

KG

11365

189

H. 35

Equatorial
May 2nd 1860
June 22nd 1860.

Sold by T. Groom & Co., Stationers, India Building, 89 State St., Boston.

KG 11365, 189



KG 11365.189

$\frac{3}{7}$

$\frac{1}{2}$



Photometry Moon

1860 May 2nd10^h P.M.

○

Moon on meridian two days from
full. Sky clear but East Wind 1

Diaphragm X on Lamp S adjusted
to good maximum constant as usual

Images equal on B_3 - B_3 to X =

2.3	+ 0.45
2.0	"
2.1	"
2.5	"

New Lamp put up I X

B_3 to X	1.9	+ 0.45
"	2.0	"
"	1.9	"
"	2.1	"

Through pane of glass
Parlor window

Jupiter

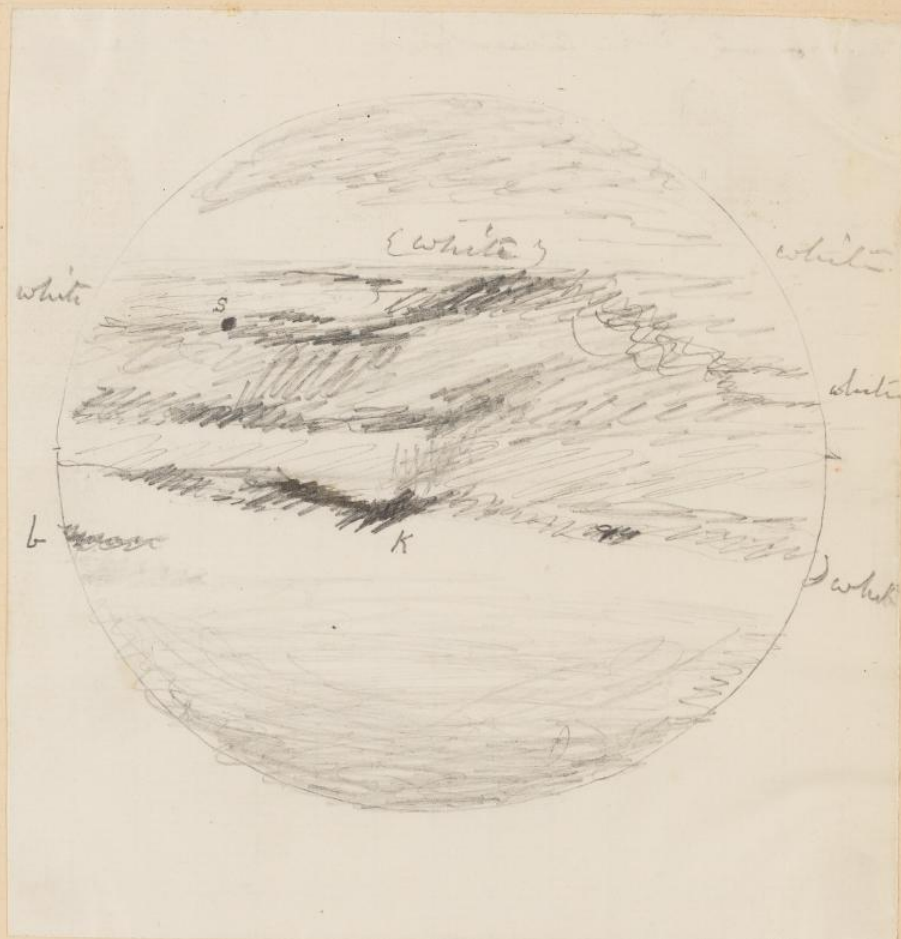
1860 May 3

8^h 00^m mst

On first looking
at Jupiter saw
the III Satellite at S
as dark spot

It disappeared when
within 3" of limb
& I went to con-
sult Almanac &
found it emer-
ging when I

returned as a silvery white point much whiter
than any part of $H =$ No one could be-
lieve that it was the same spot



K is very conspicuous & dark - L is part
of a belt visible on the edge - a very rare
phenomenon -

I think to give proper effect to
drawings of Jupiter the N & S limbs

should be darker than the E & W.

Photography

1860 May 4

Thin red haze

(1) Venus

Ap 15ⁱⁿ236 9^h 30^m

10 beats

All took

took - vessel rim = $\frac{2}{3}$ full

1

3

2

4

6

8

12

20

Venus at 3 is perhaps at least stronger than 4.60

Venus 2 $\frac{1}{2}$ = 4 60 diameter of each

Shortest exposure for strong negative

This is best time for good negative

(2) Venus ap 5ⁱⁿ

239 9 44

60

40

2

did not take No trace seen

5

took at rim took vessel rim $\frac{1}{2}$ radius

8

not yet long enough for strong negative even at rim

10

15.... almost whole disc.

20

30

~~80~~

good negative of whole ill. disc. similar to such as would be taken for good positive Moon pictures

Two together

Daguerriotype

Ap. 15ⁱⁿ

236 9 58

20

1

2

5

7

10

12

15

30

overlaid.

Type most of not all took

Photography

1860 May 4

Red haze
Jupiter 5th ap. 236 10

60	60
40	70
30	30
20	5 ~~8~~
10	20
8	40
5	8 ~~8~~
2	2
100	100

not a trace

Mean alt Venus for plates (1)(2)
= 43°
alt 4 plate 3 is 47°

3

Jupiter

15th 60

10 25

The deficiency of chemical action in the equatorial regions for the longer exposures is a remarkable feature. It occurs in a zone of $\frac{2}{7}$ breadth of polar diameter.

60 beats

2 a trace?

4 decided action over $\frac{1}{4}$ area of disc certain

8 took?

4th image at 12th Venus 5th densest part

12

20

30

40 ~~60~~

As there are spaces for only 7 images on plate a doubt is thrown on the question as to the images belonging to the several exposures

Tried full Moon 15th ap.12th 5th

15 beats too short for strong negative

40 " " not much better than 15 beats.

