

KG
11366
v.635

Chronograph Record.
From Feb. 15 1879 to June 7 1879
A,

Charles W. Sever, University Bookstore, Cambridge.

J20

1 For programme of this work
 see paper by W.A.R. on Fundamental
 Right-Ascension and Declination
 as follows:

For list of stars see book in
 list - for 1879.

For dates of observations of separate
 stars see book, with title "Dates
 of Observations"

complete set

Feb. 15 1879

N. & R. begins observation
of a Fundamental Catalogue of
→ ~~For~~

In preparation for this work, the following
changes have been made in the instru-
ment and in the methods of observation.
* A new set of transit-lenses have
been inserted in group.

Diagram of new plate.



This plate was ruled with the Royce
Scale, and at the following intervals
40 div. --- 80 div. --- 40 div. --- 80 div. --- 40 div.
Middle group.

1333 div. --- each interval

Rulings corrected for periodic and
systematic errors.

The polar group is for observations of Polaris only. For other stars than Polaris, the wide groups A A A are to be used. Since, during the spring and autumn observations, the pole star ^{to be} observed (except Polaris) are observed for the variation of the refraction and the flexure, the first object must be to get as many ^{observations in} declination as possible. As the observations in A A are of less importance, only the 9 stars of group A will be observed.

The declination strokes on the Chronograph are long, and for Polaris, they are followed by a short-rattle. For each declination Polaris is set on the middle wire by moving the telescope. For other polar stars, a short-rattle is made after the 5 strokes in declination. On the opposite page will be found the measure of this plate with the Microscope Comparator. A series of measures were made.

Perhaps it may be found advisable to observe 54 α Cephei, μ Cassiopeiae & μ Cassiopeiae over the polar group.

Time group

Serint Serint II Mean

133.22	133.20	133.21	
3.21	3.22	3.24	133.20
2.89	2.85	2.87	
3.46	3.60	3.51	
266.18	266.06	3088 3095	133.09
133.38	133.40	3.39	
3.16	3.18	3.17	
3.55	3.55	3.55	
3.22	3.12	3.17	133.24
3.22	3.38	3.30	
3.33	3.30	3.31	
2.82	2.78	2.80	
3.18	3.21	3.20	
266.32	266.36	2 3.17 3.17	133.17
133.31	133.25	3.28	
3.23	3.24	3.23	133.21
3.20	3.13	3.17	
3.05	3.20	3.15	
		133.23	

133.23 div of Comparata = 40 div of Roger's Sec

$$\frac{133.23}{5} = 44.41$$

$$133.23 \text{ div} = 2.01$$

$$1 \text{ div} = \frac{206}{133.23} = .0154$$

Measures of Polar Group.

Spaces.	1 st Series	2 nd Series	Mean.	Mean by groups
1	44.35	44.40	44.37	<u>44.3</u>
2	44.45	44.50	44.47	44.33
3	44.10	44.20	<u>44.15</u>	
4	44.30	44.25	44.28	
5	44.10	44.05	44.07	44.15
6	44.05	44.10	<u>44.10</u>	
7	44.45	44.50	44.47	
8	44.35	44.40	44.37	44.36
9	44.25	44.20	<u>44.23</u>	
10	44.70	44.75	44.72	
11	44.25	44.20	44.25	44.36
12	44.15	44.05	<u>44.10</u>	
13	44.40	44.45	44.42	
14	44.20	44.20	44.20	44.29
15	44.25	44.25	<u>44.25</u>	
16	44.55	44.60	44.57	
17	44.65	44.70	44.67	44.49
18	44.25	44.20	<u>44.23</u>	
19	44.30	44.25	44.27	44.27
20	44.30	44.25	<u>44.27</u>	
21	44.30	44.25	<u>44.27</u>	
22	44.30	44.35	44.33	
23	44.40	44.30	44.35	44.32
24	44.25	44.30	44.27	<u>44.3</u>

II A new eye piece has been constructed by Mr. Geo. Lelands, adapted both for observations of the sun and for stars. The front lens is replaced by a microscope objective made by R. B. Palmer.

There are 3 eye pieces, the highest power having been made by Mr. Lelands and the other two lower powers by Mr. Palmer.

The right angled prism is replaced by a prism set at an angle of about 60° and the tube of the eye piece has therefore the same inclination.

With this polarizing eye piece, only about 10% of the light of the sun reaches the eye of the observer.

III A better illumination of the field of the telescope has been secured by removing the four prisms attached to the Moker to the reflecting disc which gives the high-field illumination and by having the disc newly polished and nickel plated. Adjusting weights have also been attached in order to balance the disc in any regard in elevation. An attachment was also added for varying the illumination but this is so far a failure.

In order to correct the Circle Readings of I. P. M. with the help of my eyes as well as to remove all doubt from any observations as far as the Circle Readings themselves are concerned, the following order was adopted for each star.

- (a) I. P. M. reads the circle for the first setting for declination
- (b) I. P. M. is to read the circle for the second setting for declination

(C) The telescope remaining
in position.

M.R. reads the circles twice
independent.

(d) J. R.M. again reads the
circle.

In order to gain greater accuracy
in the rate of the Standard Clock
it will be compared frequently with
Chronometer 3451 and with the
Howard Mean Time Clock

~~3451~~ In order to secure greater in-
dependence in comparison the
following order is adopted for
comparison

3451 with Howard

1327 with Howard

Feb. 15 1879

N.H. begins observation of
Fundamental stars.

$m = 1$

$n = 2$

$3 = 3$

Feb. 16 1879
No AR obs.

$$\text{Nov} = 4$$

$$2 = 5$$

$$3 = 6$$

$$4 = 7$$

Per. 181179

W. A. R. Res.

Wt = 8

Feb. 19 1879

W & R obs. from

22^h — to 23^h 5^m

$\mu\alpha = 9$

$\delta = 10$ from 1^h 5^m to

Feb. 21 1879

W.R. O.

W.R. O. from

No 1 = 10 from 1 1 to Jan
 2 = 12 From 3 16 to 4 55
 3 = 13 from 3 16 to 4 55

1879phde.proj.1639R

Feb. 22 1879.

W. A. R. obs.

N^o 1 = 14 from 1^h 5^m to 15^h 15^m
2 = 15 from 15 18 to 17 50

Feb. 23, 1879

W. A. R. obs. Sun

$N^{\circ} 1 = 16$ from $22^h 22^m$ to $22^h 33^m$
 $2 = 17$ " $1^h 0^m$ to $3^h 15^m$
 $3 = 48$ " $4^h 52^m$ to $5^h 7^m$ 8
 $4 = 19$ " $16^h 37^m$ to $14^h 46^m$
 $5 = 20$ " $19^h 40^m$

Feb. 24, 1879

W. A. R. Obs. Sum

Sheet No. 1 = 21

2 = 22 from 1^h 2^m to 2^h 37^m

3 = 23 " 2.42 " 4.12

4 = 24 " 5.3 " 5.53

5 = 25 " 12 - " 13.37

W. A. R. Obs

Sum

Polaris U. b.

1879. Feb. 25

W. A. R. obs.

Sun
Polaris Lc.Sheet No. 1 = 26 from $22^{\text{h}} 19^{\text{m}}$ to $22^{\text{h}} 40^{\text{m}}$

1879 Dec. 26 1879

W.A. R. S.

Sheet-I = 27 ^h ^m for 22 17
 2 = 28 from 3 34 to 6 0
 3 = 29 from 19 40 to 20 0

②

Feb. 27 1879

Mr. R. S.

Sheet No. = 30 from ^h22 to ^h22 53

$$2 = 31$$

$$3 = 32$$

$$4 = 33$$

$$5 = 34$$

8

Howard Clock

Comp. of ^h22 46

6 15

13 30

all stars beginning with

Observed Polaris with polarizing eye piece
 After finishing the observations for declination
 moved the collimation screw over two revolutions
 and observed on α_1 5.

1879 March 1
 J. R. R. R.

Not = 30

2 = 36 18 31

to 18^h 24^m

to 19 59

Howard Clock.
 Comp. Swiss in

16 15

18 20

19 52

Mar 21 1979

M.A. Ross. Sun Polaris L.C. & R.C.

No 1 = 37

2 = 38

3 = 39

4 = 40

5 = 41

0 ^h 43 ^m	2 ^h 2 ^m
4 35	6 19

Got Polaris on A 1 at revolutions of the
Collimator screw. ⁺¹ 41.00

42.

43.

44.

45.

46.00

47. Howard Clock

Coneys. side

22^h 35^m mainy,

0 43

4 40

6 0

13 46

19 50

March 3, 1879.

W. A. R. Ls. &

Sum

Polaris L.S. U.C.

$N^{\circ} 1 = 42$ from 22 37 to 23 39
 $2 = 43$ " 0 53 to 1 34
 $3 = 44$ " 4 48 to 7 8
 $4 = 45$ " 15 55 to 18 8

Howard Block
Comp. of h

5	12 ^m
5	50
16	15
17	30

1879, March 4

W. A. R. obs.

Sun

Polaris U.C.

No 1 = 46

2 = 47 from 0 46 to 2 25

3 = 48 from 18 13 to 20 33

Howard Clock.

