.2 34.1

74.2 35.1

73.4 37.1

197 283

73.7 4 36.66

35.66

10960

44 54.80

Set at 44 54.8

Seeing very bad.

	21 <sup>h</sup> 0 <sup>m</sup>	Level
N	18.7	18.4
S	18.7	18.0
N-S	0.0	+0.4
E	21.5	21.7
Z	22.2	22.0
S	19.2	19.1
H	12.5	13.0
	75.4	75.8
	188.5	18.95
	18.8	18.5



Feb. 24, 1881

22<sup>h</sup> 45<sup>m</sup> N.C. S.C

70.4 40.8

73.3 40.1

71.3 41.0

71.5 40.7

73.2 41.7

97 43

71.94 40.86

40.86

11280

44 56.40

Set at 44 56.4

Found that the setting of  
the S. on N. coll. ~~to~~ for observa-  
tion on p 22, to be wrong. That value was therefore incorrect

22 H-

Level

N	147	18.9
S	213	21.9
N-S	-66	-3.0
E	140	22.4
W	145	23.8
B	130	22.0
H	53	14.7
	468	29
	11.70	20.72
	18.3	



Feb. 26, 1881

Long Coll.

~~73.1~~~~72.5~~~~70.8~~~~72.4~~~~72.0~~21 50<sup>m</sup> N.C., S.C.

67.9 41.0

68.0 41.2

67.8 41.7

68.3 40.9

69.0 41.0

41.0 58

68.20 41.16

41.16

10936

44 54.68

Set at 44 56.4

B. obs.

Mar. 14, 1881

Long Coll.

2140m

44	08.2	10.8	113	9.3
	09.1	14.8	143	13.7
	07.4	15.1	152	14.1
	09.0	8.1	178	7.1
	08.8	88	186	42
	425	12.20	14.65	11.05
	8.50		12.63	

2145m

N.C.

S.C.

79.3	44	41.0
79.2		40.2
80.5		41.0
79.9		41.0
79.7		40.4
36		36
79.72		40.72
40.72		
12044		
60.22		
Set at 44	56.3	



28

Mar. 14, 1881

214 20m

Runs

	E		F		G		H
5 0	38.3 36.8	39.0 39.1	40.8 39.8	36.4	35.0		
	38.2 36.8	39.2 38.8	40.7 39.8	36.0	35.1		
	38.3 36.7	40.1 38.8	40.5 39.9	36.0	35.1		
	39.1 36.8	39.0 39.0	40.9 39.8	36.2	35.0		
	38.7 36.4	39.3 39.3	40.9 39.8	36.4	34.8		
	26 35	16 0	38 41	10	0		
	38.52 36.70	39.32 39.00	40.76 39.82	36.02 <sup>20</sup>	35.00		

Flexure

214 30m	E	F	G	H	E	F	G	H
45 2	20.8	22.8	23.8	19.1	10.3	20.5	29.1	16.7
45 2	20.7	22.3	23.1	18.3	10.0	20.4	29.0	16.1
	20.9	22.2	23.2	18.1	10.0	21.3	29.0	16.3
	20.3	22.0	23.3	18.0	10.0	20.2	29.0	16.0
	20.7	21.8	23.7	18.6	9.3	20.0	28.8	16.0
	34	11	21	21	496	24	49	11
	20.68	22.22	23.42	18.42	9.92	20.48	28.98	16.22
	22.22				20.48			
	23.42				28.98			
	18.42				16.22			
	474				3560			
	21.18				18.90			
	18.90							
	2.28							
	1.14							

Mar. 14. 1881

21<sup>h</sup> 35<sup>m</sup> Focus of collimators adjusted.21<sup>h</sup> 35<sup>m</sup> N.C. S.C.

85.4 38.3

86.0 37.8

85.0 38.1

84.0 37.1

85.1 37.7

255 39.0

85.60 37.80

37.80

122.90

44 61.45

Set at 44 61.4

23<sup>h</sup> 35<sup>m</sup> Level

N 16.8 16.3

S 18.2 18.1

N-S - 1.4 - 1.8

E 12.5 13.4

Z 14.1 14.3

S 15.8 16.1

H 11.1 11.6

135 154

13.38 13.85

14.8 ~~14.8~~

15.6

15.20



Mar. 15, 1881

23<sup>45</sup> 50<sup>00</sup> Long coll.

44	5.7	5.2	13.1	11.3	12.9	13.3
	7.9	13.1	18.2	15.9	17.4	17.8
	7.9	18.2	19.2	17.7	19.4	19.6
	8.7	18.7	11.9	10.1	12.3	12.2
	10.3		224		220	229
	40.5		15.60		15.50	15.72
	10.12		15.61			
	8.10					

Mar. 15, 1881

Level

	23 145m	27 10
N	16.2	178
S	17.2	178
N-S	<del>4</del> -1.0	+5
E	11.1	151
Z	12.4	162
<del>g</del>	15.3	192
H	10.8	137
	96	242
	12.40	16.05
	13.40	15.5



Mar. 16, 1881

4<sup>h</sup> 55<sup>m</sup> N.C. S.C.

82.7 41.2

82.3 41.0

81.2 41.1

80.3 41.0

82.0 40.9

85 52

81.70 41.04

41.04

122.74

44 61.37 -

Mar. 16, 1881

Flexure

540m

	E	F	G	H	E	F	G	H
16.0	16.0	20.3	26.3	20.2	8.8	18.8	31.8	19.4
20.3	15.7	21.0	26.6	20.1	8.7	18.3	31.3	19.7
24.7	15.8	21.1	27.7	19.8	8.9	18.7	31.3	19.8
21	15.8	21.3	26.7	19.9	8.7	18.3	31.6	19.9
	16.0	20.7	27.9	19.8	8.7	18.6	31.8	19.7
	15.86	20.88	27.04	19.96	8.76	18.54	31.56	19.70

~~20.88~~

27.04

19.96

20.93

19.64

12.9

.65

18.54

31.56

19.70

19.64



34

Mar. 20, 1881  
Long Coll.

21<sup>h</sup> 45

4.8 8.2 7.8 9.0  
2.8 13.2 13.3 13.7  
4.2 14.2 15.6 15.8  
4.7 9.1 8.9 9.2  
5.1 47 50 77  
16 11.17 11.25 11.92  
4.32 11.45

21<sup>h</sup> 50 N.C. S.C.

44 84.7 38.9  
84.3 37.8  
83.8 39.2  
84.8 39.5  
84.2 39.0  
218 444  
84.36 38.88  
38.88

123 24

44 61.62

Set at 44 61.6

Mar. 20, 1881

Flexure

214 8 <sup>pm</sup>	E	F	G	H	E	F	G	H	
45	2 19.1	22.1	21.4	24.8	20.0	9.2	20.0	30.8	18.7
	19.8	22.3	21.7	24.3	20.0	9.7	20.1	30.8	18.6
	18.9	22.8	21.5	24.1	20.7	9.8	19.7	30.2	18.4
	18.4	24.5	21.9	24.3	20.2	9.7	19.8	30.8	18.5
	18.7		21.7	24.7	20.6	9.7	19.9	30.5	18.4
	49	32	22	15	31	45	31	23	
	18.98	21.64	24.44	20.30	9.62	19.90	30.62	18.46	
	21.64				19.90				
	24.44				30.62				
	20.30				18.46				
	536				3860				
	21.34				19.65				
	19.65								
	1.69								
	4.84								

22 10

Level

N	11.8	20.1	18.0
S	21.2	17.7	19.2
N-S	-9.2	+2.4	-1.2

E	40	2	2.8	17.6	14.9
F			5.8	19.1	17.0
G			8.6	22.1	20.2
H			4.3	17.8	15.8
	215		366	279	
	5.37		19.15	16.97	
	14.6		16.7	18.2	
			16.50		



36

Mar. 21, 1881

Mar. 22, 1881

21 <sup>h</sup> 50 <sup>m</sup> Song Coll.					7 <sup>h</sup> 50 <sup>m</sup>					<del>21<sup>h</sup> 10<sup>m</sup></del>					
43	98.2	9.1	9.3	9.2	43	96.6	10.2	11.2	11.7	43	98.8	<del>5.2</del>	<del>9.2</del>	<del>8.4</del>	<del>8.4</del>
	0.3	13.8	13.6	13.7		97.2	16.0	17.2	16.8		2.5	9.2	13.1	12.8	12.6
	98.8	15.2	15.7	15.2		97.8	20.5	<del>21.4</del>	21.0		1.3	<del>13.1</del>	15.0	14.3	14.0
	99.8	9.3	8.8	9.4		96.0	12.1	13.0	12.9		1.2	<del>15.0</del>	8.4	7.3	7.6
	99.9	74	74	75		96.2	18.8	<del>22.8</del>	22.4		0.5	<del>8.4</del>			
	470	11.85	11.85	11.87		33.8	14.70	<del>15.70</del>	15.60		43				
	99.40	11.86				96.76	15.75				0.86				
							33								

	22 <sup>h</sup> 0 <sup>m</sup>	1 <sup>h</sup> 0 <sup>m</sup> Level.
N	16.8	20.2
S	16.2	11.2
N-S	+1.6	+9.0
E	16.3	22.0
W	18.8	24.2
S	21.1	27.4
H	16.8	22.8
	73.0	16.4
	18.25	24.1
	17.6	15.1

Mar. 21, 1881

$21^h 55^m$ E	F	S	S	Flexure	E	F	S	H
19.1	21.8	24.7	19.9		10.0	20.8	30.8	17.1
19.2	22.3	24.1	19.4		10.0	20.3	30.8	17.2
19.5	22.0	24.2	19.3		10.0	20.8	30.5	18.1
19.7	21.8	24.7	19.7		10.0	20.8	30.8	18.0
19.6	21.8	24.7	19.7		10.2	21.6	31.0	18.0
21	47	24	30		2	43	39	34
19.42	21.94	24.48	19.60		10.04	20.86	30.78	17.68
21.94					20.86			
24.48					30.78			
19.60					17.68			
544					3936			
21.36					19.84			
19.84								
1.52								
0.76								

$22^h 40^m$	<u>N.C.</u>	<u>S.C.</u>	<u>N.C.</u>
44	80.9	43.1	44 75.7
	81.0	43.8	
	81.2	43.0	
	80.8	42.9	
	80.8	43.8	
	47	166	
	80.94	43.32	
	43.82		
	12426		
44	62.13		
Set 44	61.6		



38

Mar. 22, 1881

21<sup>h</sup> 10<sup>m</sup> E J. S H Flexure E J. S H

5 2 19.7 21.6 24.1 19.3

10.1 20.8 30.8 17.2

19.2 21.7 24.0 19.0

9.8 20.6 30.5 17.2

19.1 21.4 23.9 18.7

9.9 20.9 30.7 17.1

19.2 21.2 23.6 18.8

10.0 20.7 30.6 17.1

19.4 21.3 23.8 18.7

9.7 20.7 30.3 17.3

16 22 44 45

45 37 29 9

19.32 21.44 23.88 18.90

9.90 20.74 30.58 17.18

21.44

20.74

23.88

30.58

18.90

17.18

354

7840

20.88

24.60

19.60

19.60

1.28

0.64

Level

0<sup>h</sup> 5<sup>m</sup>

40

N

17.0

168

165

S

17.9

168

172

N-S

-0.9

00

-7

E

16.4

159

164

J

18.1

182

177

S

20.4

212

215

H

16.2

162

160

711

715

17.88

17.88

18.7

17.9

Mar. 22, 1881  
 Long Coll.

47<sup>h</sup> 50<sup>m</sup>

43	96.6	10.2	11.2	11.7
	97.2	16.0	17.2	16.8
	97.8	20.5	21.4	21.0
	96.0	12.1	13.0	12.9
	96.2	18.8	22.8	22.4
	33.8	14.70	15.70	15.60
	96.76		15.33	

21<sup>h</sup> 10<sup>m</sup>

43	98.8	5.22	9.2	8.4	8.4
	2.5		13.1	12.8	12.6
	1.3		15.0	14.3	14.0
	1.2		8.4	7.3	7.6
	0.5		57	28	26
	43		11.42	10.70	10.65
	0.86		10.92		

perhaps 5' away

21<sup>h</sup> 15<sup>m</sup> N.C S.C

44	75.7	42.3
	76.0	42.3
	76.6	42.0
	77.0	42.0
	76.2	43.0
	15	16
	76.30	42.32
	42.32	
	11862	

44 59.31

Set at 44 <sup>61.6</sup> 59.3



Mar. 23, 1881  
Long Coll.

22<sup>h</sup> 05<sup>m</sup>

44 0.4 10.8 11.9 10.9

96.9 14.6 15.8 15.2

2.0 14.9 16.8 15.9

2.4 17.9 9.4 8.8

2.0 82 139 108

57 12.05 13.47 12.70

1.14 12.74

Level

2 2 15

N 15.0 16.8

S 19.9 18.1

N-S -4.9 -1.3

E 14.2 15.2

W 15.7 16.8

S 17.8 19.5

H 12.1 14.9

198 264

14.95 16.60

17.8 17.9

18.85

Mar. 23, 1881

224 15<sup>m</sup>

Flexure

E	F	G	H
21.1	22.2	24.8	19.2
21.0	22.6	24.5	18.7
21.2	22.8	24.1	19.0
21.0	22.8	24.1	19.0
21.0	22.9	24.6	19.3
3	33	21	2
21.06	22.66	24.42	19.04
22.66			
24.42			
19.04			
7.18			
21.79			
20.15			

E	F	G	H
11.1	21.7	30.9	17.0
11.0	22.0	30.8	16.8
11.0	21.9	30.4	17.1
11.3	21.7	30.8	17.1
11.2	21.5	30.7	17.0
6	38	36	0
11.12	21.76	30.72	17.00
21.76			
30.72			
17.00			
060			
20.15			

1.64

+ 0.82

224 for N.C. S.C.

78.6	42.7
77.8	42.1
78.9	41.8
77.9	42.0
77.5	41.8
7	4
78.14	42.08
42.08	
120.22	

44 60.11

Set at 44 60.1



March 23, 1881.

Examination of Stars of which the observations indicate a correction to the Mean places of Publication XIX either in Right Ascension or Declination.

### Cases in R.A.

The following method of detecting the apparent errors was employed on the computation of the Instrumental Constants, the Fundamental Time Stars are arranged in two groups, separated as widely as possible in time for the purpose of deducing the Clock-rate. The mean of the values of  $\Delta\tau + m$  for each group having been taken, it was possible to see by inspection whether  $\Delta\tau + m$  for any star differed largely from the mean. For every suspected case the residual between the observed value and the value for the mean of the group, was taken for each date of observation for a given year. The Cases which were noted in this way were then grouped together under each year, and then for the first time an examination was made of the recurrence of the same errors for each year. From this provisional list were selected all the stars which appeared to require correction to the Fundamental Catalogue.

All the observations of these stars were then examined and a final list of correction was obtained for each year in the manner described above.

Since the values of  $\Delta\tau + m$  investigated have a negative sign the corrections in R.A. given in the provisional sheets have the opposite sign from those given below.

The corrections in declination are to be applied to the Pulkova places both in the provisional and the final sheets.



In a few cases there are apparently large corrections due to accidental causes. Cases of this kind which occur will be noticed by the inspection of the Provisional sheets. The reduction of the observations for these cases will be specially examined.

### Cases in Declination.

The method of investigation is the same as for Right Ascensions. The value of the Equator-point Correction for any star has been compared with the mean value for a given date.

The following is the list of cases which indicate large corrections. This list has been sent to Professor Auwers with the request that he shall indicate the course to be pursued with respect to these stars in the formation of the instrumental constants and clock errors for the reduction of the zone observations.

(see next Page)



Corrections in R.A. to the positions given  
in Publication XIV of the Gesellschaft.

			1872	1873	1874	1875	1876	1877	1878	Mean
$\epsilon$ Ceti	$0^h 13^m -9^s 31'$	$-0.167$	$+0.03$	$+0.07$	$+0.03$	$+0.00$	$+0.04$	$+0.12$		$+0.05$
$\eta$ Capri	$0^h 42^m +57^s 9'$	$+0.55$	$+0.05$	$+0.14$	$+0.05$		$+0.06$	$+0.08$	$+0.13$	$+0.09$
$\beta$ Andromedae	$1^h 3^m +34^s 57'$	$+0.70$			$-0.06$	$-0.07$	$-0.13$	$-0.06$	$-0.04$	$-0.07$
$\beta$ Lynx	$9^h 6^m +43^s 44'$	$+0.96$		$-0.16$						$-0.16$
$\nu$ Ursa Majoris	$9^h 42^m +59^s 37'$	$+1.70$		$-0.06$	$-0.01$	$-0.03$	$-0.01$	$-0.04$	$-0.08$	$-0.04$
$\delta$ Draconis	$16^h 0^m +58^s 54'$	$+1.66$	$-0.07$	$-0.09$	$-0.13$	$-0.09$	$-0.15$	$-0.18$		$-0.12$
$\eta$ Herculis	$16^h 5^m +45^s 16'$	$+1.01$	$+0.10$	$+0.07$			$+0.06$	$+0.02$	$+0.09$	$+0.07$
Groombridge 2377	$16^h 43^m +57^s 0'$	$+1.54$	$-0.09$	$-0.15$	$-0.08$	$-0.13$	$-0.15$	$-0.17$		$-0.13$
$\gamma$ Draconis	$17^h 51^m +56^s 54'$	$+1.53$	$-0.10$	$-0.05$			$-0.12$	$-0.19$		$-0.11$
$\beta$ Cygni	$20^h 10^m +56^s 11'$	$+1.49$					$-0.03$	$-0.17$		$-0.10$
$\lambda$ Andromedae	$23^h 31^m +45^s 47'$	$+1.03$	$-0.04$	$-0.09$	$-0.08$	$-0.06$	$-0.15$	$-0.09$	$-0.07$	$-0.08$
$\eta$ Draconis	See Vol. XII page XVII.									$-0.17$
	$16^h 22^m +61^s 48'$	$+1.87$								

Writ on Rec

Corrections in R.A. to the positions given  
in Publication XIV of the Gesellschaft.