60 " " not stronger than 40 exposure

Was disappointed in not being able to get a comparison between the Moon & Jupiter on account of bad working of chemicals or the red haze. Could not get a strong negative Moon 20° high

Attributed to red haze & low alt of Moon

I conclude from the above That $\frac{4}{\text{Venus}} = \frac{1}{25}$ taking brighter parts of each
From 1st traces $\frac{4}{9} = \left(\frac{5}{15}\right)^2 \frac{3}{4} = 0.083$ by plates 2 & 3... or perhaps $\frac{4}{9} = \left(\frac{5}{15}\right)^2 \frac{3}{8} = 0.042$
" $2 \left(\frac{5}{15}\right)^2 \frac{2.5}{60.0} = 0.042$ " 1 & 3 Adopt $\frac{4}{9} = 0.035$ brightest regions
" $\left(\frac{5}{15}\right)^2 \frac{8}{40} = 0.022$ " 2 & 3 at same altitudes
I have given the advantage to 9 in doubtful cases as above

Photometry

1860 May 4 Full Moon

7

13^h 15^m Sid10^h 20^m S

Thin Red haze dense at horizon

Diaphragm X Lamp S

Images equated on South 1371

0.36

Bull to X

Parlor Windows - through
pane of glass2^h 7 + 0.36

2.4

2.3

Jupiter IV Satellite

1860 May 6

236 $8^h 58^m$ to $9^h 9^m$

Satellite

About as dark

as black of an or-

dinary wood-cut

in the better qual-

ity of American

printing but not

up to the German-French

English-

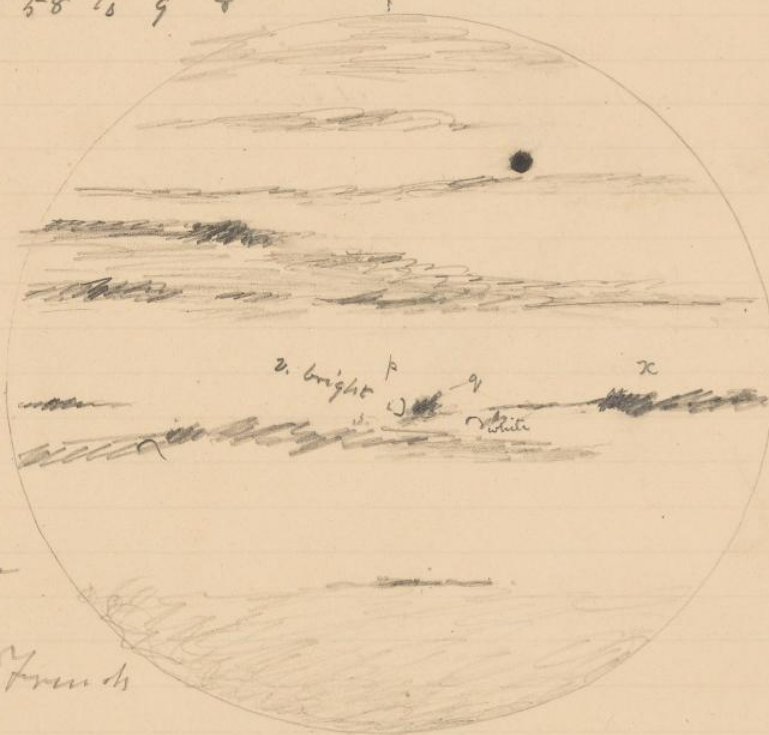
The bright spot under p is very remarkable though small say $\frac{2}{3}$ diam of 4th Sat It is followed by

another considerably fainter under q

a decided dark spot with dark stripe attached. this

& that preceding in same parallel are by far the darkest parts of the planet

The 4th Satellite is fairly black - that is to describe it as dark merely would fail to give a proper idea of the depth of its hue but it is not jet black or inky black ^{it is} rather a shade intermediate between very dark & a perfect black. I set up the screen with the

4th Satellite

X

Jupiter

shaded discs used April 18th & originals preserved
 in Eg. Book of that date } & examined them at
 distances from 20 to 30 feet & was satisfied
~~that~~ of looking first at Telescope & then at same
 place in Dome that the satellite when $\frac{1}{3}$ of
 its transit over disc was ~~done~~ & seen under
 fine definition was about half way between
 B - the darkest of the 3 discs on white ground & the
 black disc on shaded ground B₀.

I feel sure that if the whiteness (Albedo)
 of B compared with white paper is $\frac{v}{B} = \frac{1}{7.27}$ then
 the $\frac{\text{light of 4th satellite}}{\text{light of Jupiter}} < \frac{1}{10}$ for rel intensity.

The belt on which Satellite transitted was
 not whiter than the usual intervals between
 the dusky bands - it would not be noted as
 white excepting as coming between two dusky
 stripes -

The Belt X has a bluish cast & that South of
 Equator is reddish brown - An hour later in the
 evening at 10^h 30^m X showed
 a downward tendency as
 in margin

Photometry

1860 May 11th

Out of doors quite dark
 Comparison of Flake white screen with blue black screen

Dirt from S. White 14 ¹¹/₁₂
 Black 3 ⁶/₁₂

14.9 0.1732

3.5 0.5641

0.6291

18.1 = 1.2582

White
 Black

8 ¹⁰/₁₂2 ²/₁₂

$$\frac{\text{Albedo White}}{\text{Albedo Black}} = \frac{1}{2} \left[\left(\frac{14.9}{3.5} \right)^2 + \left(\frac{8.8}{2.2} \right)^2 \right] = 17$$

The tints are not noticeably different.

Photometry

1860 May 16

Compared a Wax candle light with

I Diaphragm X as follows

Bulb 1371 to I-X

3st 89
4.00

I-X to Candle

17.8

$$17.80 =$$

$$\frac{3.95}{13.85} = 0.5966$$

$$13.85 = \frac{1.1414}{0.5448}$$

2

Light of Candle

=

$$12.29 = 1.0896$$

Light of I-X.

March 27

 $\frac{x}{z}$

4.63

0.6656

Diaphragm Z less than 1 candle

56.9

$$= 1.7552$$

Students

1860 May 16

Students Junior class 2 divisions
came 3 weeks since - in the week preceeding April 22nd
Appointed for remainder to commence again
this morn

860 May 23

Sent to Capt. C. H. Davis Sup. N. H. the 4 ft.
French Telescope by Lenoir. for use of Exp. to see the
Eclipse at Cumberland House. as by application on
file.

Dark glasses & part of eye piece
not yet returned from Mr. Clarke to be sent
as soon as received.

Rüchker^{1st} Comet 1860. II.

1860 May 23.

G.P. B obs.
J.H.S. rec.Zero of Position $84^{\circ} 25'$

Comet	29	1.7	10.7	worth preceding
Star			27.8	
		B		

Comet.
StarComet
Star

The above object is not the comet, but a minute double star.

G. Rümker's (1860.II) Comet.

1860 May 23. *Chromometer*
 1st Set Comet star { 43 4 22.3 42.717 Comet North Proceeding
 35.4

2nd Set Comet Star

3rd Set Comet Star

17.1

30.8 ?