Comp. of

22 ^h 47 ^m

0 43

2 0

19 55

1879, March 5

W. A. R. St.

Sum.

Polaris U.C.

" L.C.

N^o 1 = 49 from 22^h 56^m to 23 16

2 = 50 from 0 51 to 3 19

3 = 51 from 3 23 to 5 32

4 = 52 from 5 39 to 7 36

5 = 53 " 12 24 " 13 38

Got Polaris on A₁ 3 at zero-
lutions of the Collimator screw } Howard Block
from 42.00 to 47.00 inclusive

Comp of
25^h 10^m

2 10

7 0

13 35

1879. March 7

W. A. R. obs.

Sum.

No 1 = 54 From 22^h 56^m to 23^h 23^m

Howard Block
Comp. of
23^h 15^m

Mar 8 1879

W. H. Polson.

W1 = 55 Yr ——— to 738 h.m
 2 = 56 " 1240 " 4 15

Comp. No. ~~1~~ ² ₀
 About - 7 ⁰

In order to ascertain whether there
 is any personal equation depending
 on the way the Key is held in the hand
 or in which hand it is held, began
 a series of ^{experiments} ~~experiments~~ as follows.
 Over it, ^{and it -} the Key is held in the right
 hand and the top is made with the
 fore finger.
 Over it the Key is held in the left
 hand and the top is made with
 the thumb. These observations are to be
 continued till further notice.

Mar 9 1879

W. R. Oles.

Sheet no 1 = 57
2 = 58

Ordered for personal
inspection between bright and faint
stars (reduction of magnitude in
diaphragms) from 10^m to 7.37

March 10, 1879

W. A. R. obs

Polaris U. C.

Sheet 1-59

2-60

3-61

Observed for personal equation
from 6^h 18^m to 6^h 45^m

Howard Clock
Comp $\frac{1}{h}$ ^{am}
55
3 40
7 10

90

90.0

90.0

90.1

89.5

90.0

90.0

90.2

90.0

9.00

90.0

90.1

89.5

Mar 11

Measure of provisional plate
of 30 spots covering 30' of the Merid-
ian circle graduations.

Plate I

1879phae.

89.5
 90.0
90.0
 90.2
 89.8
 90.0
 90.2

907.
 897.

 905.
 900.
 896.89.95

89.9
90.0
90.2
89.7
90.0
90.2

900
~~895~~
~~902~~
 902
 895

89.9
90.0
90.2
90.0

89.95

Plate I

4 49.8 49.9 $\frac{448.85}{+5.80}$
539.75

5 40.2 39.9 54005

5 39.8 39.7 5 39.75

5 39.8 39.9 5.3585

5 39.7 39.8 5.38.44

Plate II

4 498 500 498 5 3960

5 400 40.1 40.3 40.20

5 400 40.2 40.1 40.15

5 40.1 39.3 39.4 38.85

40.7 40.0 40.05

5- 39.75 38.80 39.77 +10 +10

40.05 40.20 40.12 -25 -15

39.75 40.15 39.95 - 8 - 23

8885 89.85 89.60 +27 +4

35.75 40.45 82.90 - 3 + 1

4934

3987

Cor. Σ	Cor. to solar wind.
-05 -05	-2
-05 -10	-3
-15 -25	-8
+45 +20	+7
-05 +15	+5
-05 +10	+3
-25 -15	-5
+15 +00	+0
-05 -05	-2
-25 -30	-10
-05 -35	-12
+25 -10	-3
-05 -15	-5
-05 -20	-7
+35 +15	+5
+05 +20	+7
-05 +15	+5
-25 -10	-3
+25 +15	+5
-05 +10	+3
-25 -15	-5
-05 -20	-7
+35 +15	+5
-05 +10	+3
-25 -15	-5
+45 +30	+16
+05 +35	+12
-05 +30	+10
-25 +05	+2
-05 +00	+0

1879, March 11

W. A. R. obs.

Polaris U.C.

Sheet No 1 = 62 from $0^h 52^m$ to $1^h 36^m$
 2 = 63 from $2^h 55^m$ to $3^h 57^m$
 3 = 64 " 5^h to $7^h 10^m$
 4 = 65 "
 5 = 66 "

Observed for personal equation
 from $6^h 15^m$ to $6^h 39^m$

Howard Clock
 Comp. of
 $1^h 30^m$
 3 45

Provisional Meridian Circle Microscope plate Nos III + IV

4	50.0	Mean	50.0
	50.0		50.0
	50.0	4	50.00
	49.9		50.00
	50.1		50.05
	49.5		49.90
			50.05 - div.
			49.40 + 20

89.8	89.9	89.9
90.1	90.1	90.1
90.1	90.2	90.1
90.3	90.2	90.3
89.9	90.0	90.0
90.1	90.2	90.2
90.1	90.0	90.1
90.0	90.1	90.0
90.0	89.8	89.9
	90.0	90.0

Mean

89.87	+17
90.01	+03
90.13	-09
90.27	-23
89.97	+07
90.17	-13
90.09	-03
90.07	-03
89.83	+21
90.00	+04
90.04	

Mar 12 1879

W. R. S.

Nov = 67

2 = 68

3 = 69

4 = 70

h m h m
23 22 34

W. R. S. for personal Equations
with diaphragms.

1879 March 13

H. A. R. obs.
Sun

No. 1 = ~~68~~ 71

" 2 = 72

3 = 73

4 = 74

23 27 — 23 44

6 23 — 8 8

12 35 — 13 40

— — 22 24

Arranged Sidereal Chronometer
2451 in its case in the Library
Connecting it with the East-Switch
board through wires 1 & 2
Set 3451 about 6^s slow of L.C. of
22^h 0^m

Howard Clock

Comp. of.

~~23 27~~

Mar 15 1879

Mrs R. Oles,

Pos = 20 19 26 5 19 54

~~Filed first of~~

12. 1. 1. 1. 1.

1879. March 17

W. A. R. obs.

Sheet 1-78 from 18 5 to 19 17

List of double_s requiring examination

	α	δ	μ	ρ
~~α Arietis pr. (as file)~~	~~1~~	~~50~~	~~48~~	~~+22° 58' 13"~~
~~T Eridani~~	~~2~~	~~39~~	~~7~~	~~-19 6 57~~
~~K Ceti~~	~~3~~	~~12~~	~~39~~	~~+2 53 58~~
~~T Eridani~~	~~3~~	~~42~~	~~10~~	~~-24 16 23~~
~~γ Eridani~~	~~3~~	~~52~~	~~4~~	~~-13 52 28~~
~~σ^2 Eridani~~	~~4~~	~~9~~	~~23~~	~~-7 51 14~~
~~64 Tauri no comp. 274~~	~~4~~	~~16~~	~~43~~	~~+17 8 42~~
~~ν^3 Eridani~~	~~4~~	~~19~~	~~14~~	~~-34 18 55~~
~~π^3 Orionis~~	~~4~~	~~42~~	~~54~~	~~+6 44 9~~
~~σ^1 Orionis~~	~~4~~	~~45~~	~~18~~	~~+14 2 6~~
~~ψ Orionis no comp. 275~~	~~5~~	~~20~~	~~8~~	~~+2 58 58~~
~~K Orionis 61 m. 42~~	~~6~~	~~9~~	~~16~~	~~+12 18 19~~
~~ψ^4 Aurigae~~	~~6~~	~~33~~	~~46~~	~~+44 38 39~~
~~ψ^7 Aurigae~~	~~6~~	~~41~~	~~43~~	~~+41 55 44~~
~~σ^1 Cam. Maj.~~	~~6~~	~~48~~	~~50~~	~~-24 1 33~~
~~ζ Canceri pr. no comp. 278~~	~~8~~	~~4~~	~~52~~	~~+18 1 54~~
~~ν^2 Hydrae~~	~~9~~	~~58~~	~~54~~	~~-12 26 44~~
~~γ Leonis pr. 2 m. 75 m. 59~~	~~10~~	~~12~~	~~55~~	~~+20 29 16~~
~~ϕ Hydrae~~	~~10~~	~~32~~	~~21~~	~~-16 12 48~~
~~δ^1 Hydrae~~	~~10~~	~~40~~	~~36~~	~~-16 37 23~~
~~κ^4 Leonis~~	~~11~~	~~0~~	~~23~~	~~+2 38 59~~
B.A.C. 4513 2 m. 5	13	24	48	+24 53 53

1879phae.proj

	δ	α	δ	α	δ	α	
2^{d} Librae	14	43	48	-15°	30	31	U.M. ϵ_{μ}
ϵ Bootis	14	45	29	+19	37	59	ϵ
ψ^1 Lupi	15	31	39	-33	59	31	{not in U.M.
ψ^2 Lupi	15	34	32	-34	17	52	
β Scorpii pr.	15	58	0	-19	27	11	B.
κ Herculis	16	2	18	+17	23	22	X
ν Scorpii segn	16	4	34	-19	7	35	ν
γ^2 Sagittarii	17	57	35	-30	25	20	γ
δ^1 Lyrae	18	49	15	+36	48	47	δ
χ Sagittarii pr.	19	17	29	-24	45	19	X
λ^2 Sagittarii	19	28	55	-25	9	51	λ
α^1 Capricorni	20	10	33	-12	54	8	α^1
α^2 Capricorni	20	10	57	-12	56	26	α^2
ζ Aquarii med.	22	22	15	-6	40	27	ζ
c^2 Aquarii	23	2	37	-21	52	1	c^2
ψ^3 Aquarii	23	12	18	-10	18	39	ψ^3
b^1 Aquarii	23	16	15	-20	47	57	b^1
b^3 Aquarii	23	26	35	-21	37	18	b^3
i^1 Aquarii	23	37	34	-18	59	14	i^1

1879. March 18

W. A. R. obs.

Sun.

