

KG  
11366  
v.654

Chronograph Record  
A 3

From Feb. 29, 1880 to May 27/80





22









Feb. 29 1880

Returned to the Observatory  
after a successful trip to London  
and Paris for the purpose of  
obtaining a copy of the English  
and the French Meteor  
harry left Cambridge Jan 6  
1880

Upon my return I learned  
that my Assistant Joseph  
R. McCormack died of  
~~hemorrhage~~ and blood poison  
at half past two o'clock in  
the afternoon Feb. 4

I wish here to record my  
sense of the great loss I have  
sustained. I bear cheerful  
testimony both to his great  
ability as a circle recorder  
and to his faithfulness in  
the discharge of his duties.  
Other labor involved in making  
the observations for the past year  
has been very considerable  
involving constant attendance



at very irregular hours  
both during the day and the  
night. With very rare exceptions  
he has been ready at every  
call.

When the observations of the  
past year are published, they  
will bear conclusive  
testimony to this great ability  
as a circle-reducer. I doubt  
if he has <sup>an</sup> equal in this respect.  
Certainly he had no superior.

Wm  
W. Rogers



Feb 29 1880

Before commencing the observations for the year 1880, made the following changes

(1) During my absence the South clock has been removed to the Howard Clock pier in the cellar clock room. As the clock was found to have a gaining rate of about 3<sup>s</sup> per day, it was thought better to reduce the rate. At my request Mr Edwards made this reduction during the time between the morning of Feb. 28 and the afternoon of Feb. 29. The pendulum bob was lowered 10 div of a revolution. This produced a change of 27<sup>s</sup> in the hourly rate.

Three ten-gramme weights ( $3 \times 10 = 30 \text{ gms}$ ) added increased the hourly rate nearly 0.5<sup>s</sup>. But one five-gramme and two two-gramme weights ( $5 + 2 + 2 = 9 \text{ gms}$ ) only increased it 0.07

The fact that the centre of gravity of the <sup>a</sup>large weight is farther above its base, than is the case with a small weight, would partly



account for the discrepancy, but probably a variation in the rate of the chronometer with which it was compared will account also for part of it.

Pendulum was left with

- ~~1 five gramme weight (5)~~
- ~~1 piece of brass weighing about 6 grammes~~
- ~~1 two gramme weight (2)~~
- ~~1 gramme weight (1)~~

~~Total about 14 grammes.~~

Pendulum left at 3 A. M. Nov. 1, 1880 (Civil Time) with the following weights: -

One five-gramme brass weight	5
Two two-gramme brass weights	4
One lead weight of <sup>nearly</sup> about two grammes	2-
One one-gramme brass weight	1
Total about twelve grammes	<u>12</u>



(2) A new mounting of the north Collimator has been made in order to allow of the mounting of a long focus collimator objective below the objecting the north collimator.

Collimator. Cops of the <sup>South</sup> Collimator pier  
The marble pier has been  
removed, & a right-rod was  
inserted in the body pier and the  
plate forming the bearing of <sup>the</sup> ~~the~~  
Collimator <sup>it</sup>  
The two fastened firmly to <sup>it</sup>  
The long Collimator has a focus  
of 266 feet. The object glass is set  
below the object glass of the  
north Collimator and an opening  
is made through the open pier  
and the walls of the building

The dimensions the pier for  
which the tube carrying the crops  
is placed  
is as follows.

Dimensions of bottom  
Diameter of top  
Dist from bottom to top

Focus distance object glass = 215.88 ft -  
minus 9.27 = 206.61



3) Adjusted the illuminating  
of all the microscopes and  
adjusted the microscopes  
so that they sent nearly the same  
when the telescope is pointed  
on the north collimator.

(4) Oiled the pivots

(5) Examined the verticality  
of the horizontal wires and found  
it unchanged

Inasmuch as it has been found  
to be physically impossible for one  
observer to carry on the <sup>regular</sup> system of ob-  
servations and at the same time to make the  
 requisite number of observations for the in-  
tegration of the <sup>diff. weights</sup> in a systematic way  
when a large and miscellaneous list of  
stars is selected the observations of this  
class will during the present year be lim-  
ited to a few stars. ~~system~~ An attempt will  
be made to obtain an equal number of  
observations of each one mentioned above.  
It has been found to be impracticable to  
limit the observations to stars whose position  
the sun in declination and at the



~~My~~ Feb. 29 - Mar. 1882

Began observations of  
absolute positions for  
the year 1882.