D. B.

20.06

D. B. D.

20.92

D.

19.80

Following Dec. are taken on the opposite side of zero.

B. B.

40.01

D. D.

39.62

B. D. B.

40.25

A. A

The star employed above is Oeltzen ~~6713~~ 6713.

Times by El.

13

3

51.2

65.7

7.2

7.1

58.4

72.8

4

49.0

64.3

8.0

6.7

57.0

71.0

5

40.2

53.9

7.1

7.9

47.3

61.8

13

8

21.1

~~9~~~~51.0~~

9

51.9

13 9 57

20.26

11

40.4

9.85

133

13 431.4

14

44.4

13 14 84

39.96

16.

lost.

Turn

G. Rümker's (1860.11) Comet.

1860 May 23.

Comet compared with Argelander (Oeltz.) 6713

Comet	13	18	23.2	49.4
Star.			26.4	52.5

Wire A. only

Comet.

Star.

Comet.

Star.

Comet.

Star.

Comet.

Star.

Comet.

Star.

B. D. B.

Times by E.C.

$$\begin{array}{r} 13 \quad 18 \quad 44.0 \\ 48.0 \end{array}$$

$$\begin{array}{r} 13 \quad 18 \quad 44.6 \\ 48.6 \end{array}$$

L.O

$$\begin{array}{r} 19 \quad 18.6 \\ 14.6 \end{array}$$

L.O

$$\begin{array}{r} 19 \quad 28.9 \\ 32.8 \end{array}$$

3.9

Diff

 $\delta - * (\Delta \alpha)$ $\delta - * (\Delta \delta)$

$$\begin{array}{r} At \quad 13 \quad 4 \quad 54 \\ 19 \quad 8 \end{array}$$

$$\begin{array}{r} - 7.33 \quad (6 \text{ comp}) \\ 3.97 \quad (3 \text{ comp}) \end{array}$$

12 20

+ 9.85

Stars for Pünder's Comet. (1860. II).

1860 May. 23.

Oc. 6713 compared with Oc. 6686 = Gr. 1127.

2nd time by chron. 236.

6686	13	22	3.3	6	27
6713		24	10.6	2	36

6686	13	25	41.8	5	48
6713		27	49.0	1	57

The following comparison was made earlier, without
S. G. which in the evening

6686	12	15	1.6	7	0
6713		17	8.8	13	10

El. at end $13^{\text{h}} 37^{\text{m}} 0^{\text{s}}$

Comparisons from prec. page, by sheet

El.

13	21	14.6	26.2
	23	21.8	33.55

13	24	53.4	4.9
	(26)	59.8	

S. G. ending badly.

Occultation of Jupiter

1860 May 23/24

Immersion Observed by G.P.B. with
Great Refractor

1st Limb of 4 E.C. = 2 36 39.9

E.C. 26.2 feet

2nd " " E.C. = 2 37 47.8

The edge of planet was very faint & the immersion
of the first limb must have been recorded too late

At Emersion : reappearance of 1st limb was
noticed perhaps too late : 2nd limb very well

Belts just visible - the central regions of
Jupiter were rather brighter than the bright edge of the
Moon at point of emergence

but scarcely as bright as the brightest parts

of Moon. at very edges No difference in color

was discernible

Em. E.C. = 3 22 43.7

E.C. 26.2 feet

E.C. = 3 23 50.6

Jupiter



Occultation of Jupiter

May ²³/₂₄. 1860

Reduction of observations of G.P.B.

Sid. T. of Imm.	2 ^h	3 ^m 6 ^s	13.7	Total	2 ^h	37 ^m	21.6
	4	6	3.02		4	6	3.02
	22	30	10.68		22	31	18.58
		3	41.19			3	41.38
Camb. m. s. t.	22	26	29.49		22	27	37.20

Sid. of Em.	3	22	17.5	Total	3	23	24.4
	4	6	3.02		4	6	3.02
	23	16	14.48		23	17	21.38
		3	48.74			3	48.92
Camb. m. s. t.	23	12	25.74		23	13	32.46

Occultations of Jupiter

May ²³/₂₄. 1860

5 ft Equatorial

<u>H. P. Y.</u> Total Imm. 236 =	2	38	10.0
			56.6
	2	37	13.4
	4	6	3.02
	22	31	10.38
		3	41.36
Comb. m. P. Y.	22	27	29.02

R. P. Y. Total Em. 236 =	3	24	9.0
			56.6
	3	23	12.4
	4	6	3.02
	23	17	9.38
		3	49.89
Comb. n. P. Y.	23	18	20.49

Star for Rümker's Comet. 1860.II.

860 May 24.

Zero of Scale $84^{\circ}40'$

Star b compared with a.

b = * of 12th Mg. a = Gr. 1149 etc.

Chro. 236.

Sub.

E.C.

a. 13	21	6.2	13.3	7 39	13 20	35.3	42.5
b.	22	~~10.6~~ +	17.6	1 39	21	39.6	46.8
a.	24	28.5	35.5	7 22	13 23	57.8	4.8
b.	25	32.7	39.8	1 22	25	2.0	9.2

~~a.~~

~~b.~~

Dünker's Comet. 1860. II.

1860 May 24th

B. B. B between star obser. on prec. page and comet.

Comet south preceding star. δ of 12th Mag.

Clus.

E.C.

Comet. ¹³ 28¹
Star (1w)13 27 6.7
20.5Comet (2w) 13 28 17.1 —
Star — 42.413 27 46.2 57.8
27 59.8 11.5Comet
Star13 28 35.0 42.8
47.0 56.4Comet
Star13 29 18.5 27.2
31.2 40.3Declination now observed
B. B.

By 236

13 34 49.6

B. B. B.

10.800 13 34 18.5

11.62 13 36 49.8

P P Zero 30.342
30.402

B. B. B.

13 46 28

B. B. B.

10.52 13 45 57.8

Runkers Comet. 1860 II.

1860 May 24th continued

By El.

By 236. 13 47 48

10^r 82

13 47 17.1

Right Ascension again

By 236

13^h50^m50^sComet
Star13 50. 1.2 9.7
10.8 19.0

B.D.B.D

2^d w.1st

13

51

52

52¹Comet
Star13 51 6.0 12.5
15.1 21.152²

17.8

8

27.2

3

13 51 39.9 46.9
49.1 55.1

53

1.6

9.2

13 52 24.6 30.8
33.3 38.8

53

32.8

40.6

13 52 55.2 62.1
53 3.5 9.6

At End. El. 13 57 0

Stars of Comparison for Circe.

