

KG
11365
206

H.52

H52

Equatorial

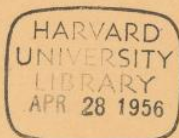
1863 Oct. 5th to Feb. 19th 1864.

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KB-11365.206



KG 11365.206



Comet 15 1863

1863 Oct-9

Clear Calm fine evening - Set upon comparison star in the early twilight. Comet readily found. Bright enough to be easily observed. Light mostly within 20" diameter.
Obsd by G.P.B.

Comet was compared

		α 1863	δ 1863
* $a = 6.5$ mag	1) with * a Arg +58° 1371	12 ^h 14 ^m 11.5	+58° 37'.1
$b = 8.12$ "	2 with * b " " 1373	12 17 25.0	+58 31.6

a is in Greenbridge, & Radeloff. b in Arg. zone.

Comet is n.f. star a and n.p. star b

Zero of Position used 82° 52'

Obs. by Chronograph (Note that E.C. was set back 2nd on the 4th & is now 0^h 34.6 slow)

	Star a	Comet	Δa
1 st wire	19 58 14.3	19 59 38.4	
2 " "	32.7	57.9	
	20 2 37.4	20 4 2.6	
	55.8	20.6	

Approximate correction of Ephemeris at end of this Book from them obs.
 $\sin \delta + 2'$ $\sin \delta + 0.7$

For Declination

20 8 23.5	71.48
20 13 00.7	71.80
20 16 10.8	71.86

Zero

61.43
61.43
61.43

Star a

Comet

20 20 5.4	20 31 31.3
18.5	43.0

20 23 24.2	20 24 49.8
37.0	25 3.1

Comet 11 1863 cont.

Comet 11 18 63 cont

1863 Oct 9 cont.

Comet Compared with star ϵ

Comet	Star	$\Delta\alpha$
20 32 41.4	20 34 28.7	
32 50.0	34 38.4	
35 40.8	37 27.4	
35 50.2	34 37.2	

For Declination

20 41 18.9	19.89
44 56.1	19.57
48 10.8	19.45

Comet	Star
20 55 55.5	20 57 41.3
56 4.9	57 50.9
58 25.0	21 00 10.9
58 34.5	00 20.7

Comet 11 1863 (Cont.)

1863 Oct 3^{9^h} (Cont.)

Comet showed decided motion

Reobserved for motion

Star	a	Comet
21	2 16.8	21 3 45.6
	2 26.7	3 54.2

For Dr.

21 13 40

73⁷.16
 Less 61.43
 11.73

At 19^h 52^m Comet prec star of
 11^h 0^m 11.83
 21 4 0 8.25
 1^h 12^m motion 3.58
 By Ephemeris at end
 of the Book 3.0

New Planet discovered by Watson Sept 14?

1863 Oct 15 Observed by G.P. B.

Planet is $9/10^{\text{th}}$ magnitude - was found by Watson's Ephemeris (with letter Sept 28) but considerably out in place. By comparisons with small stars near it the motion was very decided leaving no doubt of its identity.

Planet compared with star α 6.8 mag. Arg. Star $+5^{\circ} - 104$.

Approx. 1863 α $0^{\text{h}} 40^{\text{m}} 18^{\text{s}}$ $\delta + 5^{\circ} 59' 5$

By Eph " Planet $0^{\text{h}} 39^{\text{m}} 40^{\text{s}}$ $+ 6 1.0$

Planet is s.p. Star

By Chronograph

Line of Pos $82^{\circ} 58'$

Planet	Star	4α
82 $1^{\text{h}} 10^{\text{m}} 11.4$	11 18.6	-1 7.2
16.3	23.8	1 7.5

11 46.5	12 54.1 (a)	1 7.6
57.6	59.0	1 7.4

121 2.4	15 9.9	1 7.5
7.4	14.9 (b)	1 7.5

16 15.2	22.8	1 7.6
20.3	27.9	1 7.6

	Declination	Zero
1 21 23.6	84.73	61.46
23 45.6	84.88	47
26 19.7	84.99	<u>47</u>
28 23.5	85.31	

(a) 0.3 has been added to reading as noted in observation-remarks

(b) 0.1 " subtracted from " " "

New Planet (continued)

1863 Oct 15

G.P.B.

Obs. in AR repeated

Planet	Star	$\Delta\alpha$
1 33 10.3	34 18.3	-1 8.0
19.4	27.5	8.1
34 49.2	35 57.4	8.2
58.4	36 6.5	8.1
36 30.4	37 38.7	8.3
39.7	47.8	8.1
38 29.3	39 37.4	8.1
38.3	46.7	8.4

Orion - Variable stars -

1863 Oct 15th - 16th am C.P.B.

Very thin haze - good definition

Comparisons for magnitudes

236 = sid time

Chr. No 236	2 ^h 12	$\zeta''\zeta'' > \zeta''\zeta''$	by 2 grades
		" > μ'''	2 "
		$\mu''' > \iota''$	1 "
		$\iota'' > \nu''\nu''$	0.5 "
		$\nu''\nu'' > \theta''\theta''$	0.5 "
		$\iota'' > \zeta'$	0.5 "
		$\zeta' = \nu''\nu''$	
		$\epsilon' < \theta''\theta''$	0.5 "
		$\epsilon' < \zeta'$	1.5 "
		$\zeta''\zeta'' > \epsilon'''$	1. "
		$\epsilon''' > \mu'''$	1 "
		$\mu''\mu'' < \theta''\theta''$	2 "

Could not see the new star of 1863 Feb 20 & Mar 2 although comparison of ι'' is very plain - as are also the small stars about the Trapezium. It is certainly a variable.

Near Trapezium ρ at least as bright as in Jan & Feb last

Orion - Comparison of Magnitudes

1863 Dec 7

Vision tolerably good - quite clear &

$$F'F'' > I''I'' \quad 3^r$$

$$F'F'' > M''' \quad 2^r$$

$$F' > M''' \quad 0.3$$

$$'' > '' \quad 2$$

$$'' > '' \quad 1$$

$$'' = E'''$$

$$'' > N''N'' \quad 2$$

$$F' > E' \quad 2$$

$$I'F' < N''N'' \quad 0.5$$

$$N''N'' > O''O'' \quad 1$$

$$I'' > M''' \quad 0.5$$

$$'' > O''O'' \quad 1$$

$$I''I'' = M'''$$

$$'' < M''' \quad 0.7$$

$$M''' > P'' \quad 1$$

$$'' > P'' \quad 0.5$$

$$'' < F' \quad 0.5$$

$$F'F'' > F' \quad 2$$

 $g = 1$ distinction in brightness certainly perceptible

The vision is tolerably good - cannot see the "new" star between $H''H''$ and $D''D''$ (below line a.p.) Although $i''i''$ is very easily seen

Small v and p are readily seen but not $h''h''$

$$H''H'' > D''D'' \quad 0.3$$

Began at 4 30 Sid

End 5 30

I always look at Sinus clausus etc for change of feature but was never satisfied of any not accounted for by change of atmospheric condition. The region close s.p. The trapezium shows very plainly the wispy structure. The wisp α is narrower than in an engraving.

Looked at small stars of nebula

Orion Magnitudes

1863 Dec 8

Calm slight haze - definition inferior

 $\frac{1}{4}$ 10" sid.

$$17'' < F''P'' \quad 0.0$$

$$'' < '' \quad 1.5$$

$$F''P'' > E''' \quad 0.5$$

$$M''' > 1''1'' \quad 0.5$$

$$M''' = 1''1''$$

$$M''' < 1''1'' \quad 0.5$$

$$E''' > G''' \quad 1.5$$

$$F' = A''N''$$

$$F' > Y' \quad 0.5$$

$$F''P'' > M''' \quad 1.5$$

$$'' > A''N'' \quad 2$$

$$1''1'' > N''N'' \quad 1$$

$$N''N'' > O''O'' \quad 1$$

$$F' = 1''1''$$

$$F' > M''' \quad 0.5$$

$$M''' < E''' \quad 1$$

$$I'' < I''I'' \quad 1$$

$$M''' < O''O'' \quad 1.5$$

$$Y'' > N''N'' \quad 1.0$$

The atmosphere is not favorable
nothing of new stars seen F''I''

Although I see h''h'' by glimpses

1863 Dec 9 Wed.

Began at 4^h 20^m Sid $7^{\circ} 8' > 7^{\circ} 1'$ 1

" > M^m 1.5

 $\Delta''' \leq 1'' 1'' \quad 0.5$
$$F''F'' = F'''$$
$$1''1'' > N''N'' 0.7$$
 $1'''' > 0''0'' \quad 2$
$$A''X'' > a''o'' \quad |$$
$$N''N'' \leq 2'$$
$$f' = y'$$
$$x'' < y' \quad 1.5$$
$$I'' < I'' I'' 2$$
$$F''' > G''' \quad 2$$
 $G''' > F'''$ 1
$$E''' > M''' \quad 1.5$$
$$M^m > G^m \quad 1$$

End at 4^h 58

$$F'F'' = F'''$$

Definition too much disturbed for satisfactory work

Orion Magnitudes

1863 Dec 10

Clear - Cold +5°

Worst character of definition

Sid. t. 4^h 50^m

$$Z' = \alpha'$$

$$Z'Z'' > \mu''' 1$$

$$'' < E''' 0.5$$

$$'' > 1'' 1.5$$

$$\mu''' > 1'' 0.7$$

$$\mu''\mu''' > 0'' 0.7$$

$$\gamma' > \mu''\mu''' 0.7$$

$$1'' < 1'' 1$$

O¹ at times disappears in tumultuous undulations of the atmosphere -

Of little weight excepting to illustrate the effect of bad vision

No star excepting ϵ of Trapezium is to be seen in R. Hygenius.