Polaris U. C.

Sheet No. 1 = 79 from $23^h 57^m$ to $1^h 47^m$
 2 = 80 from $3^h 39^m$ to $5^h 54^m$
 3 = 81 from $5^h 58^m$ to $8^h 9^m$
 4 = 82 " 12 12-11 13 47
 5 = 83 " 19 24 " 19' 57

W. A. R. obs. with diaphragm

Mar 19 1879.

MSR. des.

MSR. des.
just des (123) min (8. Eyastome)

Nov 28th 28 45 to 53 mi

2 = 85

~~821720~~

23 57 1 50

3-86

5 21 7 20

4 = 87

7 w 8 11

5-88

8 16 10 13

$$6 = 89$$

10 21 12 12

$\gamma = 90$

1821 1903

8-91

12 17 13 41

Mar 28 1879

W. R. des.

101-92	23	^h 44 ^m	to	^h 133 ^m
2-93	4	16	"	6.46

Mr. Stevens fastened the bed-plates of the north Collimator to the Marble Cops of the pier in the following way.

(a) Four holes 7 inch in diameter were bored in ~~the~~ ^{each} bed plate at the four corners.

(b) Holes were drilled in the Marble Cops corresponding to these holes when the ^{iron} bed plates were in proper position.

(C) Bolts with split-heads were
 then inserted, heads down in
 their heads and fastened by pouring
 in melted lead and by driving
 firmly around the bolts after it had
 become cold. These bolts being
 only $\frac{3}{8}$ in in diameter, sufficient
 play is left to move the ^{iron} bed plate
 a sufficient amount to secure proper
 adjustment.

(D) Lead washers, being put on
 at bottom and top, the bed plates
 were firmly secured to the marble
 bed by top-nuts, after the collima-
 tors had been adjusted in position.

Mar 23 1879

W. R. S.

Nov = 94 o^h 6^m to o^h 40^m
 20 95 12 24 " 13 37

Began observation for per
 sonal operation in the reverse
 order from that described
 under date of Mar 8.

Order.

it and it, - with thumb
 + it with forefinger.

Mar 24 1879

W. Rous,

1207 = 96 0^h 8^m 51^s 147
 2 = 97 4 56 " 827

Mar 25 1879

W. R. Allen,

Pos. - 98	0	h	4 ^m	to	h	143
2 = 99	4	5	"	6	4	
3 = 100						

Mar 26 1879

W. R. Stetson

Wd = 101

2 = 102

3 = 103

4 = 104

Mar 30 1879

1st A.R. obs.

Nov = 105

0 44 5 1 76

2 = 106

12 22 5 13 43

1879. Apr. 1

W.A.R. obs. ~~Sheet~~.

	<i>h</i>	<i>m</i>	<i>h</i>	<i>m</i>
Sheet No 1 = 107	0	17 5	0	49
2 = 108	7	4	11	9 26
3 = 109	9	28	11	11 47
4 = 110	11	52	11	13 38
5 = 111	19	57	11	22 2
6 = 112	11	11	11	0 25

Mar. 21st 99
 N. O. R. Oles.

101 = 113	h n	h n
	0 28 to	146
2 = 114	4 53	621
3 = 115	7 27	88
4 = 116	17 48	202
5 = 117	20 10	2039

Aug 31, 1879

VWR des.

No 1 = 1150^h 30^m to 2^h 13^m

~~2~~ = No 1 = 118

~~3~~ =

~~4~~ =

~~5~~ =

Apr 1879
Mass = 119

^{h m} 20 24 to ^{h m} 21 17

Apr 6 1879

Nov = 120

2 = 121

3 = 122

4 = 123

h ~ h ~
30 52 13

4 59 7 10

7 18 8 27

11 55 13 42

Aug 1879

No 1 =	124	h m	h m
2 =	125	5 06	6 36
3 =	126	7 52	9 27
4 =	127		

W. R. Poles.

Ans 1879

H.R. ans.

	^h	^m	^{sec}	
Nov = 128	23	47	h	2 ^h 12 ^m
2 = 129	4	51	"	6 54
3 = 130	6	57	"	9 26
4 = 131	9	28	"	10 7
5 = 132	12	00	"	13 51
6 = 133	19	33	"	20 45

Aug 1879

W.R. Jones.

	h	m	s	m
No 1 = 134	23	32	50	42
No 2 = 135	0	49	"	2 2
No 3 = 136	9	16	"	" 30
No 4 = 137				

I. R. M. hit the minute hand
of the watch clock in winding it.
at about $4^{h} 30^{m}$ P.M. setting it -
back about half a minute.

W.R. Jones stars near the equator
for personal equation between bright-
and faint stars.

Series I = 10 stars observed
as indicated on the following page.

Series II = 10 stars as ~~observed~~ indicated
by heading on following page.

Semi

Order

 $A_+ = \text{faint}$ ~~Order~~ $A = \text{bright}$ $A_- = \text{faint}$

May

7.5

8.3

8.8

8.5

lost - 1st u.

8.0

8.2

8.8

9.1

lost A_- 1

8.0

8.5

Series II

Order 4, bright-
 4 faint-
 4, bright-

May.

8.4
 7.3
 6.5

8.4
 9.0
 8.2

9.0

8.0

8.0

8.2

End of this series = 9 ⁴ 11 ^{mm}

Apr 11 1879

Comp of Cycles,

Av = 138 ^{h_m} 141 ^{h_m} 2 34

Apr 12 1879

J. D. R. Esq.

Vol = 139 ^{h m} 21 2 to ^{h m} 22 4

Apr 13 1879
 118 Polys,

$$118 = 140$$

$$1 \quad 22 \text{ to } 158$$

$$2 = 141$$

$$4 \quad 38 \text{ to } 714$$

$$3 = 142$$

$$: 12 \quad 12 \text{ to } 1340$$

$$4 = 143$$

$$22 \quad 50 \text{ to } 2316$$

$$5 = 144$$

$$28 \quad 52 \text{ to } 033$$

Am 14 ~~1879~~
 N. R. obs.

No 1 = 145

2 = 146

3 = 147

4 = 148

5 = 149

6 = 150

h m h m
 0 56 to 2 4

5 8 to 7 37

7 52 to 9 00

9 56 to 12 18

12 21 to 13 30

21 4 to 22 16

Apr 14 1879

NR over the person
and faint - broken
Order.

$A_1 = b$
 $A_2 = b$
 $A_3 = b$

mag.

8.2

8.4

7.2

9.0

8.3

8.8

8.4

9.0

8.0

8.6

Reg. A1, Lost A₌₁ 2

al expectation between bright-

Order, δ

$A_+ = \delta$

$A_- = \delta$

$A_1 = \delta$

mag.

8.2

8.5

8.8

9.1

8.3

5.8

8.5

8.8

8.2

9.0

Apr 16 1879

N. S. R. obs.

Pro = 151	h ~	h ~
2 = 152	23 35 to 42	42
3 = 153	4 40 to 7 8	7 8
4 = 154	7 10 to 8 2	8 2
	8 to 10 18	10 18

End of series for personal
equation between bright and
faint stars

Apr 19 1879

W. R. des.

From this date until further notice, the ^{observing} key will be held in the left-hand and the breaking will be made with the thumb.

In the right-hand the eye piece will be moved along so as to keep the rock observed, with nearly in the center of the field. Much greater care in this respect will be taken than formerly.

No 1 = 155

2 = 156

3 = 157

12^h 13^m to 13^h 42^m

19 25 to 21 51

22 56 to 23 2

Shu to 1879

W. R. Rous.

$W_1 = 158$	0	h	$23^{\sim}$	$\bar{w}$	2	h	$6^{\sim}$
$2 = 159$	2		10	$\bar{w}$	3		2
$3 = 160$	4		46	$\bar{w}$	7		9
$4 = 161$	7		11	$\bar{w}$	8		31
$5 = 162$	9		10	$\bar{w}$	10		19
$6 = 163$	12		11	$\bar{w}$	13		42
$7 = 164$	19		13	$\bar{w}$	20		41
$8 = 165$	21		23	$\bar{w}$	22		13
$9 = 166$	23		45	$\bar{w}$	1		43

Apr 21 1879

N. S. R. obs.

No 1 = 167	1 ^h 47 ^m	to	2 ^h 58 ^m
2 = 168	5 30	to	7 59
3 = 169	8 1	to	10 31
4 = 170	18 53	to	21 13
5 = 171	21 18	to	22 4

1879 Apr. 21 observation for per

1st Series Order A bright
 A⁺ faint
 A bright
 -1.

