

N 15

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K G 11363.298

Note Dec. 11, 1880. There was an occultation of α Leonis on March 24, 1869, which came somewhere about the time of day named in the record posted in below.

First slow 14 56

Out 15 5

Comp of Chron &
Clock

15 8 out

$$\begin{array}{r} 15 \quad 8 \\ 15 \quad 58 \\ \hline 10 \end{array} \quad \begin{array}{r} 15 \quad 2 \quad 1.0 \\ 14 \quad 52 \quad 1.75 \\ \hline .75 \end{array}$$

[14 58 East chron signal
14 57 45 East last one]

Immersion α Leonis

Time of occult by clock

15^h 2^m 1.0

by chron (corrected to clock)

15^h 2^m 1.35

$$\begin{array}{r} 14 \quad 58 \\ 15 \quad 7 \quad 59.6 \\ \hline 9 \quad 59.6 \\ 14 \quad 52 \quad 1.75 \\ \hline 15 \quad 2 \quad 1.35 \end{array}$$

Emergence α Leon.

Time by Clock

15^h 43^m 45.8

Em. Observed with Finder

The disappearance seems to have been observed both by eye and ear and by chronograph, if the mean is taken, we have the clock time 15^h 2^m 1.2

For March 24, 1869, by the Coast Survey Observations in book 021, the clock at 7^h 35^m sid. time was slow 30.73;

for March 25, 1869, at 7^h 55^m sid. time, it was slow 31.42; this would make it slow at 15^h sid. time, March 24, 31.2.

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KG 11265-298

90-92 94

Spectr. 1-4-8-11-12-~~14~~-~~16~~-19-20-57-71-77-78-85~~86~~

Web 10-12-42-67-76-81-87-89

① 12.47-77

 α Can May '16♂ 17.87 ^{Sun in L} _{metrall} 95

Occult passed in beginning - 24.33-57-62

Lunar Eclipse 29

Arg L - 34

Positions of stars 60

≡ Pons 72-73-74-76-77

New Double 80

18-11-11: 18.824

18-11-11: 18.824

18-11-11: 18.824

18-11-11: 18.824

Tuesday 1868 Dec 22

Object	Remarks	Lines	Angles	Micrometer
Aldebaran & Sauro	Spectroscope Examination			

θ Orionis	H ⁺ spectrum line seen by J.W. C.S.P.			
------------------	--	--	--	--

& Mr. Van Fleet
Others suspected
but very doubtful

Could cause lines to dis-
appear in order of faintness by passing gradually to edge of nebula.

θ Orionis	Spectrum ex- amined by J.W. No gas spectrum about it but only cluster spectrum springing the star spectrum			
------------------	---	--	--	--

Conf

T.W. & C.S.P. obs.

star of the Great Neb.
C'n a 4' p. gave
star spectrum & gas
spectrum at once.

Noty July 3, 1880. The star of the great
nebula is pretty certainly meant; hence in
the next line we should read 4' f for 4' p.

α Orionis	Bright line b			1662 1457
------------------	------------------	--	--	--------------

Clouds	Observations interrupted by clouds.			
--------	---	--	--	--

α Orionis	Bright line at			1407
	" "			1660
	" "			2019
	" "			2019
	" "			1663

Clouds	Observations inter- rupted by clouds Bright line at Double Cile. Dark one in middle measure next			1417
--------	--	--	--	------

Tuesday 1868 Dec 22 continued

Object	Remarks	Times	Angles	Micrometer
	gives a place of this dark one			1363
	Double bright band			1044
	D			1002
	Dark line			1020
	Dark line			953
	Group dark from			980
	to			827
	Breadth filled up with black so that one cannot separate the lines.			~~800~~
	Dark line			800
	" "			740
	End of spectrum			632
	Double bright band			1277
	" "			1326

Clouds

Observations interrupted by clouds.

neb. θ Orionis Fourth line seen without much difficulty by J.W. & C.S. though sky was hazy & moon as near as θ Orionis

γ Orionis Nebulosity not well made out in spectroscopic

Saturday 1868 Dec 26

Moon

W. M. C. S. P.

Obs.

Examined
spectra of
several bright
spots. Lines
seemed to
be more dis-
tinct where
the bright
spot was
than just
beside it
except in
the case of

Aristarchus, where it
seemed to be
slightly the
reverse. But
Aristarchus
is not nearly
as bright as
last month.

Particularly
a very bright
crater, very plain
on De la Rue's
photograph. Either
Sabine or De la Rue
shows lines de-
cidedly more
distinct than
the bright.

1868 Dec. 26

Great Nebula
in Orion

Examined the spectrum in several places found that in passing from the brighter to the less bright parts of the nebula the fourth or most refrangible line disappeared first, next the middle line of the three bright lines then the most refrangible of the three. ~~so that the nebula could be seen~~ so that the spectrum was reduced to a single bright line



In this position two bright lines could be seen very near the star and with a very slight change of position only one line could be seen

Bright moon light
Saw light between 3rd
& 4th lines & before 1st
No 5th line after
intense looking

Monday 1868 Dec 28.

Moon

Examined many
points with
telescope.

Aristarchus had a remarkable
bright spot
on it.

(C. P. P. P.)

Put on spectroscope
without cylindrical
lens. Examined

Aristarchus. Bright
line which seemed
to dim the bright
dark lines where
it crossed them.

Occultation

of γ Orionis observed with
spectroscope.
Spectrum of
star less bright
than that of moon.
owing to width
of slit.

Aristarchus. Bright point
reexamined.
Y. W. could not
be satisfied of
having the same
point which gave
the bright linear
spectrum. One
good portion of crater
which certainly made
the lines more dis-
tinct.

Monday 1868 Dec 28

Neb O Orion. Fourth line
seen without
much difficulty
by J. W. C. S. J.
Though sky was
hazy & full
moon as near
as O Orion

~ Orion's Nebulosity not
well made
out in spectrum

Tuesday W.B. Dec 30

Moon

C.S.P. exam
ined

Aristarchus in the spec-
tro scope. Not
very bright.
The same line
seen as last
night. No
decided ap-
pearance of
diminished
distinctness
of dark lines
owing to this
bright streak

Tub in cylindrical
and a pointed

Bethge

on
tubowing
to C.S.P. not
knowing all
the adjustments
& the difficulty
of making
them, could get
nothing satis-
factory.

At the night
was now &
warm & dew
on the glass
was feared,
shut up at
9^h 50^m mean time,

1869 Tuesday Jan 5

Object
γ Eridani
Transit at

Time

Neb h 752 looked for. Not
found on ac-
count of haze
finder only used
as spectrocope
was on.

Thursday 1869 Jan 7

of Ceti

Found to be
double by J.M.
(Also given in
Proctor's Handbook)

Nebulae for
Spectroscope

h 600

Good. v.B. $\approx$ L
s.E.

h 604

Could not point on
this with finder
B. v. I. E

h 1157

v.B. v. I. p.E.
v. r. glbm.
First Rate

h 1225

Poor

h 1227

Very fine
Put on spectroscope
But saw nothing

Great Nebula

4^{th} line very bright J.M.
ditto C.S.P.

J.M. saw light to

Also some at

C.S.P. saw line
between 3^{rd} & 4^{th} .
J.M. had suspected
same thing.
About as far to right
of 4^{th} as disk

Note June 17, 1880. The symbol s should
mean "suddenly", but is apparently intended for
"somewhat", or "slightly". The C.S.P. says i.R.
"Good" in this place means suitable for future examination
with Spectroscope.

Cont. 1869 80

Light about 680

930

650

1869 Jan. 7

from 1st to 3rd.

This is not how
ever the same
first suspected
by 7 M. He still
thinks there is
another one
as much further
towards the 3.

h 1227

Examined again
No spectrum
visible except
a v. bright
continuous one
apparently between
the 2 stars

h 1532

Outside of innermost end on
Dark ring.
Sf side darkest

Put on spectro-
scope. Continuous
Star spectrum with
Gas spectrum of
3 lines super-
posed.

Sunday 1869 Jan 10

Day time

Solar protuberances Examined by CPP
 & saw the 3 lines
 as often seen
 here before, by
 others.

Evening

Feb 2 1351 Vis. in finder
 good cluster
 for spectroscopy

Feb. 2 1157 Pointed spectro-
 scope with great
 care & accuracy
 & no spectrum
 seen

Feb
 Orionis

Spectrum of
 great nebula
 H⁺ line brilliant
 Continuous spec-
 trum begins
 between 650 &
 830

Transit of nebula 5 26 50
 Spectrum Decid 5 27 4
 of middle of
 prepeziun 10
 32
 38

Note Sept. 6, 1880. Probably the
 two observers were present, Prof.
 Winlock looking through the
 spectroscope (in the absence of any
 record to the contrary), and
 C. S. Peirce pointing the telescope
 by means of the finder so as to
 bring the successive nebulae to
 the slit of the spectroscope.