			1872	1873	1874	1875	1876	1877	1878	Mean	
$\epsilon$ Ceti	$h^m$ 0 13	$g^s$ -9 31	$2002$ $-0.167$	+0.03	+0.07	+0.03	+0.00	+0.04	+0.12	+0.05	$\alpha$
$\eta$ Rapiorialis	$h^m$ 0 42	$g^s$ +57 9	+0.53	+0.05	+0.14	+0.05	+0.06	+0.08	+0.13	+0.09	$\alpha$
$\beta$ Andromedae	$h^m$ 1 3	$g^s$ +34 57	+0.70		-0.06	-0.07	-0.13	-0.06	-0.04	-0.07	$\alpha$
$\beta$ Lynceis	$h^m$ 9 6	$g^s$ +43 44	+0.96	-0.16						-0.16	$\beta$
$\alpha$ Ursae Majoris	$h^m$ 9 42	$g^s$ +59 37	+1.70	-0.06	-0.01	-0.03	-0.01	-0.04	-0.05	-0.04	$\alpha$
$\alpha$ Draconis	$h^m$ 16 0	$g^s$ +58 54	+1.66	-0.07	-0.09	-0.13	-0.09	-0.15	-0.18	-0.12	$\alpha$
$\phi$ Herculis	$h^m$ 16 5	$g^s$ +45 16	+1.01	+0.10	+0.07		+0.06	+0.02	+0.09	+0.07	$\alpha$
Groombridge 2377	$h^m$ 16 43	$g^s$ +57 0	+1.54	-0.09	-0.15	-0.08	-0.13	-0.15	-0.17	-0.13	$\alpha$
$\xi$ Draconis	$h^m$ 17 51	$g^s$ +56 54	+1.53	-0.10	-0.05		-0.12	-0.19		-0.11	$\alpha$
$\beta$ Cygni	$h^m$ 20 10	$g^s$ +56 11	+1.49				-0.03	-0.17		-0.10	$\alpha$
$\lambda$ Andromedae	$h^m$ 23 31	$g^s$ +45 47	+1.03	-0.04	-0.09	-0.08	-0.06	-0.15	-0.09	-0.07	$\alpha$
$\eta$ Draconis	See Vol. XI page XVII. $h^m$ 16 22									-0.17	$\alpha$
		$g^s$ +61 48	+1.87								



Corrections in Declination to the positions given in  
Publication XIV of the Gesellschaft.

	h m s	1872	1872-3	1873	1874	1875	1878	
$\alpha$ Capricornae	0 33 +55 51	-0.2''	-0.3''	+0.5''	+0.8''	+0.9''	+0.8''	+0.5''
$\alpha$ Tauri	4 29 +16 15	-0.5		-0.7	-1.5		-0.5	-0.8
$\lambda$ Eridani	5 3 -8 55	-0.7			-1.4	-2.8		-1.6
$\beta$ Orionis	5 9 -8 21	-0.1	+0.5		-0.5	-0.6		$[-0.2]$
$\alpha$ Orionis	5 48 +7 23	+0.6		+0.1	+0.8	+1.1	+0.4	+0.6
$\gamma$ Orionis	6 0 +14 47	-0.4		-1.0	-0.4	-0.4		-0.5
23 H Camelops.	6 25 +79 42			+1.7	+1.3	+1.6		+1.5
$\alpha$ Geminorum	6 45 +34 7			-1.2	-0.1	-0.4		-0.6
$\delta$ Caneri	8 38 +18 37	-0.8		-0.9	-0.9	-0.9		-0.9
$\epsilon$ Caneri med.	8 47 +31 3	+0.5		+0.9	+1.1	+0.4		+0.7
$\zeta$ Hydrae	8 49 +6 25	+0.4			+1.0	+0.5		+0.5
$\delta$ Caneri	9 12 +18 14	-0.6			-0.4	-0.7		-0.6
$\alpha$ Hydrae	9 21 -8 7	-0.1			-0.3	-0.8		-0.2
$\eta$ Leonis	10 1 +17 22	-0.1		-0.8	-0.9	-1.1		-0.7

Name	h	m	s	sec	1872	1872-3	1873	1874	1875	1876
<i>Ursae Majoris</i>	11	47	+54	23	+0.7 <sup>11</sup>		+0.3 <sup>11</sup>	+0.5 <sup>11</sup>	+0.5 <sup>11</sup>	+0.5
<i>Virginis</i>	12	14	+0	2	-0.3		-0.7	-0.3	-0.6	-0.6
<i>Virginis</i>	13	55	+2	9	-0.8		+2.2	+2.0	+0.3	+0.9
<i>Bootis</i>	14	26	+30	55	+0.3			+1.0	+0.3	+0.5
<i>Serpentis</i>	15	38	+6	49	+0.2		+1.1	+1.1	+0.9	+0.5
<i>Serpentis</i>	15	45	+4	51	-1.2		-0.7	-0.8	-0.7	+0.1
<i>Gr. 2296</i>	15	55	+55	6	+0.2		+1.1	+0.6	+0.5	+0.6
<i>Arculis</i>	16	16	+19	27	-0.3		-1.2	-0.7	-0.2	-0.5
<i>Gr. 2377</i>	16	43	+57	0	+0.1		+0.5	+0.8	+0.9	+0.6
<i>Arculis</i>	16	46	+15	11	+0.2		+0.2	+0.2	+0.5	[+0.3]
<i>Ursae Minoris</i>	16	59	+82	14	-0.9	+1.1	+1.0	+1.8	+0.5	+0.2
<i>Draconis</i>	17	28	+52	24	+0.5		+1.3	+0.3	+0.2	+0.1
<i>Draconis</i>	17	54	+51	30	+0.3	+0.7	+0.3	+0.3	+0.1	+0.5
<i>35 Draconis</i>	17	55	+76	59	-0.7			+0.5	+0.6	
<i>Serpentis</i>	18	15	-2	56	-0.8			-0.3	-0.2	-0.1



Name	h	m	s	sin z	1872	1872-3	1873	1874	1875	1878
$\gamma$ 2655	18	36	+77	27	1.1			1.2	+0.5	+0.8
$\delta$ Aquilae	19	19	+2	52	+1.0			+1.7	+0.9	+1.2
$\delta$ Sagittae	19	42	+18	14	-0.7			-0.9	-1.2	-1.0
$\eta$ Aquilae	19	46	+0	41	-0.2			-0.2	-1.3	-0.6
$\epsilon$ Cygni	20	41	+33	30	-1.0			-1.2	-0.2	-0.8
$\epsilon$ Pegasi	22	1	+24	44	-0.5			-0.7	-0.6	-0.6
$\phi$ Pegasi	22	4	+5	35	+1.1			+1.1	+1.3	+1.2
$\zeta$ Pegasi	22	35	+10	11	+0.2			+0.2	+0.6	(+0.3)
$\alpha$ Andromedae	22	56	+41	39	-0.2			-0.6	-0.7	-0.5
$\pi$ Cephei	23	4	+74	43	-2.0			-1.2	-0.9	-1.4
$\omega$ Piscium	23	53	+6	10	+0.9		+0.5	+1.0	+0.2	+0.6

48

Mar. 24, 1881  
Long Coll.214 50<sup>m</sup>

43 98.9 11.6 11.5 10.9

98.8 15.6 15.0 14.9

98.0 15.1 15.1 15.6

98.1 9.2 9.7 8.4

99.9 11.5 11.3 9.8

37 12.87 12.82 12.45

98.74

220

Level

N 11.1

S 19.3

N-S -4.2

E 15.8

W 17.0

S 18.7

H 13.2

247.

16.18

20.38



21<sup>h</sup> 55<sup>m</sup> Mar. 24, 1881

E	F	G	H	Flexure	E	F	G	H
21.8	23.8	25.0	20.3		11.1	22.0	30.7	17.4
21.9	24.2	24.8	20.0		11.4	21.8	30.8	17.2
21.9	23.7	24.8	19.9		11.8	21.5	30.3	17.7
21.9	23.8	24.6	20.0		11.8	21.8	30.3	17.8
21.9	23.7	24.7	20.1		11.8	21.8	30.4	17.7
4	42	39	3		29	39	27	28
21.88	23.84	24.78	20.06		11.58	21.78	30.54	17.66
23.84					21.78			
24.78					30.54			
20.06					17.66			
1.056					146			
22.64					20.36			
20.36								
3.00								
1.50								

22<sup>h</sup> 0<sup>m</sup> N.C. S.C.

44	78.1	37.8
	78.0	38.7
	78.1	38.0
	78.0	37.8
	77.7	37.0
	49	43
	77.98	37.86
	37.86	
	115.84	

44 57.92

Set at 44 60.1

50

Mar. 27, 1881

22<sup>h</sup> 50<sup>m</sup> Long Coll.

43 0.8 13.0 13.6

99.0 17.0 16.9

0.0 17.6 17.9

1.5 9.3 9.2

0.0 16.9 17.2

1.3 14.22 14.30

0.26 14.26

23 0

Level Fluxure

N 14.0

S 15.2

N-S - 1.2

E 15.8

Z 17.0

S 19.3

H 12.4

24.5

16.12

17.32



Mar. 27, 1881

22<sup>h</sup> 55<sup>m</sup> E F S H Flexure E F S H

20.8	22.9	24.0	18.0	17.3	10.8	21.0	30.0	15.1
20.4	22.9	23.8	17.6	17.2	10.9	21.0	30.4	15.8
20.9	22.8	23.8	18.0	17.6	11.0	21.4	29.9	15.3
20.7	22.2	23.8	18.7	17.5	11.0	21.3	30.1	15.6
20.7	22.8	23.8	18.7	17.6	11.0	21.2	30.0	15.4

~~22.9~~

20.70 22.90 23.80 17.44

22.90

23.80

17.44

21.21

19.41

1.80

+ .90

10.94 21.18 30.08 15.44

21.18

30.08

15.44

19.4122<sup>h</sup> 57<sup>m</sup> N.C. S.C.

82.8 33.8

80.5 34.2

80.0 34.1

80.3 33.8

80.1 36.1

37 22.0

80.74 34.40

34.40

11514

44 57.57

Set at 44 57.6

52

Mar. 28, 1881

Evening. Long Coll.

8h 15m

21<sup>h</sup> 40m

95.3	11.9	12.3	12.1	4.3	97.3	12.6	12.6	12.2
94.7	17.4	18.1	17.9		96.0	16.9	16.4	15.8
95.3	21.2	21.3	21.2		98.0	17.1	16.8	17.0
96.4	11.6	12.1	12.1		97.7	9.2	9.3	8.8
95.0	22.1	23.8	23.3		97.9	15.8	15.1	13.8
267	15.52	15.95	15.82		369	13.95	13.78	13.45
95.34		15.76			97.38		13.72	

8 25

Level

N	16.0	15.5
S	19.1	18.7
N-S	-3.1	-3.2
E	19.7	19.1
W	21.1	20.2
B	22.7	22.8
H	17.0	16.8
	20.5	18.9
	20.12	19.72
	23.2	22.9

23.5



Mar. 28, 1881

23 <sup>0m</sup>	E	N	S	H	Fluxure	E	N	S	H
	21.1	22.8	24.7	18.8	45 2	11.9	23.2	31.6	17.4
	21.1	23.0	24.8	18.1		12.2	23.0	31.7	17.2
	21.1	22.6	24.3	17.8		12.0	22.3	31.9	16.9
	21.1	22.4	24.2	17.8		12.0	22.8	31.8	17.0
	21.1	22.5	24.2	18.2		12.0	22.4	31.7	17.0
—	33	22	7			1	37	37	5
	21.10	22.64	24.44	18.14		12.02	22.74	31.74	17.10
22.66						22.74			
24.44						31.74			
18.14						17.10			
634						360			
21.58						20.90			
20.90									
0.68									
0.34									

44 45 <sup>m</sup>	N.C	S.C	N.C <sup>44 45<sup>m</sup></sup>	S.C <sup>44 45<sup>m</sup></sup>	224.05 <sup>m</sup>	N.C	S.C
	80.6	34.0	80.4	37.4		79.1	36.9
	79.0	35.0	79.8	38.3		79.4	35.7
	80.6	33.5	81.8	37.8		79.9	35.6
	81.2	34.8	81.1	37.1		80.3	37.0
	80.5	35.0	81.1	38.0		79.3	37.0
	19	223	42	386		480	322
	80.38	34.46	80.84	37.72		79.60	36.44
	34.46		37.72			36.44	
	11484		11856			11604	
	57.42	B obs.	59.18	R obs.		44 58.02	
	Set at 44	57.6				Set at 44	57.6

54

Mar. 28, 1881

Runs

21<sup>4</sup> 50m

E

F

G

H

Means

5	0	31.0	29.0	31.8	31.2	33.8	32.8	27.9	26.4
		29.9	29.1	31.8	31.3	33.9	33.1	27.3	26.2
		31.0	29.8	31.8	31.3	33.7	33.0	27.8	26.1
		31.0	29.3	32.1	31.6	33.5	32.9	28.1	26.0
		31.2	29.1	32.0	31.5	33.4	32.8	27.8	25.6
41	13	45	19	33	46	39	3		

30.82 29.26 31.90 31.38 33.66 32.92 27.78 26.06

298.44

299.48

299.26

298.28

298.86

Set at random

2.7	1.0	1.8	1.5	8.4	7.5	1.3	0.8
2.5	1.2	2.0	1.3	8.0	7.5	1.4	0.5
2.4	1.3	1.8	1.8	7.8	7.2	1.4	0.6
16	5	26	16	2	12	11	19
2.53	1.17	1.87	1.53	8.07	7.40	1.37	0.63

298.64

299.66

299.33

299.26

299.22

E

F

G

H

16.1	14.2	13.9	14.3	21.8	21.0	16.9	15.3
15.9	14.7	14.0	14.6	21.3	20.9	16.7	15.3
15.8	14.3	14.1	14.3	21.7	20.9	16.7	15.8
28	12	0	12	18	28	23	14
15.93	14.40	14.00	14.40	21.60	20.93	16.77	15.47

298.47

30.040

299.33

298.70

299.22

E

F

G

H

13.5	12.9	12.8	12.0	20.2	19.8	15.6	14.4
14.1	13.0	13.1	12.2	20.5	19.9	15.2	14.2
14.4	12.8	12.7	12.3	20.7	19.3	15.3	14.3
0	27	26	5	14	20	11	9
14.00	12.90	12.87	12.17	20.47	19.67	15.37	14.30

298.90

299.30

298.20

298.93

299.08

299.17





Mar. 29, 1881

	1 <sup>h</sup> 15 <sup>m</sup>	2 <sup>h</sup> 40 <sup>m</sup>	3 <sup>h</sup> 50 <sup>m</sup> Level.	3 0	
N -	148	130	191	188	189
S	191	192	152	152	154
N-S	-43	-62	+39	+36	+35
E	15.3	158	245	240	244
W	17.8	186	269	259	262
S	21.2	211	297	297	295
H	14.1	150	240	237	232
	684	705	251	238	233
	17.10	17.62	2628	2582	2582
	21.4	23.8	22.4	22.2	22.3



22<sup>h</sup> 20<sup>m</sup> Mar. 31, 1881 Rms.

E	F	G	H				
43.4	42.1	45.6	45.2	48.0	46.8	43.3	41.2
43.8	42.3	45.7	45.0	47.8	47.0	43.5	41.2
43.3	42.1	45.7	45.4	47.8	47.3	43.1	41.2
43.8	42.6	45.6	45.6	47.9	47.7	43.1	41.6
43.3	42.5	45.6	45.1	47.7	47.2	43.0	41.3
26	36	32	13	42	10	10	15

43.52 42.72 45.64 45.26 47.84 47.20 43.20 41.30

Set at

298.80

299.62

299.36

298.10

298.87  
8.9

Random

7.6	6.1	8.9	8.8	13.3	13.2	6.3	5.3
7.3	6.3	8.8	8.7	13.7	13.2	6.0	5.3
7.9	6.2	8.6	9.1	13.6	13.2	5.9	4.8
7.8	6	23	26	16		2	4
7.60	6.20	8.77	8.87	13.53	13.20	6.07	5.13

298.60

300.10

299.67

299.06

299.36

E	F	G	H				
8.8	8.3	9.8	9.3	15.6	14.9	10.4	9.4
9.4	8.1	9.5	9.4	15.4	15.3	10.1	8.7
8.9	7.7	9.6	9.6	15.7	15.4	10.4	8.8
31	1	19	13	17	6	9	29
9.03	8.03	9.63	9.43	15.57	15.20	10.30	8.97

299.00

299.80

299.63

298.67

299.28

E	F	G	H				
8.2	6.8	8.8	8.2	15.9	15.1	11.1	9.6
8.5	6.1	9.0	9.2	15.6	15.2	10.5	9.2
8.1	6.1	9.1	9.5	15.5	15.1	10.2	9.2
8	10	29	29	20	4	18	10
8.27	6.33	8.97	8.97	15.67	15.13	10.60	9.33

298.06

300.00

299.46

298.73

299.06

299.23

58

Aug 31 1881  
 Song. Coll. 22<sup>h</sup> 0<sup>m</sup>

48	96.8	117.26"	118
	97.8	167.177	169
	98.7	184.190	181
	98.8	111.108	100
	99.8	<u>78</u>	
		179	201
		1448	1502

Level

	23 <sup>h</sup> 45 <sup>m</sup>	0 <sup>h</sup> 40 <sup>m</sup>	4 45
N	18.8	18.8	23 166
S	15.1	14.3	24 140
N-S	+3.7	+4.5	-18 26
E	20.8		196
W	22.3		231
S	25.1		243
H	19.3		218
	75		918
	21.87	21.9	2295
	<del>96.6</del>	<del>96.4</del>	<del>2</del>
	18.2	17.9	203

0 22  
 18.05



Mar 31 P-lep un 22 <sup>4</sup> 1515

E	F	G	H	C	F	G	H
21.3	23.1	25.0	19.7	10.9	20.6	31.8	17.7
20.8	22.8	25.1	19.5	11.0	20.5	31.8	18.0
20.7	23.0	25.1	19.4	10.7	20.4	31.8	18.2
20.8	23.0	25.1	19.9	10.9	20.9	31.7	18.1
20.8	22.0	25.0	20.0	10.8	20.7	31.6	18.2
44	39	3	35	43	31	37	2
20.88	22.78	25.06	19.70	10.86	20.62	31.74	18.04
22.78				20.62			
25.06				31.74			
19.70				18.04			
842				126			
22.10				20.31			
20.31							

1.79

0.89

N.C. S.C.

81.5 44 35.0

82.1 35.0

82.0 35.1

81.2 35.0

81.5 34.8

33 49

81.66 34.98

34.98

116.64

44 58.32

Set at 44 57.6

60

Apr. 2, 1881  
Long Coll.

sh 15m

lamp ill.

48

91.1 13.7 13.6 13.7

91.8 19.4 18.8 18.2

94.0 23.0 23.3 22.4

95.6 14.0 13.4 13.5

98.7 30.1 29.1 27.8

182 17.52 17.27 16.95

93.64 17.25

Seeing rather bad

Level

C



Apr. 3, 1881

Sub

N<sup>c</sup>

44	774	4	354
	783		350
	789		345
	775		348
	770		341
	<u>311</u>		<u>238</u>

44	7622	3476
		7622
		1098

(2) 55.49

set at 44 57.6

62

Mr 3 1881  
Long Coll.

22 30

97.32 14.9 15.0 14.8

98.1 18.4 18.7 18.7

96.7 18.6 18.8 18.8

97.8 10.1 10.2 10.2

97.3 220 227 225

22 15.5 15.6 16.6

97.44

Same

	1 <sup>h</sup> 40 <sup>m</sup>	3 0	4 19	23 <sup>h</sup> 15 <sup>m</sup>	0 <sup>h</sup> 50
N	176	175	180	18.2	11.0
S	174	170	161	21.2	20.1
W-S + 4		+5	+1.9	-6.0	-5.7

22.3

256

18.8

20.1

24.6

280

20.6

22.8

26.8

308

21.1

24.1

20.0

24.2

15.2

17.6

13.7

1086

35.7

4.6

23.42 23.4

27.15

18.92

21.15

23.0 22.9

25.2

24.9

26.2



22<sup>h</sup> 33<sup>m</sup>

Apr. 3, 1881

Flexure

E F G H

23.3 25.8 25.7 19.8

23.8 25.4 25.8 19.9

23.6 26.0 25.8 19.7

23.8 25.7 25.9 19.9

24.0 25.8 25.6 19.8

35

2370 25.74 25.76 19.82

25.74

25.76

19.82

950.2

2376

21.02

2.74

1.37

E F G H

12.8 22.2 31.3 17.0

12.0 24.3 31.3 17.1

12.3 23.3 31.4 17.0

12.5 23.5 31.2 17.0

12.4 23.5 31.5 16.8

20

12.40 23.36 31.34 16.98

23.36

31.34

16.98

84.08

2.102

22 35

N.C. S.C. N.C. S.C.

97.3 2 14.9 77.2 35.1

98.1 18.4 78.2 34.8

98.7 18.6 78.6 33.8

97.8 10.1 78.2 34.1

97.3 78.0 33.7

22 2 15

97.44 78.04 33.30

33.30

111.34

44 55.67

Set at 44 53.7

Apr. 4, 1881

6<sup>h</sup> 50<sup>m</sup> Long Coll. 22<sup>h</sup> 25<sup>m</sup>

92.9	12.8	11.8	12.2	97.8	16.3	15.7	15.9
93.5	19.2	19.0	19.2	96.4	18.9	18.9	19.7
94.1	22.6	22.1	22.8	96.8	19.3	19.0	19.2
92.1	13.2	12.2	13.4	95.0	10.0	9.9	9.8
93.4	27.8	26.1	27.3	93.4	24.5	23.5	24.6
10	16.95	16.28	16.82	29.4	16.12	15.88	16.15
93.20				95.88	16.05		

Level

23<sup>h</sup> 20<sup>m</sup>

N	16.0
S	21.1
N-S	-5.1

E	22.6
W	22.9
S	24.3
H	17.8
	<u>21.90</u>
	+5.1
	27.0



April. 4, 1881

a 45	<u>N.C.</u>	<u>S.C.</u>	22 <sup>h</sup> 30 <sup>m</sup>	<u>N.C.</u>	<u>S.C.</u>
	76.2	32.7	44	80.4	26.6
	75.7	32.0		80.5	27.1
	76.8	33.2		79.1	26.2
	76.8	32.9		79.0	26.0
	76.3	32.9		79.9	26.4
	18	37		39	23
44	76.36	32.74		79.78	26.46
	32.74			26.46	
	10910			10624	
44	54.55		44	53.12	
	Set at 44 55.7			Set at 44 55.7	

66

Apr. 7, 1881

6 45

Long Coll. 22<sup>h</sup> 45<sup>m</sup>

89.5 12.0 12.3

90.9 19.3 19.1

90.8 25.0 24.7

90.9 14.7 13.9

89.9 31.0 30.0

20 17.75 17.50

90.40 17.62

Seeing too bad  
for observation.

Level

23<sup>h</sup> 30<sup>m</sup>

N 17.7

S 16.1

N-S +1.6

E 22.6

Z 25.3

S 29.2

H 22.4

24.88

-1.00

23.28



Apr. 7, 1881.

Apr. 6, 1881	Apr. 7		
0 <sup>h</sup> 50 <sup>m</sup>	6 <sup>h</sup> 50 <sup>m</sup> N. C.	S. C.	22 <sup>h</sup> 45 <sup>m</sup> N. C. N.C.S. C.
Seeing too bad for collimation	83.3	30.5	44 68.2 81.2 31.2
	81.2	30.5	65.7 80.9 33.4
	82.8	31.5	67.7 81.2 30.5
	82.3	30.0	67.6 80.8 32.5
	81.8	32.1	68.2 79.8 32.7
	14	52	24 39 3
	82.28	31.04	67.48 80.78 32.06
	31.04		32.06
	113.32		112.84
	44 56.66		56.42
	Set at 44 55.7		Set at 44 55.7
			See poor

Apr. 8, 1881

Long Coll.

$44 \ 0.5^{\text{m}} \overset{43}{1} \ 85.0 \ 5 \ 2 \ 12.7$   
 $83.3 \quad 21.3$   
 $81.8 \quad 28.2$   
 $81.2 \quad 15.9$   
 $81.8 \quad 28.1$   
 $13.1 \quad 17.02$   
 $82.62$

Examined verticality  
of wires & found them  
correct.