Mag

6.7

9.0

8.3

8.2

7.7

8.4

8.5

7.7

7.5

3.5

total Equator between bright and faint wires

2nd Series Order A_{+1} faint
 A_{-1} bright
 A_{-1} faint

Mag

6.5

7.9

$A_{-1} ?$

8.8

6.7

7.7

Lost 1st wire

8.6

Lost A_{-1}

8.5

8.5

8.6

Apr 22 1879

N.H.R. obs.

	h	m	t	h	m
No 1 = 172	7	46	t	2	58
	23	40	t	1	44
2 = 173	1	46	t	2	58
3 = 174	5	4	t	7	5
4 = 175	7	9	t	7	58
5 = 176	9	17	t	11	45
6 = 177	11	50	t	13	28

1

1

1879, Apr. 22.

Observation for personal
and faint-views.

Series I	Order
	A+1 b.
	A f.
	A ₋₁ b.

Mag.

8.0

8.3

8.3

Lost A 1

8.2

8.6

8.5

7.4

6.5

Lost A 1

8.6

+1

8.7

1879 Apr. 22

Equation between brights -

Series II Order

$$\begin{array}{l} A, f, \\ A', b, \\ A, f, \\ -1 \end{array}$$

mag.

7.7

8.2

8.0

8.7

8.0

7.8

8.3

7.8

8.8

8.5

Lost A 1
+1

1879 Apr. 23

Series I. Order A b.
 A' f.
 A b.
 -1

Mag.

8.3

8.9

8.2

7.3

8.7

7.7

6.0

8.2

8.9

8.8

Rej. A.9

Apr. 23

Series II

Order: A f.
A, f.
A, f.
-1, f.

mag.

7.8

8.0

7.8

9.1

7.5

8.6

8.0

6.0

8.2

7.5

Am 24 1879
W. R. Sles.

Nos =

2 =

3 =

Apr 26 1879

J. R. R. des.

No 1 = 0^h 27^m to 2^h 10^m

Apr 27 1879

Not	2 ^h 12 ^m	to 2 ^h 58 ^m
2-	4 52	" 5-12
3-	9 41	" 11 5-2
4-	12 0	" 12 47

Apr 30 1879

Began observing a second list of stars having a declination greater than 30 north, according to the following programme.

See Working Lists on pages following List II

via R obs. h m

Nov = 1	11 19 5 12 39
2 =	9 18 11 11 15
3 =	23 57 11 2 10

~~Apr. 3~~

May 1 1879

W. R. Poles.

Nov =

^h 2 ^h 20 to ^h 3 44

2 =

~~8 11 to 11 15~~

3 =

~~11 18 to 13 43~~

4 =

19 59 to 2 25

5 =

23 45 to 1 59

May 1-2 1879

W. R. R. O.

No. 1 =

2 32 4 3 17^m

May 2

No. 2 =

2 =

May 5 1879

H. & R. Poles.

Hor =	^h 242 to ^h 352
2 =	5 8 to 5 10
3 =	9 9 to 10 45
4 =	10 48 to 12 40
5 =	12 41 to ~~10~~ 13 35
6 =	20 47 to 22 19

May 6 1879
W. A. Riles -

No. 1 =	2 ^h 44 ^m to 4 ^h 14 ^m
2 =	9 12 to 11 38
3 =	11 40 to 13 34
4 =	20 57 to 22 11
5 =	22 56 to 0 41
6 =	0 50 to 2 20

After observing Palaimon to 4^h 14^m,
ret-collimating screen at 4^h 56^m
and 48760 and observing at 5^h
-1

1879 May 5
 Reinvestigation of
 Systematic Errors of Micrometer screws
 E. F. G. H.

Measures of ~~5~~ spaces on East Circle.
 Order away from narrow band,
 and toward the 6" spaces

Line 0 Line 6

Line 0 Line 6

Σ 55-3 294 50 2408
 296 897
 45.1 598
 47.3 58.2

50 4 131 45 3 231
 12.1 23.4
 31.3 42.8
 29.9 41.4

Σ 3 298 50 406
 291 893
 49.5 596
 47.2 58.5

4 184 6 242
 12.7 23.6
 31.2 42.2
 30.8 41.4

Σ 3 292 2 406
 287 400
 49.1 599
 46.7 58.0

4 196 3 236
 12.4 23.4
 31.6 42.8
 30.7 41.5

Measurements on a different degree

Σ 35 3 588 30 3 46 35 3 538 3 48
 580 8.0 571 7.9
 10.4 20.6 9.1 20.1
 5.8 16.8 6.3 17.2

Σ 3 585 3 46 3 538 3 55
 572 5.9 571 5.1
 9.3 20.1 9.1 19.8
 5.9 17.1 9.5 17.2

Measuring 1' spaces.
 Order along from narrow band
 Begin at 2nd
 Microscope L

1' spaces

0	1	2	3	4	5
0.07	4	3.0	8	4.3	2
1.0		2.1		4.1	5.4
0.6		2.8		4.4	5.3
0.6		2.7		4.3	5.0
0.4		2.6		4.2	5.5
0.06		2.64		4.30	5.52
					6.54
					7.74

0	1	2	3	4	5	6	7	8	9	10	11
0.03	5.45	4.89	4.29	3.72	3.14	2.57	2.00	1.37	0.71	0.25	
0.6	5.44	4.85	4.31	3.65	3.12	2.52	1.99	1.41	0.79	0.27	
0.7	5.42	4.91	4.29	3.64	3.16	2.51	1.99	1.41	0.84	0.28	
0.0	5.43	4.87	4.32	3.66	3.13	2.51	1.98	1.36	0.82	0.26	
0.6	5.45	4.87	4.33	3.66	3.12	2.52	1.95	1.38	0.82	0.29	

2	P.	L	K
11.4	10.1	10.7	10.9
10.8	10.2	10.4	11.3
11.0	11.3	10.8	11.3
10.8	10.0	10.2	11.0
11.1	10.7	10.8	11.2
10.0	11.3	11.5	11.5
10.8	10.9	11.0	10.6
10.0	11.0	11.2	10.8
11.2	10.8	11.1	10.8
11.7	11.0	10.7	10.7
10.94	10.73	10.81	11.02

May 7 1879

W. R. Ides.

101 =	2	h ^m 2 23 to 4 ^h 13 ^m
2 =		9 32 " 11 22
3 =		11 28 " 13 39
4 =		0 49 " 1 22
5 =		1 37 " 3 5

Perhaps microscope was
disturbed at about 2^h 30^m M.T.
in some experiments, when Mr. Gr. B. Clark
with experience to mounting the new microscope
Looked out for a change of R. at this time.

After observing Polaris on
4th and 5th, I set the collimating
screw at 47.760 and 48.760 and
observed 4th, 6th

May 7 1879

Measurements of 6" space on
East-Curve

Line 0 Line 6 Line 0 Line 6

E	40	132.7	95.0	43.2	133.2	0	43.7
		38.2		48.5			48.6
Fig		49.0		58.6			58.5
No		46.0		55.9			56.1
		<u>16.59</u>		<u>206.2</u>			<u>206.9</u>
		41.47		51.55			51.72

40	1	32.8	43.2	1	33.5	43.7
		38.7	49.0		38.6	49.2
		48.3	58.7		49.0	58.5
		46.1	55.9		46.2	56.1
		<u>16.59</u>	<u>6.8</u>		<u>1.3</u>	<u>7.5</u>
		41.47	51.70		41.82	51.87

	E	R	G	N
	"	"	"	"
6	10.5	10.3	9.6	9.9
	10.5	10.5	9.8	10.0
	10.4	10.3	10.4	9.8
	<u>10.2</u>	<u>10.6</u>	<u>9.5</u>	<u>9.9</u>
Exp	10.40	10.34	9.82	9.90
Wob	1.73	1.72	1.64	1.65

May 7 1879

Measuring of spots

Ordering for narrow band

Order

Microscope

Direct

	1	2	3	4	5	6
40	0.59.6	0.4	3.1.6	2.37	1.54	0.58
	0.1	0.9	1.7	3.2	5.2	6.0
	59.5	0.5	2.3	3.5	5.2	6.2
	59.7	0.6	1.8	3.3	5.1	6.2
	59.9	0.2	1.9	3.9	5.1	6.1
	<u>59.76</u>	<u>0.52</u>	<u>1.86</u>	<u>3.52</u>	<u>5.20</u>	<u>6.06</u>
	1.00	1.73	3.46	5.19	6.92	8.65
	.00	1.21	1.60	1.67	1.72	2.59

Order

Reverse

59.4	0.8	14	31	46	65
0.3	0.7	18	3.6	4.8	6.3
59.6	0.8	15	3.6	4.9	6.4
59.7	1.0	17	3.2	4.9	6.4
59.7	0.8	17	3.1	4.9	6.2
<u>59.74</u>	<u>0.82</u>	<u>1.62</u>	<u>3.36</u>	<u>4.86</u>	<u>6.36</u>
" <u>D</u>	" <u>R</u>	" <u>D+R</u>	"		
0.76	1.08	0.92	1.73	+81	
1.39	0.80	1.07		+66	
1.66	1.79	1.70		+03	
1.68	1.50	1.59		+14	
0.46	1.50	1.18		+55	