Two lines
 4 lines
 star
 4 lines
 gone

1869 Jan. 10

Same again

5	29	33
		40
		44
		55
		63

2 lines
3 lines
Star
2 line
gone

Same again

2 lines	5	31	44
3 lines		32	28
Star			29
2 lines			39
1 line			46
Gone			47

Same again

2 lines	5	35	42
3		36	7
Star			14
2 lines			24
1 line			27
Gone			36

This last was
the best.

Orion Examined
with eyepiece
for additional
companions.
Only 6 stars
seen

Wednesday 1868 Jan 3

Should be 1869

Feb L 1157 V.N. ob
Spectrum
continuous
extending from
to

908
2233

V.N. suspected
line at

1333

C.S. saw line
at
at

1366
1342

Feb L 116 Continuous
in Andromeda spectrum brighter
than that of 1157
reaching from
to
no lines

990
2500

Feb. L 117 V faint con-
tinuous spectrum

Feb. in Orion Many places in
which H β line
cannot be seen
The faintest at
which continuous
spectrum seems
to be best defined
is S.F. Trapezium
dist of diagonal
of trapezium. It
is at least as bright
as spectrum of Andromeda

should be 1869

1868 Jan. 13

When the slit is
so narrow
as to make
the lines very
fine & sharp
there is a black
band in the con-
tinuous spectrum
close to fourth
line toward
the third.

Thursday 1868 Jan 14Note Aug. 14, 1877
This should be 1869

β Orionis Nebula examined
air rather hazy

Feb 11 57 Line seen by
C. S. Peirce
Doubts whether
there is a con-
tinuous spec-
trum or a second
line.
Observation
interrupted by
haze.

Put on micrometer

Σ 850 Not found
probably on
account of
haze

α Can. Maj. Too hazy to
see comp.

 Σ 854

* ~~2580~~ reject.
* 257.6
.5

Coincidences

50.13

.12

.13

.14

.14

50.132

* Note Aug. 14, 1877. C. S. Peirce understands these figures as a measure of zero of position. See page 24 of the proof of his reduction of the double star work.

Coincidence
50.132

1869 Jan. 14

~~507.4~~
30.0
38.3
31.8
29.7
28.6
30.68

50.65
.73
.70
.70
.73
50.702

Sirius Examined with
care. No comp.
seen.

Mars. Polar Diam.

246.3

51.66
.53

.57
51.586

Meas. of width
of white protub-
erance about
Pole.

50.32

Equat. Diam.

51.51
.55
.58

51.547

Width of protub-
erance about
pole of Equat.
Diam.

50.69

1869. Thursday, Jan. 14. con.

Air very trem-
ulous.

1869 Sat Jan 16

Neb O Orion Examined with
spectroscope
fourth line
very brilliant
No new line
seen by Wob.
& Prof Pickering

Neb H 157 line in green
seen by C.S.P.

& Can Maj. Comp not seen
by C.S.P. or W

1869 Jan 19.
C.S.P. obs.

Set
of Lamps

Observed to
set finder
& chronometer.

Neb

R 385 or 386.

Looked at both
385 + 386 - could
not distinguish
one of them, so
not positive which
one is being observed.
Measure of bright line.
Considerable continuous
spectrum towards
red part of Spectrum.

Bright line
seen also by
A.S. and O.C.W.

1587
64
78
1576

Neb.

R 575

Saw very bright
continuous Spectrum.
Examined with eyepiece

Neb. R 1137

V. bright continu-
ous Spectrum.
Examined also with
eyepiece

Neb R 1401

Could not find
on account of
moon.

Neb R 1519

Could not find
-
Examined with
eyepiece
too small to
be made out
in finder

Jan. 22. 1869.

Coincidence (L), 5 settings, 27.004

" (g) 5 " 51.996

(h) 5 " 77.012

Intervals fg 24.990, gh 25.018 (see book 113, p. 75)

Coincidence (g) to be used in reductions 51.996

Coincidence.

51.95

.94

.94

.95

.95

51.946

51.99

.99

.99

52.00

.00

51.994

Middle Position of
Wire fixed Wire
moved.Coincidence
of another wire.

27.00

.01

.00

.00

.01

27.004

Coincidence
of 3^d Wire.

77.01

.01

.01

.01

.02

77.012

Fixed wires
movedCoincidence
of middle
Wire again.

51.99

.99

52.00

.00

.00

51.996

Jan. 22. Continued.

Position

~~258.0~~
 257.8
~~257.8~~
 257.8

 $\Sigma 686$ A.S. ob.
 Pos.

~~310.1~~
 305.2
 303.3
 304.6
 304.5
 307.5
OC W ob.
Pos.
 126.2
 126.7
 124.3
 125.9
~~125.9~~

 52.88(000)
 53.14
 53.01
 53.13
 53.18
 53.25

A.S.

 52.97
 52.94
 53.04
~~52.97~~
 52.96
 53.01

Jan. 22. Continued,

(P)

1.3,

1869 Jan 23

Coincidence

52.01

.00

.01

.01

.01

52.008

Note Dec. 11, 1880. From the chronographic record in book C17 it appears probable that the emersion of α Tauri mentioned on this slip, pasted in below was observed by C. S. Peirce with the East Equatorial and the chronograph; and the observed time was apparently read off and reduced to mean time as below. Place of the reduction not now known; perhaps on the chronograph sheet.

Emersion of α Tauri Jan 23 1869.
 $3^h 37^m 31.58$ mean time

1869, Jan 25

For the first set of distances,
perhaps 52.008, found on Jan. 23,
should be used as the coincidence.
For the others, use 52.010, mean
of sets on pp. 26 and 28.

Σ 447 Not separated

Σ 622 Not separated

Seeing poor
Hazy. Star
large

Double
2.65.
Star found
by Mr.
Mendell

Star 1 to eye.
eyes - companion
No preceding.
Star rather large
- very tremulous.
C. S. P. Obs.
4^h Power

214.5
77.8
136.6
46.6

~~217.1~~
215.0
213.8
214.7
214.2
214.3
214.40

Fixed wire moved
by Mr. Searle.

A. S. Obs.

52.43
.47
.42
.48
.37
52.434

31.0
30.7
35.0
31.5
29.9
~~33.62~~
39.62

1869. Jan. 25, continued.

W. H. Petter. Ob.
Stars 100

214.1
212.0
216.7
213.1
211.3
213.44

52.57
.64
.72
.66
.75
52.69

O. C. W. Ob.

Time

h

M. A.

5 39 33

0 31 20

5 8 13

215.1
213.3
216.0
212.0
212.6
213.80

52.57
.63
.63
.56
.58
52.590
52.57
.60
.52
.52
.54
52.55

Coincidence, C S F

52.02
.03
.00
.01
.02
52.016

 $\Sigma 986$

Ar

h

R.A.

6	47	4
23	59	43
6	47	43

$\Sigma 986$

Continued
 3^{rd} P. Star LOR
 O.C.W. obs.

183.0
 184.8
 182.3
 183.0
 182.1

 183.04

Mädlar's prediction
 P.

186.1

52.50
 .58
 55.00
 57
 50

 52.560

C.S.P. obs. Star
 1st to Eyes - 3rd power.
 2nd Power Stars faint
 hazy - companion, South

183.6
 185.0
 185.0
 185.7
 185.8

 185.02

52.68
~~.57~~
 52.58
 .57
 .56
 .60
 .58

 52.578

185.0
 177.8

 107.2

5 Navis
 $\Sigma 1146$

Star L OR
 O.C.W. obs.
 3^{rd} P. Star
 very misty
 Separated only
 at intervals

160.3
 159.7
 160.2
 159.9
 160.8

 160.18

52.55 Reg
 52.43
 .43
 .44
 .37
 .46

 52.432

Jan. 25, 1869. Con.

C.S.P. Obs.	152.5	52.46
Stars to Eyes -	152.5	.381
compair. W.	151.4	.42
Stars dancing	153.1	.34
violently.	152.8	.42
	<u>152.46</u>	<u>52.592</u>

Coincidences

52.01
51.99
52.01
52.01
52.00
52.004

1869 Jan 27

Eclipse
of moonAt
Penumbra
seen on moon

6 47 on it

At 7 44 45 min
by C. S. P.'s
watch shadow
cut acrossAt 8
moon usual
colour. Shadow
grayAt 8 43
(red on limb
C. S. P.
If any red
on the termina-
tor. T. W.

Shadow off at 10 2 30

Moon in cloud
almost all
the timeC. S. P. thought the
shadow looked blue

Thursday 1869 Jan 28

Onion
= $\Sigma 774$.

O.C. W. obs.
4th P. Star $\perp$ 00

196.0
195.8
195.9
196.4
196.3

196.24

Schronometer
Screw turned
the wrong way.

51.74
73
75
67
68

51.714

A.S. obs.
4th P. Star $\perp$ 00

11.8
11.0
12.1
11.9
12.3

11.82

52.29
36
38
42
42

52.374

C.S.P. Obs. Stars
 $\perp$ Eyes - 4th power.
companion S.
Stars moderately
steady - mod.
small -

196.8
195.0
194.7
193.3
196.1

195.18

52.28
.27
.27
.25
.30

52.274.

Coincidence (mean of 8 settings) 52.008

Thursday, 1869. Jan. 28, con.