Working list same as  
Jan 1 & 7<sup>9</sup> nearly.

No 1 = 1      Rem. 19<sup>h</sup> 3<sup>m</sup> 5<sup>s</sup> to 13

2 = 2      22<sup>h</sup> 18<sup>m</sup> to 22<sup>h</sup> 55<sup>m</sup>

Same time obtain an equal number of  
opposite seasons of the year. Hence  
during the present year, the working  
list will follow the order of right  
ascension. The object to be gained  
in making the observations differential  
with respect to the Sun will be secured  
by an equal number of observations.

Mar 1 1882  
 W. R. S.

Mar 1 = 3

2 = 4

3 = 5

4 = 6

5 = 7

4

12

15

7 6

13

5

14 15

17

9

19 16

19

31

23 2



Mar 2 1880

Mr R. M. ...

107 = 8	0 45	1 16
2 = 9	4 27	6 40
3 = 10	16 28	16 41
4 = 11	17 10	19 7

Mar. 3 1880

W. A. R.

No 1 = 12

2 = 13

19 31

16 49

23 3

17 54



May 1st

NR

$p_1 = 14$  — 1 10  
 $2 = 15$  6 38 — 4 7

June 1880

W. R.

No. 1 = 16      16 34 — 19 34



Mar 18th

WOL

Nov = 17	23	27
2 = 18	1	35
3 = 19	5	0 - 6
4 = 20	6	51
5 = 21	2	14

Mar 18th

William C. Winlocks having been engaged to take the place of J. P. McCormick, deceased as Quick Reader began work this day. At present his reading need not be used.

Mar 10 1880  
JMR

Mo1 = 22

2 = 23

3 = 24

23

9

11

44 ~ 1 29

14 ~ 11 19

23 - 13 28



Mass 1880  
 Mr. R

$$\begin{array}{ccccccc} & & h & m & & & \\ \text{No 1} & = & 25 & / & 9 & 49 & - & 20 & 25 \\ & & 2 & = & 26 & 23 & 19 & - & 23 & 15 \end{array}$$

A direct line has been run from the Van. Waerd Clocks to 1327.

The Waethan Clocks which will have the designation, W.C. was recorded for the first time, on Sheet - No. 2. An arrangement is yet to be made by which the W.C. and ~~2401~~ ~~Mon~~ 3401 can be recorded on the Chronograph at the same time.



Mar 15 / 1882

Inserted a new system of wires arranged exactly the same as in the old set, except in the addition of 8 sets of declination lines equidistant above and below the middle set. These lines are inserted for the purpose of observing both limbs of the Sun at one setting of the telescope. This plate is perhaps a provisional one. It is not as the measures of it are found in the collimation book page.

Adjusted for verticality. The stop is clean up on the west side.

$\rho_1 = 27$	4 54 to 6 20
$2 = 28$	6 44 " 7 17

Shifted the new of the ~~center~~ <sup>microscope</sup> over 9' by moving the circular support.



Mar 16<sup>17</sup> 1880

Nov = 29

h m h m  
21 42 01  
01

21 42  
01

1880 Mar 17

Vol = 30	— —	to 2	<sup>h</sup> 48
2 = 31	4 51	6	5
3 = 32	6 15	8	4
4 = 33	8 59	10	33
5 = 34	10 41	12	41
6 = 35	—	1	25
7 = 36	19 53	22	5



Mar 18 1880

Pos = 37

2 = 38

3 = 35

4 = 40

23 38 - - 1 7

4 30 - - 5 39

- - - 20 4

- - - ~~20~~ 19

Mar 20 1880

No 1 = 41 ——— 0 10



Mar 21 1880

Wt = 42	558 - 8	12
2 = 43	155 - 17	15
3 = 44	1730 - 18	0
4 = 45	182	21 16

Mar. 22 1880

No. 1 = 46

2 = 47

3 = 48

4 = 49

5 = 50

7 10

17 28

19 14

8 8

19 7

21 14



Mar 73 1980

Pos = 51	—	1	13
2 = 52	1 15	1	31
3 = 53	18 55	19	5
4 = 54	19 22	21	37
<del>5 = 55</del>	<del>0 10</del>	<del>1</del>	<del>42</del>