Microwave F

1	2	3	4	5	6
40 0' 59.6	5 14' 4	4 28	3 43	59	71
0.4	1.6	2.9	4.7	5.5	6.7
0.1	1.5	3.0	4.8	5.6	7.2
0.2	1.0	2.5	4.6	5.8	7.0
0.2	1.2	2.6	4.8	5.6	7.2
<u>0.22</u>	<u>1.34</u>	<u>2.76</u>	<u>4.54</u>	<u>5.76</u>	<u>7.04</u>

02	14	25	39	54	69
01	1.2	2.9	3.7	5.2	7.4
50.5	0.6	3.1	4.1	5.8	7.3
50.5	0.9	2.8	4.2	5.2	7.3
55.8	0.6	2.7	4.4	5.8	7.0
<u>59.82</u>	<u>0.94</u>	<u>2.80</u>	<u>4.06</u>	<u>5.48</u>	<u>7.18</u>

Microscope

1	1	1	2	3	4	5	6
1	1	1	1	1	1	1	1
40	0	0.8	0.3	3.8	5.4	5.9	8.1
		1.1	0.7	4.2	4.8	6.0	8.1
		0.8	1.8	3.2	4.8	6.1	8.2
		0.7	1.9	3.2	4.8	5.9	8.2
		0.8	1.9	3.2	4.8	6.2	8.8
		<u>0.84</u>	<u>1.72</u>	<u>3.52</u>	<u>4.80</u>	<u>6.02</u>	<u>8.08</u>

5.5	1.0	3.2	3.8	5.9	8.2
5.3	0.7	2.9	3.9	5.9	8.1
5.4	0.8	2.6	4.3	5.7	7.9
5.9	1.2	2.9	3.6	5.6	8.7
5.3	<u>0.84</u>	<u>3.1</u>	<u>4.1</u>	<u>6.2</u>	<u>8.1</u>
<u>55.36</u>		<u>2.91</u>	<u>3.94</u>	<u>5.86</u>	<u>8.08</u>

Microscope Hols

Repeated

59 4 594 12
~~90 14~~
~~42 12~~
~~90 12~~
~~90 12~~

5-9 4	0.2	1.2	3.2	4.8	6.6	7.8
	0.3	1.4	3.4	4.7	6.8	7.9
	0.9	1.4	3.0	4.6	7.1	8.2
	0.2	1.1	3.3	5.2	7.2	8.4
	0.0	1.1	3.0	4.6	6.8	8.4
	<u>0.12</u>	<u>1.24</u>	<u>3.26</u>	<u>4.78</u>	<u>6.90</u>	<u>8.14</u>

0.2	1.8	2.9	3.8	5.6	8.0
0.1	1.5	2.9	4.2	6.2	7.8
0.0	1.3	2.9	4.2	6.4	8.1
0.3	1.5	2.9	4.2	6.4	7.9
0.1	1.6	3.1	3.8	6.1	8.3
<u>0.14</u>	<u>1.54</u>	<u>2.96</u>	<u>4.04</u>	<u>6.28</u>	<u>8.08</u>

Microscope No

11	11	11	11	11	11	11
400	582	557	17	29	29	53
	583	0.2	12	29	25	52
	584	0.2	13	30	23	51
	589	0.1	13	25	21	59
	584	597	1.3	26	22	52
	<u>5844</u>	5998	<u>1.42</u>	<u>278</u>	<u>340</u>	<u>6.06</u>

582	558	12	22	35	58
585	98	12	23	37	59
588	93	09	28	37	58
587	99	09	27	35	51
580	94	09	<u>2.0</u>	<u>3.8</u>	<u>59</u>
<u>5834</u>	<u>9.64</u>	<u>1.02</u>	2.50	3.64	<u>590</u>

Microwave Repeated

"	"	"	"	"	"
576	599	14	29	52	57
8.0	0.1	1.5	2.8	4.7	8.9
82	0.1	1.5	2.9	4.8	8.7
79	0.1	1.4	3.2	4.6	8.5
7.9	0.5	1.8	3.2	4.6	8.6
<u>57.92</u>	<u>5.14</u>	<u>1.52</u>	<u>3.00</u>	<u>4.78</u>	<u>5.70</u>

577	593	09	24	38	57
7.7	9.5	0.9	2.3	3.8	6.2
8.2	9.5	1.2	2.4	3.9	5.6
8.2	9.7	1.1	2.8	3.6	5.6
8.1	9.5	0.9	2.7	3.5	6.2
<u>8.1</u>	<u>59.46</u>	<u>1.00</u>	<u>2.52</u>	<u>3.72</u>	<u>5.86</u>
399					
5798					
1					

May 9 12 79

Ordn. 2nd line any from narrow band

Diurnal	1	1	1	1	1	1	1
35-4	45-13	45-4	45-4	304	528	+7.4	E
57.1		50.4		57.8		+7.1	7.4
59.9		59.4		55		6.1	6.9
57.4		57.9		5.3		7.4	7.7
							7.6
							<u>7.60</u>

Reveries	35-4	45-5	52.4	+6.9	F
		49.6	57.3	+7.7	7.1
		59.3	5.4	+6.1	7.7
		58.3	4.9	+6.6	7.2
					7.3

D	45.4	53.1	+7.7	<u>7.32</u>
	50.2	57.4	+7.2	6.1
	58.6	4.9	+6.3	6.1
	57.4	5.2	+7.8	6.3
				5.9
				<u>6.10</u>

R	45.5	53.1	+7.6	<u>7.6</u>
	50.3	57.6	+7.3	7.6
	58.9	4.8	+5.9	7.6
	57.0	4.7	+6.9	

Micropere

Direct

40	0	00	4	0.9	3	27	2	38	1	57	0	6.5
		59.6		1.5		2.6		4.1		5.2		6.6
		59.5		1.3		2.7		3.7		5.7		6.5
		59.7		1.5		2.7		4.0		5.2		6.6
		59.8		1.2		2.6		4.1		5.7		6.6
		<u>486</u>		<u>64</u>		<u>2.66</u>		<u>15.7</u>		<u>5.50</u>		<u>6.56</u>
		59.72		1.28		2.76		4.14		5.52		6.90
		59.72		59.90		59.90		59.80		59.98		59.66
		+18		+00		-10		+18		-32		

Reverse

59.7	09	19	35	51	6.5
98	16	2.1	3.6	5.2	6.9
0.1	1.2	1.8	3.4	5.1	6.5
9.5	1.1	1.7	3.4	5.0	6.7
<u>99</u>	<u>0.9</u>	<u>2.2</u>	<u>3.4</u>	<u>5.0</u>	<u>6.6</u>
	5.1	9.7	3.46	5.08	6.64
59.66	102	1.94	-4.14	-5.52	-6.90
2	-1.38	-2.76	59.32	59.56	59.74
59.66	59.64	59.18			
	-02	-46	+14	+24	+18

M
Microscope

D		1		11		1		11		1		1		11	
40	0	0	6	4	18	3	34	2	43	1	53	0	64		
		05			20		32		43		53		66		
		04			16		34		42		53		66		
		05			19		27		42		52		65		
		09			19		28		41		53		64		
		<u>09</u>			<u>19</u>		<u>28</u>		<u>41</u>		<u>53</u>		<u>64</u>		
		0.58			1.84		3.10		4.22		5.28		6.50		

Q		04		3		2		1		11		0		11	
552	581	04		3	14	2	3826	1	52	41		0	50		
557	582	559			15	37	28		54	38		68	51		
558	588	00			15	41	30		57	42		63	49		
558	587	00			15	39	30		51	41		63	53		
558	582	596			14	39	29		40	37		64	51		
	<u>5840</u>	<u>5998</u>			<u>146</u>		<u>38286</u>		<u>500</u>	<u>398</u>		<u>644</u>			
													5.08		

Microscope.

P

400	0.2	4	10	28	2	42	1	54	72
0.1		10		27		41		52	75
599		10		28		42		53	73
596		08		27		44		53	71
0.3		11		25		41		53	71
<u>002</u>		<u>49</u>		<u>27</u>		<u>420</u>		<u>530</u>	<u>724</u>
	0.98			288		432		576	722
0.02	1.44			59.82		59.88		59.54	59.02
0.002	59.54								
	-48								

R

589	599	22	33	56	64
87	01	17	31	48	01
91	02	20	33	47	01
89	597	17	33	51	02
87	02	17	37	51	03
<u>5886</u>	<u>002</u>	<u>3</u>	<u>334</u>	<u>253</u>	<u>622</u>
	0.02	186		5.06	
	-1.67	3.34			

Microscope M

Q: 36 4 59.3 4 59.4 : 0.5 2.1 3.8 52

59.3	59.3	0.5	2.2	3.9	50
59.1	58.9	0.8	2.3	3.9	51
59.2	58.9	0.4	2.2	4.0	55
59.2	59.3	0.1	1.7	3.5	52
<u>59.22</u>	<u>59.40</u>	<u>0.58</u>	<u>2.10</u>	<u>3.82</u>	<u>52.00</u>
~~5.00~~	-1.20	-2.40	-3.60	-4.80	-5.98
59.22	57.90	58.18	58.50	59.02	59.22

+68 -28 -28
 +28 +12 -16
 +32 +08 -08
 +52 -12 -20
 +20 +20 +00
740

R

56.9	58.6	0.4	1.4	2.6	52
6.8	58.5	0.3	1.5	2.8	48
6.7	8.3	0.1	1.4	2.6	50
6.9	8.4	0.1	1.3	2.8	47
7.1	8.5	0.1	1.3	2.5	52
<u>56.88</u>	<u>58.46</u>	<u>0.20</u>	<u>1.38</u>	<u>2.33</u>	<u>26.9</u>
.00	-1.62	3.24	4.86	6.48	8.10
56.88	56.84	56.96	56.52	56.18	56.88

-04 -04
 +12 +08
 -36 -36
 +34 +34
740

May 10 1879

J. A. Rolles

No. =

2 =

3 =

4 =

10^h 14^m to 12 31^m

12 34 to 13 44

Exp.