Coincidence, C S Pobs

51.98
.99
52.00
.00
.01
51.996

α Can. Maj. C.S.P. after
 = Sirius looking long
 could not see
 the companion

Jan. 28
 1869

Coincidence W.S. Obs.

52.02
.03
.03
52.027

 $\Sigma 1104$

W.S. Obs.
 H^u Power. * 100

207.6
209.0
211.2
212.3
210.0
210.02

Continued

52.28
31
27
32
35
52.306

Thursday 1869 Jan. 28 continued

$\Sigma 1104$

G.S.P. obs.
4th P. * 1 00

star steady
well defined
5th P. put on
after 3rd reading

214.6
213.9
212.5
212.8
213.1

213.38

Companion north
These measures
believed to be
very good

52.26
.24
.26
.26

.23
52.25

O.S. W. obs.
5th P. * 1 00

207.2

204.9
211.0
209.4
210.0
211.8

209.88

52.22
.23
.25
.21

.21
52.234

~~4th P. after 1st reading~~

$\Sigma 1273$

= E Hydral

A.S. Obs. Stars
11 00 - 5th power.

128.8
130.1
130.6
130.0
129.2

129.74

52.42
.42
.42
44
045

52.430

1869 Jan. 28

C. S. P. Obs
Companion S.

306.1	52.33
308.5	.32
310.7	.33
309.4	.33
311.8	.38
309.30	.34
	52.330

O. C. W. Obs

1869 Jan 28

Occultation of Regulus.

Immersion

For some unexplained reason the chronograph did not work. Imm. took place before $12^h 52^m 8^s$ (Clock time) after which it went right.

EmergenceAt $13^h 50^m 51.0^s$ by South clock

At	4	40
	9	10 51.0

AT	+ 4.22
Rate	- .45
	- .18

13 50 55.04 Comb. sid. T.

According to Mr. Paine Imm. took place

Before	57 38	Before mean.
or	57 47	sid. T.

Subsec	12	53	18	Clock time
--------	----	----	----	------------

If it had I should have got it.

Thursda
Regulus Occultation observed
Immersion by C. S. P. with spectroscop & by Mr. Lever in finder

Note Dec. 13, 1880. The clock correction does not seem to be correct. The chronograph sheets (which, as stated in the present reduction, are a record of time determinations between details) are given for several cases been entered, and others as they represent results obtained (perhaps others) then requiring instructions are the corrections of errors in determinations from observation on Feb. 13, at $3^h 52^m$ it was slow accepted, we have the clock slow +3.7. The corrected result given noted of +0.14, making the error +4.02, which may account for the difference computed from an original trace are still visible; and this is assumed the clock to have been made the sidereal time of the reap with the spectroscop on the lamp with an ordinary eye-piece, and

1869 Jan. 28

C. S. P. Obs

Companion S.

306.1
308.5
310.7
309.4
311.8

309.30

52.33
32
33
33
38

34
52.330

O. C. W. Obs

Shradda

Regulus

Occultation
observed

Immersion
by C S P with
spectroscope
& by Madenison
in finder

Note Dec. 13, 1880. The clock correction $+4^s.22$ employed on the paper pasted upon this page, does not seem to be correct. The only data known to exist, except such as may be preserved on the chronograph sheets (which, as stated in the note of Dec. 11, 1880, in book 40, p. 72, are not to be employed in the present reduction), are those contained in books 06, 07, 019. The books 06 and 07 contain no record of time determinations between Jan. 23 and Feb. 12, 1889. In book 019, however, results (without details) are given for several intermediate dates, but the figures originally entered here in many cases have been erased, and others substituted. A probable conjecture with regard to these figures is that they represent results obtained by some of the special students (Davis, Whipple, Gammell, Bridges, and perhaps others) then receiving instruction at the Observatory; and that the alterations just mentioned are the corrections of errors in their first results. On Jan. 23 and on Feb. 13, 1889, there are time determinations from observations by A. Searle. On Jan. 23, at $3^h 31^m$ sid. time, the clock was slow $+0^s.66$; on Feb. 13, at $3^h 52^m$ it was slow $+11^s.28$; the resulting rate will be losing daily $+0^s.56$. If this rate is accepted, we have the clock slow on Jan. 28 at 14^h sid. time (5 days $10\frac{1}{2}$ hours after the determination of Jan. 23) $+3^s.7$. The corrected result given for Jan. 28, 0^h mean time, in book 019, seems to be $2^s.86$ with a losing rate of $+0^s.44$, making the error at 14^h sid. time about $+3^s.4$. The result originally entered was probably $+4^s.02$, which may account for the correction $+4^s.22$ employed on the paper pasted on this page. Or, perhaps the result is computed from an original entry of 4.22 for Jan. 29, 0^h mean time, in book 019, of which traces are still visible; and this is corrected by $-0^s.18$ to Jan. 28, 14^h sid. time. On the whole, it seems best to assume the clock to have been $3^s.5$ slow at the time of the reappearance of α Leonis. This will make the sidereal time of the reappearance $13^h 50^m 54^s.5$. Although the disappearance was observed with the spectroscope on the large telescope, it is most likely that the reappearance was observed with an ordinary eyepiece, and with the large telescope rather than with the finder.

4
Saturday 1869 Jan 30

New Double O.C. M.O.B.

~~At~~

At

5 16 22

0 40 00

4 36 22

Dec

-6° 56'

The above
R & Dec are
of the wrong
star.

Arg. 2 - 10

O.C. W. Obs.

Not double

x 969

x 965

x 966

x 974

x 973

x 981

x 986

x 988

x 987

x 989

x 990

x 991

x 992

x 956

x 957

x 953

x 949

x 942

x 943

x 938

x 976

x 975

x 977

x 980

x 984

Double Dist 40" Comp. nearly equal. Comp S. Pos. Angle 200°

Not double Not so faint as 981

Can't see it. Hazy.

Not double

Triple. Faint dist comp prec. & v. close comp S. Not fully

separated with H² Power. Doubtful.

Note, June 4, 1881. See opposite page for
another observation of No. 949, in which it
seemed not to be double.

Not double

" "

" "

" "

" "

" "

" "

" "

" "

1869 Jan. 30th Contin

x-985 Double ft. comp. 5" dist S.f. Angle 350°
Look on a better night

x 980 Not double

x 979 " "

x 978 " "

x 972 " "

x 968 " "

x 963 " "

x 961 " "

x 952 " "

x 948 " "

x 946 " "

x 939 " "

x 935 " "

x 932 " "

x 938 " "

x 930 " "

x 944 " "

x 947 " "

x 950 " "

x 945 " "

Var x 943 " " Estimated by C.S. Pat 6.5 - very red,
About same brightness as 950. - mag + half
brighter than
943

x 942 " "

x 949 " "

x 953 " "

x 936 " "

x 928 " "

Further observations prevented by clouds

Note, June 4, 1881. C.S.P. probably went over part of the same ground examined by C.C.W., which will account for the repetition of Nos. 942, 943, 949, 953.

Sunday 1869 Jan 31

Can May Comp not
seen by W
or C.S.P.
Sky looks
clear. Pretty
steady. $5^h 34^m 26^s$
stand of telescope
seen. The latter
not easily. Not
a remarkably
good night but
pretty good.

Double
h 3791

A third comp -
near found
by L.W. double
the dist of A & B
D¹¹ mag.



Another double preceding
last $\frac{1}{4}$ minute
same declina-
tion. Dist 12"
Comp precedes
angle 180 dif.
from other.
May 9 & 11

Note July 30, 1881. This is
clearly the triple star found in this
region 1868 Jan. 15 by G.M.S., but is
not h 3791. The component C was
not noticed in 1868. Both components
were measured 1870, Jan. 21 by C.S.P.
Its place for 1875 is $5^h 34^m.4$, $-20^\circ 31'$.

Place of this star $5^h 34^m.2$, $-20^\circ 31'$.
"Angle 180 dif. from other", perhaps
means 300° , the position angle of
B from A in the sketch above being
apparently s.f., and, as measured
in 1868, $122^\circ.6$.

1869 Jan. 31^d

Another Double 67M

8th

at

h

Ret

6 35 40

0 58 00

~~5~~ 37 40

5

Dec

360°

Pos. Angl 300°

Dist 7"

Mags 9 & 10

-20° 30'

4th

Another

9th May 8th

Comp. preceding

7th 80° 00'

At 6 44 12

0 50 00

5 53 30

2

3 or 4 min

with north

of back

5th

New Triple

At

7 2 10

0 48 20

6 13 50

3 Components

A 9° B 5 12" 11°

C n p 20" 11°

Dec

-20 00 #

6th

Another

Same dec as

Cent.

Comp. f. mag 9th

Dec

7 8 55

0 29 36

39 19

-190 11

Note July 30, 1881.
This is apparently
h 3791; the
setting in S
is probably
rough; the 2
agrees well
and so does the
description.
The setting in
position seems to
have been 300°; the
zero assumed at
the time 360°, in
fact 348°; position
angle 50° to 60°.
The position angle
of the second star
on this page is
probably 348° - 80°
or 268°; this agrees
with the remark
"Comp. preceding".