And 5 10

The faint star in dark channel between α' and γ'' not visible - though easily seen last night & was brighter still on the 9th

Orion Magnitudes

1863 Dec 15

Com 3^h 40^m sid

$$Z''Z'' > \beta''\beta'' \quad 1.9$$

$$\beta'' > \mu''' \quad 2$$

$$\beta''\beta'' > \mu'' \quad 0.5$$

$$\beta''\beta'' > \nu''\nu'' \quad 1$$

$$\zeta' > \gamma' \quad 1$$

$$\zeta' > \mu''' \quad 0.5$$

$$\beta''\beta'' = \zeta'$$

$$Z''Z'' > E''' \quad 0.7$$

$$\mu''' > \nu''\nu'' \quad 0.5$$

$$\nu''\nu'' > \sigma''\sigma'' \quad 1.3$$

$$\nu''\nu'' = \gamma'$$

$$\beta''\beta'' > \beta'' \quad 2.5$$

$$\beta''\beta'' > \mu''' \quad 0.7$$

End at 4^h

Vision much disturbed - clear with boisterous gusts of wind.

for Lencrothen

1863 Dec 15th

Looked for Lencrothen. There were some small stars near the place of the planet, about as follows



a, b, 10th mag : x 14th y 12th

x and y are quite near when the planet should be according

to Schubert's ephemeris, but the wind was so violent that I could not even get a transit reliable within 3 or 4 seconds of time. The vibrations of the inst. were about 30" each way.

Orion magnitudes

1863 Dec 16

Calm - a few clouds with clear sky between

Sid 4^h 5

$$\gamma''\gamma'' > E''' 0.7$$

$$\gamma''\gamma'' > \delta''\delta'' 2.0$$

$$\gamma'' > M'' 2.5$$

$$\delta''\delta'' > M''' 0.5$$

$$\eta''\eta'' < M''' 0.5$$

$$\delta''\delta'' > \eta''\eta'' 1.0$$

$$\eta''\eta'' > \theta''\theta'' 0.7$$

$$\eta''\eta'' < \gamma' 0.7$$

$$\gamma' > \theta''\theta'' 1.5$$

$$\gamma' = \iota''\iota''$$

4^h 30^m

$$\gamma' > M''' 0.7$$

Observed as follows

$$\gamma''\gamma'' > E''' 1$$

$$\delta''\delta'' > M''' 1$$

$$\delta''\delta'' > \eta''\eta'' 1$$

$$\eta''\eta'' > \theta''\theta'' 1.5$$

Orion Magnitudes

1863 Dec 29

Nearly Clear slight haze

Vision tolerably good

4^h 10^m sid- grade

1g = certain dif. of light

 $1''1'' > M''' 0.5$ $7''7'' > 1''1'' 1.7$ $" > M''' 2.0$ $" > E''' 0.7$ $F' E' = M'''$ $7' < M''' 0.5$ $1''1'' > 7' 0.7$ $N''N'' > O''O'' 1.$ $g''g'' > N''N'' 1.3$ $M''' > N''N'' 1.2$ $Y' > N''N'' 0.2$ $E' > O''O'' 0.3$ $M''' < E''' 0.7$ $7' > E' 2.0$

[See 1863 Feb 14 "M''' certainly not < E''' "] also Feb 16

I cannot make out the "new star"

N. / 1''1''

'h' star not seen

The weather has been very cold & unfavorable for the last fortnight

Orion Magnitudes

1863 Dec 30

Calm - Clear - definition pretty good

S.d. 4 20

$$\zeta''\zeta'' > \theta''\theta'' \quad 1.0$$

$$\zeta'' > \mu''' \quad 2.0$$

$$\theta''\theta'' > \mu''' \quad 0.5$$

$$\zeta''\zeta'' > \epsilon''' \quad 0.5$$

$$\epsilon''' > \mu''' \quad 1.0 \text{ (not more)}$$

$$\epsilon''' < \delta''' \quad 0.2$$

$$\epsilon''' = \delta'''$$

$$\epsilon''' > \gamma''' \quad 1.5$$

$$\mu''' = \zeta'$$

$$\theta''\theta'' > \zeta' \quad 0.7$$

$$\theta''\theta'' > \lambda''\lambda'' \quad 1.5 \text{ much brighter}$$

$$\lambda''\lambda'' > \sigma''\sigma'' \quad 1.0$$

$$\lambda''\lambda'' < \gamma' \quad 0.7$$

$$\theta''\theta'' > \delta'' \quad 2.0$$

$$\delta'' > \sigma''\sigma'' \quad 1.0$$

$$\epsilon''' > \theta''\theta'' \quad 0.3$$

$$\mu''' = \rho''$$

$$\epsilon''' > \zeta' \quad 0.7$$

L^h 50

The variable ϵ star looked for & not seen
 nor is the new star n.p. $\theta''\theta''$ visible although
 conditions are favorable & small stars in the
 vicinity easy. Comp. of $\theta''\theta''$ is always in sight

Orion Magnitudes $w = h - 8 \text{ star}$ 1864 Jan 3 Sunday
5^h 30^m sid.

Clear - definition tolerably good -

Saw immediately on putting the eye to the telescope that the
old variable 'k' has reappeared (See also April 16)

It is quite conspicuous = k (p)



5 40

$$g''g'' < \gamma''\gamma'' \quad 1.0$$

$$g''g'' > M'' \quad 1$$

$$'' > N''N'' \quad 0.7$$

$$M'' > N''N'' \quad 0.5$$

$$g''g'' > N''N'' \quad 1.3$$

$$\gamma''\gamma'' > E'' \quad 0.7$$

$$E'' > D'' \quad 0.7$$

$$E'' > g'' \quad (2.5)$$

$$'' > M'' \quad 1.5$$

$$g'' < M'' \quad 2.5$$

E'' looks brighter than Apulats

E'' is certainly brightest

g'' is too small for comparison

g'' seems to be smaller than Apulats

$$\gamma''\gamma'' > E'' \quad 0.5$$

$$\gamma'' > M'' \quad 0.5$$

$$g''g'' > F' \quad 0.5$$

$$g''g'' > M'' \quad 0.5$$

$$V' > N''N'' \quad 0.5$$

$$N''N'' > O''O'' \quad 1.0$$

$$M'' < E'' \quad 1.5$$

Orion New Star of Feb 20 1863 not visible

Jan 3 cont.

(Notation of Jan 23)

The sudden reappearance of ω (k star) is highly interesting. It was looked for carefully on 29 & 30 & although at one moment there was a suspicion (as often before) of a star or brightish knot of nebulaosity it did not stand alone scintillating - whereas now the star is conspicuous scarcely inferior to φ and about = ρ .

At times the vision was excellent bringing out σ & ϵ & δ but nothing could be seen of the 'new' star n.p. $9''9''$. Though very carefully sought for. Comp of $9''9''$ p etc all brighter

I have long found it difficult at least this season to make out the small star in R of H¹ 4" & 40" n of it. But there is either a very faint star there precisely on the edge of the nebula or else a knot of nebulosity.

Looked particularly at clustering of stars and am per-
suaded that they are associated with the aggregations of nebulae
about ϵ & δ Cygnus.

The nebulousity about c is quite bright involving a large group of stars

Orion

1864 Jan 4 G P B

5^h 20^m Saw the 'h' star (ω) for a few moments only between clouds about as bright as ρ not quite = φ certainly sun-
Clouded suddenly

Was absent until 14^h & on 16th could not see β when ρ could easily be seen though not always on account of atmospheric disturbances

Seen in April.

Aglaja

1863phae
JMS

Planet compared with star Mercur B.V. 1165

-w' for AR 173° 0'5"

Planet Star

-Su-

26.3 0 ±

Aglaja
Star7 29 31.4 43.3 -34.60
30 6.5 17.8 -31

-35.07

Aglaja n.p. x

Aglaja
Star30 45.6 52.0 -35.10
31 20.7 32.1

-35.52

A.
S.33 1.3 12.6 -35.15
36.4 47.8

-35.48

A.
S.34 6.3 16.2 -35.15
41.7 53.1

-35.44

A.
S.35 7.4 19.0 -35.30
42.7 54.3

-35.55

7 39 30

58.360 49.833

+1'23"8

41 39

58.343 50.047

27.3

43 29

58.330 50.062

21.1

46 13

42.958 34.830

20.0

48 6

43.110 34.918

20.3

A.
S.51 40.4 50.1 -36.00
52 16.6 25.9

-35.60

A.
S.52 52.0 59.7 -36.20
53 28.2 35.9

-36.75

A.
S.53 56.4 64.0 -36.15
54 32.5 40.2

-35.70

-35.51 +1'21.3

Planet & El

7 41 34

AN in K - 2.37
in A + 0.1

The observation was not a very good one, the observer was much fatigued and the planet too high up for convenience.

Aglaja

1824 Jan 11th
1825

Wejn B.V. 1185 = Lat. 13000,

Has been observed in N.R. to night

1800.0 (100)	6 34 57.39	2843	+30	18 56.1	-3.1268	no	6370.5	63718.5
	4 5.82			-3 26.38		no	3017'18	+30°16'50
1825.0 ²³⁹⁹ 1828.1	36 33.59	3841		17 33.2	3.18			
	2 29.78			-2 8.48		dp	9.76644	9.76644
	6 39 3.21		+30	15 29.7		since	9.99432	9.99407
	3.37			24.7			1.93234	1.71720
46 (provisional reduction)	3.45						3.10843	2.87824
Alt	6 39 3.45		+30	15 26.		no	9.20623	9.21542
	+2.77			-7.6			1.69310	1.47751
Planet-Str	-35.51		+1	21.3	refr. invisible		49.328	30.027
	6 36 30.71		+30	16 39.7			176.495	119.749
for Parallax	+0.132			+1"89			6.22	
Parallax	+0.06			+0.8				
Powaluy	6 39 33.36		+30	15 37.7		G	40 39	
Ant. Powaluy	-1 2.59		+1	2.8		L	99 46	
						H	34018	
						dp	9.7659	+15.24
						in G'	9.8043	+3.24
						G	0.9415	+23.06
						in G'	9.8869	+41.54
						no	0.0636	-6.76
						in H'	9.9924	+1.76
						L	1.2058	-2.55
						in H'	9.2368	-
						no	9.7023	
						27	0.470	

6 7 41 34
 first 14
 7 41 20
 19 21 49
 12 19 31
 21
 12 17 30

M.L. Lamb.

1341 [Med - 0.5]

Orion

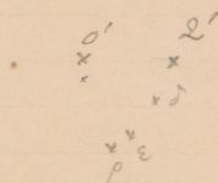
Compare star N''

1864 Jan 16

Clear but definition not good Obs. difficult.