May 8 1879

J. A. Rolles

1 =

9^h 13^m to 11 33^m

2 =

11 38 to 13 36

3 =

12 8 to 12 23

4 =

22 58 to 0 41

5 =

0 45 to 2 39

May 9 1879

No. =

246 to 46

May 11 1879

W. A. Rens.

Wt = 0^h 29^m to 2^h 32^m
~~2 = 0 29~~

Removed microscope E in order
 to experiment with the new microscope.
 Replaced it at 6^h P.M. The reading
 after replacement is about 18" different
 from before.

May 12

Mt. Rolin

Nov =

W^m 8 4 to 3 43^m

2 =

11 45 to B. 38

May 12 1879

Investigation of even
minutes of ^{micrometer} ~~curvature~~Under same as diffractates
Microscope

40' 0.1	4 1.3	3 2.8	2 4.1	1 5.7	0 6.8
0.1	1.5	3.1	4.4	5.9	6.6
0.8	1.9	3.1	4.1	5.7	6.5
0.9	1.7	2.5	4.6	5.3	6.9
0.2	1.8	3.0	5.0	5.5	6.9
<u>5.90</u>	<u>1.64</u>	<u>14.5</u>	<u>4.44</u>	<u>5.62</u>	<u>6.66</u>
0.24		2.90			

0.0	1.6	2.2	4.3	5.1	6.3
0.8	1.2		4.1	5.7	6.8
0.1	1.2	3.0	4.6	5.6	6.5
0.3	1.1	2.7	4.0	5.6	6.6
0.1	1.3	2.5	4.5	5.9	6.9
<u>0.1</u>	<u>1.22</u>	<u>2.5</u>	<u>4.30</u>	<u>5.58</u>	<u>6.62</u>
0.26		2.58			

Illumination much better than on perisundates

Microscope R

40	0	11	4	11	11	11	11	11	11
		1.1		2.1	4.2	6.2	6.2	7.1	
		0.9		2.4	4.4	6.5	6.2	8.3	
		0.9		2.8	4.6	5.2	6.7	7.9	
		1.1		2.2	4.5	5.0	6.7	7.7	
		0.6		2.8	4.4	5.0	6.5	8.0	
		<u>0.92</u>		<u>2.8</u>	<u>4.4</u>	<u>5.0</u>	<u>6.8</u>	<u>8.0</u>	
				2.46	4.42	5.78	6.48	7.88	

11	21	39	51	62	83
1.2	2.5	3.8	5.4	6.3	8.1
1.1	2.7	4.1	5.1	6.2	8.2
0.7	2.5	3.8	5.1	6.5	8.4
1.1	2.2	3.9	5.1	6.6	7.8
<u>1.1</u>	<u>2.2</u>	<u>3.9</u>	<u>5.1</u>	<u>6.6</u>	<u>7.8</u>
1.04	2.40	3.90	5.16	6.44	8.16

Microscope

40'	0'	12"	19"	39"	53"	64"	89
		14	18	41	51	67	87
		14	21	41	52	67	82
		1.5	2.1	37	51	68	88
		1.4	2.2	41	49	63	89
		<u>1.38</u>	<u>2.02</u>	<u>199</u> 398	<u>5.12</u>	<u>6.58</u>	<u>8.70</u>

04	18	33	48	68	89
0'2	1'6	3'1	5'0	6'4	8'5
0'2	1'8	3'2	4'6	6'7	8'5
09	1'5	3'5	4'8	6'4	8'6
00	1'6	3'1	4'8	6'6	8'8
<u>0.34</u>	<u>1.66</u>	<u>3.24</u>	<u>4.80</u>	<u>6.58</u>	<u>8.66</u>

Microwatts repeated

400	1.2	1.5	3.4	4.6	6.2	8.3
	1.4	2.0	2.9	4.6	6.2	7.9
	1.2	1.9	2.5	4.7	6.4	8.2
	0.6	1.7	2.7	5.2	6.5	7.9
	<u>0.6</u>	<u>2.1</u>	<u>2.8</u>	<u>5.2</u>	<u>6.1</u>	<u>8.0</u>
	0.94	1.92	2.46	7.86	6.28	8.06

00	16	31	48	61	78
0.1	1.8	3.2	4.8	5.9	7.6
0.3	1.5	2.6	5.0	6.1	8.2
0.2	1.4	2.7	4.6	6.4	8.1
0.2	1.4	3.1	4.9	5.9	8.4
<u>0.2</u>	<u>1.4</u>	<u>3.1</u>	<u>4.9</u>	<u>5.9</u>	<u>8.4</u>
0.16	1.54	2.94	4.82	6.10	8.02

Microscope No

40'	04	19	26	44	56	72
07	22	33	48	61	73	
05	21	32	45	62	72	
07	19	31	46	63	72	
05	18	29	43	56	75	
<u>0.56</u>	<u>1.92</u>	<u>3.04</u>	<u>4.52</u>	<u>5.96</u>	<u>7.28</u>	

589	04	22	30	45	64
594	04	16	33	43	62
	02	19	30	44	66
583	06	19	31	42	64
582	02	19	31	48	67
<u>589</u>	<u>0.36</u>	<u>1.90</u>	<u>3.15</u>	<u>4.44</u>	<u>6.46</u>
407			3.18		
5874					

May 13

Measuring 1" space
Ordinary fine narrow band.Microscope *LL*

D

40 0 1.8 0.5 1.3

~~56.6~~ 55.2~~50.2~~ 49.2~~44.3~~ 43.2~~38.7~~ 37.4~~32.5~~ 31.6~~26.5~~ 26.2~~20.5~~ 19.9~~15.4~~ 13.8~~9.1~~ 8.6~~11.32~~ 2.6*LL*

Microwave No

Ordnance narrow band

Lo	0	1.4	09	16	1.2	11	1,24		Z
		7.4	66	72	63	66	682	558	-33-55
		128	132	128	134	123	12,90	808	+33+00
		184	185	182	184	180	18,36	546	+37+07
		245	246	247	243	242	24,46	6,10	-27+10
		300	302	301	303	304	3028	5,82	+01+11
		361	365	359	354	353	35,86	5,58	+25+36
		423	426	420	418	417	42,08	6,22	-39-03
		478	484	476	474	476	47,56	5,48	+35+32
		532	539	538	544	540	53,86	6,30	-17-15
		598	596	595	595	594	59,56	5,70	+13-02
								5,80	

May 13 1879

Micron capn 2

	1	2	6" space	4	5	11	
40	0 11	11	70	71	72	1,10	
	72	71	67	69	69	6.56	586
	126	128	123	125	127	1254	558
	179	182	182	179	184	1812	558
	237	241	241	239	241	2398	586
	30.1	299	299	297	302	29.96	598
	35.9	360	358	362	364	36.06	610
	41.6	41.6	418	420	418	41.56	580
	47.3	47.2	47.3	47.2	47.2	47.24	588
	53.1	53.1	53.8	53.5	53.6	53.36	612
	59.2	59.1	59.1	59.5	59.2	59.2	586

	11"	10"	8" space	11"	
40	0 09	11	10	0 10	
0	599	599	596	5980	5870
1	583	588	581	5840	5860
2	56.5	56.8	57.1	56.80	5840
3	55.2	55.6	55.7	55.47	5860
4	54.3	53.9	54.1	54.10	5863

Every 6" order
and toward narrow band

May 13 1879

Microscope R

6" spars

F Lepid

40	0	1.6	1.7	1.7	1.67	4	1.8	1.3
7.6	7.3	7.6	7.50	5.83	7.3	7.2	7.3	7.2
13.8	13.4	13.6	13.60	6.10	13.8	13.3	13.8	13.3
18.8	19.2	19.3	19.11	5.51	18.9	18.8	18.9	18.8
25.0	25.4	25.2	25.20	6.09	25.3	25.0	25.3	25.0
31.2	31.3	30.9	31.14	5.94	31.1	31.1	31.1	31.1
37.1	37.3	36.8	37.10	5.86	37.3	37.1	37.3	37.1
42.8	42.9	42.8	42.83	5.73	42.8	42.4	42.8	42.4
48.8	48.1	48.6	48.50	5.67	48.2	48.4	48.2	48.4
54.6	54.8	54.4	54.60	6.10	54.6	54.6	54.6	54.6
0.3	0.1	0.3	0.23	5.63	0.3	0.2	0.3	0.2

f' spars

410	0	2.0	1.6	1.6	1.73		
1	0.3	0.0	0.1	0.13	6.50	5.40	
2	5.88	5.88	5.85	5.83	6.30	5.70	
2	5.74	5.74	5.71	5.730	6.53	5.84	
3	5.58	5.61	5.59	5.593	6.13	5.863	
4	5.46	5.48	5.49	5.4.77	6.16	5.884	

du d

1.55			
7.25	570		
13.40	615		
18.85	545		
25.15	630		
31.10	595		
37.20	610		
42.35	575		
48.30	595		
54.00	630		
~~59.10~~	~~540~~		

May 13
Microscope G.