1869 Jan. 31st

Another

Hr

7	12	50
0	26	00
6	46	50

9x10 maps
dist 8" comp
is ref. ~~near~~
Dec same as
last

8^h

Another

Star 9 map
comp very ft.
as ft. as 5th of
trans. dist 5"
n.p.
Same dec
as last

7	24	44
0	23	44
7	1	00

Others

3 or 4 more
same dec.

9^h

Another

Stars equal
maps 9^h
n. & s. - 8"

7	28	50
0	37	20
6	51	30

Dec

- 190 36'

1869 Jan. 31st10th Another

rt

7	40	52
0	38	20
7	2	32

9th Mag5th dist

h. smaller

n.h.

for dec see
next.11th

Another

rt

7	43	10
	39	40
7	3	30

h

RA

2 or 3 min

S. of last

8th & 12 mag

dist 4" or 5"

comp sprey

nearly

Dec

-19° 56'

4 or 5.

Others

Several fol.
same dec.
space & to
shutter, with
of being negative
a measured

12th

Wetter

7	51	35
	21	8
7	30	27

Largest 7th 80
Comp s. a little
10th mag. on same
line 9th mag.
30th. to B 10th
Dec

Note Aug. 4, 1881. This is
perhaps in Puppis (Hd 269,
Δ 52), but more likely some
other star; possibly Certosa
7088.

-23° 30'

1869 Jan. 31st

Another

Hr

7	59	15
	12	00
7	45	15

Maps 8x10
Comp s.p.
Dist 2"
Dec

-23° 50'

Several others

Same Dec.

Bright
Star

Close double
h. am 2 f.

14th
of Argos

Components
equal. v. close
under second
doubtful.
2nd Mag.

Hr

8	12	50
0	10	20
8	1	40

15th

Another

Hr

8	20	20
0	10	32
8	9	52
		48

Close 9th equal
Pos angle 0°
Dist 1st 5 2nd

Dec

-24° 24'

Feb. 1. 1869.

Coincidence (f) 26.610

New Double, O.C. H. Obs.

Time
to A

3	49	27
2	7	7
1	42	20

Dec.

-11 30

Zero of pos. A.S. Obs.

77.0	
76.8	
76.7	
76.4	
77.2	
76.82	

Neb R 815 A.S. Obs.

 $\Delta 8$ Comparison star
south of neb.

55.565

.710

.260

54.950

55.710

55.439

Coincidence.

26.61

.50

.62

.64

.57

.57

26.610

28.829

577

282.52Note June 19, 1880. Result for $\Delta 8$ $\Delta 8$

Feb. 1 1869 continued.

Feb. h 815 O & W obs.

 ΔS

$$\begin{array}{r}
 55.82 \\
 55.00 \\
 55.22 \\
 .21 \\
 .39 \\
 .19
 \end{array}$$
Note June 19, 1880. Result for ΔS ΔS

$$\begin{array}{r}
 55.202 \\
 26.610 \\
 28.592 \\
 280.201 \\
 \hline
 49.2
 \end{array}$$
 $\Delta \alpha$

$$\begin{array}{r}
 6 \quad 32 \quad 49.0 \\
 51.4 \\
 \hline
 2.4
 \end{array}$$

$$\begin{array}{r}
 6 \quad 33 \quad 40.0 \\
 42.4 \\
 \hline
 2.4
 \end{array}$$

$$\begin{array}{r}
 6 \quad 34 \quad 13.4 \\
 15.2 \\
 \hline
 1.8
 \end{array}$$

$$\begin{array}{r}
 6 \quad 34 \quad 59.9 \\
 55 \quad 51.8 \\
 \hline
 1.9
 \end{array}$$

$$\begin{array}{r}
 7 \quad 37 \quad 40.4 \\
 43.0 \\
 \hline
 2.6
 \end{array}$$

$$\begin{array}{r}
 2.4 \\
 2.4 \\
 1.8 \\
 1.9 \\
 2.6 \\
 \hline
 2.22
 \end{array}$$

Feb. 1, 1869

~~a. s.~~

a. s. obs.

neb. s. p.

 $\Delta \alpha$

$$\begin{array}{r} 57.0 \\ 60.7 \\ \hline 3.7 \end{array}$$

Note June 19, 1880.
The record on p. 41 is
"star south of nebula";
here it seems to be inf.

$$\begin{array}{r} 0.8 \\ 34.0 \\ \hline \end{array}$$

$$\begin{array}{r} 41.0 \\ 44.2 \\ \hline 3.2 \end{array}$$

$$\begin{array}{r} 36.3 \\ 38.8 \\ \hline 2.5 \end{array}$$

$$\begin{array}{r} 36.3 \\ 38.8 \\ \hline 2.5 \end{array}$$

$$\begin{array}{r} 18.3 \\ \hline \end{array}$$

$$\begin{array}{r} 5.3 \\ \hline \end{array}$$

$$\begin{array}{r} 8.0 \\ \hline \end{array}$$

$$\begin{array}{r} 8.3 \\ \hline \end{array}$$

$$\begin{array}{r} 2.7 \\ \hline \end{array}$$

$$\begin{array}{r} 45.3 \\ \hline \end{array}$$

$$\begin{array}{r} 48.1 \\ \hline \end{array}$$

$$\begin{array}{r} 2.8 \\ \hline \end{array}$$

$$\begin{array}{r} 3.7 \\ \hline \end{array}$$

$$\begin{array}{r} 3.2 \\ \hline \end{array}$$

$$\begin{array}{r} 3.5 \\ \hline \end{array}$$

$$\begin{array}{r} 2.7 \\ \hline \end{array}$$

$$\begin{array}{r} 2.8 \\ \hline \end{array}$$

$$\begin{array}{r} 3.18 \\ \hline \end{array}$$

Feb. 1, 1869.

C.S.P.
Sirius

C.S.P. Obs.

Comp not seen
Sirius looks
poorly.C.S.P. sweeps
for doubles, at 7 30
hazy, - at - 20 Dec, +
from 1 30 before meridian.

New Double, Line	7 33 37
h a	22 58 14
A.R.	8 35 23

Dec, $250^{\circ} 11' 35''$
 Mag, both 10
 Distance 2" Dec, $-19^{\circ} 48' 25''$
 Position angle
 280°

New Double, Line	7 47 7
h	23 56 45
A.R.	7 50 22

Dec, $250^{\circ} 42' 44''$
 270°
 Mag, both $8\frac{1}{2}$
 Pos. nearly ~~170~~ 170°
 Distance about
 $8''$
 Seeing very bad -
 very hazy.

New Double, Line	8 5 2	$251^{\circ} 18' 28$
h	22 45 54	270
A.R.	9 19 8	$-18 41 32$ Dec,

1869. Feb. 1. Conc.

Quadruple
Stars,Mags. B largest =
~~9~~ 9 + of smallest 10.5

Dis. of A+B 7"

" " C+D 12"

" " B+D 11"

Pos. Ang. A+B 150°

" " A+C 270°

" " A+D 120°

Changed Dec. for sweeping.

New Double. Mags. 10½ + 11,

Pos. Ang. 300°

Dist. 5"

Time.

8 15 45

h

23 21 38

A.R.

8 54 7

$$\begin{array}{r}
 358^{\circ} 15' \\
 348 \quad 16' 56'' \\
 360 \\
 \hline
 -1^{\circ} 43' 4''
 \end{array}$$

Total no
of stars examined by C.S.P. 103.

Examined by OCW

~~|||||~~
~~|||||~~
~~|||||~~
~~|||||~~
~~|||||~~
~~|||||~~
~~|||||~~
~~|||||~~

Two Doubles

At

8 28 13

23 23 33

9 04 20

At

8 32 29

23 27 31

9 04 20

$$\begin{array}{r}
 349^{\circ} 49' 52'' \\
 360 \\
 \hline
 -10 \quad 10 \quad 8
 \end{array}$$

1869 Feb. 1. Cor.

First Double

Stars 10th mag.

Dis. 6" or 7"

Pos. ang. 150

2nd double, ~~is~~ is triple.

3 very faint stars.

Dis. of 1st two 6" -

of 3rd from middle

only 8"

Pos. of First two 290°

- of 3rd from middle 30°

Feb. 2. 1869.

12 o'clock mean time.

5 in Aperture

Sun

10

at 1 bright line

C reads 680

Another bright line in
red seen for first time reads 810

Sodium line D reads 997

Can see no bright
line between D

+6

Bright line F reads 1747

Will now adjust the reading
of Scrin's Head so that the
above readings will be changed.
After adjustment the Sodium
line reads 958.

New line reads 776

At 12 $\frac{1}{4}$ hours mean time
the red and yellow lines
extend over half the length
of slit.

F line reads 1725 and
is not more than half the
length of other lines and does
not remain steadily visible.

Line near B did not appear
for several minutes after looking
for it - now appears at intervals.

Seems to be a haze about Sun
at present time.

At 12 $\frac{1}{2}$ hours, can only see the
red + yellow lines - probably
on account of haze.