Mar 24 1880

$\rho_1 = 55$   
 $2 = 57$   
 $3 = 57$

0	11	—	1	15
19	86	—	18	56
<hr/>		—	21	37



Mar 25 1880

No 1 = 58

2 = 59

3 = 60

4 = 61

5 = 62

6 = 63

7 = 64

8 = 65

2 3 58 - - - 0 38

6 39 - - - 3 22

8 44 - - - 8 39

11 38 - - - 10 32

12 44 - - - 12 41

15 35 - - - 13 31

20 48 - - - 20 40

24 48 - - -

Mar 26 1880

No 1 = 66 126 - 13 35



1880phae.proj.1658R

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Mar 29 1860

No 1 = 68    20 15    22 1  
               17 58    18 54  
 2 = 67    20 15    22 1  
 3 = 70

~~Notes of Dr.~~

Stars asked for by Prof  
Hall

$\alpha^2$  Eridani    <sup>h</sup> 4    <sup>m</sup> 9.8 - <sup>s</sup> 94.9    May. 5.0

Arg. 7.0     $\delta$  45.9 + 30 59.2    80



Mar 30 1882

No 1 = 71	4 <sup>h</sup>	58 <sup>m</sup>	7 <sup>h</sup>	6 <sup>am</sup>
2 = 72	7	13	9	30
3 = 73	9	34	10	7
4 = 74	15	47	17	6
5 = 75	17	58	19	55
6 = 76	19	58	22	3

Mar 3, 1880 in 1 1/2 hrs.

No 1 = 77  
2 = 78  
3 = 79

	<sup>h</sup>	<sup>m</sup>		<sup>h</sup>	<sup>m</sup>
9		12	10		21
12		21	13		31
			22		20



Apr 15 cc

No 1 = 80

2 = 81

3 = 82

4 = 83

5 = 84

6 = 85

7 = 86

<sup>h</sup>  
12<sup>m</sup>  
31

3

6

7

19

8

1

19

7

20

19

22

55

<sup>h</sup>  
13<sup>m</sup>  
28

7

17

7

57

10

18

20

16

22

38

Apr 2 (Thu)

No 1 = 87

1<sup>h</sup> 9<sup>m</sup>

1<sup>h</sup> 45<sup>on</sup>



Apr. 4 1882

	<sup>h</sup>	<sup>am</sup>	<sup>h</sup>	<sup>am</sup>
No 1 = 88	0	50	2	17
2 = 89	17	49	19	56
3 = 90	19	59	20	51

0<sup>h</sup> 41<sup>am</sup>

Note.

I'm making some investigations with Mr. Stevens to ascertain whether the Clock 1327 can be shut-off from the other clocks by a partition. The Key was put in its pocket, and by accident - left there for about 30<sup>sec</sup>. During this time the second hand was going on and fell back from 15<sup>sec</sup> to 25<sup>sec</sup>. 1327 is therefore now about 20 seconds slower than before this accident.

April 5, 1880.

No 1 = 91	0 <sup>h</sup>	47	2 <sup>h</sup>	0 <sup>su</sup>
2 = 92	9	2	10	59
3 = 93	11	4	13	30



April 6, 1880

No 1 = 94

2 = 95

3 = 96

18 37

1<sup>h</sup>

34<sup>m</sup>

20

34

22

37

April 7, 1880

No 1 = 97	7 <sup>h</sup>	44 <sup>m</sup>	9 <sup>h</sup>	47 <sup>m</sup>
2 = 98	9	56	11	27
3 = 99	11	30	13	28
4 = 100	22	44	0	18
5 = 101	0	35	2	2



April 8, 1880

No 1 = 102

2 = 103 "

3 = 104

<sup>h</sup>  
4 <sup>m</sup> 50

7 12

15 21

<sup>h</sup> <sup>m</sup>  
7 9

8 8

17 20

April 9, 1880.

No 1 = 105

0<sup>h</sup> 50<sup>m</sup>

1<sup>h</sup> 43<sup>m</sup>

2 = 106

5 15

6 28



April 10, 1880.