Oct 16 236 $E''' > M''' 1.7$ 31 30 $E''' > D''' 0.3$ $F''F'' > M''' 3$ $G''G'' < M''' 1$ $" > I'' 1.7$ $" > " 1.5$ $" = N''N''$ $N''N'' = Y'$ $N''N'' > O''O'' 1.3$ $O''O'' < I'' 0.7$ $N''N'' > I'' 0.5$ $G''G'' > I'' 0.7$ $" = F'$ $M''' < P'' 0.5$ $E' = I''$ $F''F'' > E''' 0.7$ $M''' < E''' 1.5$ $F''F'' > D''' 1$ $G''G'' > N''N'' 0.7$ $G'' > F'' 1.5$

$F''F''$ is brighter too much so for comp
 $G''G''$ fainter is too small to be
 compared with $F''F''$



p and e are both brighter than δ
 the latter being not easily seen
 when the former at once strikes
 the eye. Yet it may be occasioned
 by the bad definition. $p < e$
 being on a rather darker ^{part of the} ~~background~~ ^{appearing}.
 than δ $e > \delta 0.1$

ϕ (little) is less than p and could not
 at first be seen. ϕ is Liapounov's S_{III}
 supposed variable by Struve
 Of the stars about trapezium using
 notation of 1863 - When best seen

$\beta = r_1$ $r_1 > \phi$ perhaps. These
 three not very unequal p decidedly
 smaller

NB At no time could any sign of
 the variable 'h' be discerned. It must
 be much $< p$. The vision
 was always disturbed.

ϕ (Liapounov's S_{III}) is on rather
 bright ground than p although the
 latter is nearer to a much brighter edge
 of Alep. Branch. So that they are
 both rather uncertain under bad
 vision. See obs Mar 2 1863 when
 new star = p and $> \phi$ hence
 $\phi < p$ as now.

Respighi's Comet (Watson's)

1863 Jan 6.

7/45 (orig)

Compared with stars a and b

$$a = \text{gr } 2934 = \text{Hijp (2) XIX } 1328$$

$$b = \text{Hijp (2) XIX } 1318$$

Compared with a,

AR by Transits (Chs 236)

Dist. by measures (clock in)

Comet is north preceding a

N¹ 353° 11'

AD 4x

Comet 2 18 41.8 10.6 -23° 35'

a 28.3 33.8

Comet 19 32.9 39.6 23.20

a 57.0 62.9

Comet 21 34.6 41.2 -22.40

a 57.1 63.5

2 30.2 26° 41' 2"

Comet
Star at
transit

Comet at (in original)

+5° 45' 1"

61.631

right to faint

31 2 25.912

5 50.0

61.660

31 57 25.493

5 54.1

61.625

right to faint

32 44 25.579

5 53.2

61.624

Comet 40 6/6.6 (5) 5.5

61.624

a 41 6.2 12.8

-17.55

Comet 42 19.3 35.3

-17.00

a 36.2 42.4

Comet 43 28.3

-16.10

a 44.8

Comet 44 3.8

-16.10

a 20.3

Comet 44 39.2 46.1

-16.35

a 55.5 62.5

Orion

1864 Jan 17

Calm sky hazy with strong moon-light Delimitation pretty good

7^h sid $I'' < N''N'' 0.5$ $" > O''O'' 0.7$ $" < M''' 1.5$ $F''F'' > M''' 2.0$ $" > E''' 1.0$ $D''' = E'''$ 7²⁰ $\gamma'' > N''N'' 0.3$ $\eta'' < N''N'' 0.3$ $" > I'' 1.2$ γ'' is placed precisely $\pm 1''$ on the outer edge of the bright straight wisp on prec. boundary of R . Hugg-
d is well placed for actual test of motion in R .

[Vide M.C.B. for Dec 6 1847]

his star $z = \gamma''$

Clouding up-

"

Order of brightness

 $B \Phi > \gamma''$ but just perceptibly $\gamma'' = \text{or} > \Phi$ $\rho < \Phi$ decidedly but is nextbrightest ξ & π just in sight σ not visibleVariable ι not visible with utmost attention and must $\beta < \xi$ or π I'' appeared fainter than on last evg - γ''

Orion

1864 Jan 19

Clearing off - some haze in sky & Moon near
clouded suddenly stopping obs.

5^h 10^m sid

$$I'' > N''N'' \ 0.3$$

$$N''N'' < Y' \ 0.5$$

$$M''' > I''I'' \ 1.0$$

$$M''' < F''F'' \ 0.5$$

$$E''' > F''F'' \ 0.3$$

$$N''' < E''' \ 0.3$$

$F''F''$ looks decidedly fainter

As it clouded up $L' = C''C''$

G.P.D.

No 16 star

Orion

1864 Jan. 20

Clear. bright moonlight definition not good.

6^h 30

$$M''' > F''F'' \quad 0.7$$

$$M''' > I''I'' \quad 1.5$$

$$F''F'' > I''I'' \quad 1.0$$

$$I''I'' < N''N'' \quad 0.3$$

$$I''I'' > O''O'' \quad 1.0$$

$$I''I'' > I'' \quad 0.7$$

$$I'' > O''O'' \quad 1.0$$

$$I''I'' > J'' \quad 0.3$$

$$M''' < E' \quad 0.3$$

$$M''' < E''' \quad 0.3$$

$$E''' > D''' \quad 0.3$$

$$E''' = D'''$$

$$E''' > M''' \quad 0.7$$

$$M''' = F''F''$$

$$E''' > F' \quad 0.5$$

$$M''' > F''F'' \quad 1.0$$

 $F''F''$ much fainter than it has been


 Region near N'''
 x
15-16
7^h 30
 $r_1'' = B$ or $r_1'' > B$ perhaps

 $\phi > B$ a little

Others seen only by glances

A chart of all the stars from $2^\circ N$ to $1^\circ S$ of θ Orionis would illustrate the aggregation of stars about nebula effectively.

No sign of h star or that near $I''I''$ but vision is bad.

Orion

1864 Jan 21

Calm clear good definition Bright moonlight

3^h 50^m net.

$1'' = N''N''$
 $1'' < N''N'' 0.3$
 $N''N'' = Y'$
 $M''' > 1'' 2.0$ at least
 $M''' > F''F'' 0.7$
 $F''F'' > 1'' 1.3$
 $M''' < E''' 0.7$
 $D''' > E''' 0.3$
 $1'' > 2'' 0.7$
 $1'' < N''N'' 0.3$
 $M''' = F'$

Zones near C + 2 Orionis (continued)

Note added March 21 1864.

In carrying foregoing program into effect, no small stars which could be observed were omitted, excepting when so faint that it was a matter of great difficulty to distinguish them near the scale. A every effort was made to secure dark clear skies.

In estimating magnitudes the design was to retain my usual habit for Zones. The 9th mag. being Proxima & 12th the last mag. readily observed on the illuminated scale. The 17th mag. are near limit of vision, & barely to be seen up to within 20" or 30" of edge of scale.

The latest zones of small stars were observed after Orion had passed meridian considerably (to avoid the twilight)

The zone near 2 Orionis (small stars) was observed under peculiarly fine atmosphere, but several others were taken in very clear dark skies & none without precautions to secure a fair comparison inter se

Orion - Zones (C. Orionis)

864 Jan 21
GRB obs.
L.H.S. rec.

See for explanation two pages p back.

EC is 44° fast of sid. time
Ther. +22Zero $83^\circ 14'$ (Edge of Scale) determined at $h = 1^\circ 05'$ East.
up to March 3 when Mercury was removed.

Sky a little hazy with bright moonlight.

12 655 } False start
9 520 }Magnitudes on GRB (Mica Scale B same as has been in use since
Old. Zone scale 1852)

Zone					
37 ^m 10.5					
I A	12	6 55		EC = 4	36 58.6
B	9	5 20			37 1.0
C	13	4 10			37 8.7
D	13	5 28			37 45.7
E	10	2 20			37 56.1
		ADK			
F	13	3 12		4	38 14.7
G	13	5 35			38 36.9
H ^{on}	10.11	0 20	Prob. not.		38 49.4
I	13	4 05	3 28 Jan 27		38 50.8
J	13	7 30			38 59.7
		D.B.B			
K	9.10	-0 25		4	39 33.3
M _a	9	9 19			39 45.5
N	12	5 30		40	9.4
P	10-11	7 32		40	15.4
Q	9.10	0 1		40	25.9
		D.D.			
R	13	5 50		4	41 4.1
S	11.12	4 15		41	5.6
	11	7 45		41	31.8

The notation in [brackets] is the former Orion notation.
That underlined is to connect with Zones further north and south

[L is in 1° of Orion's zone, also W.]

Tables I & II revised as to Declinations & Magnitudes Jan. 27

<u>Fl</u>	<u>10².4.1.</u>						
A	14	1' 30"			4	46	59.9
B	12	8 34 44.				47	32.3
C	13	6 50	[See Revision - Zone]			47	39.3
D	13	2 40 50	2' 50" Jan 27 th ; following 3' 2" n.f. in d.p.			47	41.4
E	7.8	5 16	two stars together 10" in d 2' 5" in d			47	54.6
			Weisse, Piazzi				
F	10	7 40			41	48	26.9
G B	8	9 44	Weisse			48	35.3
H	10	1 50				48	44.3
I	6	3 20	Coronis			48	53.8
K α		- 0 35				49	2.1
L	7	2 20	G ₂			49	10.4
		~~D. (14)~~					
M	11	8 45				49	34.0
		~~B. 10~~					
N	13	1 40				50	30.4
O	12.13	2 50				51	10.6
P	12.13	2 55 ns				51	12.2
Q	8	5 20				51	24.0
R	11.12	6 50				51	26.5
		D.					

This is the preceding star of the double.

C-Orionis. Jones.