6" Space					mean	4
40	0	1.3	1.4	1.2	1.30	I
	71	6.7	~~8.2~~		7.33	6.03
	132	13.6	13.8		13.37	6.04
	194	19.4	19.4		19.40	6.03
	249	24.7	24.9		24.83	5.43
	305	30.1	30.3		30.30	5.47
	359	35.7	35.9		35.83	5.53
	424	42.1	42.4		42.23	6.40
	484	48.4	48.4		48.40	6.19
	548	54.0	54.1		54.10	5.70
	595	59.6	59.6		59.57	5.47

5" Space					
40	0	1.2	1.4	1.1	1.23
	0	59.1	58.8	59.3	59.07
	1	57.5	57.4	57.8	57.57
	2	55.1	56.2	55.9	55.60
	3	54.4	54.1	54.4	54.30
	4	53.3	53.1	53.2	53.20

See repeated				II	Mean
40.0	14	15-12	1.37		
6.9	6.9	6.6	6.83	5.46	5.75
13.8	13.5	13.8	13.43	6.64	6.34
19.2	18.9	19.3	19.47	6.54	6.08
24.5	24.8	24.6	24.63	5.53	5.48
30.4	30.2	30.3	30.30	5.67	5.57
35.9	36.2	35.5	35.87	5.57	5.55
42.7	42.3	42.4	42.47	6.60	6.50
48.6	48.1	48.7	48.47	6.00	6.09
54.1	54.1	53.9	54.03	5.56	5.63
59.2	59.1	59.2	59.17	5.14	5.32

May 13 1879
 W. R. R. R.

Pos = 3 3 to 4 40
 2 = 10 40 to 11 53
 3 = 11 59 to 13 41

Microcomp 76

6" spec

		"	"	"	Aug 13	Aug 12	
400	1.0	09	08	0.90			
62	59	62	6.10	5.20	5.58	5.40	
121	118	123	12.07	5.97	6.08	6.03	
184	180	181	18.17	6.10	5.46	5.78	
236	237	239	23.73	5.56	6.10	5.83	
300	298	296	29.73	6.00	5.82	5.91	
360	355	357	35.73	6.00	5.58	5.79	
414	404	416	41.70	5.77	6.22	6.00	
473	475-474	47.40	5.70	5.48	5.59		
532	528	536	53.20	5.80	6.30	6.05	
588	584	591	59.10	5.90	5.70	5.80	

5" spec

400	0.9	11	10	1.00	
0	58.9	58.9	58.6	58.0	
1	57.4	57.9	57.6	57.63	
2	56.1	56.5	56.1	56.23	
3	54.9	54.6	54.8	54.77	
4	52.7	52.2	52.9	52.93	

May 14 1879

H. A. R. Olen,

Nov =

2 =

3 =

~~4~~ =

3^h 5^m to 3^h 31^m
 11 12 to 12 23
 12 27 to 13 58
~~1~~ 48 to 2 58

Took microscope, & out of it
 bearing at 4^h P.M. for experiments
 with new microscope.
 Replaced it at 10^h 0^m 5^m P.M.

May 21 1879

Measure of provisional plate
 for New York copies
 Dr. Combs.

120.0 - 0.50 .00	119.830 + 0.162 + 1622
120.15 .20 .18	120.180 - 0.9880 - 0246
119.60 .65 .70	119.650 + 0.1342 + 3104
120.06 .06 .02	120.050 - 0.058 + 2586
120.20 .20 .18	120.190 - 0.198 + 0608
119.75 .70 .65	119.700 + 0.292 + 3520
120.02 -.04 .00	119.990 + 0.002 + 3502
120.30 .25 .23	120.260 - 0.268 + 0866
119.65 .68 .70	119.680 + 0.312 + 3986
120.20 .20 .20	120.200 - 0.208 + 1908
120.50 .02 .00	120.010 - 0.018 + 172
119.85 .87 .93	119.880 + 0.112 + 284
120.35 .40 .30	120.350 - 0.358 - 074
119.80 .78 .80	119.780 + 0.212 + 138
120.06 .00 .00	120.020 - 0.028 + 410

+110

$$120.30, 35, 35 \quad 120.380 - 0.338 - 228$$

$$119.40, 35, 40 \quad 119.380 + 0.612 + 384$$

$$120.02, 02, 05 \quad 120.030 - 0.038 + 346$$

$$120.30, 25, 20 \quad 120.250 - 0.258 + 088$$

$$119.85, 80, 87 \quad 119.840 + 0.152 + 240$$

$$120.18, 10, 12 \quad 120.130 - 0.138 + 102$$

$$120.15, 15, 12 \quad 120.140 - 0.148 - 056$$

$$119.65, 70, 60 \quad 119.650 + 0.342 + 296$$

$$120.15, 18, 15 \quad 120.160 - 0.168 + 128$$

$$120.00, 12, 06 \quad 120.060 - 0.068 - 060$$

119.980
 119.966
 120.008
 119.966
 120.28
 9996
 119.890

<u>119.83</u>	+06	+16	+16	+07	+16	+5
120.18	-28	-22	-19	-21	-03	-1
119.65	+24	+02	+34	+04	+31	+9
120.05	-15	-13	-06	-11	+25	+7
<u>120.19</u>	-30	-43	-20	-40	+05	+2
119.70	+20	-23	+29	-20	+34	+10
119.99	-10	-33	+00	-29	+34	+10
120.26	-36	-69	-27	-65	+07	+2
119.68	+21	-48	+31	-43	+38	+11
<u>120.20</u>	-30	-78	-21	-73	+17	+5
120.01	-12	-90	-02	-84	+15	+4
119.88	+01	-89	+11	-82	+26	+8
[120.35]	-45	-134	-85	-127	-10	-3
119.78	+11	-123	+21	-115	+11	+3
120.02	-12	-135	-03	-127	+08	+2
<u>120.33</u>	-44	-179	-84	-170	-26	-8
119.38	+52	-127	+61	-118	+35	+11
120.03	-14	-141	-04	-131	+31	+9
120.25	-35	-176	-26	-166	+05	+2
<u>119.84</u>	+05		+15	-160	+20	+6
120.13	-23		-14	-183	+06	+2
120.14	-25		-15	-207	-09	-3
119.65	+24		+34	-182	+25	+7
120.16	-26		-28		+08	+2
<u>120.06</u>	-16		-08		+01	+0

6" band.

J.

10.00	10.00	10.05	10.017	+017	+017
10.05	10.10	10.05	10.067	-033	-016
10.02	10.04	10.00	10.020	+014	+002
9.95	10.03	9.98	9.987	+047	+049
10.00	10.00	10.02	10.007	+027	+076
9.90	9.88	9.97	9.917	+117	+193
10.08	10.08	10.08	10.080	-046	+147
10.04	10.05	10.08	10.057	-023	+124
10.07	10.10	10.03	10.067	-033	+091
10.07	10.10	10.11	10.093	-059	+032
9.95	10.00	9.94	9.963	+071	+103
10.12	10.04	10.15	10.137	-103	000
			12.0412		
			10.034		

41.2	41.2	41.4	41.27	+ .20	+ .20	+ .04	+ 1
41.5	41.6	41.6	41.57	- .10	+ .10	+ .02	+ 1
41.3	41.6	41.3	41.40	+ .07	+ .17	+ .01	+ 1
41.6	41.3	41.3	41.40	+ .07	+ .24	+ .06	+ 2
41.2	41.4	41.1	41.23	+ .25	+ .49	+ .12	+ 4
41.2	41.1	41.1	41.13	+ .34	+ .83	+ .20	+ 6
41.7	41.7	41.4	41.60	- .13	+ .70	+ .19	+ 6
41.8	41.8	41.7	41.77	- .30	+ .40	+ .10	+ 3
41.5	41.7	41.4	41.53	- .06	+ .34	+ .08	+ 2
41.5	41.8	41.6	41.63	- .15	+ .19	+ .05	+ 2
41.4	41.4	41.2	41.33	+ .14	+ .33	+ .08	+ 3
41.8	41.7	41.9	41.80	- .33	.00	+ .10	+ 0

566

41.472

41.57

I.