Feb. 11. 1869.

Coincidence for M. 48, 49, 51.694
" " M. 50 52.032

Since.	5	32	35.0
"	0	7	13.5
R.A. by chron.	5	25	21.5
Hue A. R.	5	25	19.3
Cor.			2.2

Winlock's
18th of 31st June 1869 looked for
but not found
being poor so
low.

Double found
by C. S. P.

Star // so
Compan. precedes.

317.1

51.92

Coincidence,

317.1
<u>77.4</u>
239.7
<u>329.7</u>

51.70

.70

.69

.69

.69

51.674

Measure for dis-
tance probably
too wide.

Since,	6	7	13.4
"	23	30	20.0
A. R.	6	36	53.4

338° 25' 30"

1869, Feb. 4. Con.

Triple,
found this
evening by
Y.W.

A+B, 9th mag. -
C, 15th mag. -
C, about equally
dis. from A+B,
and about 2 $\frac{1}{2}$ times
the dis. of A+B from
each other.

Seeing poor - Stars
very large and
blurred.

Seeing very poor
indeed and ap-

parently getting worse.

3^d power - Stars + 50

237.3

52.62

246.4

.66

241.5

.50

239.0

239.2

239.48

All previous observations
spoiled by fact that the
micrometer was not screwed
on.

~~26.5~~~~25.4~~

28.0

28.5

28.8

29.8

28.0

28.62

208.6
77.4
131.2

1869 Feb. 14. Can.

Fixed wires
moved.

Coincidence.

$$\begin{array}{r}
 52,02 \\
 .04 \\
 .03 \\
 .05 \\
 \hline
 .02 \\
 52,032
 \end{array}$$

Dist.

$$\begin{array}{r}
 \cancel{52,97} \\
 53,04 \\
 .03 \\
 \hline
 .06 \\
 .11 \\
 52,97 \\
 53,042
 \end{array}$$

 Lines
 to
 A. R.

$$\begin{array}{r}
 6 \ 48 \ 21.2 \\
 23 \ 52 \ 40.0 \\
 \hline
 6 \ 55 \ 41.2
 \end{array}$$

$$\cancel{339^{\circ} \ 40' \ 20''}$$

Dec.

Circle reading
Dec
$$\begin{array}{r}
 339^{\circ} \ 40' \ 20'' \\
 - 19^{\circ} \ 40' \ 20'' \\
 \hline
 320^{\circ}
 \end{array}$$

0 Positions.

$$\begin{array}{r}
 77.4 \\
 77.4 \\
 \hline
 17.4
 \end{array}$$

1869. Feb. 4. Con.

Sirius. Examined Sirius
with Spectroscope
and saw nothing but
dark band at H .

2)

Sunday 1869 Feb 7.

Coincidence 52.435

 $\Sigma 651$ Zero of Pos. A.S. obs.
L.S.P. obs.74.2
74.1 $\Sigma 651$ A.S. obs.
H.P. Star 1100
Comp n.f.
Mag. 8° & 10°

Pos. & Dist.

6^h 30^m 80^s100.0
99.8
98.8
100.8
101.7

100.22

54.13

.00

.10

.05

91

04

54.064

Coincidence

52.44

435

44

43

43

435 $\Sigma 651$ O.S.P.
H.P. * L.O.P.An immense
number of
wide doubles
in this vicinity102.8
103.5
103.7
103.2
103.4

103.3253.96
54.01
53.91
53.93
53.97

Sirius

Long search for
comp by C.S.P.
Doubtful whether
seen. If seen for

220 ±

Friday, Feb. 11, 1869.

Coincidence
52.486.

Looked for
Σ 850 but
could not
find it.

2 Orionis
for time,

Signe,
h.
a. R.
R. A.

6	14	28.0
0	25	56.0
5	48	32.0
5	48	55
		-27

Set Chron.

Signe,
h.
a. R.

6	18	10.4
5	30	2.5
5	48	7.9
5	48	5
		-3.

Σ 1104.

Star large -
very faint and
unsteady.
4th power * L No
Comp. W. proceed.
Star very unsteady.
" extra. "

32.7
28.8
28.5
34.9
32.7
31.52

52.48
.49
.49
.48
.49
52.486

Coincidence

Feb. 13. 1869.

Coincidence 51.898 C.G.W.
 " 51.976 C.S.P.
 Mean 51.937

E. 826.

Since 5 45 40
 h 1 37 28
 4 8 12

T.M. & C.S.P. obs.
 Spectrum con-
 sists of 2 bright
 lines quite close
 together & another
 with one to-
 gether with a
 faint continuous
 spectrum.

Since

T.M. obs
 Dark lines
 another
 Lines with bright
 light as far as
 scale will go. As
 high as

24.25
 29.70

33

Rabon Microometer

Zero of Position C.G.W. obs.

72.7
 72.6
 72.4
 72.57

Coincidence

54.89
 91
 90
 87
 92
 54.898

Feb. 13. 1869 con.

 $\Sigma 1104$ 3rd P. * 11 ore
O.C.M. obs.

Hayy

In measures for
dis. * 1 ore

211.0
210.3
211.0
210.0
<u>209.9</u>
210.46

52.08
.09
.08
.09
.12
<u>52.09</u>
51.898
.194
<u>1.9</u>

C.S.P. obs.

3rd power * 11. oreStar moderately
steady - rather
large - div.

31.1
29.8
30.1
30.8
<u>32.1</u>
30.58

52.14
.22
.23
.19
<u>.23</u>
52.202

Coincidence. C.S.P. obs.

51.96
.97
.99
.98
<u>.98</u>
51.976

4th power
C.S.P. obs.

Dis.

52.26
.24
.24
.24
<u>.23</u>
52.242

1869 Feb 13.

Q Hydrae ~~dr. P. *~~ L 00
 $= \Sigma 1273$ O. C. M. 000 -

300.7	52.29
~~304.4~~	.30
301.9	.28
300.8	.34
301.4	.31
301.78	52.304

C. S. P. obs.
 * L 00 Comp. S.
 4th power

305.6	52.33
306.4	.33
309.1	.31
307.0	.30
306.5	.35
306.92	52.324

Feb. 17. 1869.

Coincidence 51.916

New Double. O.C. H. Obs. 6 47 5.6
 Time, 6 47 5.6
 W. 23 43 38.0
 7 3 27.6

Dec. -15° 48'

μ Ceti
 Occultation.

C.S.P. Obs. Immersion. 7 12 47.8 Note
 Time noted on
 Bond 236 by
 A.S.
 and by O.C.W. - 48.0

Note Dec. 13, 1880.
 No record found of
 any comparison of the
 chronometer B. 236 with
 the clock; this occultation
 therefore cannot be used

Σ 311. 4th Power.
 μ Arietis. # 11. So
 A.S. Obs.

37.8
 36.4
 35.9
 38.3
 35.0
 36.68

52.32
 .33
 .43

μ Ceti.

Immersion.
 Only an approximation,
 on account of clouds.

8 17 44.7 A.S.
 45.0 O.C.W.

Σ 1216 Could not
 separate

1869 Feb. 17. Cor.

E Hydrae O.C.W. Obs.
 $\Sigma 1273$ * 100 H.P.

125.7
 127.8
 129.2
 127.3
 126.9

 127.98

52.22
 .29
 31
 30
 30

 52.280

C.S.P. Obs.
 * 100

Stars mod. steady -
 mod. distinct.

309.1
 304.9
 307.5
 307.7
 307.0

 307.24

52.27
 .27
 .27
 .29
 .26

 52.272

Coincidence, C.S.P. Obs.

51.92
 .91
 .92
 .92
 .91

 51.916

$\Sigma 1356$ C.S.P. Obs.
 = ω Leonis, 5th Power - * 100
 pretty well elongated
 but not separated

37.5
 13.2

Feb. 19, 1869.

Coincidence
51.930 (# settings)

C. I. P. 06

H. 1361.

Loose cluster
in which Σ
844 + 848 are
contained.Begin with brightest star
in whole, which is.
double mag about
7+8 + comp fall.

* 11.00

Position =

Stars very unsteady
Wind blowing hard

Zero

Position
Pos of $\Sigma 848 AB$

Coincidence.

Distance

Dist $\Sigma 848 AB$ Position angle
between largest component
of this double and the nearest
star in neighborhood.

* 11.00

This latter star
is about 8th mag.
Smaller * follows.

Zero

Position angle

Pos of $\Sigma 848 AC$

Dist

Dist $\Sigma 848 AC$ Pos. of 4th mag in reference
to that of 9th mag which is S.

Zero + 270°

Pos =

Pos $\Sigma 848 AD$

52.9

53.3

53.1

72.4

10 8.5

52.16

52.17

52.17

51.93

11
2.4

2.3

41.3

42.0

41.65

72.52

120.9

120.4

54.92

54.88

54.90

2.97

2.96

29.1

28.6

339.7

339.19

339.8

342.6

182.8

182.0

56.33

.27

56.30

4.84

42.8

* Note Aug. 14, 1877. The zero here
is probably not an observation,
but only a step in a computation,
72.57 being the value used here.
This seems to be 72.6

1869 Feb. 19. Corv.

$\Sigma 844$ seems to
be badly out of
place.