No 1 = 107	0 <sup>h</sup>	51 <sup>m</sup>	2 <sup>h</sup>	21 <sup>m</sup>
2 = 108	9	9	11	16
3 = 109	11	19	3	35

April, 11, 1880

No 1 = 110

0<sup>h</sup> 39<sup>m</sup>

2<sup>h</sup>

13

2 = 111

7

5

3 = 112

18 19

20

30

4 = 113

21 47



April 12, 1880

No 1 = 114	0 <sup>h</sup>	45 <sup>am</sup>	1 <sup>h</sup>	42 <sup>am</sup>
2 = 115	4	56	7	0
3 = 116	9	18	11	36
4 = 117	11	39	13	23
5 = 118	22	01		

April 13, 1880

$$\text{No } 1 = 119$$

$$2 = 120$$

$$3 = 121$$

$$0^h \quad 48^m$$

$$7 \quad 19$$

$$9 \quad 59$$

$$1^h \quad 49^m$$

$$9 \quad 41$$

$$10 \quad 18$$



1880phae.proj.1658R

人

200

 $2^h$ 

17<sup>th</sup>

4

55

6

公侯

April 15, 1880

No 1 = 124

1<sup>h</sup> 6<sup>m</sup>

2<sup>h</sup> 21<sup>m</sup>



April 18, 1880

No 1 = 125

2 = 126

3 = 127

4 = 128

4<sup>h</sup> 11<sup>m</sup>

~~9~~ ~~26~~

9 17

23 13

6<sup>h</sup> 22<sup>m</sup>

10 19

10 19

1 0

April 19, 1880

No 1 = 129

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

2<sup>h</sup> 43<sup>m</sup>



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April 20, 1880

No 1 = 130

2 = 131

3 = 132

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

11 18

20 47

11<sup>h</sup> 14<sup>m</sup>

13 31

23 5

April 21, 1880

No 1 = 133

0<sup>h</sup> 50

2<sup>h</sup> 1<sup>m</sup>

2 = 134

9 17

10 20

3 = 135

18 39

20 29

4 = 136

20 32

22 7

5 = 137

22 10

0 4



April 22, 1880

No 1 = 138	1 <sup>h</sup>	23 <sup>m</sup>	3 <sup>h</sup>	14 <sup>m</sup>
2 = 139	4	58	7	4
3 = 140	7	12	8	9
4 = 141			9	58
5 = 142	21	15	23	4
6 = 143	23	9	1	33

Began to take circle readings  
on the new Long-focus collimator  
which will be designated by the  
letters "L. F. C."

April 23, 1880

No 1 = 144

2 = 145

1<sup>h</sup> 38<sup>m</sup>

4 12

2<sup>h</sup> 21<sup>m</sup>

Chronometer 3451 gave out in its break circuit apparatus, and was taken in to Hm Baud & sons to be repaired.



1880 photo. proj. 1658B

April 24, 1880

No 1 = 146

2 = 147

3 = 148

11<sup>h</sup> 48<sup>m</sup>

22 52

13<sup>h</sup> 42<sup>m</sup>

22 42

0 53

April 25, 1880

No 1 = 149

2 = 150

h m

5 10

2<sup>h</sup>

~~4~~

17<sup>m</sup>

17



April 26, 1880

No 1 = 151	10 <sup>h</sup>	53 <sup>m</sup>	12 <sup>h</sup>	37 <sup>m</sup>
2 = 152	19	04	20	32
3 = 153	20	34	22	13
4 = 154			0	36

Chronometer 3451 returned from  
Hm Bond & sons with its break slightly  
lengthened.

April 27, 1880

No 1 = 155

2 = 156

3 = 157

4 = 158

5 = 159

29 58

22 11

0 57

11

22  
79

0

3

45

9

8

11



April 28, 1880

No 1 = 160

2 = 161

20 36

19<sup>h</sup> 44<sup>m</sup>

22 11

April 29, 1880

No 1 = 162



April 30, 1880

	<i>h</i>	<i>m</i>	<i>h</i>	<i>m</i>
No 1 = 163	2	29	[3]	33
2 = 164	5	1	7	07
3 = 165	7	12	8	10
4 = 166	12	40	14	17

May 2, 1880

No 1 = 167

2 = 168

3 = 169

11<sup>h</sup> 3<sup>m</sup>

19 56

22 5

13<sup>h</sup> 23<sup>m</sup>

22 1

0 9



May 3, 1880

No 1 = 170

2 = 171

3 = 172

11

22

0

59

4<sup>h</sup>

13

1

8<sup>m</sup>

22

0

May 4, 1880

	h	m	h	m
No 1 = 173			15	42
2 = 174	19	59		
3 = 175	22	11	0	11
6-4 4 = 176	0	16	2	12