1860 May 25 - July 7.

Ephemeris in A. N. 1255.

Arg. 229.25 (1850.0)	7 ^h M.	18 12 27	-15° 17.6
26	8 -	13 39	15 9.3
Arg. 390.116 = 229.3 = 216.127	8	17 57.59	14 58.9
216.108	8	17 43 29	-14 59.0
390.107	8.9	17 52 6	-15 3.0
390.117	9	57 36	15 3.3
" 118	9	58 36	15 38
" 119	8.9	58 52	15 0.1
" 120	8.9	18 0 19	15 3.4
" 121	8	0 35	15 4.7
" 122	9	0 7	15 2.3
123	8.9	1 8	-14 53.7

Photometry

May 25, 1860

Clear -
Lamp compared with Moon

Maximum Thermometer Bulb used.

Bulb. to Lamp
236 = 12^h 33

cor to lamp
8.9 ft. + 0.4
9.8
10.0

Repetition

Bulb to Lamp
236 = 12 51

8.9 ft.
9.4
8.9

Bulb to Lamp means distance from Bulb to outside
of window glass. Diaphragm X was used with the
Cupid Lamp. S

Observer H.P.V. & A.M.

Photometry - Moon

May 28, 1860.

Lamp compared with Moon

Bulb to Lamp
236 = 13^h 40^m4.5 ft
4.0
3.8Bulb to Lamp
236 = 13 503.5
4.0
4.1

Aurifer Lamp and diaphragm X.

The Lamp was placed out of doors, it being very calm.

Observers H.P.G. & S.H.

Photometry. - Moon

May 28. 1860

perfectly Clear

Lamp compared with Moon

Bulb to Lamp
236 = 14^h 15^m

4.8 ft + 0.6
4.0
4.15

Bulb to Lamp
236 = 14 20

4.2
4.1
4.2

Cupid Lamp with diaphragm x

Lamp in cellar of west wing. Through glass as usual

observed H.P.V. & A.M.

Photometry

1860 May 30

Burned a blue light and a Bengola in Sun light. The former had a purple tinge the latter was much more intense (being much larger) and was of better color in contrast with sunlight.

At 9 P.M. Compensell by means of their images in Bulbs B_2 and — the color of blue-light & Bengola. Both matched very well in color with Moon's image. Though a purplish tinge was suspected. The agreement was far better than ^{with} for the "moderateur" lamp.

Blue light to Bulb 16 paces = Moon

Bengola " 53 .. = "

On 31st Compensell light of 3 Bengolas placed close together with image of Sun reflected from B_2 & received on B_3

$$\begin{aligned} \text{Sun's image to } B_3 &= 3.5^{\text{ft}} \\ 3 \text{ Bengolas to } B_3 &= 7.0 \end{aligned} \left\{ \begin{aligned} \text{hence Sun's image} &= \left(\frac{3.5}{7.0} \right)^2 \times 3 \text{ Bengolas} \\ \text{Sun's image reflected from } B_2 &= \text{---} = \frac{3}{4} \text{ Bengola.} \end{aligned} \right.$$

The purplish tinge in Bengola & want of intensity still leaves an uncertainty in the comparisons (Taken merely as rough experiment)

Occultation of γ Virginis

May 29, 1860.

G. P. B. with Gr. Refs.	S.C. =	15 ^h	21 ^m	0.9	Imm.
	90 for			83.5	
		15	20	27.4	
		4	29	42.37	
		10	50	45.02	
			1	46.61	
Camb. m. 2.		10	48	58.42	

H. P. J. with Plate Equations	424 =	15	21	- 80 beats	Imm.
90 =	15	26	00		
424 =	15	25	29.3	2.8	
			30.7		
			33.5		
424 fast			2.8		
		15	20	25.2	
		4	29	42.37	
		10	50	42.83	
			1	46.60	
Camb. m. 2.		10	48	56.23	

A. H. with 5 ft. E. na Torcan	236 =	15	21	40.7 - 16 beats	Imm.
90 =	15	28	00		
236 =	15	28	32.4	65.9	
			33.1		
236 fast			65.9		
		15	20	26.8	
		4	29	42.37	
		10	50	44.43	
			1	46.61	
Camb. m. 2.		10	48	57.82	

On May 30th Bengola at 53 paces = 137^h = Moon $v = 132^\circ$ ang from Sun

87 =

130

137

2.1367

4.2734

9.712

~~5.64~~

3.985

1.993

2.968

1.961

2.025

0.5202

11.0 = 1.0404

May 30 As s. diam = 16' 9".4 969.4

June 2 " = 15' 49.3 949.3

As Mean s. diam 934.67

June 2 Bengola = Moon

13 Bengola Mean

 $v = 175$ Phase cor.

Red Mean s. diam Moon

Mean full Moon at alt. 22° ExtinctionBy comparison June 2nd

Mean full Moon at zenith = Bengola at

" May 30 "

adopt.

Comparisons of G & Blue light June 2nd
reduced to previous next pages givesMean full Moon at zenith = Bengola at
Blue light

1 Bengola = 12.4 Blue lights.

Comparison of May 30th reduced to full Moon
at same alt. 34° makes aft. cor. for extinction
for phase } Mean Full Moon = Bengola at ~~98.1~~ ~~91.4~~ ~~83.8~~
from obs values } Blue light = 11.0 Bengola

June 2nd

1.961

2.025

3.922

0.076

2/3.846

83.8 = 1.823

3.985

9.968

4.017

Ext. cor 0.076

2/3.941

93.3 = 1.970

87 1.9395

22.7 1.3560

0.5835

14.7 = 1.1670

9.9842

9.9933

9.9684

9.9866

1.9395

1.9261

9.998

1.925

1.9395

2

3.8796

9.9866

3.8924

9.998

3.890

0.978

2/3.720

72.5 1.860

83.8 wt = 1/2

76.2 = 1.882

= Cor to Mean s. diam

= Cor phase $v = 175$

2/3.890

88.1 = 1.945

88.1

80.1

72.5

83.8

76.2

76.2

76.2

76.2

76.2

76.2

76.2

76.2

76.2

76.2

76.2

76.2

76.2

Photometry

1860 June 2nd? Sat evg - fine & very clear

$$\text{ang } \alpha \text{ to Sun} = \nu = 175^\circ$$

Comparisons of Bengolas with Moon at 16^h 20^m
 α on meridian

Refer to the comp of image of Moon from B_2

The following was not satisfactory & should not have $\frac{1}{3}$ to weight of them afterwards made

[Bengola = Moon Max. thr. to light 87 ft]

2nd Bengola recd on B_3 & compared with image of Moon on B_3 from B_2

B_3 to B_2

0.72

B_3 to Bengola

220 paces = 572 ft

Blue light & Moon

22^{ft}.7

Blue & Bengola

$$\left(\frac{45.90}{71.00} \right)^2 \text{ result}$$

In the latter the smoke from Bengola must have affected its light as it fell on the side towards

Blue light

$$0.72 = 9.8573$$

$$572 = 2.7574$$

$$2.9601$$

$$5.8002$$

Cor Ext. + 22°

$$0.154$$

$$0.170$$

$$2.15641$$

$$\text{Phen } 0.002$$

$$2.820 = 661$$

$$\text{Solium } 9.957$$

$$0.159$$

By single obs above recorded

Image of Moon full Moon at zenith reflected from B_2 & received on B_3 at a distance of 1.000 from B_2 is equal to Bengola at distance of 661 ft.