Apr. 8. 1881

took out Taupine  
for cleaning glass plate  
and for measuring value of  
collimation error

7 $\frac{1}{2}$  pm

N.C.

S.C.

18-16.9 18 85.0

16.1 83.8

17.1 84.8

16.9 83.8

15.4 84.0

24 14

18 16.48 84.28

17 84.28

16 80.76

18 80.38

Set at 18 0.4

Put books here the mens  
were completed

Apr. 8 1881

Investigation of the collimation micrometer screw.

Division	I	II	Division	rev.	I	II	III
40 to 41	27.8	5 24.8	14 to 15	5	24.8	23.8	
41 " 42	27.2	21.8	15 " 16		24.2	12.2	
42 " 43	27.0	12.8	16 " 17		24.4		
43 " 44	29.7		17 " 18		29.3		
44 " 45	28.4		18 " 19		25.6		
45 " 46	21.1		19 " 20		24.3		
46 " 47	20.2		21 " 22		17.3		
47 " 48	21.2		22 " 23		26.6		
			23 " 24		18.8		
			24 " 25				



April 9, 1881

24 <sup>th</sup> Jan	N.C	S.C	8 <sup>h</sup> 25 <sup>m</sup> N.C	S.C.	0 <sup>h</sup> 45 <sup>m</sup> N.C	
B obs.	13.0	74.5	Lamp	18 12.2	17 87.2	18 174 87.0
	11.5	75.0	illumina.	13.0	87.7	19.0 84.5
	12.2	78.0		12.3	84.0	16.4 86.0
	12.4	78.6		12.9	85.6	15.5 85.1
	14.1	76.9		12.7	85.6	18.0 85.7
	13.2	33.0		3.1	36.1	36.7 280
18	12.64	76.60		18 12.62	86.02	18 17.34 85.60
17	76.60			17 86.02		17.34
<del>17</del>	<del>89.24</del>			198.64		102.94
	65.84			17 99.32		18 1.47
17	189.24		Set at 18 0.4	Set at 44 18 0.4		
17	94.62					

Apr. 9, 1881  
Long Coll.

8<sup>h</sup> 20<sup>m</sup> 17 29.3 51 35.9  
26.2 42.6  
27.2 51.1  
27.6 40.2  
26.0 98  
363 42.45  
27.26

In order to investigate the error of the Collimator Scale -  
Mr. Steiner attached a platform to the piece of the Com-  
parator. The air piece was arranged upon this  
platform at the <sup>from the</sup> end of the Comparator. The air piece being  
placed so that the vertical wires were perpendicular to  
the lining motion of the micrometer plate, a given wire  
was placed in coincidence with the fixed wire of the mic-  
rometer. ~~A~~, ~~the~~ the Collimator Scale being then  
first set for zero and divided. The Collimator Scale was  
then moved forward, one revolution and the distance  
was measured with the micrometer. The half revolutions  
were measured in the same way.

See page 76



Apr 10 3<sup>h</sup> 1

Took out tail piece to  
complete investigation of  
Calculation even.

6<sup>h</sup> 0<sup>m</sup>

Put tail piece in position  
& adjusted for meridian.

W.C.

C.S.C.

18 230  
247  
239  
248  
235  

---

194

18 2388

918

907

895

890

900

---

4510

17 9020

18 2388

16 1408

18 7.1

Set of 18 7.1

74

Apr. 10, 1881

22<sup>h</sup> 30<sup>m</sup>Seeing too bad for  
Long Collimator.

See page 76

		$\Sigma$	Rev.	$\Sigma$
Rev. 14-15	5 <sup>uu</sup> 34.10 <sup>dis</sup> -140 -140		40-145	2 64.73 -12 -12
15-16	35.16 -35 -1.75		145-190	68.57 +1.12 +1.00
16-17	37.98 +2.48 +73		190-195	64.21 -48 +.82
17-18	35.99 -.02 +71		195-200	70.87 +2.12 +2.64
18-19	35.57 +.07 +78		200-205	65.70 +.86 +3.50
19-20	35.34 -17 +61		205-210	67.50 -1.35 +2.15
20-21	36.67 +1.17 +1.78		210-215	67.63 -1.21 +.94
21-22	33.66 -1.85 -07		215-220	67.80 -9.44 .00
22-23	35.58 +.07 +.00		2	68.846
5	38.806			

Level

23<sup>h</sup> 40<sup>m</sup>

N	15.5	19.
S	16.7	
N-S	-1.2	
E	129.1	19.3
W	21.4	22.0
S	27.3	28.2
H	21.2	20.4
	90	99
	22.25	22.47

Rev.	$\Sigma$
14.25-18.25	2 69.80 +0.17 +1.7
18.25-19.25	70.20 +0.57 +7.4
19.25-19.25	70.00 +0.37 +1.11
19.75-20.25	71.50 +1.87 +2.88
20.25-20.75	69.00 -0.63 +2.35
20.75-21.25	64.20 -1.43 +9.3
21.25-21.75	64.70 -9.3 +.00
	69.63

$$5 \cdot 35.57^{\text{dis}} = 1.26^{\text{dis}}$$

$$1 \text{ dis} = .00235^{\text{dis}}$$

$$338.48 = 1.26$$

$$1 \text{ dis} = .00234^{\text{dis}}$$



Apr. 10. 1881

22 <sup>h</sup> 38 <sup>m</sup>	C	F	G	H	Flexure	C	F	G	H
45	1	38.8	40.2	46.1	39.8	29.5	39.9	53.2	37.8
		38.8	40.5	46.3	39.6	29.4	39.9	53.1	37.9
		38.7	41.1	46.0	39.7	29.2	40.3	53.1	38.2
		38.6	41.3	46.0	39.6	29.2	40.3	53.2	38.1
		38.3	40.2	45.9	39.7	29.3	40.6	53.1	38.6
		38.64	40.70	46.06	39.68	29.32	40.20	53.14	38.12
		40.70				40.20			
		46.06				53.14			
		39.68				38.12			
		<u>41.27</u>				<u>40.19</u>			
		108							
		+ .54							

22<sup>h</sup> 35<sup>m</sup> N. C. S. C.

18 23.7 17 88.2

23.6 88.1

22.8 88.6

22.2 88.1

21.0 89.0

33 20

18 22.66 88.40

17 88.40

= 11.06

18 55.53

Set at 18 55.5

Apr. 10. 1881

See page 72

Coincidence = 14.9<sup>th</sup> div.  
Series I

Rev.

14-15	15-16	16-17	17-18	18-19	19-20	20-21	21-22	22-23
5 <sup>rev</sup> 21.1	24.3	24.3	28.1	21.6	28.5	23.6	20.0	20.8
23.4	23.5	25.3	22.2	20.9	23.2	24.5	22.9	20.9
22.3	22.4	22.5	21.1	21.0	22.8	23.3	21.2	21.5
21.0	22.5	23.6	22.3	21.2	22.5	24.7	18.3	21.6
21.7	24.3	24.5	23.2	22.3	22.3	23.5	18.9	23.1
21.86	23.46	24.16	22.58	21.21	22.88	24.04	20.36	23.64
20.78	21.67	20.60	23.20	24.73	22.50	24.10	21.77	22.33
21.18	22.56	25.38	22.89	22.57	22.74	24.07	21.06	22.98
5- 20.0	21.8	26.1	23.8	25.3	23.6	24.4	21.7	22.7
20.0	21.1	27.2	22.0	24.5	21.8	22.3	21.8	22.8
21.5	22.1	26.6	23.5	24.1	22.1	25.8	21.8	22.0
20.50	21.67	26.63	23.20	24.73	22.50	24.10	21.77	22.33

Half revolutions

Rev.

18.0 to 18.5	68.73	2 <sup>rev</sup> 68.4	71.2	68.6	18.5 to 19.0	69.97	70.7	68.2	70.0	
18.5 to 19.0	68.27	68.8	67.9	68.4	19.0 to 19.5	70.97	70.8	70.2	70.9	
19.0 to 19.5	69.70	70.5	68.9	69.7	19.5 to 20.0	67.50	67.2	67.8	67.1	
19.5 to 20.0	67.63	67.8	68.1	67.0	20.0 to 20.5	67.90	67.1	68.7	67.9	
20.0 to 20.5	68.75 to 19.25	70.2	19.25 to 19.75	70.0	19.75 to 20.25	71.5	20.25 to 20.75	69.0	20.75 to 21.25	68.2
20.5 to 21.0	21.25 to 21.75	68.7	21.75 to 22.25	68.7	22.25 to 22.75	68.7	22.75 to 23.25	68.7	23.25 to 23.75	68.7



Apr. 10, 1881

## Recapitulation

Rev.	#	microm.	$\Sigma$
Coll. screw	5	21.50	-11.40 -140
14-15	5	22.56	+0.34 -174
15-16	5	25.38	+2.98 +.74
16-17	5	22.89	+0.01 +.73
17-18	5	22.97	+0.07 +.50
18-19	5	22.74	-0.16 +.64
19-20	5	24.07	+1.17 +1.81
20-21	5	21.06	-1.84 -3
21-22	5	22.98	+0.08 +.5
22-23	5	22.90	

1 Rev. screw =  $\frac{5}{260}$ 

Add 126 div to reduce to the same  
Coincidence as for  $\frac{1}{2}$  revolutions

Rev.	microm.	Rev.	microm.
18.0-18.5	2 68.73 -0.12 -12	16.25-16.75	2 68.80 -17
18.5-19.0	69.97 +1.12 +100	16.75-17.25	70.20 +.59
19.0-19.5	68.37 - .48 +52	17.25-17.75	70.00 +.39
19.5-20.0	70.87 +2.12 +244	17.75-18.25	71.50 +1.88
20.0-20.5	69.70 +0.85 +349	18.25-18.75	69.00 -63
20.5-21.0	67.50 -1.35 +214	18.75-19.25	67.20 -143
21.0-21.5	67.63 -1.22 +52	19.25-19.75	68.71 -0.53
21.5-22.0	67.90 -0.95 -03		69.63
	2 68.85		

See page 74

6 <sup>4</sup> obs.	B obs.	6 <sup>4</sup> obs.	B obs.
N.C	S.C	N.C	S.C
24.8	93.5	18 17.3	95.5
22.6	94.1	18.1	94.7
23.0	93.6	17.8	96.2
25.5	94.0	15.6	96.1
22.5	92.0	15.0	95.3
18.4	172	338	278
18 23.68	93.44	16.76	95.56
17 93.44		95.56	
17.12		12.32	
18 8.56		18 6.46	

Set at 18 5.5

18 5.24

In previous setting on N.C.  
read microm. head wrong way  
Reread + combined with same S.C.

78

April 1881

Long Coll.

17	25.2	5-1-31.0	325	328
28	2	373	386	378
229		448	458	453
229		351	368	367
267				



Apr 6 1181

Apr 17

23h 50m

N.E

18 15.9 17 971

17.0 970

16.2 965

16.8 964

16.8 979

327 349

18 16.54 9698

17 9698

1352

6.76

Apr 17

0 50

N.E S.E

18 18.2 17 90.2

19.2 91.5

19.2 92.8

19.8 91.7

19.1 91.9

5 31

18 19.10 91.62

17 91.62

1072

18 5.36

Set at 18 5.4

Set at 18 5.4

Apr. 18, 1881

9<sup>h</sup> 55<sup>m</sup>

Long Coll.

20<sup>h</sup> 20<sup>m</sup>

17	24.8	32.3	31.9	32.6	25.5	32.5	33.0	33.7
	23.2	40.2	39.4	40.1	22.0	38.8	39.1	39.5
	20.2	47.3	47.4	47.8	21.0	44.2	44.9	44.9
	22.8	38.8	38.7	38.6	26.0	35.2	35.9	36.6
	23.1	38.6	37.4	39.1	26.8	30.7	32.9	34.7
	14.1	39.65	39.35	39.78	21.3	37.67	38.22	38.67
	22.82		39.59		24.26			

Seeing very bad.



Mar 18, 1881

23 <sup>h</sup> 35 <sup>m</sup>	E	F	S	H	Flexure	E	F	S	H
40.5	43.7	49.9	43.8		29.0	41.2	54.9	40.0	
40.8	43.8	49.2	43.8		28.9	41.7	54.9	40.1	
40.3	44.1	49.6	44.1		29.2	41.7	54.9	40.0	
40.3	44.1	49.4	44.1		29.6	41.8	54.6	40.1	
40.3	44.2	49.7	44.1		29.4	41.1	54.6	39.9	
22	49	28	49		11	25	39	1	
40.44	43.98	49.56	43.98		29.22	41.50	54.78	40.02	
43.98					41.50				
49.56					54.78				
43.98					40.02				
1796					552				
44.49					41.38				
41.38									
5.87	3.11								
+ 1.55									

23 <sup>h</sup> 40 <sup>m</sup>	N.C.	S.C.	N.C.	23 <sup>h</sup> 45 <sup>m</sup>	N.C.	S.C.
18	15.9	17	87.3	23 <sup>h</sup> 45 <sup>m</sup>	15.2	85.6
	15.1		86.0		15.0	86.0
	15.2		85.7		14.4	86.8
	16.0		86.0		15.3	85.2
	15.7		85.2		14.3	85.9
	29		2		242	45
18	15.58		86.04		1484	85.90
17	86.04				85.90	
	01.62				074	
18	0.81				16	0.37
					Set at 18	0.6

Apr. 18, 1881  
Runs

18881

3 <sup>h</sup> 30 <sup>m</sup>	E		F		G		H		
50	58.7	00	57.7	2.7	2.3	58.5	58.1	2.5	1.7
	59.0		57.8	3.3	2.4	58.8	57.9	2.3	1.2
	59.0		57.9	3.2	2.4	58.9	57.9	2.3	1.1
	59.3		57.8	3.2	2.2	58.8	57.9	2.1	1.2
	58.7		58.0	3.0	2.7	58.8	58.2	2.2	1.4
47	42	14	20	38	0	14	16		
58.94	57.84	3.28	2.40	58.76	58.00	2.28	1.32		
	298.90		299.12		299.24		299.04		299.75 <sup>07</sup>

Set at	E		F		G		H	
random	1.0	0.0	3.5	3.4	11.6	10.9	4.6	3.2
for the	0.9	0.0	3.5	3.2	11.5	10.8	4.2	3.4
constant	1.3	0.0	3.7	2.8	11.7	10.4	4.3	3.0
of runs	2	17	4	1.8	21	11	6	
	1.05	0.00	3.42 <sup>56</sup>	3.13	11.60	10.70	4.36	3.20
	298.95		299.57		299.10		298.84	299.12

E		F		G		H	
44.5	43.2	46.8	46.0	56.8	56.1	50.7	50.0
44.7	43.5	46.7	46.0	56.9	55.6	51.1	50.3
45.0	43.8	46.7	46.3	56.9	55.9	50.7	50.1
22	15	22	3	26	26	25	4
44.73	43.50	46.73	46.10	56.87	55.87	50.83	50.13
	298.77		299.37		299.00		299.30
							299.11

E		F		G		H	
19.8	18.8	20.7	20.3	32.2	32.0	24.3	23.8
19.9	18.5	20.8	19.9	32.2	32.1	24.2	23.6
19.8	18.7	20.9	20.2	32.2	31.9	24.1	23.9
25	23	24	4		0	6	23
19.83	18.76	20.80	20.13	32.20	32.00	24.20	23.77
	298.93		299.33		299.80		299.57
							299.41
							299.81





Apr. 19, 1881

☁

7<sup>h</sup> 10<sup>m</sup> Long Coll. 24<sup>00</sup>m

20.0 31.2 31.7 31.4 21.8

22.8 39.9 39.6 39.2 20.8

19.0 49.6 49.7 49.2 24.1

21.1 40.4 40.3 40.3 30.0

21.2 11 13 01

41 40.27 40.32 40.02

20.82 40.20

Seeing too bad  
for observation



Apr. 19, 1881

☉

7 <sup>h</sup> 15 <sup>m</sup>	<u>N.C.</u>	<u>S.C.</u>	2 <sup>h</sup> 5 <sup>m</sup>	<u>N.C.</u>	<u>S.C.</u>
16.9	87.0		18 14.9	17 85.1	
16.1	85.8		15.3	84.0	
15.5	84.3		16.3	84.1	
16.3	84.8		14.7	85.0	
15.1	85.2		14.0	87.0	
49	21		25.2	25.2	
15.98	85.42		18 15.04	85.04	
85.42			17 85.04		
1.40			0.08		
18 0.70			18 0.04		
Set at 18 0.4			Set at 18 0.4		

Apr. 20, 1881  
Long Coll.

23<sup>h</sup> 20<sup>m</sup>

seeing too bad  
for observation

\* Mr. Steiner fired core so as to arrive at  
hearing upon the axis.

Level. 4th 21

Time	0	30	1 <sup>h</sup> 0 <sup>m</sup>	6 0
N		177	18.0	137
S		<del>187</del>	18.0	145
N-S		+0.0	+0.0	-1.1
		+1.6		
E	40	4 37	4.4	10
E		72	8.7	53
S		140	16.5	40
H		71	8.6	83
		320	381	286
		+8.00	+9.5	7.15
		+9.0	9.5	82

9.25



Apr. 20, 1881

87

	<u>N.C.</u>	<u>S.C.</u>
23 <sup>h</sup> 25 <sup>m</sup>	12.8	87.0
	11.3	88.1
	9.8	87.0
	11.4	88.4
	10.8	87.0
	61	25
	11.22	87.50
	87.50	
17	198.72	
17	99.36	
Set at 18	10.4	

Am 21<sup>h</sup> 45<sup>m</sup> -

18	86.17	89.2
	9.8	80.2
	100	87.8
	85	87.0
	97	88.0
	479	427
	189.58	88.54
17	88.14	
	98.12	
	99.06	

Set at 17.40 90.0

Apr. 21, 1881  
Lang Coll.

23 <sup>h</sup> 35 <sup>m</sup>	38.1	33.3	33.2
26.2	39.0	38.2	38.6
26.1	46.0	45.9	46.0
26.0	38.6	38.2	38.1
27.8	367	356	359
27.8	39.17	38.90	38.98
39	39.02		
26.78			

4<sup>h</sup> 15<sup>m</sup>  
 137  
 S 181  
 - 44  
 555  
 597  
 68  
 2.0  
 + 1.0  
 5.4

48  
 88  
 110



Apr. 21, 1881

23<sup>h</sup> 30<sup>m</sup> B. obs 23<sup>h</sup> 40<sup>m</sup> R. obsN.C S.CN.C S.C

9.0 87.7 9.

10.7 89.6

10.1 89.8

11.0 90.6

8.1 89.0

11.5 90.9

10.0 89.5

12.2 90.4

10.0 89.0

12.1 91.0

472 0

25 25

18 944 89.00

11.50 90.50

17 89.00

90.50

19844

200

17 99.22

18 1.00

Set at 18 1.0

Apr 23

1<sup>h</sup> 0<sup>m</sup>N.C S.C

124 933

127 937

120 928

133 723

131 916

133 137

1266 974

9274

540

18 2.70 Set at 18 1.0

seeing very good

Apr. 24, 1881

3<sup>h</sup> 20<sup>m</sup>

Long Coll.

3.5 27.1 26.0 26.7

4.8 36.7 35.7 36.6

6.3 33.1 31.9 33.2

5.3 43.4 42.2 43.2

5.2 203 158 197

1 45.08 43.95 44.92

#5.02 44.65

Level

Time 23<sup>h</sup> 50<sup>m</sup>

N 20.7

S #6.7

N-S +14.0

E 8.0

F 15.3

G 32.8

H 24.3

804

20.1

06.1



Apr. 24, 1881

23425<sup>h</sup> N.C S.C

97.8 13.2

97.9 13.1

96.7 13.2

97.3 13.5

97.7 13.1

24 11

97.48 13.22

13.22

10.70

18 5.35

Set at 18 5.3

Apr. 25, 1881

Long Coll.