1863phae.proj..206B

1864 Jan 21 under
1863 B 141.
1865 210

III = II repeated

A	14	1 33	
B	1	8 43	
C		6 50	ns
D		2 50	ns
E	9	5 18	
		B.	
F	10.11	7 40	8. on V
G	9	9 44	again
H	6	3 27	9 46
I	2	-0 33	3 27
J	7	2 20	-0 29
K	13	5 50	2 25
L	11	8 45	
		B D B	
M	14	1 40	
N	12.13	2 55	
O	12.13	3 4	no same as II. P
P	8	5 20	
Q	11	6 55	

22.		
4	56	21.8
	56	53.9
	57	0.5
	57	2.9
	57	15.9
4	57	48.2
	57	56.4
	58	15.4
	58	23.4
	58	31.8
	58	46.5
	58	56.1
4	59	52.0
5	0	32.3
	0	45.6
5	0	47.9

C. Morris Jones

1866 Jan 21.
4213 obs.
214.5 rec.

IV. 40' n. of II. III.

A	91	8 40	
B	9.10	9 18	no
C	90	5 17	
		O.D.	
D	92.13	1 12	
E	13	3 24	
		O.D.	
F	12.13	7 50	
G	13	5 10	no
H	13	0 40	
I	10.11	10 12	
J	9	-0 16	
K	11	+0 20	
L	11	8 2	
M	11.12	2 38	
N	11	2 54	no
O	12	7 30	
P	92	7 20	
		O.D.	
Q	12.13	4 10	
R	12.13	9 3	
S	12	5 40	no
T	12	3 46	
U	13	5 20	

5	9	13.2
	9	14.9
	9	32.4

	9	49.1
	10	2.5

	10	30.6
--	----	------

h	10	31.5
---	----	------

	10	41.4
--	----	------

	10	46.2
--	----	------

	11	23.3
--	----	------

	11	24.0
--	----	------

	11	31.4
--	----	------

	11	36.2
--	----	------

	11	37.1
--	----	------

	12	1.0
--	----	-----

	12	14.6
--	----	------

	13	11.9
--	----	------

	13	20.7
--	----	------

	13	22.2
--	----	------

	13	40.2
--	----	------

	13	49.9
--	----	------

Should read 0'32" Jan 27

Comp 11th 10 13
-0 14

C. Morris Jones

1863 Jan 24
 1863 obs.
 1863 dec.

V 10' n. of 4.			EC		
A	12	829	5	20	0.2
B	9	048 ns		20	1.6
C	12.13	223 ns		20	3.4
~~D~~	~~14~~	~~53~~		20	19.7
E	12.13	253		20	32.0
		B. D. B.			
F	13	820 ns		21	1.7
G	11	940		21	7.3
H	13	148		21	18.7
I	13	450		21	22.4
J	12.13	310		21	27.4
K	10	03	04	21	32.5
L	9	412	Weiche	21	36.4
M	9	100	958	21	47.0
N	13	030		21	58.8
O	10	152		22	4.3
P	7.8	358 } same as B	Wien	22	26.0
Q	7.8	812	Weissen	22	26.0
R	9	817	Weissen	23	10.1
S	12.13	930		23	39.7
T	12	810 ns		23	44.9
U	11	818		23	55.4
V	13	84		24	11.3

Orion's Zones

1864 Jan 21.

18610 obs

2115 no.

VI 10' n of V

A	13	6 10	Same as 12 of Zone VIII but discrepant 10' in Dec	5	30	50.8
B	10	2 15			31	3.7
C	13	1 35			31	23.7
D	12	8 54	8 55-		31	39.3
E	11.12	5 56	5 54		31	46.0
F	11.12	3 57	3 56		31	56.5
G	11	5 7			32	7.3
H	10	1 28			32	12.4
I	8.9	0 16	8 is a close double the 2' or 3" angle of position (verified afterwards) 300° - comp. 9-10		32	29.1
J	11.6.12	3 12			32	41.2
K	9.10	2 36 no			32	45.0
L	10	0 45			32	49.8
M	8.9	2 8	double comp 11' dist 4" at angle of position 50°		33	17.0
N	12	8 48			33	37.4
O	11.12	2 30			33	59.2
P	11.12	2 37	[Q marks 1' 37" Feb. 27 th]		34	3.7
R	12.13	-0 14			34	22.2
S	12	7 38			35	19.9
T	11	4 6			35	28.8

VII Same as VI

12.13 D

A 20	12.13	8 50		5	42	21.6
B 5'	11.12	5 50			42	11.5
C	11	-0 11			42	15.1
D 1"	11.12	3 50			42	21.7
E	12	2 11			42	32.3
F	9-10	0 20	probably 1 20		42	37.8
G 8	8	0 12	1' 27" by zone book. (Examine Dec)		42	54.8
H	11	3 10			43	6.7
I	9.10	2 30			43	10.4
J	10	0 43			43	15.4
K	13	5 50 no			43	27.2
L	—	2 3	double		43	42.5

1864 Feb. 25

6' 8" 1' 8" *

2 17 2 13

Different
from
of 1864

5 10

1 31

0 19

2 42

188

VIII

6' north of VI

Chen.

A	12.13	9 25	922	6 31 2.7	6	21	18.2
B	13	0 2	See A of Zone VI		21	34.5	
C	14	2 45			21	43.7	
D	12	2 55	2 50	6 32 6.6	22	22.7	
E	12	-0 6	-0 8	13.4	22	29.6	
F	12	6 59			22	36.6	
G	12	3 14			22	40.8	
H	12	0 20			Same as R as prev. star. <u>22 40.8</u>		
<u>OB.</u>							
I		-0 50	No AR (To be supplied in Revision)				
J	13	-0 12			23	8.3	
K	13	+0 20			23	10.0	
L	12.13	+0.20			23	17.0	
M	12	5 48			23	31.1	
N	13	4 30			23	38.2	
O	13	5 45			23	45.9	
<u>OB.</u>							
P	11	2 48			24	20.8	
Q	13	1 15			24	21.3	
R	12	5 58			24	55.9	
S	13	8 11			25	28.8	
T	13	4 50			25	35.4	
U	14	5 32			25	50.5	
V	12	1 40			26	3.6	

C O Morris Zone

1863 Jan 21

P. 12.06

X 10' n. of K III

B B B

A 5	12.13	-0 32
B 5	12.13	1 50
C	12-12	6 10
D	12-12	9 20 ns
	12	13 20
E	13	5 50
F	12.13	5 50 ns
G	12.13	1 0
H	12.13	1 4 ns
I	12	9 40
K 7	9	1 16
L 7	13	-0 18
M	12.13	5 55
N	12.13	-0 11
		B. 13
O	12.13	4 20
P	11	9 23 ns
Q	12	2 54

6	34	46.2
	34	49.6
	35	10.1
	35	11.9
	36	3.8
	36	8.1
	36	20.0
	36	21.6
	36	44.4
	36	50.8
	37	14.4
	37	28.3
	37	47.4

	38	55.6
	38	57.1
	39	19.3

go on 13⁵ in revision

No star visible in finder within 20' n of ^{star} η , within the limits of the zones in AR.

1863 Jan 25th AR sheets read off in duplicate by Mr. Cony & E. H.

The Moon stars	8	22	36.6	} Done
To be revised		22	40.8	
		23	—	

Orion Zones (C-Orionis)

1864 Jan 21

Owing to the number of stars near the middle of the zones many bright stars even have not been included in the preceding zones.

The magnitudes are very insecure from moonlight & the haste of making obs.

The stars lettered in general serve as connections with zones next north.

The actual limits in R extend considerably beyond 2^m in R from θ on either side although it may happen that no star occurs outside of 2^m .

Orion

1864 Jan 22

Clouds opened for a few minutes & the following comparisons were made -- Stars faint from haze & moonlight

Set 4^h 10^m

$$1'' = N''N''$$

$$'' < N''N'' \quad 0.3$$

$$7'' > 9'' \quad 2.$$

$$N''' > 5''g'' \quad 1$$

$$N''' < 7'' & 2'' \quad 1$$

$$N''N'' < Y' \quad 0.3$$

Clouded

C. P. B.

$$E''' < D''' \quad 0.3$$

During month have noticed that ρ can generally be seen with attention except under the worst quality of atmosphere.

Have not seen β star since 4^h though always looked for

Orion-Lorees (= Orionis)

1864 Jan 25th
4118 obs.
4116 rec.

Orion - Jones, Orionis

64 Jan 25
 P.P.B. obj
 M.H.S. rec.

Clear with Moonlight

Zero of Scale 30' 50" of Orionis

Ther + 35° (from Record)

Used zero of position circle - 83° 14' as on 21st

	Mag.	Scale. Sec.	
X A	11.12	8' 20	
B	10	4 20	
b	12	10 20	ns
d	12.13	9 0	ns
c	13	8 50	ns
		B	
f	10	7 45	
g	10	7 20	
h	13	1 20	
		B B	
j		7 20	
E.H.M.		10 20	
L	11	1 14	
M	9	1 12	
N	8	3 43	
O	12	2 15	
P	10	2 12	ns
Q	10	5 11	ns
		B D	
R	8	9 25	
S	12	-0 26	ns
T	9.10	1 15	
U	12	4 20	
V	13	8 8	
W	11	5 14	
X	10.11	0 46	
Y	12.13	1 13	

False signal about $\frac{1}{2}$ half second before H.M.
 H. 7 48

H.M. in old Orion zones

Orion Zones near ϵ Orionis

L_1	4	59.2
	5	7.2
	5	41.3
	5	45.7
	5	47.1
	B	
	6	20.2
	6	39.3
	7	10.7
	B B	
	7	22.8
	7	23.7
	7	38.9
	7	58.0
	8	4.4
	8	12.4
	8	16.0
	8	16.7
	B. D	
	9	19.7
	9	23.3
	9	47.4
	9	51.2
	10	4.9
	10	13.5
	10	25.3
	10	30.1

1863 Jan 25th cont.

<u>XI</u>	X	D-B	
<u>II</u>	same as I		
A	11.12	8 20	
B	10	4 20	
C	12	10 20	
D	12.13	9 10	same
E	12.13	8 50	
F	9.10	7 48	
G	9.10	7 23	
		<u>13.</u>	
H	13	7 25	
I	9.10	7 25	
K H ^m		10 20	
L	11	1 14	
M	8.9	1 12	
N	8	3 44	
O	41	2 13	
P	10	2 13	no
Q	13	2 20	
		<u>13.13</u>	
R	8	4 20	
S		-0 30	
T	9	1 15	
U	12.13	8 10	
V	11	5 17	
		<u>13</u>	
W	10	0 44	
X	12	1 16	no

47 12 26.3
12 34.6
13 8.9
13 12.9
13 14.5
13 47.6
14 6.9
13
14 37.7
14 50.4
14 51.4
15 6.4
15 25.6
15 32.1
15 40.0
15 43.4
16 2.9
13 13
16 47.3
16 50.7
17 14.8
17 32.2
17 40.9
13
17 52.8
17 57.8