Measurement of
what is supposed to be
 $\Sigma 844$.

* $\perp$ No

Components
nearly equal -
comp. N. + reddish,

Position + Distance

Meas. of both
about 8.7

Pos. angle

Dist

337.0

54.33

337.1

54.32

336.9

.33

336.9

.41

336.9

.38

336.96

54.354

336.57

51.916

5.61

2.438

49

23".89

Measurement of dif. of Dec.
between $\Sigma 848 + 844$

844 precedes

Meas. is between largest star
of 848 and most
southern of 844.

at 7 20 30

7 21 5

7 21 20

7 21 45

22 5

at 7 23 5

30

45

7 24 0

10

59.57

.57

.58

.63

.66

61.34

.31

.26

.20

.30

61.282

51.916

9.366

187

91.79

1869 Feb. 19

Meas. of dif of A. 78. between
same stars.

$\Sigma 844$ is n. forced.
848.

Transits of
 $\Sigma 844$ & $\Sigma 848$
over 3 wires

$\Sigma 844$ 7 27 17.5
By Band 236 27.0
Time noted by
A.S. 34.5

12.3
12.0
11.6
12.0

$\Sigma 848$ 7 27 29.8
39.0
46.1

Again $\Sigma 844$ 7 29 48.0
56.8
Noted by A.S. 64.5

12.0
12.2
11.9
12.0

$\Sigma 848$ 7 29 59.0
30 9.0
16.4

Noted by O.C.W. $\Sigma 844$ 7 29 48.0
56.6
64.5

11.7
12.5
11.8
12.0

$\Sigma 848$ 7 29 59.9
30 9.1
16.3

Noted by A.S.
 $\Sigma 844$

7 32 41.0
49.9
57.1

1869 Feb. 19. Continued.

$$\begin{array}{r} 2115 \\ 11.9 \\ \hline 12.3 \\ 11.9 \end{array}$$
 $\Sigma 848.$

$$\begin{array}{r} 7 \ 32 \ 52.5 \\ 33 \ 1.8 \\ \hline 9.4 \end{array}$$

Noted by O.C.W.

 $\Sigma 844.$

$$\begin{array}{r} 7 \ 32 \ 40.6 \\ 50.0 \\ \hline 57.3 \end{array}$$

$$\begin{array}{r} 12.1 \\ 11.75 \\ \hline 12.1 \\ 11.98 \end{array}$$

$$\begin{array}{r} 12.1 \\ 11.6 \\ \hline 12.1 \\ 11.9 \end{array}$$
 $\Sigma 848.$

$$\begin{array}{r} 7 \ 32 \ 52.7 \\ 33 \ 1.6 \\ \hline 9.4 \end{array}$$

Chron. - Clock = + 8.9 seconds

 Runker
1203.
Immersion.

 By A.S. 8 21 58.9
" O.C.W. 58.4
C S Pobs

 75 Lauri.
Immersion.

 C.S.P. 8 25 57.8
O.C.W. 57.5
C S Pobs

 Runker 1210.
Immersion.

Lost.

 Runker 1203. Lost on account
Emer. of extreme faintness.

 75 Lauri.
Emer.

 O.C.W. 9 31 52.7
H. W. Davis. 52.3
C S Pobs

73. a.c. 1391

 O.C.W. 9 38 17.4
H. W. D. 17.2
O. S Pobs

Note Dec. 13, 1880.
By book 019, clock slow
at 0^h mean time Feb. 19
(22^h sid. time) 12.73 with a
losing rate of 0.4; hence
clock slow at time of these
occultations 12.9; chronometer
slow 4.0, since it seems
by this note on this page
to have been 8.9 fast of the clock

1869 Feb. 19

A Star S. foll. C.S.E. 9 54 38.2
last, of about O.C.H. 38.4
6th mag. m.m. Di. obs.

Reverb. 1232.

Summer. Can't be seen.

B.A.C. 1406.

Immersion O.C.M. Obs.

by WWD	11	57	23.7
by CSP		57	23.9

Feb. 25 1869

 $\Sigma 932$

A.S. obs.

4th power

4th power

X 1.00

190.0

52.25

188.2

.24

189.0

.30

188.9

.24

188.3

.25

188.88

.25

.25

.27

.25

.25

52.255

Hence report distance.

Fixed wire accidentally disturbed
and coincidence not measured
as there was no time to repeat
the measurements.

1869 Feb 27

Coincidence $\frac{51.972}{51.976}$ A.S.
C.S.P.
Mean 51.974

Chronos	Chron time	5 ^h	45	45.3
	h	0	19	35
		5	26	10
	R.A.	5	25	19
	Corr.		-	51.5

$\Sigma 850$ Not separable

$\Sigma 880$ A.S. Obs.
4th P. * 11 00
Components equal

290.2
289.4
288.9
290.3
288.4

289.44

Coincidence Coinc.

51.95
96
97
99
99

51.972

$\Sigma 880$ Dist.

52.595
58
65
60
625

52.610

$\Sigma 880$ C.S.P. Obs.
4th P. * 11 00

106.2
106.7
105.8
106.3
106.6

106.22

1869 Feb. 27 Continued

 $\Sigma 880$ C. S. P. Obs.
Dist.

52.54

52.53

52.53

52.53

52.59

52.57

52.532

Coincidence

51.98

.98

.98

.98

.96

.976 $\Sigma 932$

Not separated

Visitors introduced by Prof. Agassiz
 asked if the telescope moved in a ball and socket joint
 Closed up on
 account of cloud

1869 Feb 28

Neb h 1565 Found
 Difficult
 to point spec-
 troscope on
 somewhat resol-
 vable C & P
 Transparent
 stars seen through
 it T.W.

Neb h 1567 Good for specth
 Easily seen as
 a blurred star
 in finder.
 Has appearance
 of a ring. Having
 the preceding
 end of ring is
 S. Elongated
 sp to n.f. T.W.

Neb h 1574 If seen with
 too far for spectra

Neb h 1594 Found a little
 cluster some
 minutes greater
 R. n.f. Nothing
 more

Mars



Tried it also with
 5 inch aperture,
 no more seen

1869 March 1 Monday

Orionis

rd Chron	6	12	00
h =	0	43	56
	5	28	4
R.A.	5	48	55
Corr Chron		+	30

HR	6	15	19
h	0	27	17
	5	48	2
R.A.	5	48	5
Corr. Chron.		+	3

Neb h 1425

Proper object
for spectr.
Can be recognized
in finder by its
just preceding a
star of 7th mag.
Can be well seen
in finder
Ques: whether fol-
lowing star be
nebulous. Looks
so.

Neb h 1440

Not good for
spectr.

Sirius

after long ex-
amination by
T.W. & C.S.P. no
comp seen.

1869 March 1

Neb h 1673

SVE pos angle 75°

np or sf. B

vs vm BM.

Too small for
spectr. Not visible
in finder. Bright
enough

Note Sept. 15, 1880. 75° np of is
presumed to mean 285° , but might
be $270^\circ + 75^\circ$, or 345° .

Neb h 1674 B.L. & E

Neb h 1712 Good for spectra

Neb h 1777

Too small for
spectr. Bright
enough

May perhaps
be found by
large star which
precedes it

1m 24^s

Neb h 1780

Good for sp.
Can be seen
in finder



Neb h 1790

Doubtful for
spectr

Neb h 1749

Good first rate for sp.

Wednesday March 3^d 1869~Coincidence
52.460
(3 settings)

0 of position 252°.5 Stars parallel to eyes
 position angle ~~275.9~~ 275.9 275.6 274.6 274.2 273.9 274.
 distance 58.68 58.63 58.58 58.66 58.58 58.65
 Coincidence 52.45 52.46 52.47 51.35 51.38 51.32
 zero of position 252.6 252.4
 position angle ~~275.9~~ 275.8

Sinus
 zero of position 252.5- Stars parallel to eyes
 Position 275.9 list 53.68 52.45 51.35
 275.6 63 46 5.83
 274.6 58 47 32
 274.2 66 35 51.33
 273.9 58 33 52.46
 274.0 65 32 1.13
 282 37.8 23.8
 274.7 53.630 52.49
 52.46 52.46
 1.170
 58
 1112
 23
 11.37

282
274.70

zero of position Angle of position
 92.7
 94.3

275.8

11.37

Haro. h.m.D.



H. Cole

1869 March 9

Aurora

Very brilliant
indeed

Sinus

Comp. seen
easily by J.W.
C.S.P.
Probably 8 mg C.P.
" 9 " J.W.

Aurora

Examined with
spectroscope
single line

at

J.W. obs

at

C.S.P. obs.

11 00

11 19

11 27

Single line
very remarkably
bright. As
bright as
brightest in Orion
nebula or brighter

J.W. saw also

right continuous
spectrum with esp. by
dark bands or stripes

more so than with the

the bright line

Some continuous

light far up in the air

the continuous spectrum

not nearly so bright

as that in Orion nebula

light line quite

narrow when

slit was closed up

Note Jan. 7, 1882. See p. 86
for a comparison with hydrogen.
The auroral line has a wavelength
of about 5650 by C.S.P., as in his
observation of July 10, 1868; see
N 13, 45. The observation by
J.W. seems to make it near
5700.