10<sup>h</sup> 35<sup>m</sup> B observer 20<sup>h</sup> 45<sup>m</sup> R observer

17	3.2	31.8	30.2	29.9	57.5	28.6	29.6	29.9
	6.0	40.0	38.6	38.9	3.2	36.8	38.1	38.2
	5.0	53.7	51.8	51.1	3.2	50.1	50.6	51.2
	4.0	44.1	41.5	41.5	4.5	41.1	42.0	42.7
	6.2	96	21	14	3.8	1566	03	20
244	42.40	40.52	40.35	202	39.15	40.07	40.50	
4.88		41.09		4.04		39.91		



Apr. 25, 1881

Flexure

20455m	E	F	G	H	E	F	G	H
	33.7	39.8	53.3	47.0	25.0	329.2	53.7	46.1
	33.8	40.1	53.2	47.2	25.8	329.4	5.6	46.1
	33.8	40.1	53.2	47.2	25.3	329.3	5.8	46.1
	33.9	40.2	53.1	46.9	25.2	329.2	5.4	46.1
	33.8	40.0	53.0	47.1	25.0	39.2	5.6	46.1
	40	2	8	4	13	13	31	
	33.80	40.04	53.16	47.08	25.26	39.26	55.62	46.10
	40.04				39.26			
	53.16				55.62			
	47.08				46.10			
	1408				166.24			
	43.52				41.56			
	44.06				250,			
	- 0.54				1.2)			
	- 0.27							

20	25	B obs.	2140m R obs.
N.C	S.C	N.C	S.C
96.8	2.0	95.8	0.3
95.0	2.1	96.1	0.0
96.5	0.9	95.9	1.3
96.8	99.3	96.1	1.2
96.4	99.0	94.5	1.0
315	33	284	38
96.30	0.66	95.68	0.76
0.66		0.76	
196.96		196.44	
98.48		98.22	

Set at 18 5.3

Apr. 28  
27, 1881



Apr. <sup>28</sup>~~27~~. 1881

Apr. 27, 1881      Apr. 28, 1881

	<u>N. C</u>	<u>S. C</u>	
0 <sup>h</sup> 5.5 <sup>m</sup>	99.1	94.2	11 <sup>h</sup> 15 <sup>m</sup>
	99.9	94.8	Tried for Colli-
	99.9	94.2	mation, but
	101.0	95.0	seeing was too
	102.5	94.0	bad.
	24	22	
	100.48	94.44	
	94.44		
	194.92		
	97.46		

Set at 18 53

96

Mar 30 1981



Aug 30 1881

Aug 30  
22<sup>h</sup>  
MC SC

18	41	1792.2
	56	918
	4.0	834
	5.1	824
	4.3	820
	25.1	<u>119</u>

18 4.62 823.8

17 92.38

15 8700

17 9850

Set at 17 98.5

May 1 7<sup>h</sup>  
MC

18	3.4	17 888
	4.4	897
	4.8	898
	5.1	883
	<u>40</u>	<u>804</u>
207		480

414 8940

4.14

8354

9677

Set at 17. 80.0

May 2, 1881  
 Seeing very bad.

3<sup>h</sup> 50<sup>m</sup> Long Coll.

17	10.8	5.1	30.9	31.0	30.4
	10.5		37.6	37.2	37.1
	10.4		50.2	49.9	49.1
	10.0		42.6	40.8	41.1
	9.0		13	389	377
	7		40.32	39.72	39.42
	10.14		39.82		

Level

Time 0<sup>h</sup> 45<sup>m</sup>

N	18.1
S	17.7
N-S	+ .4

E	0.2
Z	5.3
G	19.1
H	16.8
	4.4

10.35  
 10.0



May 2, 1881

04 10m

	E	F	G	H		E	F	G	H
45.1	36.2	40.1	54.0	47.9		43.5	56.8	17.2	2.2
	36.0	40.6	53.8	47.5		43.3	56.7	17.2	2.4
	36.0	41.0	53.7	47.2		43.5	56.9	16.9	2.2
	36.0	40.3	53.8	47.7		43.8	56.9	16.9	2.0
	36.0	40.0	53.8	47.7		43.3	56.8	16.9	1.9
	2	20	41	38		24	41	1	7
	36.04	40.40	53.82	47.60		23.48	56.82	17.02	2.14
	40.40					56.82			
	53.82					17.02			
	47.60					2.14			
	17.86					239.46			
	44.46					59.86			
	59.86								
	- 15.40								
	- 7.70								

N.C S.C

20455 <sup>m</sup>	17	99.0	89.7
24		99.5	91.0
		98.7	90.0
		98.8	92.0
		98.0	91.6
		40	43
	17	98.80	90.86
		90.86	
		18966	
	17	94.83	
	Set at	17	80.0

100

May 3, 1881

4 20m

Long Coll.

17 <sup>41</sup>~~78~~ 38.6 30.8 30.4

5.6 37.7 37.5 37.3

4.3 48.8 48.7 48.3

4.7 40.0 40.0 39.3

3.0 371 370 353

17 39.27 39.25 38.82

4.34 39.11

*[Handwritten scribble]*



May 3, 1881

0<sup>h</sup> 30<sup>m</sup>

E F G H

37.2 40.8 52.8 46.8

37.2 41.2 52.8 46.5

36.7 41.1 52.8 46.1

36.7 41.0 52.8 46.4

36.9 40.8 52.9 46.7

47 49 41 25

36.94 40.98 52.82 46.50

40.98

52.82

46.50

1724

44.31

41.85

2.46

+ 1.23

E F G H

25.9 39.8 58.2 43.1

25.9 39.7 58.4 43.2

26.2 39.6 58.1 43.7

26.1 39.5 58.5 43.4

26.0 39.8 58.7 43.1

1 34 19 15

26.02 39.68 58.38 43.30

39.68

58.38

43.30

15738

41.85

~~383~~  
~~18~~  
~~12~~
2<sup>h</sup> 50<sup>m</sup> Adjusted collimators for focus2<sup>h</sup> 55<sup>m</sup>

N.C.

S.C.

11<sup>h</sup> 30<sup>m</sup>0<sup>h</sup> 25<sup>m</sup>

N.C.

S.C.

18 5.8 1788.0

6.3 87.6

5.7 89.7

7.1 88.8

5.6 88.1

8 22

6.16 88.44

88.44

194.60

17 97.30

Set at 17 80.0

 Tried to read coll.  
 by lamp collim.

18 5.8 83.7

6.1 81.5

8.1 83.8

7.0 82.8

7.4 82.3

44 141

6.88 82.82

82.82

18970

94.85

Set at 18 5.0  
0.5

May 3, 1881

<u>E</u>	<u>F</u>	<u>G</u>	<u>H</u>
27.0 27.0	32.0 31.2	43.9 43.0	38.1 36.7
27.3 26.2	31.5 31.5	44.1 43.5	37.8 36.3
27.9 26.3	31.3 31.3	44.2 43.1	37.2 36.7
27.7 26.3	31.8 31.2	43.8 42.9	37.2 36.1
27.2 26.2	31.8 31.0	43.8 42.8	36.9 36.1
21 20	34 12	48 3	22 19

Let at 27.42 26.40 31.68 31.24 43.96 43.06 37.44 36.38

random  
for con-  
stant  
of runs.

<u>E</u>	<u>F</u>	<u>G</u>	<u>H</u>
22.8 21.8	25.8 25.2	42.0 41.6	35.1 33.8
22.2 21.8	25.5 25.1	41.8 41.8	35.0 34.3
22.6 21.7	25.1 25.2	41.8 41.4	34.9 33.9
16 23	14 5	26 18	0 0
22.53 21.76	25.37 25.17	41.87 41.60	35.00 34.00

11.0 10.1	13.4 13.9	30.1 30.2	23.2 22.3
10.9 10.0	13.5 13.7	30.3 29.8	23.2 22.3
11.0 10.2	13.4 13.3	30.1 29.8	23.5 22.6
29 3	13 19	5 28	9 12
10.97 10.10	13.43 13.63	30.17 29.93	23.30 22.40

24.8 23.3	26.2 26.6	44.8 44.1	35.8 36.1
24.9 23.3	26.1 27.1	44.3 44.1	35.1 35.8
24.8 23.3	26.0 26.8	44.8 44.3	34.8 36.1
25	3 25	19 5	7 0
24.83 23.30	26.10 26.83	44.63 44.17	35.23 36.00





May 4, 1881



May 4, 1881

1881phae.proj.1527B

11 <sup>h</sup> 40 <sup>m</sup>	<u>N.C.</u>	<u>S.C</u>	0 <sup>h</sup> 10 <sup>m</sup>	<u>N.C.</u>	<u>S.C</u>
Lamp illuminated	99.8	87.2	1.8	80.0	
	98.7	89.1	1.5	80.5	
	98.3	87.8	2.8	80.8	
	98.8	88.1	1.3	80.8	
	99.9	88.6	2.8	80.9	
	5	8	2	30	
	99.10	88.16	2.04	80.60	
	88.16		80.60		
	187.26		182.64		
	93.63		91.32		

Set at 17 95.0 Set at 17 91.3

May 7, 1881



May 7, 1881

11<sup>h</sup> 35<sup>m</sup>    N.C    S.C  
 17 98.1    88.1  
      98.2    89.0  
      97.8    89.1  
      ~~97.2~~    89.8  
      99.1    88.0  
      40.4    40  
      98.08    88.80  
      88.80  
      186.88  
 17 93.44  
 Set at 17 91.3

May 9 1881

Indecap line of new level  
see Chromosphere Bar.

New Level

E	W	<del>E-W</del>	E	W	<del>E-W</del>
up		<del>W-E</del>	down		<del>W-E</del>

10.1	12.1
<u>13.1</u>	<u>9.1</u>
11.60	10.60 +1.00

4.6	15.8
<u>10.2</u>	<u>8.2</u>
7.40	12.0

+4.60  
-1.00  
+3.60  
+1.80 +90

11<sup>h</sup> 35<sup>m</sup>

E	W	W-E	E	W	W-E
---	---	-----	---	---	-----

up

14.0	13.1
<u>16.3</u>	<u>10.7</u>
15.15	11.96 -3.2

7.8	13.3
<u>3.5</u>	<u>17.5</u>
11.3	15.90

+9.75  
-3.20  
6.5  
+3.25 +1.22



May 9, 1881

1<sup>h</sup> 30<sup>m</sup>

11 <sup>h</sup> 45	<u>N.E.</u>	<u>S.E.</u>		<u>N.E.</u>	<u>S.E.</u>
17	94.3	18 2.3		17 98.3	94.8
	94.2	1.1		95.2	94.8
	93.8	1.8		96.4	92.8
	93.3	1.6		97.2	95.0
	93.3	1.1		96.4	94.9
	39	29		33.5	22.3
	93.78	1.58		1796.70	94.46
	1.58			9446	
	195.36			191.16	
	97.68			95.58	

Set at 17 91.3

Set at 17 95.6

1<sup>h</sup> 30<sup>m</sup> Seeing too bad for Long Collimator  
and for Flexure.

Level.

Level up			Level down.		
E	W	W-E	E	W	W-E
7.4	8.1		11.2	4.2	
7.1	8.2		3.8	11.8	
5		+ .90	15.0	16.0	
7.25	8.15	7.70	7.50	8.00	+ .50
					+ .90
					140
					+ .70 + .35
163	164		10.6	5.0	
158	171		4.2	11.2	
722	135		148	16.2	
1610	1675	+ 0.65	7.40	8.10	+ .70
					+ .65
					135
					+ .68 + .21

Muzg

Equator pt. corr.

Level up

N	S	N-S
8.2	7.2	
7.8	7.9	
8.00	7.55	+4.5

Level down

N.	S	N.S
12.9	2.3	
6.4	8.0	
193	103	
9.65	5.15	+4.50

0 0 0.0

4.1

24.6

15.9

11.15

Level

up

E

W

16.3

16.4

15.9

17.0

E 0 0 1.1

7 14.0

9 43.9

14 27.5

86.5

21.62

Equator pt. repeated

Level up

N

S

15.2

17.6

15.9

16.9



May 9, 1881  
Long level

N  
S  
123  
E  
S  
E  
H

E	W
475	434
473	436
<u>11</u>	
4755	4350
2455	6245
7210	<u>10595</u>
3605	5297
	1692

E	W
252	655
239	674
91	129
2455	6245

Rij

+8.46

Adjusted for parallelism

E	W
368	578
361	524
416	460
423	449
<u>1568</u>	<u>1951</u>
3920	4878

9.58  
+4.79

E	W
306	564
313	550
420	434
424	428
<u>1463</u>	<u>1976</u>
3658	4940

1282  
+6.41  
+4.79  
1120  
+560  
1680  
336  
224  
448  
+470" b = +31

May 11, 1881

0<sup>h</sup> 15<sup>m</sup> Seeing too bad for Long Collimator.

	N.C.	S.C
0 <sup>h</sup> 20 <sup>m</sup>	83.8	14.0
	81.7	12.1
	81.1	12.0
	81.0	15.2
	81.6	13.1
	42	164
17	81.84	13.28
	13.28	

19512

97.56

Set at 17 97.6

	Runs								
	E		F		G		H		
5-0	25.0	23.8	31.3	30.9	54.9	43.2	54.8	43.2	42.2
	24.8	23.5	30.9	30.8	55.1	42.8	54.8	42.8	41.8
	24.7	23.7	31.4	31.3	55.1	42.7	54.7	42.9	42.0
	24.8	23.6	31.3	30.8	54.9	43.0	54.7	42.8	42.0
	24.8	23.5	30.3	31.0	55.1	42.7	54.7	43.2	42.0
	41	31	52	48	1	37	49	0	
	24.82	23.62	31.04	30.96	55.02	54.74	42.98	42.00	



May 11, 1881  
 Level No. 1 = the long level.  
 Level No. 2 = level first used, namely the  
 Russian transit level.  
 Level No. 3 = the new Clark level.

		Level No. 2	
N	8.9	13.6	
S	3.0	18.2	
N-S	+5.9	-4.6	
E	0	0	2.8 2.9
F			8.8 8.8
G			33.2 33.1
H			21.2 21.2
			16.50 16.50

~~Level No. 3~~

<del>Level up</del>	<del>Level down</del>
<del>E</del>	<del>E</del>
<del>W</del>	<del>W</del>
<del>18.6</del>	<del>18.4</del>
<del>13.6</del>	

114

May 22, 1881

14 45<sup>m</sup>

	<u>N.e</u>	<u>S.e</u>	<u>N.e</u>	<u>S.e</u>
17	93.1	89.4	90.1	92.2
	93.0	86.8	88.8	90.7
	92.6	88.7	92.1	91.7
	92.2	87.9	90.2	91.4
	92.1	86.8	90.2	91.3
	130	390	14	73
17	9.260	17 8780	90.28	91.46
	8780		91.46	
	18040		174	
17	9.020		17 90.87	

1430<sup>m</sup> Seeing too bad for long collimator



May 22, 1881

Rexum

	E	F	G	H	E	F	G	H
45 1	31.5	37.4	55.0	45.7	23.0	36.4	2.3	46.0
	31.6	37.8	55.0	45.1	22.7	36.3	2.7	45.9
	31.7	37.2	54.9	45.6	22.8	36.2	2.4	45.8
	31.7	37.9	53.4	45.7	23.2	36.9	2.3	45.7
	31.4	37.9	55.4	45.9	22.7	36.8	2.8	45.7
	<u>31.58</u>	<u>37.64</u>	<u>55.14</u>	<u>45.60</u>	<u>22.88</u>	<u>36.52</u>	<u>2.50</u>	<u>45.82</u>
	<del>22.88</del>				<del>36.52</del>			
	<del>37.64</del>				<del>2.50</del>			
	<del>55.14</del>				<del>45.82</del>			
	<u>45.60</u>							
	42.49				41.93			
	056							
	+28							

E	F	G	F	G
16.2 15.3	21.5 39.7	39.4 38.7	21.8 22.4	50.7 49.2
16.2 15.0	21.4 39.8	39.3 38.7	21.5 22.0	50.6 48.8
16.2 14.9	21.6 39.9	39.2 38.7	21.7 22.0	50.2 49.0
15.8 15.0	21.7 39.7	39.1 38.7	21.4 21.2	50.3 49.2
16.0 15.0	21.6 39.7	39.0 38.7	21.9 21.3	50.2 49.1
0.4	2	38 46	33 39	20 3
16.48 15.04		39.76 38.92	21.66 21.78	50.40 49.06

116

May 22/181 New level  
Long Level.  $N \pm 8$

	No. 1	No. 2	No. 2 - No. 1	No. 2 No. 3
0V	—	5.5	— 0.6	16.1 51
8	—	8.2	— 13.2	9.8 80
0-5	—	-2.7	-12.6	+6.3 -38
0 0	46"		0 0 50.2	0 237 <del>101</del>
	10.3		55.1	88 <del>88</del>
	28.8		134	27.2
	18.8		233	177
	62.5		2120	64
	15.62	15.62	3.25	14.85
	$\frac{1}{2} \text{ div} = 1.24$		$\frac{1}{2} \text{ div} = 1.22$	$\frac{1}{2} \text{ div} = 1.59$
	1.24			+ 5.3
	+ 3.8 1.58		+ 18.6	
	19.4			

103  
734  
2.68

19.9 = 19.43

## Series II

No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8
141	299	16	110	13.2	31	119	12
0.2	354	12.8	32	19	111	23	130
515.5	139	54.2	12.8	10.3	-8.0	+9.6	-11.8
299	0.6	222	268	583	261	536	138
354	188	272	32.1	34	31.1	58.3	1.42
53.2	9.1	45.1	50.1	214	498	168	1.51
43.1		362	409	120	403	178	1.56
4040	5.68	32.68	34.48	8.85	36.82	6.42	1.59
1.38	1.42	1.51	1.56	1.59	1.41		1.48
20.1	16.2	11.3	14.9	11.6	139	171	11
20.3	20.4	21.4	22.6	20.4	229	23.5	-21.80



Mr 20	Mr 20	Mr 52	Mr 52
87	115	25	<del>43</del>
16	29	118	<del>107</del>
+51	+86	-93	-38
149	238	557	34
195	286	112	88
382	467	189	268
288	372	102	176
1014	1363		
2565	3408	6.50	14.15
154	154	1.28	1.53
-43	-120	+29	+60
210	221	194	207
			209

$\frac{11}{1.24}$   
 $\frac{1.24}{1.59}$   
 $\frac{1.59}{1.54}$   
 $\frac{1.54}{1.14}$   
 $\frac{1.14}{1.28}$   
 $\frac{1.28}{1.53}$   
 $\frac{1.53}{1.42} = 1 \text{ div}$   
 $\frac{1.42}{1.48}$   
 $\frac{1.48}{1.45} = 1 \text{ div}$   
 for present:

Mean  
 $20.22$

Note

In all the above, the values of 1 div are to be doubled.

The value is therefore

$2.90$  and not  $1.45$   
 $0.19$

118

May  $\frac{22}{23}$ , 1881

C = 90.2

①

4 2 19

+ 20 42

B

5 2 48.1

55.8

21.4

9.1

Copied in paper books

Upper limb in  $\delta$   
 2<sup>nd</sup> limb in R.A.  
 Seeing pretty fair



run level May 23

Level up

E W ~~W-E~~

17.2 16.8 -0.4

20.9 18.1 -2.8

17.3 16.5

17.0 16.9

17.15 16.70

15.20 14.75

16.17 17.22

+ .77 = ~~10.11~~"  
+14<sup>s</sup>

Level down

E W ~~W-E~~

16.3 17

14.1 14.5

15.20 14.75

20

May 23, 1881

Focussed collimators + reread the collimation

11<sup>h</sup> 20<sup>m</sup>N.C. S.C.N.C. S.C.1<sup>h</sup> 30<sup>m</sup>N.C.S.C.

83.2 94.1 84.8 99.9

84.8 97.8

84.1 94.2 83.8 0.8

85.3 98.0

83.0 94.2 84.2 0.8

86.8 98.2

83.1 95.5 84.6 1.2

85.5 98.0

82.8 95.6 84.9 1.1

85.3 98.1

162 36 23 38

27 1

83.24 94.72 84.46 0.76

17 85.54 98.02

94.72 0.76

98.02

177.96 185.22

183 56

17 88.98 17 92.61

17 91.78

Use the 2<sup>nd</sup> of above determination Set at 17 90.2

Set at 17 90.2

1<sup>h</sup> 30<sup>m</sup> Seeing too bad for Long Collimator.11<sup>h</sup> 30<sup>m</sup> Set Collimation at 18 2.0



1681phae.proj.1527B

May 23, 1881

Flexure

	E	F	G	H	E	F	G	H
45 1	33.8	41.1	58.1	48.8	23.1	38.2	3.7	46.0
	33.8	41.0	58.1	48.3	23.1	38.4	3.8	46.9
	33.3	41.2	58.3	48.7	23.7	38.2	3.8	46.2
	33.2	40.8	58.4	48.8	23.7	37.7	3.9	46.3
	33.8	41.0	58.6	48.7	23.6	38.1	3.9	46.1
29	1	15	33		22	6	41	5
33.58	41.02	58.30	48.66		23.44	38.12	3.82	46.10
41.02					38.12			
58.30					3.82			
48.66					46.10			
2156					18148			
45.39					42.87			
42.87								
2.52								
+ 1.26								

22

May 23 1881  
Smy Level.

W	E
68.7	312
9.0	885
<u>77.7</u>	<u>1200</u>
3885	60.00
	2115
	<u>70.55</u>

Ry.

W	E
616	308
29.0	68.8
84.6	<u>80.6</u>
4830	4880
	<u>-1.50</u>

(2  $\frac{-1.50}{2} = -0.75$  p.p.e.)

55.6	421
38.2	597
938	1018
46.90	5090
	4.00
	<u>-2.00</u>

Ry.

298	657	-200
68.0	26.8	-1.50
988	925	-1.35
4940	4625	<u>-4.85</u>
	318	
	<u>+1.57</u>	

+2.85  
+3.2  
+1.57  
+0.47

Adjusted.

38.0	604
<u>31.0</u>	<u>648</u>
70	52
34.5	626
1028	914
514	281
	<u>-14.0</u>
	457
	<u>+5.7</u>
	<u>+2.85</u>

478	473	+5.21
44.3	50.2	+1.30
921	955	-4.85
4605	4875	<u>+1.33</u>
	-250	+0.15
	<u>-1.31</u>	<u>+0.05</u>

312	652
66.1	30.8
973	<u>96.0</u>
46.65	480
	0.65
	<u>+4.67</u>
	<u>+0.32</u>

46.8	4.7
50.2	4.4
95.0	93.1
4750	4655
	<u>+4.95</u>
	<u>+0.47</u>



May 23 1881  
New Level.