XII			Chro times	
A	13	-0 27		
B	12	10 10		
b	13	7 0		
		03		
D	13	4 30		
E	12	1 13		
F	10	3 17		
G	13	2 45		
H	13?	5 44	4 26 59	
I	12.13	7 7		
K	12.13	6 40	no	
L	10	0 10	27 22±	
M	12	5 58		
N	13	8 15		
O	13	3 18		
P	10.11	3 50		
Q	9.10	3 28		
R	9	2 58	no	28.40
S	(7.8)	2 48		
T	(7)	3 20	no	
U	(8)	7 50	no	
V	(7.8)	1 27	no	
W & Thrown	(5)	8 54	29 17	March 12 th Double comp 9 th 12" J. J
X/B	9	2 48		per 150°
		03		
Y	11.12	2 50		
Z	12.13	1 12		
AA	12	5 55	no	
BB	γ	-0 13	dbl comp 10.11 10" m.p.	BB is 8 th my Th. h. 3
bb	11	2 57		
SS	8	7 35	no	
EE	12	1 23		

4	25	6.2
	25	16.8
	25	35.2
	B	
	25	46.8
	26	3.4
	26	5.8
	26	32.2
	26	35.8
	26	44.7
	26	48.0
	26	55.6
	27	14.0
	27	30.6
	27	55.9
	28	11.6
	28	16.2
	28	16.6
	28	28.6
	28	30.4
	28	38.6
	28	43.5
	28	53.4
	29	13.9
	B	
	29	35.9
	29	50.2
	29	55.8
	30	3.7
	30	49.6
	30	54.8
	31	5.0

In one of the 2g books is a remark
that there are one or two
fields about 15' from the Orion
constellation of stars (or of small stars)

revision of

III part of XII

IX part of III

Decl. rough here

over

A	41	3'50"		3 51
B	10	3 25	ms	3 27
C	9	2 59		2 59
D	12	5 18		
E	44	2 48		2 47
F	8.7	3 17	ms	3 -
G	9	4 50		4 50
H	9	1 29		1 29
I	2	8 53		8 54
K		2 48		2 50

→
This set of decl.
is better than those
following

XIV do. of XIII, XII

10.5 of III

A	12.13	0 13
B	12	4 14
C	42.13	-0 24

4 39 31

D	12	4 59
E	10	6 28
F	9.10	10 10
G	13	5 2
H	12	7 40
		13.10

5'59" March 1st

4 40 30

I	13	8 40
K	12	2 50
L	12	4 20
		13.13

M	42.13	6 7
N	11	5 13
		13.

4 42.16.5

O	9	8 32
P	13	1 20
Q	13	1 20
		-0 20
		5 28
		9 50
		11.12

4 42 40

cloaka Lee must page

4 35 00.0

35 4.7

35 5.3

35 17.3

35 26.9

35 32.0

35 41.9

36 2.4

39 6.9

39 25.2

39 31.0

B

39 38.8

39 54.7

40 6.7

40 37.8

40 41.8

B D

41 4.8

41 7.6

41 8.7

B B

41 47.7

41 54.5

B

42 13.9

42 28.2

4 42 51.4

L	13	-0 20
S	11-12	5 28
T		9 50
U	12	9 40
V	9.10	4 30
W	11	7 33

double 9" dist

8th mag - March 12th Dist 5" R.S.
Com 10th

Hg ² Xii	= β	9 58
Gg ² XIV	= γ	6 56
U	XIV = χ	1 40

double * 8th

50 26

51 25

51 49.5

True stars not

observed on the

Chronograph

Probably intended

as Checks by Chron.

Sg XV	δ	1 30
XV 10 ⁵ 28 XIV	$\chi = 28$	8 58

53 3.7

54 3.0

A	9.10	-1 0
---	------	------

5 2 26.5

B	8.9	-0 46 ns
C	10	5 10

D		4 20 ns
E		-0 12 ns

F	13	7 0
---	----	-----

G	12.13	0 0
---	-------	-----

H	12	0 5
---	----	-----

I	12	5 58
---	----	------

K E		0 13
-----	--	------

5 3 47.3

L	13	4 14
---	----	------

M	12	3 23 ns
---	----	---------

N	12	4 42
---	----	------

O	9	6 13
---	---	------

P	10	9 4
---	----	-----

Q	10	1 30
---	----	------

R	13	7 30
---	----	------

S	9	7 2
---	---	-----

T	10.11	2 45
---	-------	------

U	10	3 50 ns
---	----	---------

10th mag March 14th

6 10

The RR is given ^{nearest} away with

41 42 57.8
 43 4.7
 43 14.7
 43 22.8
 43 38.4
 43 49.2

5 2 2.5
 2 5.4
 2 12.8
 2 15.7
 2 18.3
 B
 2 45.0
 2 49.9
 3 3.8
 3 5.9
 3 23.3
 B. B. 93
 3 42.5
 3 44.9
 4 44.0
 4 50.4
 4 55.0
 5 21.1
 5 42.1
 5 45.6
 5 50.8
 5 5 52.5

cont.		
V	10.11	-020
W	11	6 2
		137D
X	13	4 12 ns
Y	10.11	9 3
Z	10	3 40
AA	10.11	0 30 ns
BB	8	0 27
XVI 10.1 of XV Long Dots		

VII 10.2 of VI

			Decl. given before	Chm
A	9	9 3 =	9 9.3	5 12 53
B	12	-0 30 ns	12-030 ns	
C	8	9 18 ns	8 9 18	12 56
D	12	9 49		
E	12	3 49		
F	9	3 14		13 30±
G	8.9	2 41		
H	13	2 45		
I	10	8 30		
J	9	1 11		
K	9	10 12		14 16±
L	12	5 0		
M	13			
N	10	1 55		
O	12	7 40		
P	13	7 40		
Q	9	-0 27		15 48±
R	13	6 45		
S	12	2 0		
		13 19		
T	10	9 55		16 44
U	10	9 42		
V	11	6 38		

Magnitude certainly not equal to a 9th
is rather a brighter 12th but like others of 12th in same zone

5 6 1.9
 6 11.4
 B.D
 6 18.8
 7 15.7
 7 20.6
 7 21.4
 7 48.4
 D

12 29.1
 12 30.3
 12 31.9
 12 44.6
 12 55.4
 13 4.9
 13 5.3
 13 17.5
 13 29.7
 13 39.3
 13 49.7
 13 59.4
 B
 14 24.5
 14 27.5
 14 41.0
 15 21.6
 15 54.3
 16 0.8
 B.D
 16 19.9
 16 28.2
 16 35.4

Orion-Louis near 1 Orionis-

W	8	6 24	5 17 8
X	10	8 20	
		B	
Y	12	0 14	
Z	10.11	7 38	17 56±
AA	10	-0 10	
BB	9.10	5 17	double comp 10 th 5" dist

XVII 10.5 of XVI
~~XIII 10.5 of XII~~

A	12	0 45	Ch. time
B	8	0 27	5 25 52.7
C	12	9 18	
D	10	-0 15	26 8±
E	13	4 28	

This should be 9.42 ± 43" in Mich 14th

		B	
F	12.13	2 50	
G	13	1 30	
H	13	6 20	
I	12.13	7 47	
		B.	
K	12.13	5 47	
L	12	4 59	
M	12	3 37	
N	10	0 22	26 th May 28 comp sp 10 th

O	9	6 20	
		B 12 13	
P	11	0 20	
Q	10	4 12	5 28 17
R	13	4 3	
S	13	8 50	
T	12	5 42	W
U	12	-0 3	
V	5	9 43	5 28 54± 8:49 th mag. Mich 14 th
W	11	8 50	

5 16 44.1
 16 50.9
 13
 17 13.6
 17 31.5
 17 54.9
 18 2.6
 13

25 20.8
 25 28.9
 25 38.3
 25 44.4
 25 52.5
 13

26 4.6
 26 5.3
 26 16.8^{5.1}
 26 19.9^{3.1}
 2 13^{13.7}
 26 33.6^{6.0}
 26 39.6^{3.0}
 26 42.6^{2.8}
 26 45.4^{28.3}
 27 13.7^{20.9}
 13.9.13
 27 34.6^{8.4}
 27 43.0^{11.8}
 27 54.8^{7.6}
 28 2.4^{1.9}
 28 4.3^{16.3}
 28 20.6^{9.0}
 28 29.6^{2.8}
 5 28 32.4^{11.1}

III cont

III	12	2 47	
Y	13	6 12	
X	9.10	-0 30	5- 29 26
Ad	9	2 2	29 32
B/B	40	4 58	
b/b	9.10	0 49	30 11
	B. B.		
SS	9	8 59	
EE	10	10 6	
FF	9	1 32	
GG	8	0 45	31 37.2
XVIII 10.5.2 XVII			

Double March 28 amp 13^h pos 350° 15"

Annular nebula

IX 10.5.2 PHIL

Am	9	9 49	5- 36 30
B	9	0 18	46.7
b	12	8 48	
S	10.11	3 20	
E	13	5 28	
F	13	9 50	
G	10.11	4 12	
H	10.11	7 23	37 37.7
		2 13	
I	12	8 40	38 0.
J	14	-0 10	38 1.
L	8.9	3 6 6	13
M	9.10	1 42	
N	12	-0 50	
O	12	5 30	
P	12	-0 29	
		B. B.	
Q	12	10 0	
R	13	1 40	
S	12	-0 34	

5
 28 43.5 11.2
 28 54.7 8.0
 29 2.7 5.3
 29 8.0 27.5
 29 35.5 11.4
 29 47.3
 D.D. 17.6
 30 34.9 9.0 on 14^e
 31 3.0
 31 8.9
 31 12.7

36 6.1
 36 23.1
 36 29.2
 36 43.6 9.0
 36 52.6 6.1
 36 58.7 3.9
 37 2.6 11.2
 37 13.8
 D.D. 12.7
 37 36.5 1.1
 37 37.6 11.6
 37 49.2 7.3
 37 56.5 6.5
 38 3.0 10.3
 38 13.3 8.3
 38 21.6
 D.D. 20.8
 38 42.4 11.8
 38 54.2 14.1
 39 8.3 9.0

Orion - Lower near ϵ Orionis

XVIII cont

~~W~~ ~~und.~~	12	2 12	
U	12	8 28	
V	10	9 34	ns Double comp 13 th Dist. 12" (March 28)
W	10	3 30	dbl comp 11.8" Dist ~~W~~ is the double Jan Mar. 28
X	11.12	4 13	W is 3' 30" not 2' 30" Mar. 28
Y	12	4 28	
Z	12	8 4	ns
AA	12	5 40	
BB	11.12	6 40	
CC	13	0 10	

5	39	17.3	
	39	20.4	3.1
	39	24.6	4.2
	39	45.2	20.6
	39	55.6	10.4
	40	31.7	36.1
	40	32.3	0.6
	41	29.4	57.1
	41	38.7	
	41	43.7	

Above Zones I to XVIII have been read off in duplicate.
 The only difficulty encountered requiring reference to stars was in
 Zone VIII $20^h 22^m 40.8$ where two stars transited at same time
 as found on Jan. 27th

Orion

1864 Jan 25 Monday

Before the moon rose saw $\theta''\theta'' < \eta''\eta''$ 1.0 $\theta''\theta'' > \sigma''\sigma''$ 0.3
 " $> \iota''$ 0.3

Bright moonlight - Clear
 5^h 50^m sid

$\theta''\theta'' < \eta''\eta''$ 0.7 $\theta''\theta''$ quite faint
 " $> \sigma''\sigma''$ 0.5 $\theta''\theta''$
 " $< \iota''$ 0.5
 $\sigma''\sigma'' < \iota''$ 1.0
 $\eta''\eta'' < \chi'$ 0.3
 $\mu''' > \iota''\iota''$ 3.0 μ''' too bright for comparison
 $\mu''' < \tau''\tau''$ 1.7
 $E''' < \tau''\tau''$ 0.5
 (E'') $E'' < D'''$ 0.3
 $D'' \sim \tau''\tau''$

Vision is sufficiently good to bring out δ γ π ψ etc. But κ star & 'new star' near $\theta''\theta''$ are not in sight

ρ is in a v. small dark opening.