Photometry

1860 June 2nd Cont Fair & clear 17^h to 17^h 25 Sid -
Moon 10^h from full

Burned 3 blue lights on gate post at front
avenue - & compared image of each receiver
on bulb B₃ with image of Moon reflected from B₂
seen on B₃ & made equal with Plane light as follows

Distance centres B₂ to B₃ $\frac{1}{3}(1.6 + 1.5 + 1.3) = 1.47$
Distance B₂ + B₃ from Blue light (I) was 322 feet

Moon = Blue light on Mass the bulb at 25.8 by H. P. T.
2

2nd Blue light Distance $\frac{1}{3}(1.8 + 1.45 + 1.3) = 1.52$
Moon = Light at 30.3

3rd Distance $\frac{1}{4}(2.3 + 1.8 + 1.6 + 1.5) = 1.80$
Moon = Light at 27.7 ft

1.47 = 0.1673	1.52	0.1818	1.80	0.2553	219.1	25.8
322 = 2.5079	398	2.5999	498	2.6972	261.9	30.3
219.1 = 2.3406	261.9	2.4181	276.6	2.4419	276.6	27.7
					157.6	23.8
					252.5 ft	

June 2 Moon + image in B₂ at 1.000 is as bright as Blue light at 26.6 at 20°

" Moon = Blue light at distance 26.6 at 20°

Correction for Moon light to its mean semidiameter and for // on prev. page

extinction & phase $\log = 9.987 + 0.190 + 0.001 = 0.178$

2.4022 $(252.5)^2 = 4.804$

1.4249 $(26.6)^2 = 2.850$ Adopt. 26.6

4.626

Mean full Moon at Zenith gives image in B₂ 2.672

which at 1.5 from B₂ = 1 Blue light dist - - 205.6 = 2.313

Mean full Moon at Zenith = 1 Blue light at 21.7 = 1.336

Photometry

1860 Sat evg June 2 perfectly clear parlor window
Continued

17^h 40^m Sid. Compared Moon 11^h from full with
Lamp S Diaphragm X.

$A \approx X$ equal - X to max. the bulb

$$= \frac{1}{1.75} + 0.45$$

$$1.95$$

$$1.85$$

The lamp was a little low, but it was twice altered

From Obs June 2

$$\frac{\text{Image of Mean Full Moon in } B_2}{\text{Blue light}} = \frac{1}{42300}$$

~

From the obs June 2

Moon $v = 175$

$$= \text{Blue light at } 27.9 = 1.4456$$

$$\text{cor Phase } 0.002 \quad \underline{\quad 2 \quad}$$

$$\text{Extinct. } 0.170 \quad 2.8912$$

$$\text{S. diam } \underline{9.997}$$

$$\text{Mean full Moon} = \text{Blue light at } 23.23$$

$$\frac{\text{Light of Moon reflected from } B_2}{\text{light of Moon seen direct}} = \frac{M}{4} \frac{\rho^2 A^2}{A'^2 A'^2}$$

$$0.159 = \frac{0.159}{2, 2.732}$$

$$23.23 = 1.366$$

$$2\rho = 3.436 = \text{diam } B_2$$

$$A = A' = B_2 \text{ to Moon}$$

Mars

1860 May June 2

Bad definition

At 17^h 10^m Looked at planets both poles whitish
but southern a remarkably bright spot but much
smaller than northern -

Brightest at edges

I fear that the result may be affected by two circum-
stances 1st that the direction of axis of ~~Mars~~ not being
the same for Moon & Sun there may have been
a difference in intensity of reflected image

$$\begin{array}{rcl} 1.83^2 & 0.525 \\ 661^2 & \underline{5.641} \\ 131000 & = 5.116 \end{array}$$

found to be
the same July 1st

2nd the group of Bengolas may
have burned brighter than as many single stars on ac-
count of the greater heat. This is quite probable. & much more
likely to have influenced the result than the previous condition

Photometry Sun

1860 June 3/4 11^h A.M. Clear sky = used a new lot of Bengolas, of same
 maker number, with appearance. Made compare with Blue light
 Compared image of Sun reflected from B₂ upon B₃ with 7 Bengolas set
 25 feet from B₂ Images equal when Dist B₂ to B₃ = 4.20
 " B₃ to Bengolas 20.70

The Bengolas were arranged as in margin very compact.
 all within circle 4" in diameter

Their image had a pinkish tint contrasted
 with that of Sun but on the whole the difference
 of color was not so great as I had expected



The equalisation was noted by G.P.B. A.H. T.H.D. and H.P.T.
 and all were agreed that the comparison of the brightness
 of the two was a good one

$$\begin{aligned}
 4.20 &= 0.6232 & \log R & 0.0064 \\
 20.70 &= 1.3160 & & 0.0128 \\
 &0.6928 \\
 &\underline{\quad 3 \quad} \\
 70^\circ &1.3856 \\
 \text{Extinct. alt} &\underline{0.003} \\
 &1.383 \\
 \text{Cor to Sun's} & & \text{see previous pages} & \\
 \text{mean dist} &\underline{0.013}
 \end{aligned}$$

$$\begin{aligned}
 2) 1.370 &= 1.370 \\
 4.84 &= 0.685 & 7 &= 0.845 \\
 &2) 0.525 \\
 &1.83 &0.2625 \\
 &0.299 &= 9.475
 \end{aligned}$$