~~162~~ 169  
Level Ups

E	N
181	169
171	178
	<u>147</u>
1760	1735-
1582	1935-
1348	1670
1674	1835-

1.81  
+ .90

shortened bubble

5.7	12.8
11.8	6.6
17.5	19.4
87.5	9.70
6.10	6.60
14.85	16.30
7.43	8.15-
	- .72
	- 0.36

Level Down

E	N
176	177
140	210
316	387
1580	1935-

see page 117

6.2	6.3
6.0	6.9
	12
6.10	6.60

68 3.8

May 23 ~~Long~~ Level  
 Level up 2 h 30 ~ Level down

6.8 6.2

6.4 6.3

6.66 6.25

5.40 5.20

12.06 11.45

6.03 5.72

0.31

+0.15

6.8

3.8

4.0

6.6

10.8

10.4

5.40

5.20

+50

-36

+15

10.5

6.5

+2.3

+2.3 = 1.45

3 h 30

8.2 9.1

9.7 8.0

17.9 17.1

8.5 8.5

5.25 6.15

14.20 14.00

7.10 7.35

- .25

4.2

7.1

+90

6.3

5.2

-36

10.5

12.3

+15

5.25

6.15

-25

+27

+0.14 = .05

= 0.20 = .01

Tm

9.3 8.0

7.6 9.8

16.9 17.8

8.45 8.90

16.35 18.00

25.80 26.90

12.90 13.45

3.5

+2.27

17.6

16.8

15.1

15.2

32.7

36.0

16.35

18.00

1.1



May 23

10 a

Level Up

16.9	16.0
15.9	16.7
16.0	16.4
16.6	15.9
254	210
163.5	16.25

11.2 15.5

15.9	17.7
17.2	16.3
16.8	16.7
17.0	16.6
17.2	16.2
18.3	18
17.08	16.45
16.00	17.65
13.08	19.10
16.54	17.05

51

+ .25

Level down

16.8	15.8
15.3	17.2
16.5	16.4
15.4	17.2
23.8	26.6
15.95	16.65
16.35	14.25
15.95	16.65
23.0	9.0
16.15	16.45
	.80
	-1.5

15.9 17.7

16.7 16.9

16.4 17.1

15.0 18.9

240 306

16.00 17.65

see page 117

$$\begin{array}{r} -36 \\ +15 \\ -25 \\ +27 \\ -15 \\ +25 \\ \hline -100 \end{array}$$

$$\begin{array}{r} -76 \\ 67 \\ -08 \\ -05 \end{array}$$

$$11 \quad b = -0.15$$

May 24, 1881  
Long Collimator

34 05<sup>m</sup>

N.C. S.E.  
23<sup>h</sup> 18<sup>m</sup> 83.9 99.8

17 91.7 ~~5~~ 1 25.0 25.5 25.3

90.8 24.9 35.1 35.2 34.7

89.6 25.1 51.4 52.3 51.8

90.8 25.1 39.0 40.0 39.2

92.8 305 330 310

57

37.62 38.25 37.75

17 91.14

37.87

84.08 99.12

99.12

18320

17 91.60

23<sup>h</sup> 15<sup>m</sup>

Flexure

Set at 17 91.6

E F B H

E F B H

33.3 40.8 57.8 47.7

24.8 40.4 4.9 47.1

33.2 40.8 57.8 47.7

24.8 40.1 4.9 47.0

33.2 40.4 57.8 47.6

24.8 40.7 5.3 47.2

33.1 40.3 58.2 47.2

24.7 40.2 5.1 47.2

33.3 40.4 58.0 47.7

25.0 40.3 5.1 47.1

11 27 46 29

41 17 3 6

33.22 40.54 57.92 47.58

24.82 40.34 5.06 47.12

40.54

40.34

57.92

5.06

47.58

47.12

1926

17734

44.81

44.33

44.33

.48

+.24



14 June May 24, 1881

Level No. 3

Level up Level down

E W E W

19.1 17.0 5.2 1.4

17.8 18.2 1.8 4.8

17.8 18.1 1.8 4.9

18.5 17.4 5.2 1.4

332 307 140 125

18.30 17.68 3.50 3.12

18.50 3.12 3.12 3.00

24.80 20.80 1.62 2.50

10.90 10.40 3.31 1.50

- .60

- .25

Level up Level down

E W E W

18.4 17.3 4.7 2.0

17.8 18.1 2.2 4.2

17.7 18.0 2.2 4.2

18.0 17.9 5.0 1.6

319 313 141 120

17.98 17.82 3.52 3.00

3.52 3.00

21.50 20.82

10.75 10.41

- .34

- .17

$$b = -2' = -03''$$

- .04

see p. 117

May 26  
Level No. 3

10<sup>h</sup> 30<sup>m</sup>

Level Up

12.55	12.55
16.20	15.55
16.20	15.60
16.20	15.58
17.72	17.18
13.92	<u>12.96</u>
16.96	16.38
	.58
	-.29

11<sup>h</sup> 2<sup>m</sup> 10<sup>s</sup>

19.7	15.9
17.6	17.9
18.65	16.80
17.75	15.60
18.20	17.45
	-95

4 -47

11<sup>h</sup> 20<sup>m</sup>

15.5	15.3
15.2	14.1
17.0	14.1
15.9	15.3
<u>76.50</u>	<u>74.70</u>
17.10	17.92

16.10 16.31  
-49  
-25

Level down

E	W
17.40	17.60
16.95	17.85
435	145
17.18	17.72

see p. 117

-29
-47
<u>-25</u>
101

151	203
254	169
1725	1760

-34 x 1.45

6 = -.05

150	200
150	163
150	16.3
<u>154</u>	<u>15.3</u>
1710	1784



May 26, 1881

140<sup>m</sup>

Seeing too bad for Long Collimator

1440<sup>m</sup>

N.C. S.C.

85.6 98.2

85.2 98.2

83.3 98.7

86.6 0.7

83.3 97.8

240 436

84.80 98.72

98.72

352

17 91.76

Set at 17 91.3

130

May 26, 1881

## Level Readings

No. 3

Level up Level down

W	E	W	E
<del>15.9</del>	17.3	<del>17.6</del>	<del>16.9</del>
16.8	16.8	<del>20.2</del>	13.2
16.7	16.8	17.9	15.8
16.0	17.4	17.9	15.7
25.4	28.3	17.2	16.1
16.35	17.07	26	5
17.65	16.12	17.65	16.12
17.00	16.59		
	+41		
	+20		

Level up

W	E
16.0	17.3
16.8	16.8
17.2	16.0
16.0	17.4
26.0	27.5
16.50	16.88
17.58	18.90
17.04	16.39

No. 3 Repeated

Level up Level down

W	E
17.1	16.2
18.2	15.3
18.2	15.3
16.8	16.8
30.3	23.6
17.58	15.90

65

+32

 $b = +0.5$ 

Level No. 1

W	E
558 <sup>no</sup>	443 <sup>2</sup>
41.0	54.3
41.6	53.1
51.3	43.4
18.97	19.51
47.42	48.78
	1.36
	- .83

Level No. 1

<del>42.8</del>	51.5	42.8
	<del>52.2</del>	40.3
	40.3	52.2
	38.7	55.7
	50.8	52.6
	181.3	19.27
	453.1	281.8
		283
		+1.41
		- .83
		.58
		+2.9

see p. 11

 $b = +2.9$  dia



June 5, 1881

B. Obs.

2<sup>h</sup> 15<sup>m</sup>

8<sup>h</sup> 25<sup>m</sup>

12<sup>h</sup> 0<sup>m</sup>

N.C S.C

77.0 ~~100.0~~

77.9 99.9

76.3 0.0

78.0 99.8

77.8 0.2

20 499.9

77.40 99.98

99.98

177.38

88.69

Set at 17 88.7

12<sup>h</sup> 0<sup>m</sup>

N.C S.C.

80.3 0.5

81.0 0.4

79.0 0.4

80.0 0.8

79.1 99.9

494 20

79.88 0.40

100.40

180.28

90.14

Set at 17 89.1 (the mean of the 3 above)

N.C S.C

77.0 99.5

77.0 99.5

77.2 100.1

78.0 99.0

76.6 101.1

8 49.2

77.16 99.84

99.84

177.00

88.50

June 14, 1881

B. Uls.

4 25<sup>m</sup>

N.C S.C

80.0 97.0

78.8 96.2

79.0 96.4

80.0 97.1

81.0 96.3

488 30

79.76 96.60

96.60

176.36

1788.18

Set at 17 89.1

Seeing tolerable

June 15, 1881 B. Uls.

June 15

12<sup>h</sup> 25<sup>m</sup>2<sup>h</sup> 10<sup>m</sup>

N.C S.C

74.5 3.0

75.8 4.2

76.2 3.6

75.0 4.2

75.0 3.0

15 30

75.30 3.60

103.60

178.90

89.45

Set at 17 89.1

Seeing very poor

N.C S.C

76.6 100.0

76.9 99.9

76.2 100.6

76.1 99.3

75.9 100.0

17 4998

76.34 99.96

99.96

176.30

88.15

Set at 17 88.2

Seeing good.

June 15, 1881  
Long Coll. B. Uls.91.0 5<sup>h</sup> 1 24.0 23.8 23.7

92.0 34.9 34.9 34.6

90.8 52.0 51.9 51.1

91.0 38.2 37.9 37.8

90.7 1491 1485 1472

55 37.28 37.12 36.80

91.10 37.07

Seeing pretty good.



June 19, 1881

3<sup>h</sup> 20<sup>m</sup> N.C S.C

70.8 3.1

71.4 3.3

71.0 2.7

71.5 3.5

70.6 3.8

53 14

71.06 3.28

3.28

174.34

87.17

Set at 17 88.2

Seeing moderate

June 22, 1881

B. Uls.

$4^h 45^m$ N.C	S.C	$2^h 55^m$ N.C	S.C	$3^h 10^m$ N.C	S.C
72.1	100.0	72.8	97.9	73	73.0
72.0	98.9	72.8	98.0	72.2	97.9
72.0	98.9	73.0	98.1	72.6	98.0
73.5	99.0	72.2	97.9	72.9	98.5
72.7	98.9	72.2	98.0	73.0	99.0
23	7	30	49	37	22
72.46	99.14	72.60	97.98	72.74	98.44
99.14		97.98		98.44	
171.60		170.58		171.18	
17 85.80		85.29		85.59	

Average = 17 85.56  
 Set at 17 85.6



June 28, 1881

04 35<sup>m</sup>

Runs B. Abs.

E

F

G

H

50	24.2	23.2	31.6	31.4	55.2	54.4	41.3	39.3
	24.1	23.1	31.7	31.4	55.0	54.5	41.1	39.5
	24.0	22.9	31.6	31.5	55.1	54.5	41.0	39.2
	24.3	22.8	31.7	31.6	55.0	54.6	41.0	39.3
	24.3	23.0	31.6	31.4	54.9	54.4	40.9	39.4
9	0	32	23	2	24	3	17	
24.18	23.00	31.64	31.46	55.04	54.48	41.06	39.34	

14 40<sup>m</sup>N.C. S.C.

64.5 3.5

63.9 3.7

64.0 3.0

64.0 3.1

64.4 3.4

8 17

64.16 3.34

3.34

167.50

17 83.75

24 5<sup>m</sup>N.C. S.C.

63.5 2.9

63.1 3.2

62.9 4.0

63.8 3.9

62.9 3.9

12 29

63.24 3.58

3.58

166.82

17 83.41

24 15<sup>m</sup>N.C. S.C.

64.0 5.2

64.0 5.2

63.0 5.0

62.9 4.5

64.1 5.1

180 0

63.60 5.00

5.00

168.60

84.30

Mean = 17 83.82

Set at 17 83.8

B. Abs.

July 1, 1881  
B. Obs.

7 40 <sup>m</sup>	N.C	S.C	N.C	S.C
	46.7	24.7	46.2	21.0
	46.0	25.0	46.9	21.9
	46.0	25.2	47.0	22.1
	47.0	24.3	46.0	21.2
	46.3	25.5	46.3	21.1
	20	47	24	23
	46.40	24.94	46.48	21.46
	24.84		21.46	
	171.34		167.94	
17	85.67	17	83.97	
	Set at 17 84.8			

9420<sup>m</sup>

W	E	Long	Level
<del>W</del>	<del>E</del>	<del>W</del>	<del>E</del>
35.3	42.3	43.2	33.1
59.4	18.2	56.4	20.3
59.8	17.9	56.3	20.1
35.3	41.2	37.1	39.1
189.5	1196	37.1	39.4
4738	2990	38.1	38.8
1748		1879	1186
874		4695	2965
		1730	
		865	

1 div = 84  
42  
= 25-6 s

894  
865  
139  
= 870 div



July 1, 1881  
9430m Level No. 3

W	E	E	W	E	W
<del>17.0</del>	13.1	12.2	17.2	<del>14.1</del>	<del>15.7</del>
<del>16.9</del>		12.8	17.0	15.3	14.4
<del>8.6</del>	<del>24.2</del>	<u>12.0</u>	17.1	18.8	11.1
		15.8	11.1		
		31.3	28.2		
		15.65	14.60		
		14.60			
		10.5			
		+5.2			

$$b = +0.5$$

Exp.  
keep 177

9440m

Long Level

W	E
60.3	16.3
33.0	43.2
<u>93.3</u>	59.5
46.55	29.75
16.90	
8.45	

874	
8.65	
8.70	
<u>209</u>	
8.80	8.7
X.057	<u>.057</u>
	52.2
	43.5
	<u>4.9</u>

$$b = +.48$$

8.74
8.65
{ 8.45
{ 8.61
.057
51.66
43.05
+ 0.98216

July 2, 1881

Long Level w B. Cbs.

36.5 41.5 38.3 38.0 38.1 37.5

41.5 19.0 57.2

26.9 51.1 18.4 57.8

25.5 57.9 38.0 37.8

36.3 40.3 33.7 30.8

52 248 28.42 47.70

31.30 46.20 28.42

14.90 19.28

7.415 9.64

.056<sup>s</sup> .056

4470 5784

3725 5724

.41720 .63024

 $b = +.42^s$



Aug 2 1881 Long Level MPR. obs.

W	E	W	E
438	438	54.2	30.6
54.2	30.6	38.8	45.6
<del>46.5</del>	<del>34.9</del>	98.0	76.2
47.7	34.9	46.5	38.10
37.4	37.4	38.10	
103.0		<u>84.0</u>	
5.15		4.20	

388	45.2
53.3	30.2
92.1	70.4
460.5	37.70
88.5	
4.17	

53.2	29.7
67.3	45.2
90.5	<u>74.9</u>
45.2	
37.4	
7.80	
3.90	

5.15
4.20
4.17
<u>3.90</u>
17.42
4.36

4.36
<u>.056</u>
26.66
<u>21.80</u>

$$b = .24$$

Aug 2 1881  
New Lowell

$$\begin{array}{r}
 \Sigma \\
 \textcircled{1} 0.1 \\
 0.0 \\
 \hline
 0.1 \\
 + 5.2 \\
 \hline
 + 5.3 \\
 + 2.6 \\
 \hline
 \Sigma
 \end{array}$$

$$\begin{array}{r}
 \Sigma \\
 \textcircled{1} 0.1 \\
 4.15 \\
 \hline
 4.25 \\
 2.12 \\
 \hline
 \Sigma
 \end{array}$$

$$\begin{array}{r}
 W \\
 9.0 \\
 5.1 \\
 5.1 \\
 8.2 \\
 2.74 \\
 6.85 \\
 6.86 \\
 7.65 \\
 3.83 \\
 5.5 \\
 \hline
 \Sigma
 \end{array}$$

$$\begin{array}{r}
 W \\
 5.2 \\
 5.2 \\
 \hline
 5.2 \\
 - 0.6 \\
 \hline
 4.6 \\
 2.3 \\
 \hline
 \Sigma
 \end{array}$$

$$\begin{array}{r}
 W \\
 5.2 \\
 0.5 \\
 \hline
 5.75 \\
 2.87 \\
 \hline
 \Sigma
 \end{array}$$

$$\begin{array}{r}
 \Sigma \\
 \textcircled{1} 0.1 \\
 1.7 \\
 - 3.0 \\
 \hline
 1.3 \\
 - 1.6 \\
 \hline
 \Sigma
 \end{array}$$

$$\begin{array}{r}
 W \\
 2.3 \\
 - 1.3 \\
 \hline
 1.0 \\
 0.5 \\
 \hline
 \Sigma
 \end{array}$$

$$\begin{array}{r}
 -1.8 \\
 3.4 \\
 1.6 \\
 0.82 \\
 \hline
 \Sigma
 \end{array}$$

See p. 117



W	E
87	12
5.2	4.1
13.3	5.3
6.65	2.65
2.4	5.6
90	8.2
4.5	4.1

W	E
50	30
-0.2	8.2
4.8	11.2
2.4	5.6

- 0.22 div  
 + 0.37  
 + 0.42  
 + 0.20  


---

 .99  
 77  
 18

15145-1097<sup>5</sup>  
 135  
 100

$$b = .18 \text{ div} \times 10^5 = +.02^5$$

July 4, 1881

7<sup>h</sup> 5<sup>m</sup>

Long level

W	E
39.7	40.7
51.2	29.1
51.2	29.1
38.3	41.6
204	205
45.10	35.12

35.12

998

4.99

$$b = +28^{\circ}$$

<del>W.</del>	<del>E</del>
<del>15.9</del>	<del>19.9</del>
<del>18.5</del>	<del>12.1</del>

Mid Level ~~Pro. 3~~

序

9.6 21.0

W. E

15.9 19.9

18.5 12.1

144 120

172 160

13.1 176

$$\begin{array}{r} 303 \\ \hline 236 \end{array}$$

1565 1680

1565

115

157

~~W E~~  
~~15.9 19.9~~

18.5 ~~12.1~~

W E

9.6 21.0

16.6      14.2

262 342

13.1 176

*Handwritten signature*



July 4, 1881  
 No level ~~run~~

W	E	W	E
15.3	15.1	16.7	14.1
19.8	11.0	9.2	21.4
15.1	6.1	25.9	31.3
17.55	13.05	12.95	17.75
12.95	17.75		
10.50	10.80		
6.25	5.40		

$$\begin{array}{r} 1.25 \\ \hline 15 \end{array}$$

$$- .07$$

$$- .57$$

$$- .64$$

$$- .32 \times .10 = - .03^s$$

$$b = - .03^s$$

See p. 117

144

July 6, 1881

44 45<sup>m</sup>

Long Level.

W	E
55.2	30.9
40.3	46.2
41.2	44.8
54.8	31.3
31.5	33.2
47.87	38.30
38.30	
9.57	
4.78	

 $b = +.27$   
 Level No. 3

W	E	W	E
16.0	8.0	17.8	14.7
12.1	12.0	10.0	22.0
<u>28.1</u>	200	78	362
14.05	10.00	1390	1835
13.90	18.35		
2795	2805		
13.97	14.17		
	.20		
	-10		

 $b = -.01$



~~Aug~~ July 14 1881

Collimation before the reversal  
of the telescope.

~~N.C.~~ Collimation before reading = 17 64.2

	<u>N.C</u>	<u>S.C</u>	<u>S.C</u>
16	79.7	16 83.0	18 48.0 50.6
	80.2	82.8	50.1
	80.0	84.1	50.0
	80.0	82.8	50.3
	79.6	82.6	50.6
	49.7	15.3	16
	79.94	83.08	50.32
	<del>83.06</del>		

~~163.00~~ 81.50 Flexure

25	2	E	$\mathcal{F}$	G	H	E	$\mathcal{F}$	G	H
25	2	11.5	28.1	17.6	20.2	6.8	30.4	26.7	22.3
		11.5	28.1	17.8	20.8	6.8	30.8	26.4	22.6
		11.9	28.2	17.9	20.6	6.7	30.5	26.7	22.3
		12.0	28.2	17.8	20.6	6.7	30.1	26.4	22.3
		11.5	27.8	17.7	20.6	6.6	30.0	26.7	22.3
		34	4	38	28	36	18	29	18
		11.68	28.08	17.76	20.56	6.72	30.36	26.58	22.36
		28.08				30.36			
		17.76				26.58			
		20.56				22.36			
		78.08				<u>86.08</u>			
		19.52				21.50			
						1.98			
						.95			

July 11, 1881

<u>N.E.</u>	<u>S.E.</u>	<u>N.E.</u>	<u>S.E.</u>
1.1	56.3	1.6	56.8
1.4	55.9	0.2	57.0
1.8	56.0	1.6	56.9
0.1	55.8	1.3	56.1
0.3	55.6	0.5	57.2
47	46	2	40
18 0.94	55.92	1.04	56.80
17 55.92			56.80
17 56.86			57.84
17 78.43		17	78.92
Set at 17 78.7			



July 14, 1881

Long Level

W	E	W	E
47.9	41.2	45.3	42.6
53.6	35.0	53.4	34.2
53.2	35.2	55.1	32.6
43.9	44.5	44.5	43.0
38.6	35.9	38.3	32.4
49.65	38.97	49.57	38.10
38.97		38.10	
10.68		11.47	

5.34

5.73

5.73

1.07

5.53

0.56

3318

2765

b = .30968

July 17, 1881

5<sup>h</sup> 0<sup>m</sup> N. C. S. C. 5<sup>h</sup> 15<sup>m</sup> N. C. S. C.