May 5, 1880

No 1 = 177

2 = 178

3 = 179

4 = 180

2<sup>h</sup> 47<sup>m</sup>

20 47

22 4

0 31

3<sup>h</sup> 6<sup>m</sup>

21 41

0 14

2 45

# May 6 1880

No 1 = 181	2 <sup>h</sup>	46 <sup>m</sup>	3 <sup>h</sup>	56 <sup>m</sup>
2 = 182	7	5	8	10
3 = 183	12	0	13	54
4 = 184				
5 = 185				

11<sup>h</sup> 0<sup>m</sup> M.T.

Removed coxes for the purpose of getting a photograph of the Meridian Circle. In order to do this it was necessary to remove the heads of the microscopes.

After the photographs were taken, got the sun in V.R. only.

Before putting the microscopes and coxes in position again, oiled pivots.

Adjusted microscopes on the 5<sup>th</sup> mark, the instrument pointing to the North Celestial Pole.



May 7, 1880

No 1 = 1816

4<sup>h</sup> 30<sup>m</sup>

May 8, 1880

No 1 = 187

12<sup>h</sup>

4<sup>am</sup>

13<sup>h</sup>

32<sup>m</sup>

Adjusted the microscopes and replaced the cases. The equator point correction may have been slightly altered. By this process.



May 9, 1880

No 1 = 188

2 = 189

3 = 190

4 = 191

5 = 192

<sup>h</sup>

2

7

11

20

0

<sup>m</sup>  
57

41

35

32

13

<sup>h</sup>

3

13

2

<sup>m</sup>  
45

45

2

May 10, 1880

No 1 = 193

2 = 194

3 = 195

4 = 196

4<sup>h</sup>

21<sup>m</sup>

11

25

12

8

21

42

22

31

After finishing observation  
of Venus, adjusted illumination  
of Microscopica. The illumina-  
tion since May 8 has not  
been good.





May 12, 1886

No 1 = 202      20      48      22      35



May 15, 1880

No 1 = 203

2 = 204

~~3 = 205~~

11<sup>h</sup> 48<sup>m</sup>

21 56

~~11 42~~

13<sup>h</sup> 29<sup>m</sup>

~~13 33~~

May 16, 1880

No 1 = 205

2 = 206

3 = 207

11<sup>h</sup> 42<sup>am</sup>

21 26

13<sup>h</sup> 23<sup>m</sup>

22 59



May 17, 1880

No 1 = 208

2 = 209

12

18

4<sup>h</sup>

13

54

45

May 21, 1880

No 1 = 214

2 = 215

11

45

13

52



May 22, 1886

No 1 = 216

<sup>h</sup>  
11

<sup>min</sup>  
33

<sup>h</sup> <sup>min</sup>  
13 36

2 = 217

13

38

14 41

May 23, 1880.

No 1 = 218

2 = 219

3 = 220

10<sup>h</sup>

57<sup>m</sup>

12<sup>h</sup> 41<sup>m</sup>

12

43

13

31

23

25



May 24, 1880

No 1 = 221			5 <sup>h</sup>	26 <sup>m</sup>
2 = 222	9	30	11	15 <sup>-</sup>
3 = 223	11	38	14	01
4 = 224	21	37		
5 = 225	0	3	1	39
6 = 226	1	50	3	46

May 25, 1880.

No 1 = 227	3 <sup>h</sup>	49 <sup>m</sup>	5 <sup>h</sup>	0 <sup>m</sup>
2 = 228			12	31
3 = 229			20?	3
4 = 230	22	42	24	38
5 = 231			2	48



May 26, 1880.

No 1 = 232

2 = 233

3 = 234

4 = 235

h

m

h

m

22

49

22

52

~~22~~

58

May 27, 1880

No 1 = 236

2 = 237

3 = 238

4 = 239

5<sup>h</sup>

46<sup>m</sup>

12

53

12

55

14

3

1

50

Began Longitude Campaign with  
Winchester Observatory, New Heaven.

~~No telegram from J. Dr. Waldo.~~

Sent telegram to Waldo at 5:00'clock  
saying "all right go ahead".

No reply received at 7:50 (M I)



May 27/1880 see also next chrono-  
graph's record Book.

232 Det-16<sup>5</sup> faint-







1889p300 (proj. 1858R)