Mean

$$\frac{\text{Mean Full Moon}}{\text{Mean Sun}} = \left(\frac{1}{205.6} \right)^2 \left(\frac{1}{12.4} \right) \left(\frac{1}{0.299} \right) = \frac{1}{156300} \quad \text{wt} = 3$$

$$\begin{aligned}
 (205.6)^2 &= 4.626 \\
 12.4 &\underline{1.093} \\
 &5.719
 \end{aligned}$$

$$\begin{aligned}
 0.299 &\underline{9.475} \\
 156300 &5.194
 \end{aligned}$$

$$\begin{aligned}
 \text{May 31}^{\text{st}} &\left(\frac{1}{205.6} \right)^2 \left(\frac{1}{12.4} \right) \frac{1}{0.75} = \frac{1}{390750} \quad \text{wt} = 1 \\
 \text{1}^{\text{st}} \text{ June 2} &\left(\frac{1}{661} \right)^2 (1.83)^2 = \frac{1}{131000} \quad \text{"} = 1
 \end{aligned}$$

From above it appears that
 the image of Sun formed in B₂ is at
 a distance of 1.000 = 1 Bengola at a dis-
 tance of 1.83 ft After applying corrections
 for Extinction &c.

$$\begin{aligned}
 \text{Image of Sun in B}_2 &= 0.299 \text{ of 1 Bengola} \\
 \text{" Moon} &= \left(\frac{1}{205.6} \right)^2 \text{ of 1 Blue light.}
 \end{aligned}$$

We have also from preceding pages

$$\begin{aligned}
 \frac{\text{Mean Full Moon light image in B}_2}{\text{Blue light}} &= \left(\frac{1}{205.6} \right)^2 \\
 \frac{\text{Blue light}}{\text{Bengolas}} &= \frac{1}{12.4}
 \end{aligned}$$

Photometry

1860 June 4

Compared 2 Blue lights with 2 Bengolas of
same lot used in comparison with Sun

7m Bull	to	Blue light	24.9	21.7
"		Bengola	<u>75.1</u>	<u>78.3</u>

24.9

21.7

66

23.3 = 1.3674

76.7 1.8848

0.5174

10.8 = 1.0348

$$\frac{\text{Blue light}}{\text{Bengola}} = \frac{1}{10.8}$$

June 4

$$\frac{1}{12.4}$$

May 30 June 2

Adopt " 11.6

From previous pages

$$\frac{\text{Mean Full Moon at Zenith}}{\text{Mean Sun}} =$$

Search for Concordia

1860 June 4th

+ a = Weiss

 α 1860.0 11^h 49^m 19.^s $\delta + 4^{\circ} 50' 15''$ + α 12.13 mag+ β 12.13 mag. α 14 52 50.0 3'.5 so. of centre α 54 38.2 ~~3'.7~~ " " 1.0 m β 54 42.4 1'.0 no. of centre 3.7 m α 14 56 38.4 3'.3 so. of centre α 58 26.2 1.5 so. of centre β Star α is very near the predicted place.

15 1 45

At this point moon and clouds prevented further observations.

Search for Concordia

June 6th

15	9	11.8
	10	56.0

15	27	57.0
	29	19.8

Star α of June 4th is not the planet.

Clouds.

b. .5

c.

f

d.

e.

The planet should be to night about in the pos. f.

The magnitudes of α and β are estimated too low, June 4th
They are nearly 11th.

c. d. e. f are smaller.

For Runkel's Comet.

860 June 7th

At 8^h 45^m Cambridge

7^h 28^m 23^s + 54° 8' 3"

Dec. 8093 7^h 26^m 39^s 30 54° 15' 3" 7 for 1842.0

7th mg. Arg. 1 26.29 - 2 14.3

7.8 - Gr. 7 28 55.59 54 12 49.4 for 1860.0

This star is Gr. 1336 and has perhaps some proper motion.

Photometry

Drummond Light with Sun

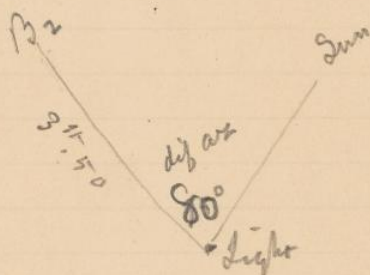
1860 Jan 7

Clear between Cumuli -
Sun's image on B₂11.57 10^h 28^mLight to B₃

2.25

B₂ to B₃

3.50 - 2.25 1.25

Centre of B₂ is 8 inches higher than light-

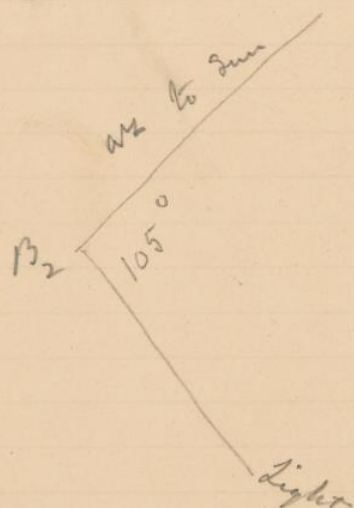
Axis directed towards the Sun

B₂ to B₃
Light to B₃

4.8

8.8

Centre on horizontal plane

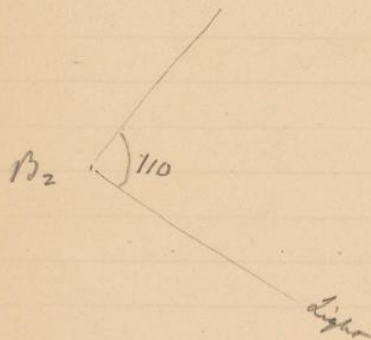


Photometry Drummond Light with Sun

June 7th cont.

Axis of Bull always pointed towards Sun

14.4 - 4.6
4-6
9-8



Sun's axis

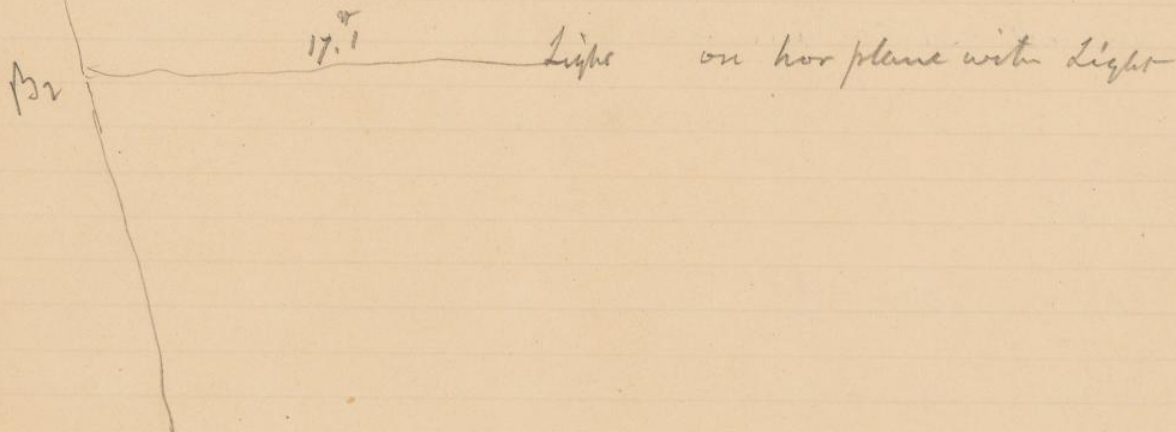
B_3 to B_2
 B_3 to light

very thin curve not perfectly clear

11^h m. s. t.