16 87.9 18. 45.6 16 88.0 18 45.1

87.2 45.8 87.5 45.3

88.3 46.6 88.3 45.0

88.3 46.6 87.9 45.0

88.1 46.0 88.1 45.8

48 6 48 12

16 87.96 18 46.12 16 87.96 18 45.24

18 46.12 18 45.24

13408 13320

17 67.04 17 66.60

Set at 17 66.8



July 26, 1881

12<sup>h</sup> 0<sup>m</sup>

Long Level.

W	E	W	E
40.0	40.5	39.8	40.1
50.5	30.0	46.3	33.2
50.0	30.1	46.1	38.4
37.9	42.3	40.5	39.0
184	229	127	25.7
44.60	35.72	43.18	36.42
35.72		36.42	
8.88		6.76	
4.44		3.38	

12<sup>h</sup> 30<sup>m</sup>

W	E	
40.5	38.4	4.44
45.4	33.3	3.38
45.3	33.5	3.55
40.6	38.2	2.37
118	234	3.79
42.95	35.85	.056
35.85		2274
7.10		1895
3.55		.21224
		b = 0.21

150

July 26, 1881  
 12<sup>h</sup> 15<sup>m</sup> Level No. 3  
 W E

17.8 13.0

18.4 12.0

18.6 11.9

17.5 13.0

3 99

18.08 12.48

12.48

5.60

2.80

Rej.

July 27, 1881  
 12<sup>h</sup> 30<sup>m</sup> Level No. 3

W

E

W

E

17.9 11.7

12.9 16.7

17.8 11.6

12.3 17.3

17.85 11.65

12.60 17.00

12.60 17.00

30.45 28.65

15.12 14.32

+80

+40  $b = +.08$



July 29, 1881  
64 10<sup>m</sup>

	<u>N.C</u>		<u>S.C</u>
16	87.3	18	43.7
	87.4		44.3
	87.0		43.8
	86.8		43.7
	87.0		43.7
	5		42

16 87.10 18 43.84

18 43.84

130.94

17 65.47

Set at 17 65.5





Aug 14, 1881

$6^h 20^m$  16 79.9 18 50.6  
 80.2 50.1  
 80.0 50.0  
 80.0 50.3  
 79.6 50.6  
 49.7 16  
 16 79.94 50.32  
 18 50.32  
 1 30 26  
 17 65.13

Flexure

E	F	G	H	E	F	G	H
4.8	28.2	25.1	21.1				
4.8	28.3	24.9	20.8				
4.9	28.4	24.8	20.9				
4.9	28.3	24.8	20.9				
5.0	28.4	24.7	20.7				
4.4	16	43	20.74				
4.88	28.32	24.86					

154

Aug. 14, 1881

Collimation repeated.

40" N.C. S.C

16 80.9 18 ~~50.6~~ <sup>50.4</sup>

80.8 51.1

79.6 51.2

79.8 51.4

79.0 50.7

1 48

16 80.02 50.96

18 50.96

130.98

17 65.49

64 35<sup>m</sup>

Flexure repeated

E Z S H

11.8 28.6 18.1 20.5

11.4 28.2 18.3 20.8

11.7 28.1 18.2 20.7

11.8 28.0 18.1 21.0

11.8 28.0 18.0 21.0

E Z S H

6.6 30.0 27.0 22.6

6.7 30.2 26.6 22.6

6.4 30.1 26.7 22.8

6.3 30.3 26.8 22.8

6.6 30.2 26.6 22.7

35

7

11.70 28.18 18.14 20.80

28.18

18.14

20.80

19.70

6.56 30.16 26.74 22.70

30.16

26.74

22.70

21.54

1.80

+ 80



Aug. 17, 1881

Reversed the telescope at about 13<sup>h</sup>

Collimation after reversing.

9<sup>h</sup> 35<sup>m</sup> N.C S.C

18. 35.7 16 92.7

37.1 92.7

37.8 92.6

36.8 93.8

37.0 92.1

34.4 139

18 36.88 16 92.78

16 92.78

129.66

17 64.83

9<sup>h</sup> 50 Brought North Collimator into the zero line of Collimation.

9<sup>h</sup> 55<sup>m</sup> N.C S.C

17 97.68.8 17 59.360.3

68.8 59.1

69.6 58.2

69.9 60.1

68.7 60.0

8 477

17 69.16 17 59.54

17 59.54

8.70

17 64.35

Set at 17 64.6

Aug. 17, 1881

94 40<sup>m</sup>

Flexure

E F G H

E F G H

6.2 35.7 36.3 22.5

50

4

10.8 26.1 29.3 28.4

6.0 35.7 35.9 22.3

10.4 26.3 29.1 28.2

6.2 36.2 36.0 22.3

10.7 26.7 29.1 28.3

6.3 35.8 36.1 22.5

10.7 26.8 29.3 28.3

6.2 36.1 35.7 22.5

10.4 26.4 29.2 28.2

9 45 0 21

30 23 10 14

6.18 35.90 36.00 22.42

10.60 26.46 29.20 28.28

35.90

26.46

36.00

29.20

22.42

28.28

20.50

14.54

25.12

23.63

23.63

1.49

+ 0.74

Flexure repeated after adjustment

E F G H

E F G H

6.2 36.5 36.0 23.1

10.5 27.1 29.4 28.8

6.9 36.3 36.2 22.3

10.4 27.2 29.1 28.7

6.8 36.7 36.0 22.5

10.6 27.2 28.8 28.6

6.9 36.8 36.1 22.4

10.2 27.2 29.0 29.0

6.8 36.8 36.2 22.8

10.1 27.1 29.3 28.7

36 31 5 31

18 8 6 38

6.72 36.62 36.10 22.62

10.36 27.16 29.12 28.76

36.62

27.16

36.10 25.51

29.12

22.62 23.85

28.76

22.06 1.66

15.40

25.51 + 0.83

23.85



# Aug. 17. 1881

## Long Level

10<sup>h</sup> 10<sup>m</sup>

W	E	W	E	W	E	W	E
55.2	37.7	46.4	44.4	44.2	48.6	48.0	44.0
35.0	56.0	46.0	47.0	48.2	44.0	48.0	46.0
902	937	4	114	124	126	48.00	45.00
45.10	46.85	46.20	45.70	46.20	46.30	45.00	
46.85		45.70		46.30		3.00	
1.75		0.50		.10		+1.50	
- 0.88		+0.25		- 0.05			
+ 0.25							
- 0.05		.056					
+ 1.50		.20					
+ 0.82		.01120					
+ 0.20							

$$b = +0.01^s$$

## Level No. 3

10<sup>h</sup> 15<sup>m</sup>

W	E	W	E	10 <sup>h</sup> 30 <sup>m</sup> W	E	W	E
17.7	17.5	12.0	3.0	7.0	5.0	17.2	17.6
17.6	17.6	13.5	1.5	9.2	2.8	21.4	11.2
12.0	3.0	5.5	4.5	16.2	7.8	38.6	6.8
17.65	17.55	12.75	2.25	8.10	3.90	19.30	13.40
12.75	2.25			19.30	13.40		
10.40	19.80			<del>27.40</del> 17.30			
15.20	9.90						
9.90							

see p. 117

$$b = +0.53^s$$

$$+ 2.65 \quad + 0.26$$

Out of adjustment

$$+ 0.10$$

$$+ 3.2$$

$$+ 3.3$$

$$b = +57^s$$

$$+ 2.5$$

after adjustment

158

Aug 21 1881  
10h 15m
$$\begin{array}{r} 50 \quad 4 \quad 9.5 \\ 36.8 \\ 38.4 \end{array}$$

$$\begin{array}{r} \text{Plexure} \\ 8 \quad 8 \end{array}$$

22.1 North

$$\begin{array}{r} \text{E} \quad \text{R} \quad \text{G} \quad \text{W} \\ 50 \quad 4 \quad 9.5 \quad 36.8 \quad 38.4 \quad 22.1 \\ 9.7 \quad 37.8 \quad 38.8 \quad 22.3 \\ 9.75 \quad 37.50 \quad 38.60 \quad 22.20 \\ 37.30 \\ 38.60 \\ 22.20 \\ 107.85 \\ 269.6 \end{array}$$

$$\begin{array}{r} 26.96 \\ 23.34 \\ 3.62 \\ +1.51 \end{array}$$

10h 20m

Callination  
S.C.
$$\begin{array}{r} 17 \quad 79.8 \\ 70.1 \\ 69.2 \\ 68.9 \\ 68.8 \\ 84.78 \end{array}$$

$$\begin{array}{r} 17 \quad 56.2 \\ 57.0 \\ 56.3 \\ 55.9 \\ 57.7 \\ 29.1 \end{array}$$

$$\begin{array}{r} 17 \quad 69.56 \\ 55.82 \\ 125.0 \\ 62.7 \end{array}$$

Alt of 17 62.7

South.

$$\begin{array}{r} \text{E} \quad \text{F} \quad \text{G} \quad \text{W} \\ 120 \quad 26.4 \quad 29.0 \quad 25.4 \\ 26.4 \quad 26.2 \quad 29.6 \quad 26.0 \\ 12.1 \quad 26.30 \quad 29.30 \quad 25.70 \\ 12.05 \quad 26.30 \quad 29.30 \quad 25.70 \\ 26.30 \\ 29.30 \\ 25.70 \\ 93.35 \\ 23.34 \end{array}$$



Long level

578 1,324  
 258 623  
 736 947  
 368 473  
 1,05  
 +1,52

not adjusted

E W  
 356 461  
 388 422  
 14 83  
 372 44,15  
 695  
 +3,47

new level

~~E W~~

~~578 324~~

E W  
 17.2 188  
 15.7 15.4  
 15.8 153  
 17.6 185  
 263 280  
 1658 17.00  
 12.15 1908  
 873 1608  
 14.38 18.04  
 366  
 +1.83

E W  
 423 421  
 352 484  
 775 105  
 3825 4525  
 650  
 +3.25

E W  
~~348 486~~  
 402 41.5  
 362 456  
 764 7.1  
 382 43.55  
 535  
 +2.67

+3.25 056  
 +2.67  
 +3.47  
 939  
 +3.13  
 1056  
 1878  
 1565  
 1752

b = +1.18

E W  
 14.9 167  
 9.2 215  
 14.3 169  
 102 212  
 486 763  
 12.15 1908

see p. 117

b = +2.6

Aug. 21, 1881

N.G. S.C. Repeated N.C. S.C.

5 <sup>h</sup> 55 <sup>m</sup>	17 <sup>h</sup> 78.0	17 55.2	at 6 <sup>h</sup> 10 <sup>m</sup>	75.6	55.4
	78.1	56.8		75.8	56.8
	78.4	56.6		75.0	55.8
	76.8	57.3		75.0	55.8
	77.2	57.2		75.8	56.2
	385	49		22	0
17	77.70	56.98		75.44	56.00
	56.98			56.00	
	13468			13144	
17	67.34			65.71	

$$\begin{array}{r} 65.71 \\ 67.34 \\ \hline 1305 \end{array}$$

Set at 17 66.5

6 <sup>h</sup> 0 <sup>m</sup>	E	F	G	H	Flexure	E	F	G	H
	10.8	37.6	37.3	30.9		14.3	29.1	30.7	27.2
	10.9	37.4	36.8	30.8		14.3	29.1	30.2	27.0
	11.0	37.8	37.3	30.8		14.6	28.6	30.2	27.0
	10.8	37.9	37.7	30.7		14.3	28.3	29.9	27.2
	10.4	37.3	37.5	30.8		14.3	28.0	30.4	27.0
	39	30	16	40		18	31	14	4
	10.78	37.60	37.32	30.80		14.34	28.62	30.28	27.08
	37.60					28.62			
	37.32					30.28			
	20.80					27.08			
10650						2034			
2662						25.08			
25.08									
1.54									
+2.77									



Aug. 21, 1881

Long Coll.

to 44<sup>m</sup>

Adjusted long coll. to the middle wire of tel-  
 escope, before this observation. It was a-  
 bout 0.7 of a wire interval to the apparent W.

Not light enough for description.

7245

New Level

Up

Down

$\Sigma$	W
102	131
<u>130</u>	<u>103</u>
232	234
1160	1170
10.75	19.35
2235	31.05
11.17	15.52
	4.35
	2.17

$\Sigma$	W
68	220
<u>167</u>	<u>167</u>
215	387
1075	1935

$$b = +21.41^s$$

$$\begin{array}{r}
 966 \\
 217 \\
 \hline
 6543 \\
 966 \\
 \hline
 1932 \\
 \hline
 2096 \ 23
 \end{array}$$

see p 117

Aug 21 1881  
 8<sup>h</sup> 30<sup>m</sup> New Level

W E

down

10.3 202

12.8 179

~~23.1 231~~

11.55 19.05

W E

5.0 11.3

4.1 12.0

9.1 23.3

4.55 11.65

11.08 9.05

15.55 20.50

7.77 14.35

- 2.58

4.55 11.65

9.05 11.00

13.60 65

6.50 11.32

45.2

+ 2.26

b = +43

10<sup>h</sup> 30<sup>m</sup> W E

2.0 18.2

20.9 -0.8

11.45 8.70

~~14.85~~ 7.40

28.75 16.10

12.87 8.05

4.82

+ 2.41

b = +46

E W E W

20.8 -0.7

1.2 18.8

11.00 +9.05

see p 117

W E

16.8 4.8

11.9 10.0

14.35 7.40



Aug. 22, 1881

13 <sup>h</sup> 5 <sup>m</sup>	N.C.	S.C.	7 <sup>h</sup> 50 <sup>m</sup>	N.C.	S.C.	Adjusted long focus.	
17	81.3	54.8	17	82.6	50.8	N.C.	S.C.
	80.8	54.0		83.2	51.5	17	79.2 17 52.8
	81.7	55.1		81.2	51.0		79.1 51.8
	79.3	55.0		80.8	51.8		77.7 51.3
	81.4	54.9		82.6	52.1		79.1 52.9
	45	23.8		104	72		80.2 52.9
17	80.90	54.76	17	82.08	51.44	45.3	17
	54.76			51.44		79.06	52.34
	1356.6			133.52		52.34	
	67.83		17	66.76		131.40	
Set at 17 67.8						17 65.70	

Set at 17 66.2

7 <sup>h</sup> 55 <sup>m</sup>	E	Z	S	H	E	Z	S	H
50 4	7.7	38.1	41.8	21.5	12.5	30.2	34.2	28.3
	7.8	38.2	41.3	21.7	12.8	30.2	34.8	28.2
	8.3	38.8	41.8	21.3	12.9	30.2	34.4	28.5
	8.0	39.0	41.7	21.8	12.8	29.8	34.9	28.2
	8.5	39.0	41.5	21.6	12.9	30.2	34.8	28.0
	3	31	31	29	39	6	31	12
	8.06	38.62	41.62	21.58	12.78	30.12	34.62	28.24
	38.62				30.12			
	41.62				34.62			
	21.58				28.24			
	10988				10576			
	27.47				26.44			
	26.44							
	1.03							
	+0.51							

Aug. 22, 1881

Song Coll.

17 <sup>3.5</sup> 65.2 10 4 33.5

61.0 5.1

62.1 8.8

61.8 48.1

62.2 155

106 53.88

62.12



Aug. 29, 1881

10<sup>4</sup> 25<sup>m</sup> N.C. S.C.17 ~~29~~ 79.8 17 56.7

78.2 55.8

79.3 57.6

79.2 56.3

78.1 56.0

46 24

78.92 56.48

56.48

13540

17 67.70

Set at 17 67.7

10<sup>4</sup> 15<sup>m</sup> E Z S H Flexure C Z S H

50 4 8.1 37.4 41.2 21.1 12.3 28.1 32.3 27.8

8.1 37.5 40.8 21.3 12.7 28.7 33.1 28.0

8.0 37.6 40.9 21.2 12.7 28.1 33.1 27.3

8.7 37.7 40.9 21.1 12.0 28.2 33.1 27.8

8.3 37.8 40.8 21.3 12.5 27.7 32.9 27.8

12 30 46 10 22 8 45 37

8.24 37.60 40.92 21.20 12.44 28.16 32.90 27.74

37.60 28.16

40.92 32.90

21.20 27.74

10796 10124

2699 25.31

25.31

1.68

+0.84

Aug. 29, 1881

10<sup>h</sup> 15<sup>m</sup> Long Collimator.  
Seeing too bad for  
observation.

11<sup>h</sup> 0<sup>m</sup> Nomenclature of levels changed.

New level = No. 2 Fixed plane tube = No. 3

10<sup>h</sup> 40<sup>m</sup> Adjusted new level in the plane of the  
11<sup>h</sup> 5<sup>m</sup> central wire of S. Collimator.

Also adjusted it for movement in a  
horizontal plane.

Also adjusted level No. 2 nearly in  
the same plane.

Began reaching the new level for variation  
of Equator pt. correction + level.

Level No. 2				Level No. 3	
N.	S	E	W	N	S
8.7	7.0	6.8	8.9	11.0	31.11
8.1	7.6	4.2	11.3		20.1
8.40	7.30	11.0	20.2		-18.05-
	+1.10	550	10.10		
	+55-		4.60		
			+2.30		
			6.49		



dry 30/1881

Long

7<sup>4</sup> 5<sup>m</sup> Callimaclozi

17 61.2 10 (3) 48.1 48.0

61.8 16.8 16.8

62.8 20.1 19.3

62.1 0.2 0.2

61.1 26.5 24.3

40 3 46.30 6.08

61.80 4 6.30

17<sup>4</sup> 5<sup>m</sup> N.E S.E

17 83.1 50.8

84.2 50.3

83.8 50.3

82.8 51.0

82.0 50.2

9 26

83.18 50.52

50.52

133.70

17 66.85 let at 17 66.8

7<sup>4</sup> 5<sup>m</sup> E E

T

Runs

G

H

50 8.0 6.8 36.8 36.1

7.9 6.6 36.6 36.1

8.2 7.1 36.8 36.1

7.9 6.4 36.7 36.1

7.5 6.8 36.6 36.0

45 37 35 4

7.90 6.74 36.70 36.08

39.1 38.6 18.5 20.2 18.5

39.1 38.8 18.2 20.7 18.2

38.8 38.9 18.3 20.4 18.3

38.8 38.8 17.7 20.0 17.7

38.2 38.8 18.0 20.5 18.0

40 39 18 7

38.80 38.78 20.36 18.14

168

Aug. 30, 1881

8<sup>th</sup> am

Level No. 2

Level No. 3

N.	S	E	W
17.0	12.6	13.7	16.9
16.9			
16.0	14.4	11.7	18.9
16.45	20	54	158
16.45	13.50	12.70	17.90
	29.5		520
	+1.47		+260

N.	S
10.0	25.1
	151
	-7.55

	E	N	S	H
50 4	14.9	29.2	34.0	27.4
	14.8	29.2	33.7	27.9
	14.7	29.2	33.8	28.1
	14.6	29.9	33.9	28.0
	14.6	29.8	33.3	28.0
	36	23	37	44
	14.72	29.46	33.74	27.88
		10.580		
		26.45		



Aug 31 17<sup>h</sup> 20<sup>m</sup>

Level No. 2

N	S	E	W
14.0	13.7	10.5	17.1
15.6	12.0	12.2	15.1
96	57	27	

1480	1280	1135	1610
------	------	------	------

195	475
+ .97	+ 2.37

b<sub>2</sub> + 45

Level No. 3

N.	S.
<del>20</del> + 2.0	20.0
	180
	- 9.00

	E	J	S	H
--	---	---	---	---

50	4	14.4	30.1	36.1	30.1
----	---	------	------	------	------

		13.7	30.0	36.0	30.4
--	--	------	------	------	------

		13.5	30.1	35.6	30.0
--	--	------	------	------	------

		14.0	30.1	35.3	30.3
--	--	------	------	------	------

		14.0	30.0	35.8	30.3
--	--	------	------	------	------

		46	3	38	11
--	--	----	---	----	----

		13.92	30.06	35.76	30.22
--	--	-------	-------	-------	-------

10996

27.49

170

Sept. 1, 1881

Long Collimator,

10<sup>h</sup> 55<sup>m</sup> N. C

S. C

17 66.2 50 3 46.7

17 88.1

48.0

64.2 16.9

90.8

48.1

64.7 22.0

88.8

48.8

64.7 1.2

88.6

48.8

65.0 26.8

89.0

49.2

48 4 6.70

3

29

64.96

89.06

48.58

Seeing very bad

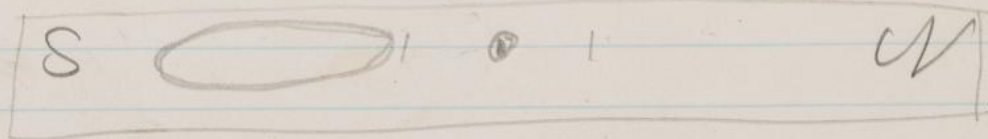
48.58

137.64

17 68.82 66.8

Set at 17 68.8

Wien Level No 3 The bubble is so short -  
that both ends require to be read on  
the same side of the center.