 $\begin{matrix} \text{II} & \text{F} & \text{Mean} \\ \Sigma & \Sigma & \end{matrix}$

10.00	10.04	10.04	10.027	+026	+026	+017	+02	+1
10.10	10.07	10.08	10.083	-030	-004	-016	-01	-0
10.02	10.08	10.07	10.057	-004	-008	+002	+00	+0
10.03	10.02	10.04	10.030	+023	+015	+049	+03	+1
10.01	10.02	-01	10.007	+046	+061	+076	+07	+2
10.00	10.00	.00	10.000	+053	+114	+193	+15	+4
10.05	10.02	.05	10.040	+013	+127	+147	+14	+4
10.09	10.05	10.10	10.080	-027	+100	+124	+11	+3
10.08	10.09	10.06	10.077	-024	+076	+091	+08	+2
10.12	10.10	10.05	10.090	-037	+043	+032	+04	+1
10.06	10.04	10.03	10.043	+010	+053	+103	+08	+2
10.10	10.12	.10	10.100	-047	+006	+000	+00	+0

634

100 0 53

879 May 21
 Measures of 2nd provisional plate

See following pages

I		II	
119.90	15.90	120.02	02.00
120.08	15.10	120.10	07.05
120.05	00.03	120.02	98.00
120.00	90.95	120.03	07.07
120.15	13.10	119.90	85.82
<u>9998</u>		<u>13</u>	
120.00		120.026	
119.88	86.85	~~120.03~~	02.04
120.04	00.02	120.03	04.05
119.92	04.00	120.00	96.95
119.93	02.97	120.05	04.04
119.98	04.00	119.85	88.85
<u>471</u>		<u>9976</u>	
119.942		119.952	
120.08	08.10		
120.00	97.00		
119.88	82.86		
119.97	97.98		
120.00	95.00		
<u>9986</u>			
119.97			

1879phae:proj.1639R

Dir.	Comparison	Corr.	Z	Corr. in terms of Roysen's	Original selling	New selling Roysen's
119.92	+07	+07	+21	30.59	30.911	
120.11	-.12	-.05	-15	72.40	72.385	
120.03	-.04	-.09	-27	7.92	7.893	
119.95	+04	-.05	-15	44.04	44.025	
120.13	-.14	-.19	-27	80.41	80.388	
119.86	+1.84	-.05	-15	15.85	15.835	
120.02	-.03	-.08	-24	52.20	52.176	
119.99	.00	-.08	-24	88.28	88.256	
119.97	+02	-.06	-18	23.81	23.792	
120.01	-.04	-.09	-21	60.29	60.269	
120.09	-.10	-.17	-51	9.14	96.089	
119.99	.00	-.17	-51	31.87	31.819	
119.85	+1.15	-.02	-0.6	68.34	68.334	
119.97	+02	-.00	.00	3.93	3.930	
119.98	+01	+01	+03	39.52	39.923	
120.03	-.04	-.00	+00	76.34	76.340	
120.07	-.08	-.08	-24	11.89	11.866	
120.00	-.01	-.09	-27	98.12	98.093	
120.06	-.06	-.15	-45	84.36	84.315	
119.86	+1.3	-.02	-0.6	19.79	19.784	
120.02	-.03	-.08	-15	56.20	56.185	
120.04	-.05	-.18	-30	92.16	92.130	
119.97	+02	-.07	-21	27.79	27.769	
120.05	-.06	-.15	-39	64.33	64.291	
119.86	+1.3	-.00	-.00	0.00	0.000	
49981						
119.992						

6" Band.

Cor. in
dis.
Rogers

1000	1000	1000	10,000	+004	+004	0.1
1002	1000	1002	10,001	+003	+007	0.2
9.93	9.97	9.98	9.960	+044	+051	+1.5
9.98	9.98	9.97	9.977	+027	+078	+2.3
9.98	1000	1000	9.993	+011	+089	+2.7
1003	1000	1000	10,010	-006	+083	+2.5
1005	1008	1003	10,033	-029	+054	+1.6
1002	1000	1003	10,017	-013	+041	+1.2
1005	1002	1000	10,023	-019	+022	+0.7
9.99	1000	9.98	9.990	+014	+036	+1.0
1000	1001	1001	10,007	-003	+033	+1.0
1006	1003	1002	10,037	-033	+000	0.0

12 6048

100.048

Original New Selling
Selling Rogers
Rogers

31.819	31.819
34.853	34.854
37.897	37.899
40.944	40.959
43.988	44.011
47.042	47.069
50.096	50.121
53.149	53.165
56.193	56.205
59.227	59.234
62.270	62.280
65.312	65.322
68.334	68.334

May 21. Measured y glass scales to be substituted
in the new microscopes made by Sloan Clark & Sons
for the metal comb. The following is a diagram of
the plate

1

May 15 1879

W. H. Rollins

Pos =

Ru h m
3.3 43.35

May 29 1879
 W & R
 No 1 = 4^h 45^m to 5^h 22^m
 2 = 12 6 " 13 35
 3 = 13 40 " 14 45
 4 = 22 33 " 23 55
 5 = 0 49 " 2 25

May 28th

Substituted the new Oal's microscopes for the old ~~ones~~. Is N for the old ones furnished with the instruments. These differ from the old ones mainly in the following respects:

(a) The screws which have a pitch of $\frac{1}{16}$ in have been made with great care, so as to be ^{regular} even depending on one revolution thus avoiding the necessity of the laborious operation of applying corrections to each position of a revolution or when they are used.

From the recapitulation on page 111
of the *Plexure* record it appears
that the ^{mean} maximum error depending
on one revolution is only 0.04

(b) Instead of the metal comb of the
old microscope and the spider line
micrometer of the old microscope,

there is a fixed glass plate, having
15 spaces = 15'. While the middle space
is ^{again} subdivided into 10 equal parts giving
6". The screen carries a glass plate
on which are ruled 2 parallel lines sep-
arated by an interval of 10 divisions of the
Rogey-Degener. The wings of the two
plates (being face to face) have nearly
the same focus.

The error of the 1' spaces of the fixed
plate will be found on page 97 & c
of the *Plexure* & c Book.

The error of the screws for each successive
revolution, can be found by setting the
micrometer (double) wire on even line of
the glass plate and comparing with
the measured spaces with the known

values of the spaces of the glass plate.

(C) All the microscopes have 2 eye pieces so arranged that either can be used or vice. No. 1 magnifies 51 diameters and No. 2 magnifies 87 diameters. No. 1 is used to read the divisions and No. 2 to make the accurate section.

The order of observation will be as follows
~~1st~~ First setting of telescope.

I. R. M. reads with No. 1

Second setting of telescope.

(1) I. R. M. reads with No. 1

(2) W. S. R. reads with No. 1

(3) W. S. R. reads with No. 2

(4) I. R. M. reads with No. 2

May 30 1879

W. R. Oles,

No 1 -

4^h 15^m to 5^h 20^m

May 31 1879

W. R. Oles,

No 1 -

12^h 11^m to 1^h 41^m

2 -

14 18

14 47

3 -

0 12

1 24

June 1 1879

W & R obs.

	h	m	h	m
Wol =	4	28	5	22
2 =	11	30	11	13 57
3 =	22	32	"	0 42
4 =	1	44	"	3 3

June 4 1879

W & R obs.

	h	m	h	m
Wol =	12	35	to	14 45
2 =	14	47	"	15 30
3 =	0	44	"	56
4 =	1	59	"	2 30

June 5 1879

W & R obs.

	h	m	h	m
Wol =	4	48	to	6 20
2 =	12	43	"	14 09

May 30 1879

~~W. R. L. begins~~

~~No. 1 = 4 15 to 5 20~~

May 31 1879

~~No. 1 = 12 h 11^m to 141~~

~~No. 2 = 14 15 11 14 17~~

~~No. 3 = 0 12 124~~

June 5 1879

W. R. L. begins an investigation
of the error of the meridian circle
Purser & Cheering begins a similar
independent investigation.

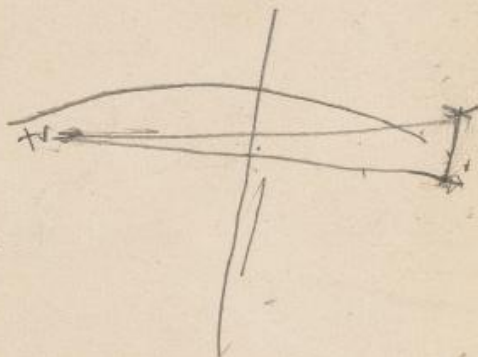
June 4 1879

W. R. L. & E. C. P found that

the $\frac{1}{2}$ E.P. of the new micrometer
of the meridian circle the magnifying
power is 51 diameters and with
the $\frac{1}{4}$ E.P. that it is 87 diameters

June 5 See next Book (182)

June 7 1879

h m
229

558

Disc
eye
the line
Jaceon
(a) G
Taper
Cut the
or a little
(8) Mar
Jaceon
the end
Care must

h power
That
The

ring
of the
the set-

are an
is beyond
the

line ob.

i o

June 5 See next Book (182)

June 7 1879

NR vln.

Wor = $0^h 42^m$ to 22^h

~~2 = 1 5 4 5 58~~

Discovered with the new high power eye piece of the ^{new} micrometer that the lines of the circle have the following defects.

(1) Many of the short-divisions taper off & change at the end of the cut. Thus Care must be taken to set at a little distance from the end.

(2) Many of the long divisions have an offset amounting to as much as $1.3''$ just before the end of the short-divisions. Thus Care must be taken to set along the line ob.

187938a, proj. 1839R