~~17.1~~

4.6
12.6



Photometry. Bengola & Drummond

Light to B₃
Bengola to B₃

21.
7.5
18.5

7.9
18.4

6.1
20.2

In the last the Drummond was fainter than before.

The colour of the Drummond was golden yellow contrasted with white with tinge of blue of Bengola

Compared with Sun Drummond was yellowish with tinge of pink - or red. By no means white like the sunlight.

The quick time was a pyramid of $\frac{3}{4}$ inch height - but not above $\frac{1}{2}$ inch from apex was intensely ignited.

The Bengolas give a light much more like that of Sun in color than the Drummond.

For Runkle's Comet.

1860 June 8th

At 8^h 45^m Cambridge

δ α 7^h 33^m 3^s δ 53° 55' 4"
H.M. . + 11.5 - 0' 38"

Dec. 8106. 8.9 mag.

1842.0	7 27 50	53° 53' 3"
	+ 1 26	- 2.3
1860	7 29 16	53 51.0

For Rümker's comet.

860 June 11th

At 8^h 45^m Cambridge

H. M. $7^{\text{h}} 48^{\text{m}} 48^{\text{s}}$ $+53^{\circ} 7.1$ this is not right
 $+ 11^{\text{s}}$ $- 0.6$

Rümker 2324 $7^{\text{h}} 45^{\text{m}} 56^{\text{s}}$ $+53^{\circ} 15.7$
47 21

Magnitude not given.

Runkel's Comet

1860 June 11th~~Comet.~~~~46.63~~

Comet 16 12 8.3 55.00

Star ————— 39.00

~~Comet~~ - ~~16 14 47.1~~~~Star~~ By Obs. 236.

Comet 16 15 17.3 } South Preceding Star.

Star 15 42.2 }

Comet 16 16 1.2 }

Star 16 25.6 }

Comet 16 16 51.5 }

Star 17 15.8 }

Comet 16 20 56.8 60.00 Reported.

Star ————— 44.82

The angle of position here was: 78° instead of 88°.

~~Comet~~~~Star~~

Turn over

Rümker's Comet.

68 June 11th
 16 July 11th 8 36 27
 * ~~236.~~ 16 25 55 in centre of field
 Dec. Cir + 53° 18'

236 }
 8 31 20
 16 31 20 } 27 Lyncis.
 51° 58'

The following comparisons were also made: —

Comet 15 51 28.3

* 56.0

Comet 52 13.0

* 39.7

Comet 53 15.8

* 41.2

Very uncertain
~~Allowed 1/2 weight~~
 rejected.

The star turns out to be Rümker 2324.

~~For~~ ¹¹Runkel's Count



Rümker's Comet

1860 June 11th

Star - Reduction

2324 Rüm	7 45 ^m 28.384	53° 19' 15".73
	1 52.17	- 3. 35.52
	7 47 20.55	53 15 40.2
	24.53	- 2 32 "

At 10 54 Am	7 46 56	53 13 10 }
Comp.	7 47 6	53 13 0 }

1848.0	2° 7' 46" 24.5	
	2° 53' 17.48	
~~4.5~~		0.12748
~~sin~~		+9.95140
		-1.30222
		-9.65107
	24."049	1.38110
	46.059	
	70.108	
	4.6730	
		-0.95320
		8" 980

For Runkel's Comet.

1860 June 12th

G. P. Blodgett T. H. Sover

At 8 45.

$$751.0 + 52^b 59^1.8$$

Oeltz. 8510

$$7 \ 52 \ 44 + 53 \ 8.6$$

7th Aug.

Rim 2324

7 47 21 53 15.7

At 9^h 45^m Chr. t.

7 51 11 52 59.2 .

Runkel's Comet.

60 June 12th

B. obs. S. rec.

Star of Comparison = a 12.13 / b = Delzen 8510 8th

(El 14 50 0)

Star a 0 02

(B_y 73.6 14 53 30)

" b 8 28

(14 53 50)

" a -0 02

" b 8 25

" a 1 00

" b 9 28

Right Ascensions of Stars a b.

B_y 236 14 57 (21) a

a' 11 g 1.7.2 2 40

35.6 30

57 (26) b

57 47.8 a

12 24 3.1 2 19 2

37.6 8 9 3

533 b

Several sets follow.

Comparison of Stars a. and b. continued.

By El.

7 52 39 43 17

Star 28.5 pounds better *

By 236. after S.G.
 15 1 6.2
 11.8

By S.G. El. again.

B. B. B.

a	15 ^h	11 ^m	17.8	}
b			23.1	
a			37.9	}
b			43.5	
a			57.6	}
b	12		3.1	

By El

15	10	36.6
		41.8
10		56.7
11		2.2
11		16.4
		21.8

Rinkert Count.

1860 June 12thZero of Wires $84^{\circ} 1'$.

236.	15	26	53.8	} Comet S. Rec.	18.411
		27	12.2		

15	28	23.6	} ~~2d~~ half wt	17.0 $\frac{1}{2}$
		40.6		

29	28.9	} ~~2d~~	17.9 $\frac{1}{2}$
	46.8		

17.9	$\frac{1}{2}$
17.9	$\frac{1}{2}$

~~30 56.7~~
Declination 5.

At 15 34 ~~Zero of~~ 46.5

15 40 46.

60^r.00 Comet
52.49 Star

60^r.10 Comet
49.56 Star

Runkel's Comet

1860 June 12th
236 . 15

45	39.5	}	Comet.
46	3.4		
46	24.7	}	Star a. h ₁
"	48.7		
	48.7		Comet

It seems that the comet instead of being south preceding
was south following the star.

14 12 11
12 11 10

Photometry Venus

June 12 1860 Clear

Compared Venus with diaphragm Z, Lamp S at good adjustment in cellar of West Wing. As usual, through window glass.