Sept. 1, 1881 11<sup>h</sup> 0<sup>m</sup>

Level No. 2

N	S	E	W	N	S	E	W
14.9	13.7	11.0	17.3	9.3	19.1	11.0	17.2
15.1	13.3	12.1	16.3	9.8	18.7	12.0	16.3
100	10	31	136	11	178	230	135
15.00	13.50	11.55	16.80	9.55	18.90	11.50	16.75
	1.50		5.25		9.35		5.25
+1.75			+2.62	-4.67			+2.62

Level No. 3

N	S	N	S
6.2	24.3	12.0	30.1
	18.1		18.1
<del>9.25</del>		<del>9.05</del>	
	5.8		5.8
	5.8		5.8
	-5.80		

1<sup>st</sup> setting.

E	G	S	H
50 4	11.3	27.6	33.0
	11.0	27.2	33.1
	11.15	27.40	33.05

9840  
4 2460  
- 2.10  
9840  
17 15

No. 1 div = 2.78  
No. 3 div = 2.60

13.2	14.3	101	173
15.0	12.7	12.6	150
82	70	1135	1615
14.10	13.50		480
	+ 0.60		+2.40

2<sup>nd</sup> setting.

E	G	S	H
3	56.0	12.2	18.3
	56.4	12.1	17.8
	56.20	12.15	18.05
	27.810		
4	89.52		
	13.08		
	22.60		

5.3 222  
0.9 189.21  
- 89.5 150

Σ F G No

50	4	96	25.2	32.1	27.1
		98	25.0	32.2	26.7
		9.70	25.70	32.15	26.90

9394  
2348  
168  
9150

72

84 pm

Sept 1, 1881  
Long Collimator

17	70.6	30	3	45.6	45.3
	70.9			17.3	16.8
	71.2			23.9	23.8
	71.8			2.2	2.6
	71.2			290	285
	7			7.25	7.12
	71.14			7.18	



Sept 6, 1881

14<sup>h</sup> 5<sup>m</sup> Long Collimator7 15<sup>m</sup> N.C S.C

17 69.0 55.2 50.0 49.6

17 77.8 17 61.8

69.3 58.8 17.2 16.5

79.0 61.6

69.0 59.8 18.8 17.8

78.9 61.4

66.0 54.8 0.8 39.6

79.6 61.3

61.8 56.3 26.8 23.5

78.9 61.0

34.9 6.70 5.88

42 21

56.98 6.29

78.84 61.42

61.42

140.26

17 70.13

Set at 17 70.1

Flexure B. Obs.

E C F G H E F G H

50 4 11.0 38.9 39.5 20.0 15.8 28.0 30.5 26.2

11.0 38.5 39.2 19.9 15.5 28.1 30.9 26.8

11.4 39.0 39.2 19.5 16.0 27.8 30.0 26.2

11.2 38.8 39.0 19.8 16.0 27.7 30.9 26.0

11.1 38.3 39.0 19.5 15.2 28.0 30.8 26.0

11.4 38.70 39.18 19.74 15.70 27.92 30.62 26.24

38.70 27.92

39.18 30.62

19.74 26.24

27.19 25.12

25.12

2.07

1.03

174

Sept. 7, 1881  
Long Coll.

16<sup>h</sup> 45<sup>m</sup>

16<sup>h</sup> 45<sup>m</sup> N. C. S. C.

17 87.1 17 57.0

Unable to reach.

90.0 59.1

90.9 56.9

89.1 58.5

92.5 58.4

49.6 39.9

89.92 57.98

57.98

147.90

17 73.95

Rej.

Set at 17 70.1

Seeing very bad

4<sup>h</sup> 40<sup>m</sup>

Long Coll.

17 64.8 45.0 45.2

66.9 16.1 15.9

66.1 20.3 20.2

64.9 59.0 59.8

66.2 20.4 26.11

39 49.5 65.28

65.78 5.19

5<sup>h</sup> 55<sup>m</sup>

N. C. S. C.

17 61.91.8 51.0

92.0 50.9

92.7 57.0

92.4 52.1

93.2 50.3

21 53

92.42 51.06

51.06

143.48

17 71.74

Set at 17 70.1



Sept. 7, 1881

16<sup>h</sup> 50<sup>m</sup> Level No. 2

N	S	E	W
13.2	11.7	12.0	12.9
10.0	15.0	7.3	17.2
<u>11.6</u>	<u>13.3</u>		

1.7  
- 0.85

19.3  
9.65 - 15.05  
5.40  
+ 2.70

Level No. 3

N	S
7.4	21.2

202  
542 ) 1599 ( 2.95  
1084  
515  
488  
27

	E	S	W	H
50 4	9.2	23.0	32.4	25.7
	9.0	23.0	32.3	25.3
	9.10	23.00	32.35	25.30

8995

22.49  
+ 2.38  
2487

16<sup>h</sup> 55<sup>m</sup> Level No. 2

N	S	E	W
4.2	20.5	7.9	16.9
8.1	16.9	12.7	12.2
12.3	37.4	10.30	14.5
6W	18.70		42.5

- 12.55  
6.27  
- 5.42

+ 2.12

	E	S	W	H
50 3	53.2	7.8	16.7	8.2
	53.5	7.6	16.4	8.6
	53.37	7.70	16.55	8.40

26602

06.50  
17.55  
24.05

Level No. 3

N	S
16.1	30.0
8.7	8.8
	8.75

8.75 ) 15.99 ( 1.83  
8.75  
7.24  
7.00  
24

203  
1 div = 1.83

Began regular observing for 46 and  
4 R.S. with new telescope and level

Sept. 7. 1881  
Flexure

$\delta^h$	$\delta^m$	C	F	F	S	H	C	F	S	H
50	4	7.1	37.2	38.0	41.4	20.0	13.7	29.1	34.0	27.3
		7.4	37.2	38.1	41.3	20.8	13.2	29.3	34.0	27.6
		7.5	37.9	38.0	41.1	20.8	12.8	28.8	34.1	27.7
		7.8	38.1	37.6	41.2	20.7	13.7	29.3	34.0	27.3
		7.4	38.0	37.7	41.2	20.2	13.2	29.1	33.0	27.3
		22	34	44	12	25	16	6	41	22
		7.44	37.68	37.88	41.24	20.50	13.32	29.12	33.82	27.44
		37.88					29.12			
		41.24					33.82			
		20.50					27.44			
		10706					10370			
		26.76					25.92			
		25.92								
		0.84								
		+0.42								



Sept. 7, 1881

Level No. 2 Level No. 3

6 <sup>40m</sup>	N	S	N	S
	11.7	19.1	<del>6.1</del>	<del>25.9</del>
	9.0	21.0	6.8	26.8
	<u>207</u>	401		
	10.35	20.05		
		-9.70		
		4.85		

Level	E	W
	15.0	15.9
	11.1	19.2
	61	151
	13.05	14.55
		4.50
		+2.25

	E	N	S	H
50 3	57.1	12.5	18.0	11.5
	57.0	12.2	17.8	11.2
	<u>57.05</u>	<u>12.35</u>	<u>17.90</u>	<u>11.35</u>
	4	966		
		13.58		
		<u>23.24</u>		

11.40  
 21.2  
 1.00 = 24.6

	No. 2	No. 3
h	N	S
10	16.3	14.0
	<u>13.7</u>	<u>16.8</u>
	15.00	15.40 - 0.20

		15.40 - 0.20		
	16.8	13.3	—	21.6
7 10	<u>16.0</u>	<u>14.3</u>	—	<u>22.2</u>
	16.10	13.50		21.9
		+1.30		4.9

	E	N	S	H
50 4	8.7	24.1	29.5	22.5
	8.5	23.8	29.3	22.1
	<u>8.60</u>	<u>28.90</u>	<u>29.40</u>	<u>22.30</u>
	4	21.06		
		+1.56		
	81	240	305	228
	<u>8.0</u>	<u>245</u>	<u>304</u>	<u>224</u>
	8.05	24.25	30.45	22.60
		4.21	3.34	

21.62

Level	E	W
	11.6	18.7
	14.8	15.4
	<u>64</u>	<u>141</u>
	13.20	17.05
		3.85
		+1.92

178

Sept 8 2<sup>h</sup> 50<sup>m</sup>no 2  
~~no 2~~ 8

no 3

n s

level

2  
114 186

50 4 157 186

199 100

22 138

157 150

349 350

16.5 13.3

23 139

65 136

404 402

166 106

2.25 13.45

13.25 16.80

34.6 34.6

19.8 102

335

1286 1284

71

+ 1.78

3.315 32.10

18.20 11.78

7.45  
6.95  
14.40  
7.20

32.12

642

8.99

+ 3.21

23.13

50 9 187

23.13  
23.23  
23.18

99 207

-0.2 20.8

50 3 580

14.6

120 18.2

20.8

219 383

13.6 380

10.95 19.15

6.95

-8.20 -4.10

7.15

11.75

11.48

64.1

61.1

60.8

60.0

61.1

71

61.42

23.07

7.95 8.20

8.07

731 2037 / 2.79  
1462  
575  
5118  
6337.20 2037 / 2.83  
1440  
597  
576  
210no 2 = 2.79  
3 = 2.83



Sept. 9, 1881.

Song Coll. 11<sup>h</sup> 30<sup>m</sup> N. C. S. C.11<sup>h</sup> 20<sup>m</sup>

17 55.8 50.3 45.0 44.9

55.4 15.8 16.0

56.1 16.7 17.2

54.7 59.1 59.0

54.0 16.6 17.1

10 4.15 4.28

55.20 4.22

81.7

81.8

81.4

82.7

81.8

44

17 81.88

52.64

134.52

17 67.26

Set at 17 67.3

11<sup>h</sup> 25<sup>m</sup> E F G H Fluxure E F G H

9.1 39.9 40.4 22.3

8.8 39.5 40.3 22.8

8.4 40.2 40.1 22.0

8.7 39.8 39.9 22.0

8.2 39.8 40.0 22.3

32 42 7 14

8.64 39.84 40.14 22.28

39.84

40.14

22.28

11090

27.72

27.08

0.64

+0.32

81.7 14.4 31.6 33.2 29.4

81.8 14.1 31.4 33.4 29.8

81.4 14.2 31.0 33.0 29.8

82.7 14.2 30.8 33.3 29.7

81.8 14.0 31.2 33.7 29.3

9 10 16 30

14.18 31.20 33.32 29.60

31.20

33.32

29.60

10830

27.08

Sept. 9, 1881

11<sup>h</sup> 35<sup>m</sup>

No. 2

No. 3

N S

N S

50 3 59.9 59.9

1.1 10.2

8.6 30.6

16.1 16.0

3.0 8.4

220

18.1 17.6

41 186

-11.0

14.2 14.2

205 9.30

83 77

725

12.08 11.92

-3.63

12.00

10.16

22.16

short bubble.

11<sup>h</sup> 40<sup>m</sup>

No. 2

No. 3

Level

N. S.

N. S.

E

W

50 4 11.9 11.8

7.7 3.8

4.7 26.3

2.8

8.4

28.5 28.3

5.3 6.0

3.9 ~~2.6~~

5.2

5.8

30.5 30.5

13.0 9.8

3.9 4.3

8.0

14.2

26.2 25.7

6.50 4.90

4.10

4.00

7.10

17.1 16.3

1.60

3.10

24.28 24.08

+ .80

+ 1.65

24.18

44.3

2.24

21.94



Sept. 9. 1881

11 <sup>h</sup> 45 <sup>m</sup>		No. 2		No. 3		Level	
		N.	S.	N.	S.	E	W
50	3	57.8	58.0	0.2	11.1	10.0	32.0
		14.4	14.0	2.7	8.8	6.0	6.3
		15.7	16.2	2.5	19.9	8.2	14.5
		12.2	12.1	1.45	9.95	4.10	7.25
		01	03		8.44		3.15
		10.02	10.08		-4.22		+1.67

54 10.05  
+11.82  
21.87

521 12.00 - 3.63  
10.05 - 4.22  
2.05 7.85

54 11.02 - 3.92  
521 24.18 + 0.80  
131.6 4.72

4.72 131.6 / 2.80  
9.44  
3.72  
3.76

No. 2 1 div = 2.80

No. 3 = 1 div 2.74

100 30.6  
8.6 32.0  
186 2.6  
9.30 31.30  
4.7 26.3  
4.6 5.0  
4.6

4.80 131.6 (2.74  
9.60  
35.60  
33.60  
2.00

85 131.6 / 1.57  
83.7  
4.810  
4.75  
6.350  
1 div = 1.57

182

12

Sept 18-1881  
17<sup>h</sup> 20<sup>m</sup>

17 78.1	17 58.4
75.4	57.0
75.8	58.2
76.8	58.5
76.5	56.0
<u>326</u>	56.5
76.52	58.30
58.30	
133.82	
66.9	

6 <sup>h</sup> 0 <sup>m</sup>	N.C.	S.C.
41.7	71.8	59.1
	72.2	58.3
	73.0	59.7
	72.7	60.4
	72.2	59.7
	19	22
	72.38	59.44
	59.44	
	131.82	

Oct 17 66.9

17 65.91

Set at 17 66.9

18<sup>h</sup> 25<sup>m</sup> Long Coll.

41.2	48.7	50.3	48.8	49.8
------	------	------	------	------

41.7	49.7	18.0	18.0
------	------	------	------

46.8	52.1	16.3	16.8
------	------	------	------

50.1	52.2	58.8	59.8
------	------	------	------

49.8	50.0	24.9	24.4
------	------	------	------

30.6	2.7	5.48	6.10
------	-----	------	------

Ry.	50.54	5.79
-----	-------	------



Sept. 12, 1881

E	F	G	H
9.6	38.3	34.8	17.7
9.8	38.6	34.8	17.7
9.2	37.8	34.8	17.1
9.0	38.0	34.8	17.3
9.3	38.0	34.8	17.6
19	7		24
9.38	38.14	34.80	17.48
38.14			
34.80			
17.48			
19.80			
24.95			
26.04			
9.1			

E	F	G	H
12.8	40.8	37.8	20.9
12.3	41.2	38.2	20.3
12.3	41.1	38.1	20.8
12.2	41.1	37.7	20.6
12.2	41.1	37.8	20.3
3.18	3	46	31
12.36	41.06	37.92	20.62
41.06			
37.92			
20.62			
11.96			
27.99			
26.04			
1.95			
+0.97			

Flexure E F G H

E	F	G	H
16.3	31.2	29.9	26.7
16.2	31.4	29.9	26.8
16.7	30.7	29.6	26.8
16.2	31.2	30.1	26.6
16.8	31.2	30.1	26.5
22	7	46	34
16.44	31.14	29.92	26.68
31.14			
29.92			
26.68			
24.18			
26.04			
24.95			
1.09			
-0.54			

Sept-12 1871

L. C.

17 457 10 3 493 50?  
 457 16.6 17.2  
 430 13.7 15.4  
 440 57.2 58.0  
 458 256.8 261.8  
 2236 4 84.20 85.45  
~~55.90~~  
 4472

		no. 2		no. 3		Level	
		N	S	N	S	Σ	N
9.30	50 4 13.2	17.1	17.9				
	26.3	18.8	16.1	5.1	30.1	16.8	18.1
	26.3	15.9	14.0			15.0	15.8
	23.1	17.95	17.00			11.8	17.9
	88.9		+0.95			15.40	18.95
54	2222		4.47				30.5
	-1.31						+1.53
	<u>20.91</u>						

*Long bubble*

4 38  
 16.2  
 17.4  
 14.6  
 54.0  
 13.50  
 +6.92  
~~20.42~~  
20.42

15.6  
 14.1  
 9.7  
 14.55  
 19.3  
 20.3  
 39.6  
 19.80  
 4.55  
 -2.47  
 2.94

7.7 32.6  
 2.6 2.5  
 2.55

No 1 idw = 2.96  
 2 idw = 3.42

294) 872  
 588  
 284  
 2646  
 1940

255) 872  
 265  
 1070  
 1020  
 120

20.91  
 20.42  
 103  
 20.42



Sept 12

11<sup>h</sup> 20<sup>m</sup> $\Sigma$  26

14.8 19.1

~~12.8~~ ~~10.7~~~~16.2~~ ~~13.2~~

15.8 19.9

11.0 6.1

15.5 3.0

18.1

2.6

+ 1.3

16.3 17.1

14.7 19.1

11.0 16.2

15.5 18.0

2.6

+ 1.3

2.6

186

Sept. 13, 1881

11<sup>h</sup> 30<sup>m</sup>

No. 2

No. 3

N

S

N

S

50 4 11.3

16.9

16.1

6.3

29.6

25.2

15.9

17.1

24.6

128

132

21.1

16.40

16.60

22

- 20

20.55

- 10

$$\begin{array}{r}
 + 28 \\
 20.55 \\
 \hline
 20.27
 \end{array}$$
11<sup>h</sup> 35<sup>m</sup>

No. 2

No. 3

Level

N

S

N

S

E

W

50 4 1.1

12.8

20.2

+

14.0

19.2

15.2

13.1

19.8

9.9

33.0

16.9

16.1

14.5

59

4.0

109

153

11.0

12.85

20.00

3.6

3.4

154.5

17.65

18

7.25

3.50

220

10.45

- 3.62

+ 1.10

$$\begin{array}{r}
 + 10.14 \\
 10.45 \\
 \hline
 20.59
 \end{array}$$

3.52

3.50

$$\begin{array}{r}
 86 \\
 20.43
 \end{array}$$

$$\begin{array}{r}
 3.52 \quad 10.10 \\
 \quad \quad 7.04 \\
 \quad \quad 2.06 \\
 \quad \quad 28.16 \\
 \quad \quad 24.40 \\
 \hline
 20.59
 \end{array}$$

No. 2

2.87

$$\begin{array}{r}
 20.59 \\
 20.27 \\
 \hline
 86 \\
 20.43
 \end{array}$$

$$\begin{array}{r}
 3.5 \quad 10.10 \\
 \quad \quad 7.0 \\
 \quad \quad 3.10 \\
 \quad \quad 28.0 \\
 \quad \quad 3.0 \\
 \hline
 20.59
 \end{array}$$

No. 3

2.89



Sept. 13, 1881

13<sup>h</sup> 30<sup>m</sup> Long Coll.

57.8	51.0	57.7
52.8	21.4	20.7
50.3	20.9	21.1
52.1	1.3	2.4
52.8	346	359
48	8.65	8.98
51.96	8.81	

13 Obs.  
7<sup>h</sup> 30<sup>m</sup> Long Coll.

48.5	10	3	47.9	47.3	48.0
49.6			16.3	16.0	16.6
47.5			14.6	13.2	13.5
49.6			56.7	56.1	56.2
47.9			155	126	143
431			388	3.15	3.58
48.62					

Sept. 13, 1881

No. 2

No. 3

Level

N S

~~Long bubble~~E ~~7~~ W

50 4 14.3

16.7 15.3

N S

13.2 18.8

28.3

18.7 13.3

6.0 28.0

15.8 16.1

32.1

17.70 14.30

14.50 17.45

27.6

3.40

29.5

22.3

+1.70

+1.47

25.58

- 4.76

20.82Long bubble  
~~in~~ No. 2

No. 2

No. 3

Level

N S

N S

E W

50 4 19.4

17.4 14.4

5.1 27.1

13.2 18.7

33.5

19.5 12.2

15.7 16.2

36.3

18.45 13.30

0.9 0.9

13.95 17.45

31.8

+5.15

0.90

14.45 30.0

10

2.57

+1.50

30.25

4.67

7.20

23.052005  
2086  
387  
21.93



Sept-13

16 W 17 76.3 574  
 774 569  
 758 572  
 777 577  
 765 560  
 337 352  
 7674 5704  
 57.04  
 13378

17 66.89

Set at 17.619

<sup>7440m</sup>  
N. C S. C B Obs  
 17 73.8 17 58.5  
 74.5 60.0  
 74.9 60.0  
 74.9 59.9  
 74.0 58.4  
 21 46.8  
 74.42 59.36  
 59.36  
 13378

17 66.89

Set at 17 66.9

B Obs. 840ms	No. 2		No. 3		Level	
	N	S	N	S	E	W
3.0	1.6	—	27.5	2.0	2.5	
1.0	3.5	—	27.0	-0.8	5.1	
<u>2.0</u>	<u>5.1</u>	—	27.0			
	2.51					
	1.25					

Perhaps the instrument was touched here.