Fainter star of 12th mag see zone XVI south of ϵ Orionis
 EC 5 13 59.4 Dec 5^h 0^m

Orion

1864 Jan 26

Sid arm 3 3

$$J''J'' = O''O''$$

$$'' < I'' \quad 0.5$$

$$'' < N''N'' \quad 1.7$$

$$N''N'' < Y' \quad 0.3$$

$$J''J'' < N''N'' \quad 2.0$$

$$M''' > J''J'' \text{ by more than } 3 \text{ too large for comp}$$

$$F''F'' > M''' \quad 1.7$$

$$M''' > F' \quad 0.5$$

$$M''' < E''' \quad 0.5$$

$$F''F'' > E''' \quad 0.5$$

$J''J''$ rather fainter than on 25th

I should call it by my old zone scale
11th mag M''' 9/10 $F''F''$ 9th or 8.9

$F''F''$ has a strong wisp of nebulosity running off to 3rd side & should be perhaps reckoned among the stars with attachments
So also about D'' star up N''' - 2 bright Peacock's star etc

I find a large & by no means very faint map of nebulosity sweeps from the region preceding D''' and 35th at center preceding H''' to 2 Orionis besides that from deepening branches

Orion. Zones near ϵ Orionis

Sp. Jan 27th
10 obs
NSR
Revision =

Continued by the insertion of smaller stars

Jan + 29°

Zone I Most follows A or B

Revision =
Zone II & III

Pos. list as on Jan 21

Mag Reading Following principal

c ₁	13	2' 0"	4.7
d ₁	12	nothing before 2	
e ₁	13	0.24	10.5
f ₁	16	5.55	0.0
g ₁	17	1.10	4.5
g ₂	15	6.20	3.5
g ₃	17	2.10	6.
i ₁	15	4.40	4.0
i ₂	14	3.32	+6.0
l ₁	13	2.59	-2.7
l ₂	13	10.20	+3.1
l ₃	13.14	8.30	+10
m ₁	17	-0.8	+3
m ₂	14	2.18	+5.7
m ₃	17	6.10	+8
m ₄	17	6.30	+7.1
n ₁	14	-0.40	0.0
n ₂	16	6.40	+2
o ₁	13	9.45	+1
o ₂	13	4.0	+4.3
r ₁	16	3.55	+2.5
r ₂	15	6.45	+2.
r ₃	16	0.45	+5.2
r ₄	15	-0.5	+5.7
r ₅	14	2.30	+20.5
r ₆	17	6.55	+27.5
s ₁	12	7.25	+5.
s ₂	14	8.45	+8
s ₃	16	4.40	+18
s ₄	8	7.55	+20

The revision of Zone I was extended to limit + 2^m 15^s from ϵ on Feb 27 when
new stars were added

See Feb 27 29
Probably -0.45
See Feb 29

a ₁	16	2.16	-0.2
a ₂	16	3.50	+12
c ₁	14	9.0	14
d ₁	13.14	3.0	+2
e ₁	15	9.50	+2.7
e ₂	13	6.20	+0
e ₃	17	3.40	+6.0
e ₄	13	5.14	18
e ₅	17	5.58	23.5
e ₆	15	5.34	27.0
e ₇	16	5.10	+31.5
f ₁	15	10.0	-5.7
f ₂	15	4.14	+7.0
f ₃	13	7.2	+8.5
g ₁	17	9.10	+7.0
h ₁	12.13	8.58	+1.5
h ₂	17	7.55	+1.2
h ₃	17	8.48	+4.
h ₄	10	0.30	+8.5
h ₅	15	2.55	+8.5
i ₁	13	10.20	0.0
i ₂	13	6.12	+4.0
i ₃	15	8.40	+4.5
i ₄	16	6.25	+4.8
i ₅	15	2.50	+9.5
i ₆	9	3.30	+10.3
i ₇	16	8.10	+5.5
i ₈	16	7.40	+8.5
j ₁	14	2.35	+11.5
j ₂	17	6.15	+13.5
j ₃	14	5.48	+15.0
j ₄	17	3.40	+21.8
j ₅	11	-0.10	+22.5
j ₆	15	3.35	+24.

Beginning of It was revised Feb 27, and two new
stars were added completing zone to limit 2^m 15^s

Beyond K's SR
" "

The telescope was set so that the principal stars read
the same as in the Zones observed with chronograph, Jan 21

* Revised Feb 29th and not found although 5, and 8 new

Orion - Jones

1864 Jan 27th
 G.P.B. obs.
 J.W.S. rec.

Revision of Zone II { vision good - Clear - Moon rose before obs -
 were quite finished but did not obstruct visibility
 of small stars seriously.
 continued

m_1	14	9 10	0.7
m_2	13	2 40	11.0
m_3	15	9 0	16.0
μ_1	15	7 20	1.8
ν_1	12	1 25	0.5

Began about 4^h 20^m
 Ended " " 6 5

Appended	hour angles	Th
Zone I	leg. - 1 ^h 2 ^m	+29
	end - 0 23	
II	- 0 8	+29
	+ 0 27	

Following are subsidiary to Original
 Zone I and II of Jan. 21. All of
 the principal stars were recognized and
 their declinations verified. The small
 stars in their vicinity were then observed
 in declination the scale being adjusted to
 read to same ^{mean reading} zone as in original zones.
 The dif. st. were obtained by Chronometer
 in general referring to principal star
 by corresponding small letters as a_1, a_2
 a_3 etc. following it in right ascension -
 a_{-1} would denote first star preceding principal

Orion Magnitudes

1864 Jan 27

Clear & pretty good definition

At 4^h 10^m $\theta''\theta'' < \theta''\theta'' 0.5$

6 8

 $\theta''\theta'' < \theta''\theta'' 0.5$ $\theta''\theta'' < \theta''\theta'' 1.7$ $\theta''\theta''$ faint $\theta''\theta'' < \theta''\theta'' 1.0$ $\theta''\theta'' > \theta''\theta'' 0.3$ $\theta''\theta'' < \theta''\theta'' 0.5$ $\theta''\theta'' < \theta''\theta'' 2$ $\theta''\theta'' < \theta''\theta'' 1$ $\theta''\theta'' < \theta''\theta'' 0.2$ $\theta''\theta'' > \theta''\theta'' 0.7$ $\theta''\theta'' > \theta''\theta'' 0.3$ $\theta''\theta'' < \theta''\theta'' 0.5$ $\theta''\theta'' > \theta''\theta'' 1.5$ $\theta''\theta'' < \theta''\theta'' 1.3$ Small stars $\theta''\theta''$ of
usual order of brightness $\theta''\theta''$ $\theta''\theta''$ & $\theta''\theta''$ glimpse of $\theta''\theta''$ & vague sus-
picions of $\theta''\theta''$ not confirmed
also of new stars $\theta''\theta''$

Orion

8/4 Jan 28

P10 obs

1945 rec.

IV revised

	δ	$\Delta\alpha$	$\mu\alpha$
b_1	8 50	11.5	16
b_2	6 30	14.0	16
c_1	1, 40	~~11.5~~ 9.0	16
c_2	9 4	~~15.16~~ 15.0	15.16
c_3	9 40	15	15
d_1	-0 30	3.7	16
d_2	9 30	7	17
e	7 50	8.0	17
e_1	3 45	+4	17
e_2	4 48	+6	16
e_3	3 58	+22.5	15
h_1	-0 12	-2.0	15
i_1	9 50	-7.0	15

Revision of Zones by Jan 28
(III is II repeated)

Jm + 37°

Apparent hour angle

Zone IV by $-2^h 15^m$ Jm + 37

" Star L, -1 58

Clouded suddenly Continued on Feb. 12

Orion Magnetudes

1864 Jan 28

At 3^h 10^m sid. 3rd mag < N.W. but comparison deferred till after 20^m when it clouded

Orion

1864 Feb 3

Clear calm definition not very good - fair but later excellent.

7^h sid $\gamma'' > \delta''$ 0.3
 $\gamma'' < \lambda''$ 0.7
 $\gamma'' > \iota''$ 0.5
 $\gamma'' > \epsilon''$ 1.0
 $\gamma'' > \mu'''$ 2 ? Too large for comparing well
 $\delta''' = \epsilon'''$ or $> \epsilon'''$ 0.2
 $\lambda''' < \epsilon'''$ 0.5
 $\mu''' < \gamma''$ 2.3

Fine definition 7^h 30^m

σ is easily seen but no sign of ζ star nor of new star near γ''

The little star λ'' in same R with $H''H''$ & 1' n of it can be seen but it is difficult σ & ρ easy ρ is on rather darker ground

Under fine definition the ^{3rd} field following π'' is starless ($= \nu'''$)

New star below ι'' & μ'' . $1/3$ 15^h mag. not on chart but query is ι'' placed wrong - Saw both stars ϵ'' s.p. $C''C''$ both faint.

The wisps shooting southward from γ'' $B''B''$ and $\epsilon''\epsilon''$ finely seen that from $B''B''$ certain but least distinct owing perhaps to confusion with ι'' That from $\epsilon''\epsilon''$ I thought tended to sweep round towards direction of $A''A''$

As usual under fine definition the region between γ'' & ϵ'' seems to have many very faint stars which have not been recorded though with time they might be.