March 11 1869

Comet Pons

Searched for
it by C. S. P.

Not found

Shut up on
account of
clouds.

1869 March 14

Pons

Search for
it by Tux
LST
Not found

Shut up on
account of
clouds

Time	8	34	47.5
Hour Circle	21	18	30

1869 March 15

Coincidence
48.794Pons
CometSearch for
by J. W. & C. W. R.

Found
line on. 8 34 47.5
h = $\frac{21 \ 18 \ 30}{11 \ 16 \ 17.5}$
R.A.
Corr.
Dec) $\frac{11 \ 14 \ 14}{27^{\circ} 40'}$

Zero of position

73° 0

73° 0 unsatisfactory

Coincidence of wires

48.83

.81

~~.72~~

.78

.78

.77

48.794

Comparison

Diff. of decl.

Comet precedes star

(Cham. J. R. Arnold. 424)

9^h 42 30
46 57
51 15

81.84

80.51

84.81

80.51

81.74

4.16

81.39

48.79

32.6

32.8

h. 74

h. 75

6.4

33.2

66

325.4

5.4

Transits over 3 wires

55 47

54

56 13

14

58

57 40

47

58 5

15.2

51

Δ 2 2^m 13^sΔ 2 1^m 53^s

Arg. 2. + 27° 2009
2009

1869 March 15

$$\begin{array}{r}
 58.32 \\
 39 \\
 \hline
 58.5 \\
 129.5 \\
 \hline
 43.
 \end{array}
 \left. \vphantom{\begin{array}{r} 58.32 \\ 39 \\ 58.5 \\ 129.5 \\ 43. \end{array}} \right\} \text{comet}$$

$$\begin{array}{r}
 10 \ 0 \ 26.5 \\
 33 \\
 \hline
 51.5 \\
 111 \\
 \hline
 37
 \end{array}
 \left. \vphantom{\begin{array}{r} 10 \ 0 \ 26.5 \\ 33 \\ 51.5 \\ 111 \\ 37 \end{array}} \right\} \text{star}$$

Chronom. Bond 236

$$\Delta \alpha \ 1^m 54^s$$

$$\begin{array}{r}
 10 \ 2 \ 7.2 \\
 14. \\
 32.2 \\
 4 \ 0.5 \\
 7. \\
 25.
 \end{array}
 \left. \vphantom{\begin{array}{r} 10 \ 2 \ 7.2 \\ 14. \\ 32.2 \\ 4 \ 0.5 \\ 7. \\ 25. \end{array}} \right\} \Delta \alpha \ 1^m 53^s$$

$$\begin{array}{r}
 53.4 \\
 17.8 \\
 32.5 \\
 10.8
 \end{array}$$

Diff. of decl.

$$\begin{array}{r}
 10 \ 6 \ 40. \\
 10 \ 6 \\
 12 \ 18
 \end{array}$$

$$\begin{array}{r}
 83.65 \\
 82.69 \\
 81.57 \\
 \hline
 7.91 \\
 82.64 \ 33.8 \\
 48.79
 \end{array}$$

At
Approx RA at
Dec

$$\begin{array}{r}
 9^h \ 56^m \ 8 \\
 11^h \ 13^m \ 53^s \ 2 \\
 27^\circ \ 38' \ 3
 \end{array}$$

Note June 11, 1880.
Presumably G.C. 2380.
See next page.

Ephem place

$$\begin{array}{r}
 11 \ 9.5 \\
 26 \ 22 \\
 \hline
 + \ 4.4 \\
 + 1^\circ \ 16'
 \end{array}$$

Diff

Place of DM. +27 2009

1855	11 ^h 44 ^m 42.3	+27° 39.4
1860	11 14 58.3	27 37.8
	- 1 53.3	+ 5.4
	11 13 5.0	27 43.2
G.C. 2380	11 13 3.3	27 42.8

The record does not give
the sign of the $\Delta \delta$; the nebula
is assumed to be north of
the star.

1869 March 16

Nebula
of 15th March 1869Object observed
last night for
comet found
in the same placeNote June 11, 1880.
This object is G. C. 2380; see
reduction p. 75.

1869 March 17

Sun

In afternoon
C.C.P. observed
spectrum of
sun. Found
the usual
bright lines

Pons's Comet

Search for by
C.C.P. not
found

Feb 12 2343

Found by C.C.P.
for Mr. Francis
of Rumford Com-
mittee

Pons's Comet

Search by C.C.P.
Found

~~R.A.~~

h

R.A.

Corr.

9	59	35
23	35	20
10	18	15
—	3	
10	15	

Nebulous spot
shaped thus

Dec.

11	26	40
1	8	10
10	18	30



Did not seem
to move after
an hour

62° 36'
84 46'
+ 22° 10'
Dec

Note June 11, 1880.

G. C. 20863

α 1860 10^h 14^m 39^s δ 1860 +22° 18'
30
1869 10 15 9 22 15

Agrees with D'Arrest's
description. See his
catalogue for 1861, p. 131.

1869 March 18

Neb - 2 neb. $\frac{t}{L}$

8	36	35
22	26	00
10	10	35

Note June 11, 1880.
 G.C. 2054, 2055.

Dec

62	16
84	46
22	30

Neb. L 2575 Found in Cook-
 ing for Cornet

21	22
9	5
11	43

New Nebula C. 5 Pab

10	30	20
22	57	20
11	33	00

Perhaps 2500
 or 2502

+ 25 18

Note June 11, 1880.
 Most likely
 G.C. 2487.

1-090
 1868

1869 March 25

Coincidence
48.693

2 Can May. L.M. has never
seen the comp
better.

~~L.M.~~ Pos -
L.M. obs.

274.5
275.0
276.2
275.9
275.1

275.34

2 Can May Nothing can
be finer than
the appearance
of the comp. P.W.

illum defective on the meas me

Mean rejecting one
Mean not rejecting any

Cine

Note June 20, 1881.

49.783	49.793
48.693	48.693
1.090	1.100
22	22
10.68	10.78

10.68 used.

C. S. P. obs.
Pos.

X

dist

49.78
.79
[.84]
.79
.76
.795

48.783
49.793

48.67
.71
.71
.685
.70
.68

65.55

Mean 68.693

94.8
[92.2]
94.0
97.5
95.8
95.0

95.42

Mean rejecting 2nd measure

1869 March 25 continued

x Can. May L.S.P. Obs.
Dist.

49.77
.83
.80
[.90]
.82
.82
49.808

Zero of pos. (thought to be too small) 74.8
Telescope clamped in
declination, but
still moving so as to
disturb the measures.

75.2

75.0

74.8

74.8

74.6

74.8

74.9

74.8

625

J. W. Obs.
Zero of pos.

74.6

p Hydrae L.S.P. Obs.
this a
Comp dist
11" sf angle
35° ± from S.
mag 11 or 12

~~x Hydrae~~ ~~12 mag~~

115
22
1093

1869 April 3

Coincidence

49.734 f.o.s.p. 5 settings

48.810 f.w. 3 "

If the last is correct, the fixed wire
had been moved. More likely the whole
number of revolutions in the first set should be 48.
See p. 79, 84. On this supposition, mean of 8, 48.762.

71.2

h 1796

L.S.P. obs.

Zero of fws.

Nebula
compared with
a star w.p.

 $\Delta \delta$ $\Delta \alpha \cos \delta$

Coincidence

A.S. $\Delta \alpha \cos \delta$ $\Delta \delta$

51.91

51.78

51.99

51.96

51.85

51.898

58.68

58.52

58.43

58.10

58.20

58.386

49.72

.72

.74

.70

.74

49.734

58.70

59.31

58.83

59.10

59.30

59.064

51.59

.73

50.73

51.43

50.87

Note Sept. 16, 1880.
This set probably rejected on
account of uncertainty in
second reading.

1869 April 3 continued

h 1796

A. S. obs.

4 d

57.81
 51.11
 51.58
 51.84
 52.02

 51.672

Neb h 2170

C. S. P. could
not find this

Neb. h. 2102 Oral. J. W.

Pos. major axis

26.5
~~24.5~~
 26.5

Sees no bright
points in itPos angle of
star 19° full
The bright star

48.5 v. good mean
 48.2
 48.4
 48.3
 48.5

Dist of same star

Note Sept. 25, 1880.
 Use coincidence
 48.810 as on this
 page for reduction
 of the distances
 opposite.

Pos of major
 axis is obviously
 inclined to that
 of the star.

Coinc

79.78
 79.23
 54
 82
 52

4
 48.81
 .82
 80

 48.810

1869 April 3

Mik 8.2×4.2
 Powers 2 bright
 spots in it v.
 distinct to
 M & C 10.

C. S. P. thought
 he made out
 a ring or
 broken ring
 T.M. not

C. S. P. & draws

A star

Another (ft.)