50 4 9.9 0.2 4.2 — 27.0 1.40 3.80  
 24.6 2.4 2.0 2.40  
 23.5 1.30 3.10 +1.20  
 19.4 1.80  
 374 -90  
 19.35  
 +2.52  
 21.87

190

Sept. 13, 1881

h 50	m 0	No. 2		No. 3		Level		
		N	S	N	S	E	W	
50	4	16.2	18.8	17.2	2.0	19.0	21.5	24.7
		31.2	20.7	15.2			17.1	19.0
		30.5	19.75	16.20			386	430
		26.4		355			1.930	21.85
		243						255
		26.08						+1.28
		<u>496</u>						
		<u>21.12</u>						

Long bubble

Long bubble  
in No. 2

h 6	m 10	No. 2		No. 3		Level	
		N	S	N	S		
50	4	9.9	15.8	20.7	1.5	20.2	
		24.4	17.0	19.0	0.0	20.8	
		23.5	16.20	39.7	2.0	1.8	
		20.1	16.20	19.85		1.90	
		379		-365			
		19.48		-1.88			
		+3.44					
		<u>22.59</u>					
		<u>22.59</u>					
		17.2	18.8				
		16.2	19.5				
		16.70	19.15				
			245				
			-1.22				

2187  
 21.12  
 22  
21.50

21.12  
 22.59  
 20.1  
21.02



Sept. 14, 1881  
11<sup>h</sup>40<sup>m</sup> Long Coll.

44.8 10 3 47.7 48.8

44.1 17.3 18.1

45.1 16.2 16.7

43.2 58.7 59.3

44.5 199 229

17 4.98 5.72

44.37 5.35

11<sup>h</sup>50<sup>m</sup> N. C. S. C.

17. 76.1 17 57.9

74.2 57.9

74.2 57.0

75.2 58.0

74.4 58.1

24.1 38.9

74.82 57.78

57.78

13260

17 66.30

Set at 17 66.9

192

Sept. 14, 1881

1<sup>h</sup> 55<sup>m</sup>

No. 2

No. 3

Level

N S

N S

E W

50 3 55.0

6.0 15.0

~~11.3~~ 35.0

50 9.8

4.2 16.8

9.4 5.10 15.90

5.6 5.10

198 10.80

4.95 -5.40

~~15.12~~~~10.35~~~~14.12~~~~20.07~~12<sup>h</sup> 0<sup>m</sup>

No. 2

No. 3

Level

N S

N S

E W

50 4 19.0

13.0 8.0

5.7 28.0

8.0 13.1

34.3 14.0 7.0

9.7 11.4

34.0 13.50 7.50

5.6 7.0

17.7 45

30.1 7.50

6.30

8.85 12.25

374 6.00

340

29.35 +3.00

+1.70

8.40

26.35

idw = 2.90

~~8.40~~~~20.95~~~~20.51~~



Sept. 14, 1881

12 10

No. 2

No. 3

N S

N S

57 4 13.8

10.8 10.2

5.6 28.9

29.1

11.8 9.1

28.1

2.6 19.3

24.4

11.30 9.65

9.54

+ 1.65

20.85

4.62

79.23

20.07

20.95

19.23

13<sup>h</sup> 5<sup>m</sup>20.08

No. 2

No. 3

N S

N S

11.3 9.1

5.3 28.0

194

Sept. 14, 1881

2<sup>nd</sup> 25<sup>m</sup>

No. 2

No. 3

Level

N S

N S

E W

50 4 16.8

12.0 10.0

— 27.6

7.8.8 13.2

32.4

13.2 8.9

10.0 12.0

32.3

12.60 9.45

188 52

28.4

3.15

9.40 1260

299

1.57

320

27.48

+1.60

4.40

23.08



Sept. 15, 1881  
11<sup>h</sup> 40<sup>m</sup> Long Coll.

17	47.8	10.3	47.0	47.3
	45.0		16.1	15.9
	49.0		15.2	15.4
	48.8		56.8	57.2
	49.0		15.1	15.8
	39.6		3.78	3.95
	47.92		3.86	

Seeing rather bad

N.C.	S.C.
75.8	55.9
76.2	56.0
75.7	56.5
76.7	56.9
76.8	56.96
12	19
76.24	56.38

56.38

13262

17 66.81

Set at 17 66.9

Flexure

11<sup>h</sup> 45<sup>m</sup> E F G H

13.2 42.5 40.7 23.2

12.8 43.1 40.7 23.0

13.1 43.2 41.1 23.3

13.2 43.2 41.0 22.7

13.1 43.2 41.1 23.0

4 2 46 2

13.08 43.04 40.92 23.04

43.04

40.92

23.04

0.08

30.02

27.56

2.46

+1.23

E F G H

16.6 32.8 32.0 28.5

16.8 32.1 32.0 28.2

16.2 32.0 31.9 28.7

16.5 31.8 31.8 28.7

16.7 32.1 32.1 28.8

28 8 48 29

16.56 32.16 32.96 28.58

32.16

32.96

28.58

30.26

27.56

196

Sep-15-1881

11" 50<sup>m</sup> Long Collimator.

50.7 47.4 48.8

50.0 16.8 17.6

52.0 16.8 17.1

51.3 57.2 58.4

50.4 182 219

44 4.55 5.48

50.88 5.01

16<sup>h</sup> 55<sup>m</sup> N.C S.C

17 75.8 57.0

74.0 56.8

75.1 56.1

74.9 57.8

75.9 57.1

7 48

75.14 56.96

56.96

13210

17 66.05

Set at 17 66.9

11<sup>h</sup> 25<sup>m</sup> Long Coll.

17 46.2 10 3 48.2 49.0 48.8

47.3 17.0 18.2 17.3

47.9 14.8 15.9 15.1

46.2 57.6 58.0 58.7

47.6 176 211 199

2 ~~2.90~~ 5.28 4.9847.04 4.40 4.8911<sup>h</sup> 30<sup>m</sup> N.C S.C

17 75.0 17 57.3

74.2 57.1

74.8 56.8

74.8 56.3

75.8 57.7

46 2

17 74.92 57.04

57.04

13196

17 65.98

Set at 17 66.0



197

Sept. 15, 1881

		No. 2		No. 3		Level	
17 0		N	S	N	S	E	W
50	4	11.1	13.8	16.2	—	24.1	12.1 17.7
		25.8	15.3	14.6			14.7 15.1
		25.6	14.55	15.40			68 28
		22.0		14.55			13.40 16.40
		45		0.85			3.00
		21.12		-0.42			+1.50
		+1.18					
		22.30					

Sept. 17 1881

Long Coll.

18<sup>h</sup> 30<sup>m</sup>~~Seeing too bad~~

Seeing too bad for observation.

19 <sup>h</sup> 30 <sup>m</sup>	46.8	10	3	47.8	50.9	49.8	10	20	39.2	481	487
	44.0			17.4	20.7	18.6			407	171	16.7
	44.0			15.7	18.7	17.4			446	139	14.2
	46.1			58.5	1.0	0.2			437	588	587
	46.3			19.4	31.3	26.0			40.1	2579	2583
	22			4.85	7.82	6.50			2053	6448	6458
	45.44				7.16				4166		4.53

Coll

7 30	17	70.0	605
		70.8	608
		69.6	626
		69.3	613
		68.8	618
		3485	70
		69.70	6140
		6140	
		13110	
		6555	

Oct. 17 1881



Sept-17  
7<sup>h</sup> 40<sup>m</sup>

Level

		No. 2		No. 3		Level	
		N	S	N	S	E	W
50	4	166	19.0	178	<del>190</del> <del>174</del>	11.0	21.0
		318	21.2	154	26.7	17.7	18.4
		297	19.0	171	—	32.7	35.9
		277	21.3	153		16.35	19.95
		1058	80.5	6.57			3.60
		2645	20.12	16.28	28.0		+1.80
		5.38		3.84			
		<u>21.05</u>		-19.2			

8 <sup>h</sup> 0 <sup>m</sup>	7.8	13.6	9.9	11.2
4 28	7.6	13.7	9.0	12.1
18.0	17.70	13.65	9.0	12.2
158		59.5	10.0	11.1
139		-2.97	37.9	6.6
50.5			9.48	11.65
126.5	21.07			2.17
	20.57			1.08
+8.32	21.02			1.80
20.97				<u>8.8</u>
				+14.4

10 <sup>h</sup> 5 <sup>m</sup>	7.2	13.9	7.2	33.0	10.0	11.2
4 28	7.7	13.3			8.1	10.1
17.5	7.4	13.6			18.1	4.3
154	7.7	13.2				12.15
14.0		20			9.05	3.00
49.7	7.50	13.50				+1.52
124.2		6.00				
8.00		-3.00				
<u>20.82</u>						

Sept 1 + 181 C=17 66.0

~~11 41 20  
 + 2 1  
 R  
 15 2 144  
 29.2  
 24.2  
 21.4~~

Readings of reflected image. Miller float

to mercury  
 18.102  
 .084  
 .082  
 .091  
 .095

17.870  
 863  
 873  
 864  
 872

Pulled down one end 19.20  
 " " other side 18.30

Loaded one side with string.



Sept. 18, 1881

8<sup>h</sup> 55<sup>m</sup>

Runs

<u>E</u>		<u>F</u>		<u>G</u>		<u>H</u>	
28.9	28.7	58.2	57.4	54.8	34.2	39.6	<del>45.8</del> 36.2
29.0	28.7	58.0	58.0	54.3	34.1	38.8	<del>4</del> 35.9
29.2	28.9	58.0	57.8	54.1	34.2	38.9	36.2
29.3	28.2	58.3	57.8	54.2	33.7	38.3	36.5
29.7	28.9	58.0	57.8	54.2	34.6	38.7	36.8
21	34	5	38	16	8	43	16
29.42	28.68	58.10	57.76	54.32	34.16	38.86	36.32

11<sup>h</sup> 45<sup>m</sup>N.CS.C

70.8

62.8

71.8

62.8

70.9

62.4

71.7

63.0

72.0

63.0

72

140

71.44

62.80

62.80

13424

67.12

Set at 17 67.1

Sept. 18, 1881

Investigation of quadrant points of circle.

940<sup>m</sup> $Z = 0^\circ$ 

0	0	34.2	34.0	34.2
		52.4	53.2	52.9
		46.2	45.9	46.1
		35.8	36.8	36.0

 $Z = 90^\circ$ 

0	0	46.2	47.0	47.7
		1.8	2.0	1.9
		0.6	0.7	0.2
		58.8	59.0	58.2

 $Z = 180^\circ$ 

0	0	35.8	35.8	36.3
		56.5	57.0	56.4
		33.8	4.3	4.0
		52.0	52.0	52.1

 $Z = 270^\circ$ 

0	0	44.9	46.1	45.8
		13.7	13.7	13.6
		11.1	11.3	11.3
		55.7	55.8	55.8



Sept. 19. 1881  
11<sup>h</sup> 55<sup>m</sup> Long Coll.

17	43.1	47.6	48.3	48.8
	41.3	16.6	46.9	15.8
	44.2	13.0	13.8	13.2
	48.0	57.0	58.0	57.2
	46.0	142	170	150
	226	3.55	4.25	3.75
	44.52	150		
		3.50		

12<sup>h</sup> 0<sup>m</sup> Shifted position of sub level No. 3  
so that the bubble falls on North side of  
the center.

		No. 2		No. 3		Level		
		N	S	N.	S	E	W	
50	4	14.8	16.1	12.2	31.7	6.9	13.9	14.9
		29.1	15.0	13.9			12.1	16.3
		27.2	15.55	13.05			13.0	15.4
		24.4	13.05				11.3	17.1
		15.5	2.50				103	237
		23.88	2.8	+1/2 25			1258	1592
		3.50	5.00					334
		<u>20.38</u>	7.8					+167

Sept. 19. 1881

		No. 2		No. 3	
12 <sup>h</sup> 10 <sup>m</sup>	B	N	S	N	S
50	4	21.6	16.7	12.0	34.1
		35.9	18.3	10.1	
		34.0	150	21	
		30.5	17.50	11.05	
		12/4	635		
		3035	+3.17		
		-8.88			
		21.47			

12 <sup>h</sup> 40 <sup>m</sup>	R					Level	
						E	W
20.7	178	10.6	34.0	9.3		13.7	14.7
35.2	16.4	11.9				12.0	16.2
33.7	14.2	25				57	109
31.0	17.10	112.5				128.5	114.5
120.6		58.5					260
30.15		29.2			20.38		+1.30
8.18					21.47		1.67
21.97					21.97		97
					21.55		+1.48
					<u>537</u>		
					<u>21.34</u> //		
	164	12.0					
	181	10.2					
	145	2.2					
	1725	11.10					
		615					
		3.07					
30.15							
8.60							
21.55							



Sept. 19, 1881

~~16<sup>h</sup> 44<sup>m</sup>~~

Long Coll.

16<sup>h</sup> 50<sup>m</sup>

N. C

S. C

16<sup>h</sup> 45<sup>m</sup>

44.1 48.9 50.3

73.0 60.7

46.2 18.6 19.3

73.0 60.7

46.0 18.8 19.2

72.8 61.3

48.0 0.7 1.8

73.6 61.3

48.2 ~~28.0~~ ~~29.6~~ 27.26

73.2 61.2

325 ~~47.50~~ ~~48.5~~ 6.90

15.6 2

46.50

73.12 61.04

46.70

61.04

134.16

17 67.08

Set at 17 67.1

16<sup>h</sup> 55<sup>m</sup>No. 2  
N SNo. 3  
N SLevel  
E W

50 4 13.7

16.0 12.1

~~37.9~~ ~~34.0~~

13.8 15.6

27.5

14.0 15.0

36 9.9

10.6 11.2

28.7

15.00 13.55

11.90 16.90

25.3

13.55

Ry. 200

15.2

1.45

O.R. +2.50

23.80

+0.72

+2.50

-2.01

2.8

21.79

57/6

14/4

20/6

On the afternoon of Sept-18  
 Mr. Geo. Clark made a  
 trial of a new form of radi-  
 callimeter. In making the  
 observations he stood with one  
 foot on the east rail  
 Full description see Thompson's Record.

206

Sept. 19. 1881

7<sup>h</sup> 0<sup>m</sup>

No. 2

No. 3

N S

N S

50 3 57.0

10.4 18.5

25.7 —

10.8

18.3 21.2

10.8

18.7 35.7

7.5

19.35 19.5

26.61

10.50

4 26.62

2.75

14.70

5.25

21.22

21.22

6<sup>h</sup> 0<sup>m</sup>

N.C

S.C

74.7

58.2

74.2

58.3

73.7

59.3

74.3

59.0

74.3

60.3

12

45.1

74.24

59.02

59.02

133 26

17 66.63



Sept, 19, 1881  
5<sup>h</sup> 5<sup>m</sup>

Flexure

E	F	G	H	E	E	F	G	H
13.8	42.2	38.8	22.1	74.7	18.8	33.3	31.7	29.3
13.7	42.1	38.8	22.7	74.2	18.7	34.3	31.3	29.1
13.7	42.3	38.7	23.0	73.7	18.9	34.3	31.5	29.0
13.5	42.2	38.2	22.7	74.3	19.0	34.3	31.4	29.2
13.7	42.5	38.3	22.7		18.8	33.3	31.8	29.4
4	13	28	32		42	4.5	27	10
13.68	42.26	38.56	22.64		18.84	33.90	31.57	29.20
42.26					33.90			
38.56					31.57			
22.64					29.20			
11714					11348			
29.28					28.37			
28.37								
0.91								
+0.45								

1008

Sept-19 1851  
9h 10m

Long Coll.

17 428 3' 482" 486  
 433 175 170  
 439 136 136  
 434 581 576  
 456 2574 2568  
 4 6435 6420  
 4 4.27

9h 15m

50 4 228  
 380  
 362  
 237  
 1307  
 3268  
 - 10.93  
21.65

(21)  
 W S  
 17.5 87  
 16.4 97  
 17.5 8.5  
 16.4 97  
 278 96.6  
 16.95 9.15  
 7.80  
 + 3.90

(31)  
 W S  
 36.9 12.1

2 W  
 9.8 16.1  
 13.0 13.1  
 10.2 15.8  
 12.8 13.1  
 10.1 15.8  
 5.59 239  
~~1396~~ 1398  
 9.31 466  
 + 233

40	108 157	273 25	124 13.2
182	98 161		103 15.2
163	106 152	9.6 9.6	13.0 12.9
148	97 161	9.60	10.2 15.4
533	412 22.5		59 16.7
1332	1030 156.2		11.48 14.18
7.45	532		2.70
<u>20.92</u>	- 2.66		+ 1.35



km	(2) <del>45</del> (3)	$\Sigma$	$Z$
9.40	N S N <del>S</del> S	9.5	15.9
166	145 111	13.0	12.8
309	13.2 12.2	101.	15.3
293	13.6 12.0	123	13.2
267	15.0 10.5	452	17.2
1035	163 61	1130	14.30
<del>3838</del>	1408 1152		3.00
2588	256		+1.50
3.61	+ 1.29		+1.35
<u>22.20</u>			<u>85</u>
			<u>+1.43</u>
21.65			
20.77			
22.27			
<u>469</u>			
<u>21.56</u>			
	h ~		
	19 25		

Sept. 20, 1881  
Long Coll.

9<sup>h</sup> 10<sup>m</sup>

44.3	10.3	3	47.8	47.9
43.9			17.6	18.0
45.2			17.0	17.1
43.3			59.6	59.1
44.6			220	221
13			5.50	5.52
44.26			5.51	

9<sup>h</sup> 10<sup>m</sup> Long Coll.

9<sup>h</sup> 05<sup>m</sup>

N.C. S.C.

71.2	60.8
70.7	60.6
71.2	59.1
71.2	59.0
70.8	61.2
1	0.7

71.02 60.14

60.14

131.16

17 65.58

Set at 17 65.6

39.8 48.7 48.5

40.3 16.4 15.8

41.2 12.1 12.3

42.8 57.0 57.2

41.8 142 138

59 3.55 3.45

41.18 3.50



Sept. 20, 1881

$C=17$

from

Flexure

E	F	G	H	E	F	G	H
15.2	43.3	38.5	<del>23</del> 23.3	19.3	<del>71.2</del> 33.8	32.0	29.2
14.8	43.8	38.8	22.9	19.0	<del>70.7</del> 34.3	31.9	29.1
14.7	43.7	38.9	22.7	19.7	<del>71.2</del> 34.0	31.7	28.8
15.1	43.1	38.3	22.8	19.7	<del>71.2</del> 33.9	31.8	28.9
15.0	43.4	38.7	23.6	19.6	<del>70.8</del> 33.6	31.8	29.1
48	23	32	3	23	46	42	1
14.96	43.46	38.64	23.06	19.46	33.92	31.84	29.02
43.46				33.92			
38.64				31.84			
23.06				29.02			
0.12				34.24			
30.03				28.81			
28.81							
1.22							
+0.61							

12

Sept. 20, 1881

B. Obs.			No. 2		No. 3		Level	
			N	S	N	S	E	W
50	4	5.5	4.3	9.0	29.7	—	5.5	8.0
		19.9	4.2	9.1			3.6	9.9
		18.2	4.25	9.05			9.1	179
		15.0		4.25			4.55	8.95
		18.6		74.80				4.40
		14.65						+ 2.20
		6.72						
		21.37						

B. Obs.			No. 2		No. 3		Level	
			N	S	N	S	E	W
50	4	30.4	11.7	1.8	40.5	14.0	4.3	9.1
		44.4	13.4	0.0			5.2	13.1
		42.5	14.0	-0.7			9.5	222
		39.9	12.85	1.25			4.75	1,1.10
		37.2	1.25					6.35
		39.30	+11.60					+ 3.17
		16.24	+ 5.80					
		23.06						

21.37  
 $\frac{443}{22.21}$

1060/2465  
 $\frac{212}{318}$   
 $\frac{27}{27}$   
 2.32





















$$\begin{array}{r}
 4.8 \\
 2.8 \\
 \hline
 384 \\
 96 \\
 \hline
 13.44 \\
 6.72
 \end{array}$$

$$\begin{array}{r}
 168 \\
 85.36
 \end{array}$$

$$\begin{array}{r}
 5.8 \\
 2.8 \\
 \hline
 464 \\
 116 \\
 \hline
 16.24
 \end{array}$$

$$\begin{array}{r}
 20 \\
 37.07
 \end{array}$$

202	203
287	289
196	3.42
280	274
279	282
246	(1.80)
2.95	2.60
<u>2.80</u>	<u>2.90</u>

$$\begin{array}{r}
 292 \\
 1.28 \\
 \hline
 2336 \\
 584 \\
 \hline
 818
 \end{array}$$

$$\begin{array}{r}
 525 \\
 1.28 \\
 \hline
 4200 \\
 1050
 \end{array}$$

$$\begin{array}{r}
 262 \\
 37.87
 \end{array}$$

$$\begin{array}{r}
 307 \\
 28 \\
 \hline
 2456 \\
 614 \\
 \hline
 889
 \end{array}$$

$$\begin{array}{r}
 39 \\
 1.28 \\
 \hline
 312 > \\
 78 \\
 \hline
 053
 \end{array}$$

$$\begin{array}{r}
 266 \\
 28 \\
 \hline
 2128 \\
 132 \\
 \hline
 745
 \end{array}$$

$$\begin{array}{r}
 125 \\
 28 \\
 \hline
 1032 \\
 258 \\
 \hline
 341
 \end{array}$$

$$\begin{array}{r}
 297 \\
 28 \\
 \hline
 2376 \\
 594 \\
 \hline
 832
 \end{array}$$

$$2.75$$

$$\begin{array}{r}
 182 \\
 1.28 \\
 \hline
 1586 \\
 384 \\
 \hline
 138 \\
 84
 \end{array}$$

$$18$$



1881 phase, p. 01, 187B