δ near δ' is just $= \epsilon$ Both are in dark strips narrow with bright nebulae near at hand on all sides. I have lately thought $\delta < \epsilon$ but this vision tonight is much better than usual - δ & ϵ compared carefully $\delta = \epsilon$.

(unless possibly σ is fainter)

In the stars of the Hygieum region I do not recognise any which have changed since last year. Thus B γ'' & ϕ are the brightest When vision is best γ'' seems to gain slightly on the others but in general B is $> \gamma''$ v. little but $B > \phi$ pretty decidedly ρ not difficult but decidedly $< \gamma''$ or ϕ
 σ I do not see unless vision is above the average (with Feb 25 1863)

Orion

1864 Feb 3 (Cont.)

See also Jan 26

The nebulosity from θ , sweeps up both on
pr. & fol. sides to ϵ Orionis. From the
"can" it tends rather to the following side
of ϵ Orionis.

The annular nebula θ IV 33

1830.0 R $5^{\circ} 28' 7''$
Dec $-6^{\circ} 51'$

Following, on Jan 2^d 48's. Dec Feb 23 1863
is a beautiful object. central star vivid &
opening remarkably outlined coming close to
star on n.p. side.

This nebula is connected by diffused
light with ϵ Orionis.



Orion

1864 Feb 5

Have gathering - comparisons not easily made as the stars are rather faint

4^h 10^m 30^s -

1"1"	=	N"N"	
2"2"	=	D"	
"	>	E"	0.5
D"	>	E"	0.5
E"	>	M"	1.0
M"	>	1"1"	1.0
1"1"	>	N"N"	0.5
N"N"	<	Y'	0.5
O"O"	<	N"N"	1.0
M"	=	Z'	

1"1" evidently brighter than of late
 Z"Z" perhaps fainter
 M" < E" "

1"1" seems to have passed its minimum

Raspighi's Comet

1864 Feb 5
7:45.

Rough transit across edge of scale - w Tauri - Comet north preceding

Comet 6.8
w Tauri 2.2Comet 7.9
w Tauri 3.7Comet 7.35
w Tauri 3.3

Chron.

W¹ 353° 0' - Niles - Alt by Transit - Sun measured without clock.

Comet	5	40	18.5	25.8	
w Tauri			~~52.9~~	59.8	- 34.20

Comet	41	57.3	4.1	
w Tauri	42	—	37.0	- 52.90

Comet	43	24.1	32.2	
Star		56.4	64.5	- 32.30

Comet	44	48.8	57.3	
Star		20.7	28.9	- 31.75

W¹ 83° 0'.

Comet	5	57	1	Comet - Star	+ 1' 37" 9	Comet	63.005
							62.777
		53	22.5	Coincidence	1 19.4		62.891
				56.782			62.973
		55	17	Coincid	1 2.0		62.793
				56.558			62.964
		57	8.5	Coincid	45.8		62.806
				58.208			62.884
		59	52	Coincidence	18.8		62.886
				60.970			

Ch.	6	41	47.8	El Star	537.0
El.		38	10	Chruped	1.8

$N = 353^{\circ} 0'$ 6 9 3.2 $\pm 10^5?$
31.3

6 70 10.3 19.5
28.6 —

12 19.5
36.1

13 17.9
32.7

14 10.4
25.7

Chro. time $5^h 55^m 20^s$ $\delta - 25^{\circ} 56'$ $+104^{\circ} 6'$ zero point assumed $353^{\circ} 0'$ for AR

* μ is cont. by Robinson; Bradley by T. Mayer. The star has been also by Waple

Respietti's Comet

66 Feb 5th
145

50 to Jauri			
Müller 1850.0	62° 7' 9.87	+20° 12' 17.56	
Ph 14.155	-0.42	-0.63	
	+12 16.15	+2 11.29	
	+ 0.20	-0.44	
1864.0	62 19 25.80	+20 14 27.78	
Δκ Δσ	+26.64	-0.18	
Time 1864.0	41 9 17.72		
Δκ	+1.91		
Comet. Star	-25.86	+ 1 1.6	
Comet d. σ	41 8 53.77	+20 15 29.2	

Am time

5 55 20

fast 1

Sun Time 5 55 19

21 0 23

8 54 56

1 28

8 53 28 M. J. Lambury

	Feb 5 to Berlin	
G	33° 52'	
Δ	62 19	
H	310 53	
h ₁ D	9.5666	+16.59
in (G+H)	9.9775	+3.58
J	0.9890	-6.51
in (G+H)	9.0322	28.64
h ₁ D	0.0777	-1.05
in (H+J)	9.6946	+6.43
K	1.2916	-5.56
in (H+J)	9.9777	
h ₁ D	9.5359	
h ₁ i	0.7723	

Orion

1864 Feb 8

5h 25^m a

$\gamma\gamma'' > E''' 0.5$
 $" > M''' 2.0$
 $M''' < E''' 1.0$
 $" > I''I'' 1.5$
 $I''I'' > N''N'' 1.0$
 $O''O'' < " 0.5$
 $N''N'' < Y' 0.2$
 $E' > M''' 0.5$

Orion

1864 Feb 9

Pretty Clear not good vision

Sid 3 30

$$\zeta''\zeta'' > E''' \quad 1.5$$

$$'' > M''' \quad 2$$

$$E''' > '' \quad 0.5$$

$$'' < D''' \quad 0.5$$

$$M''' > I'' \quad 1.0$$

$$S''S'' = N''N''$$

$$'' > N''N'' \quad 0.3$$

Orion

1864 Feb 10

Sid 4^h 50^m Clear - cold +11° & very bad definition $\theta''\theta'' = \lambda''\lambda''$ $\lambda'' < M''' 1.0$ $\gamma''\gamma'' > \lambda'' 2.$ $E''' > M''' 0.7$ $\lambda'' < \gamma''\gamma'' 1.7$ $\lambda'' < D''' 0.5$ $\gamma''\gamma'' > \lambda'' 1.5$ $\theta''\theta'' = \lambda''\lambda''$ $M''' < \gamma' 0.3$ $\lambda'' < E''' 1.0$ Have no doubt but that D''' is brighter

Orion

1864 Feb 11

Imperfectly observed among clouds. Stars dim

Sid 6^h 00^m to 6^h 15^m

$$\beta''\gamma'' = \alpha''\nu''$$

$$\gamma'' < \mu''$$

$$\mu'' < \zeta''\zeta'' 2$$

$$E''' < D''' 0.5 \quad \text{have no doubt that } E''' \text{ is least}$$

$$\mu''' < E''' 0.7$$

$$\mu'' < \zeta' 0.3$$

$$\beta''\gamma'' > \alpha''\nu'' 0.3$$

9

Stars are too faint to be well observed

Orion

1864 Feb 12

Clear fine dispersion

$\delta\alpha 2^h 30^m$
 $D''' > E''' 0.3$
 $g''g'' > M'' 0.7$
 $Y' = N''N''$
 $g''g'' < M'' 1.5$
 $F''F'' > M'' 1.7$
 $g''g'' < F''F'' 3.5$
 $E''' > M'' 0.5$
 $F''F'' > M'' 2.5$
 $E''' < F''F'' 1.7$
 $D'' > M'' 1.0$
 $F' = M'''$

4 45 (about), $E' < F' 2.0$

As usual when vision is best. The small stars of Trapezium region

$B - \theta$ & γ do not differ much in brightness. The latter is critically placed on prec-edge of bright-edge of strong light.

σ easily seen. No sign of 'h' star but I fancied the "new" star near $g''g''$ was out by glimpses - not very sure of it.

$\delta\alpha$
 γ

The star α to be corrected on Chart
2nd Feb 3

(x) α

* η'

5. 30

Orion - Jones near C Orionis

Revison. Jones. Small stems

Thr. 36

Good definition. Once or twice thin clouds
intervened but did not interfere seriously -
Moonlight rather bright.

Began probably about 4^h 50^m

Assumed hour angles

Zone IV star i, $-0^h 38^m$ Mr +36

"a₁ - 0 8

Per circle on Jan 21

Game store

N and O are nebulous

1863pha	1936	46 run	TK revised	Age	S	Mg
			cont from	2.5		
			21	2.20	2.20	17
			22	12.5	3.10	16
			23	17	0.15	14
			24	17	7.20	15
			25	22.5	8.8	15
			26	22	1.40	17
			27	23.5	-0.08	15
			28	26.7	3.28	16
			29	36.5	10.3	15
			30	0.7	6.28	12
			31	0.3	6.28	12
			32	2.3	4.30	12
			m1	2.2	-1.0	10
			m2	2.5	10.15	14
			m3	3.7	3.9	15
			01	0.6	6.45	14
			02	4.2	1.30	16
			03	5.0	0.16	14
			04	15.0	-0.18	15
			05	18.0	10.15	16
			p1	0.5	1.0	13
			p2	8.0	2.15	16
			g1	2.0	7.23	13
			g2	5.5	9.40	15
			g3	8.5	-0.45	12.13
			30	1.0	5.48	16
			21	-2.7	3.12	15

Orion

1864 Feb 16

Clear high wind bright moonlight - not good vision.

7^h 30^m Sid $\beta''\beta'' > \alpha''\alpha''$ 1.7 $\alpha'' < \mu'''$ 0.5 $\alpha''\alpha'' = \gamma'$ $\alpha'' > \theta''\theta''$ 1.7 $\mu''' < \gamma'$ 0.3 $\delta'' > \epsilon'''$ 0.2 $\delta < \zeta''\zeta''$ 1.0 $\mu''' < \alpha''$ 2.0 $\mu''' < \epsilon'''$ 1.0 $\delta''\delta''$ is getting brighter $\zeta''\zeta''$ is brighter μ''' fainter?

No evident difference

 $\zeta''\zeta''$ is decidedly the brightest δ looks as bright as ζ & ϵ

of Jan 16

Orion - Zones

Revision (Cont.)