350°

23.5

The discrepancy
 between the
 pos of ζ ac-
 cording to ζ
 and d'Arrest
 is owing to them
 having taken
 different stars

1869 Apr. 5 Monday

Coincidence 48.672 C.S.P.
 48.682 A.S.
 Mean 48.677

x Can. claj. C.S.P. seed
 comp. but
 not so ad to
 measure it.

A.S. ditto.
 Saw it several
 times but not
 well.

α Leonis

C.S.P. Elong

125° ±

ζ Cancri

C.S.P. obs.

A & B (the close pair) separated
 very well.
 Pos. angle

1145.0

Pos.

124.1

Pos.

322.7

324.7

323.8

324.04

x ⊥ ob.

Dist.

(rather wide)

48.75

.73

Coinc.

48.68

.66

.68

.66

.68

48.672

Dist.

(wide)

48.75

.74

1869 April 5

7 Cancri

d & B
A.S. Obs.

48.77

48.79

78

80

79

81

48.794

One

A.S. Ob

48.68

68

68.5

69

67.5

48.682

7 Cancri

d & B

Pos.

3219.2

3241.9

321.3

322.6

319.7

C.S.P.
Zero pos.

71.7

72.0

71.5

71.6

72.1

71.78

Aurora

Line.
Single line at
Spectrum
C.S.P. Obs

See also by
J.W.

11.47

Note Jan. 9, 1882. The reading 11.47
will answer approximately to a wavelength 5660.
See next page.

1869 April 5

Hydrogen Spectrum Observer C. S. P.

Bright line at 11 17 corresponds with aurora line

4 line 23.84

7 line 18.03

Faint line 13 78

Two other still fainter not measured one mentioned above
coincides with aurora line

Red line 6.57

to yellow line -

Note Jan. 7, 1882. The bright line at
11.17 will have a wavelength of about 5650

Note Jan. 9, 1882. See p. 93 for a more exact
measure of the hydrogen lines which confirms
this as regards C and the hydrogen G, but shows
that we should read 17.03 above instead of 18.03
for the F.

1869 Apr 6

Mars



C. S. P.

C S P sees

little or no-
thing

Irregular bright
border with mottled
spot in middle
seen by J.W. &
O.S.P. ✓

Neb h 2843

Good for spectro-
scope Not a
planetary

Neb h 2413

Good for spectr.
But rather hard
for finder. Still
visible.

April 8 1869 Coincidence 52.440

Leonis

C. S. P. obs.

5th Power

Zero pos.

* = 56

Comp. foll.

Colors both yellow

Pos.

reject measure
in brackets

71.0

[47.6]

50.5

51.3

50.7

49.7

49.0

50.24

4th Power
Dist.

52.80

[75]

181

Rej bad obj

79

[75]

182

Rej quite too close

182

52.808

Coinc.

52.44

.45

.43

.44

.44

52.440

3.68

414
8

April 8 1869

γ Leonis

AS Jo -
4th P.
* 1100 Pos.

47.8
48.3
47.3
47.9
47.8

46.82

Dist.

Neb h 2173

Too faint to
be easily found

52.91

.81

.89

.83

.84

(2)-854

Neb h 2838

Good for spectra.
CSP & both
fancy they see
some spic ality



Have br. star at
bottom of finder
to get it in the
field

with comet seeking
eyepiece

CSP.

Neb h 2890

Good for Spect
with comet seeking
eyepiece find
a good nucleus
and 4 or 5 bright
points,

Neb h 2884

Poor for sp.

Apr 10, 1869

Neb in Orion Examined with
new spectro-
scope by J.W.
& C.S.P. Both
thought they saw
H γ line

α Orionis Very fine in
new spectroscope

Aurora Not very fine
Not found in
spectroscope

Neb L 1949 Spectrum looked
for. not seen New
spect

Neb L 1950 Ditto.

Neb L 2343 Ditto.

Aurora Reexamined
 α one line
seen. Another
v. doubtful.

Apr 14. 1869.

Dome opened
Clouds prevented
observation

1869 April 15.

Aurora
covering
larger part
of sky
examined
with spectroscope
C.S.P. obs.

Very faint line
1958 again at about 1986

These
are

rough

Very bright
line 110763 afterwards 1127
Another 1213

Another about 2500

Auroral
streamers
converging
from all
quarters
to a point
near Leonis
at 10^h sid. time
Streamers
converging
spirally.
Spiral from
W to N. & E.
E to S. S to W.

Number of lines seen by
C.S.P. at 10^h 15^m sid. time

1086 ^{very} ~~mod.~~ bright

1302 mod. bright

faint: About 1377 diff. from 1302
near 1926 somewhat brighter
light near 2400

1732 may be wrongly
measured. Perhaps same as one of the others

Aurora first noticed at about 7¹/₂ M. J.
by C.S.P. Part of it was then rose colored
part of the usual yellowish green.
Rose color disappeared before telescope
could be turned on it.

1869 April 15 Continued

C. S. P. obs.
Spectroscopic
Low power

Bright line measured again
first measure
thought best

1125
1108
1126
1135
1133
1125 mean

Measurements of Hydrogen lines

Red line 655
another measure 660
third measure 664
4th " 658
5th " 660 659

F. Line measured 1697
2nd measure 1695
3rd " 1696
4th " 1703
5th " 1698 1698

Violet Line measured 2388
2nd measure 2383
3rd " 2373
4th " 2382
5th " 2369 2379

Note Jan. 9, 1882. This seems to answer to $\lambda 5625$ from the measures of the hydrogen lines on this page; but the observer reduced his measures to Huggins's scale at the time, and by Dr. Gibbs's article in the Am. Journal of Science, March 1882, (vol. 97, p. 203) we shall have $\lambda 5570$ equivalent to 1280 of Huggins's scale (see foot of this page). Reducing all the lines to wavelength in the same way, we have

	Huggins	Wavelength
1 Brightest	1280	5570
2	1400	5446
3	1550	5320
4	1680	5210
5 Near F	-	-
6	2640	4650
7 Near G	-	-

Telegraphed to Prof. Winlock at Washington.
Got fine spectrum of Aurora - not of the rosy part. Saw half a dozen lines at the following places on Huggins's scale.

Brightest 1280 Another 1550 Another Near F.
Another 1400 Another 1680 Another 2640
Another near G.

Measures rough. It clouded up before battery was put on.
(Signed) C. S. Poirce.

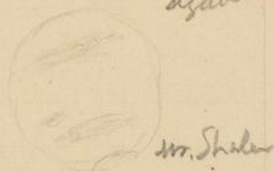
Apr 17 1869

Examined various objects with new spectro scope

Sunday Apr 18 1869

land

More than
usual on it.



Taken at
8:10 m. a. m.

April 22 1869 continued.

C. S. P.
obs.
3rd Power.

6th sweep ~~in~~ decl. $-11^{\circ} 50'$ (began at $10^h 56^m$)
7 stars examined - none double

7th sweep decl. $-11^{\circ} 20'$ (began $10^h 58^m$)

8th $-10^{\circ} 40'$ Dec

A.S. Obs.

16 Stars

Began $11^h 3^m$ (Annob 424)

9th sweep. Dec. $-10^{\circ} 45'$
 $-15^{\circ} 56'$ 36 stars

10th Dec. $-17^{\circ} 2'$
Began $11^h 30^m$
18 stars

11th Dec. $-18^{\circ} 3'$
Began $11^h 35^m$

Note Aug. 20, 1881.
Probably h 4496.

Double 8th

8 & 8 mag.

8 & 8 mag.

11	28	34	line (Bad 236)	33 stars
23	37	40		
11	50	54		
	8	36		
11	59	30		

12th Dec. $-19^{\circ} 0'$ 33 stars
21 stars $11^h 40^m$

48 obs

13th Sweep - 19° 30' 11^h 50^m
40 stars

14th Sweep - 20° 00' 11^h 50^m

Double 10^h & 11^h mag } 11^h 51^m 40^s Time (Bond 236)
Comp. sf. }
8^h ± }

12	00	16
0	16	19
11	43	57

C. S. Probs. 15th Sweep - 20° 15' 12^h 5^m
15 stars

16th Sweep - 20° 40' 12^h 9^m
14 stars

17th Sweep - 21° 0' 12^h 13^m
19 stars

2 stars 11 & 11¹/₂ mag. comp. n.s.p. dist. 10"

12	78	53.5	Time (Bond 236)
		36.	
-12	16	29.5	
0	23	25	
11	53	4.5	

18th Sweep - 21° 10'

Close double star 9 & 10¹/₂ mag. comp. sf. dist 2"
Separated with some difficulty

April 22 1869 continued

Measurement of double star last found

C. S. P. obs.

4th Power

* = 56

measured with difficulty
star difficult to resolve

pos.

39.6

39.2

37.4

38.73

dist.

coinc.

52.64 (wide measure)

52.49

52.49

52.49

52.49

Seen double only by glimpses; measures
accordingly rough. Dist. 1" to 1.5"

Another double?

examined with 5th power but
not separated

218.7
71.8
146.9
236.9
38.7
71.8
283.1
123.7

June 28, 1869. This book indexed except for double stars