Revision of V

c_1	0.7	0 30	16
c_2	2.3	2 58	16
c_3	9.5	3 0	15
d_{-1}	-1.0	8 10	16
d_1	6.7	6 35	17
d_2	10.	7 30	17
e_1	0.7	8 30	16
e_2	1.0	-0 32	15
e_3	4.5	5 50	17
e_5	8.7	6 10	15
e_4	7.0	0 47	15
f_{-1}	-9.0	8 3	14
g_1	6.7	6 14	14
g_2	7.0	5 0	15
h_0	0.0	4 16	15
i_1	1.5	4 40	17
i_2	3.5	-0 15	14
k_1	1.7	4 25	14
k_0	0.0	8 40	17
m_{-2}	-3.0	8 43	10.11
m_{-1}	-1.7	8 43	11.
m_1	3.0	6 3	13
m_2	3.0	8 28	13.14
n_2	-1.5	9 0	13
n_{-1}	-0.5	8 38	11.12
n_1	1.5	7 15	16
n_2	1.5	6 40	16
n_3	1.7	6 13	12
n_4	3.7	4 28	14
n_5	10.7	4 30	15

Revision of V was extended to limit $2^m 15^s$ Feb. 27
but no new star could be seen.

Orion Zones

Revision (Cont.)

Revision of V continued

Appumed times & hour angles

V. beg. $5^h 35$ $h = +0^h 7^m$ $Ther. +32^\circ$
 end $6 35$ $+1 7$ "

	$\Delta\alpha$	δ	mag
	s	$'"$	16
p_0	0.0	8 7	17
p_1	1.8	0 5	16
p_2	4.0	4 25	13
p_3	8.5	5 43	13
p_4	10.0	5 50	16
p_5	15.5	0 3	16
p_6	17.5	4 15	13
r_1	5.0	8 12	13
r_2	12.5	10 15	16
r_3	15.0	0 2	16
r_4	17.5	8 33	13
r_5	17.8	5 58	16
r_6	21.	8 50	15
r_7	25	7 28	17
r_8	27	9 10	17
r_9	30	8 40	17
s_1	-3.7	-1 30	15
s_2	-4.	8 22	17
s_3	-4.	6 0	16
s_4	-8.5	1 40	16
s_5	-13.5	3 40	14
s_1	8.0	10 12	15
s_2	11.0	9 12	15
Meridith s_3		4	17
s_3	11.5	7 20	17
s_4	20.7	7 8	17
s_5	23.5	6 45	17
s_6	26.5	6 45	17
t_1	3.0	6 50	16
t_2	4.7	9 40	15
m_1	4.	8 0	16

Only one

Almost no small stars beyond W in a field or more

Orion

1864 [Feb 16 (vide 4 pages back)] Feb. 18

Feb 18

Sail 5⁴00

Cold + 6° Clear & calm

Definition though not good is better
than is usual at so low a temperature

$$g''g'' > N''N'' \quad 2.5$$

$$Y' > '' \quad 0.3$$

$$g''g'' = M'''$$

$$g''g'' > M''' \quad 3$$

$$'' > E''' \quad 1.5$$

$$D''' < E''' \quad 0.3$$

$$M''' = F'$$

Should say that D''' is certainly not $> E'''$

Orbit Perseid - Watson

1864 Feb 18th

GHS.

Comet at 8^h 15^m 72^s T. The prev. 45^s or nearly same predicted
and 36^s 0' 30" 22.

Chro	6 ^h 14 ^m 6 ^s	128.2	Right	127° 21'	45° 45'
1 st stage	16 47	126.5	Left		
	17 59	123.7	Left	122 33	50 33
	20 41	121.4	Right		
	24 37	116.2	Right	114 20	58 36
	26 34	112.8	Left		
34 56	28	100.5	Right	75.508	2100 62.968
37 2	"	185.9	Left	75.185	62.758 62.873
39 0	"	"	Right	75.660	62.992
41 0	"	181.1	Left	75.868	62.784 62.888
42 56	"	181.1	Left	75.682	62.920
47 34	"	177.9	Right	76.692	62.760 62.865
					62.875
54 23		79.0	Below	70.57	94.9
58 36		78.9	Above		

262° 0'

264° 0'

68.272	22 ^s	67.752	30 ^s	0.598	22	8.250	263° 1'
67.674		68.411		0.653	27	8.200	262 54
				0.778	25	8.309	263 10
68.465	27	67.752	32.5	0.659	30	8.158	263 11
67.812		68.448		0.696	32.5	8.147	263 12
				0.667	28	8.193	263 6
68.130	25	67.752	28				263° 5.7 ± 1.9
67.752		68.419					min + 6.9

Ended there at 7^h 11^m 12^s time

The comet was rather faint as the moonlight was very bright

Comet Respighi. Watson

Wife r 721. is the star S of the V Orion zone 1869 Jan 21

	m'	n'	lyn'	lyn'	r'	h'e'	z'	q	5	30y	25
6 15 26	+84"6	+80"3	1.9574	1.9067	43°30'	2.0668		45°45'		-4.6	
6 19 2	77.3	86.9	1.8882	1.9390	40 21	2.0656		50 33		-4.5	
6 25 36	63.9	69.2	1.8055	1.9965	52 13	2.0219		58 36		-2.85	
6 35 59	42.7	114.5	1.6304	2.0737		2.1002	125"95		122"22		+3.73
6 40 0	34.5	126.0	1.5378	2.1004		2.1161	130.65		126.41		+4.24
6 45 15	+22.8	135.7	1.3766	2.1326		2.1092	137.78		130.56		+7.22
6 57 30	-1.2	+158.5	2.0792	2.2000	90°36'	2.2001		9 9		-10.3	
I 6 34 7											

Assumed Dist 124"

" Angle 68°

" m +46"5 dt

Stampfer

-2"04

+1.86

Equations

Errors remaining

O: -4"6 -0.69 dm +0.73 dn -0.9
 -4.5 -0.75 0.66 +0.1
 -2.6 -0.84 +0.54 -2.8
 -10.3 -1.00 -0.01 -4.6
 +3.7 +0.34 dm +0.94 dn -2.3
 +4.2 +0.26 0.96 -1.1
 +7.2 +0.17 0.98 +2.6

mn 238 an 2.98 2.96 -0.70 +23.9 -1.91
 an +13.8 ab 4.03 4.03 +8.2
 bn +6.7 bb -0.70 a 3.07 -18.3 -3.9
 dn -3"2
 dm -8.7
 n 2.86 8

2^d assumption m +37"8
 n +111.8

Equations

O: -0"6 -0.71 dm +0.70 dn
 +0.2 -0.77 0.63
 +2.9 -0.82 +0.50
 -1.4 -0.98 -0.06
 -2.0 +0.28 +0.96
 -0.9 +0.21 0.90
 +2.8 +0.11 0.99

mn 23"42 an 2.96 2.96 -0.70 +1.91
 an -1.31 ab 4.00 4.00 +8.2
 bn +1.21 bb -0.70 a 3.07 -18.3 -3.9

Comet

Rft. invisible

Δx m +111"58
 Δd +38.20
 2nd 1. 1/20

dn -0"22 = 1"73
 dm +0.40 ± 0.80 mn 2 22.67 0.2 10.6 ± 1"43 (2 minutes)

Ornet Respighi-Watson

1864 Feb 18th

The comparison star Wupr V. 721 is found in no other catalogue at present yet examined; but its place can be relied upon within 2" or 3", as it has been compared by Prof Bond with 3 other stars of Wupr on Jan 21st to the Orion - Lines.

It is star 5 of Zone IV. It is to be observed with the Meridian

1825.00	5 27 26.98	-4° 32' 42" 2	2° 5' 28" 24.8	9.99586
	+ 1 59.66	+ 1 47.5	8° -4' 31" 47.7	8.89887 ⁿ
1566.00	5 29 22.64	-4 30 54.7		1.417 20 ⁿ
24.5 (1566.00 + 19)	22.58	54.3		2.89329
Ornet-Star	+ 1.42	- 12.4		9.13795
	+ 7.46	+ 38.2		0.61193 ⁿ
Ornet's L.D	5 29 31.92	-4 30 28.9	9 31 15	2 + 19.99
pr Par	+ 0.118	+ 6.22	2 32' 21"	2" -0.74
Par	(-0.23)	(+12.4)	14 302 29	10 +8.09
Stappfer	5 29 43.1	-4 34.2	40 8.897 ⁿ	40 8.897 ⁿ
Cor. cph	-11	+ 3' 9	Sub 9.9621	9' -4.07
			2 1.0078	11 -4.37
			2.19-2 9.6024	11 -6.99
			0.0013	
			9.6232	
			1.2683	
			9.9579	
			8.8961 ⁿ	
Christine	6 34 7			
Harriet El	4			
El slope	3			
to Min	6 34 14			
- 21 51 38				
- 1 26				
8 41 10				
14 15				

W. Cambridge

Orion

1864 Feb 19

Sid 5^hClear - cold - bright moonlight
vision tolerably good $\theta''\theta'' > \eta''\eta''$ 2.5 $\theta'' > \mu'''$ 0.7 $\zeta''\zeta'' > \theta''\theta''$ 2.5 $\theta'' > \epsilon'''$ 1.7 $\theta''\theta'' < \epsilon'''$ 1 $\delta'' = \zeta'''$ $\mu''' > \zeta'$ 0.3 $\mu''' < \epsilon'''$ 1. δ' is conspicuously brighter
tonight than ρ or ϵ

Comet II. 1863. 12^h Berlin m.s.t.

Extrapolated from Oppolzer's Ephemeris A.N. 1433

1863	α				
	12 ^h	11 ^m	37 ^s	+ 58° 8'.9	Proc α + 2.94
Oct 5	12	11	37	16.1	δ - 20.0
6	12	36		23.5	
7	13	35		31.1	
8	14	35		38.1	+ 0.7 = cor by obs.
9	15	34	+ 2° = Cor by obs	58 46.1	
10	16	34			
11					
12					
13	19	32		59 12.6	
14					
15					
16	22	30		+ 59 40.5	

Reduction to 1864

From 1800	196.495 + [1.9334] in $2^{\circ}45'$	3.10843 in 2°	1832.0
1825	119.749 + [1.71720] in $2^{\circ}45'$	2.89329 in 2°	1844.5

Compare E''' with D''' , M''' & $F''F'''$ G'''

M''' F' $g'g''$ $N''N'''$

$g'g''$ g'' $F''F'''$ $N''N'''$ M''' F'

F' $N''N'''$ E'''

N''' See Feb 16 1863

14th May 1858
12 1863
11-12 "

To see if Y' should read

	$+1^m 22^s.83$	$23^h 46^m.5$	as by 10 obs in 1857
or	$1 \quad 22.75$	$23 \quad 50.3$	" 3 " 1862 Jan 7
Feb 6	Jan 1863 ⁴	$23 \quad 48$	

$g''g''' > 1/10''$