14^h 15^m Sid.

Lamps to β_2 for equal images
" "

¹⁵
63.2 + 0.6
63.2 + 0.6

Alt. of planet 15° ±.

For Rüchker's Comet.

1860 June 13th.At 8^h 45^m m. t. Cambr.

$$7^{\text{h}} 55^{\text{m}} 16^{\text{s}} + 52^{\circ} 45'.0$$

Oelzen	85 ³⁹ ₄₀	⁴ 9	7	54	14	^{1860.0} +52° 32'.8	}
	85 ⁸⁴ ₈₅	⁴ 9 ¹⁰	7	56	55	52 40.0	

Note!

June 14th Oc. 86⁴⁶₄₇ 8^h 0^m 24^s + 52° 26'.2 ⁴7^h 8^m = Johnson 47a.

$$\begin{array}{c} 6 \\ m \\ 55 \quad 56 \end{array}$$

$$56 \quad 39$$

$$57 \quad 35$$

$$58 \quad 54$$

$$0^{\text{m}} \quad 16^{\text{s}}$$

$$1^{\text{m}} \quad 20^{\text{s}}$$

$$5 \quad 30$$

For Concordia

1860 June 13thAt 10^h Cambridge11^h 57^m 8^s

+4° 15' 8"

(H.M.)

1.9

- 0.2

Stars in the vicinity

4055 B.A.	11 54 0	+ 4 24.8	8.9
W. 11.963	56 48	4 8.1	9
966	56 55	4 8.9	9

The same stars will be available for June 14th.

1860

Chart for Concorde

H. P. T.

June 18



For Lois.

860 June 18.

H. S. Johnson

296

Star a 17 59 48.7 18 0 13.4 a center 0.5 north
18 0 39.6

Star b 0 2.7 b. 1' south
54.6 0 28.6

Star c 0 57.5 c 0.5 north
1 48.5 1 23.0

c. (1900.0) 19 9 51 - 26° 10' 3

Transits across scale of a and b.

236

a 18 8 52.7
b 9 7.2

a 10 2.4
b 10.4

a 10 49.3
b 11 3.3

a 11 48.5
b 12 2.2

Adjusted for ref

a 13 23.0
b 37.3

a 14 29.4
b 43.1

1860 June 18.
J.H.S.

Zero of Scale $82^{\circ}13'$

a	18	45	19.1	+13.00	18 46.2
b			32.1	+12.35	19 42

a		46	26.3
b			39.2

a		47	30.3
b			43.4

Star b is perhaps the planet.

Comparison between b and c.

b	18	57	3.9	8.3	4 48
c					

~~b~~
~~a~~
~~b~~
~~c~~
~~b~~

b-a 12.5 at $19^h 0m$

Fis.

El

1860 June 18
H.S.

a	6 10	19	3	25.2	29.4		
b	4 21			37.4	41.8		
c	5 18 ? right.	4	34.4	38.8	- 57.00	- 0' 57"	
a	7 41	5	24.7	29.2			
b	5 48			37.1	41.6		
c	6 49	6	33.9	38.4	- 56.80	1 1	
b	5 38	8	44.4	48.4			
c	6 39	9	41.5	45.9	- 57.30	1 1	
b	7 45	10	27.0	31.3	- 57.45	1 3	
c	8 48	11	24.4	28.8			
b	5 18	12	9.3	13.6			
c	6 —						
b	5 0						
c	6 6						

Doubtful Cloudy

Cloudy

Jais.

1860 June 18.
I.H.S.

$$19 \quad 3 \quad 39 \quad - 0.10 \quad - 57.10^{\circ} \quad - 1.3 \quad - 0' 58'' 3.$$

$$5 \quad 40 \quad - 0.04 \quad 56.84 \quad - 0.5 \quad - 1 \quad 1.5$$

$$8 \quad 46 \quad + 0.05 \quad 57.25 \quad + 0.7 \quad - 1 \quad 0.3$$

$$10 \quad 29 \quad + 0.10 \quad 57.35 \quad + 4.3 \quad - 1 \quad 1.7$$

$$19 \quad 7 \quad 0 \quad 57.13 \quad - 1 \quad 0.4$$

Star b. observed above seems to be Jais

Star of Comp.

Arg. 239.18

$$19 \quad 9 \quad 12.50 \quad - 26 \quad 11 \quad 18.7$$

$$- \quad 34.13 \quad + 1.1$$

$$- \quad 0.01 \quad - 3.3$$

1850.0

$$19 \quad 8 \quad 38.36 \quad - 26 \quad 11 \quad 21$$

$$+ 37.50 \quad + \quad 59''$$

$$\text{Lair} - 9.6918$$

$$\text{W. A.} - 9.9802$$

$$1.3022$$

$$\text{and} + 9.4699$$

$$9.44$$

$$5.4006$$

$$19 \quad 9 \quad 15.4 \quad - 26 \quad 10 \quad 22$$

$$+ 4.2 \quad + 4.6$$

$$19 \quad 9 \quad 19.6 \quad - 26 \quad 10 \quad 17.4$$

$$- \quad 57.1 \quad - \quad 1 \quad 0.4$$

$$19 \quad 8 \quad 22.5 \quad - 26 \quad 11 \quad 18$$

$$0.0 \quad + \quad 8$$

$$19 \quad 8 \quad 22.5 \quad - 26 \quad 11 \quad 10$$

$$19 \quad 8 \quad 42.0 \quad 26 \quad 11 \quad 10$$

$$+ \quad 19.5 \quad 0' 6''$$

App. Eq.
SC - *Jais
Computed ParallaxComputed
C - 0

Chromat

$$1.3 \quad 15.5$$

$$+ 5 \quad 38.1$$

$$- \quad 8.2$$

Baker

$$18 \quad 45.5$$

Comet first seen by H.P. 77

15^h

Sed.

June 21. 1860.

G. P. B. obs.

☞ south prec x b 10th mag.The comp. are not well
obs. on account of noise

Scale

6' 03"

6 37

☞ 15- 34 41.5-7

* b 35- 11.6

☞ 19.0

* b. 35- 49.0

☞ 1 36 41.4

* b. 37 11.0

☞ 19.0

* b. 48.5

6 35

7 03

	h	"	"
HB West	9	8	5
236	= 15	38	46

Dec. C. 132° 8.7

47 51.3 from pole

Dec 42 067

Cor ref

EC =	16	33	40
236 =	16	32	33.2

comet continued.

June 21.

 $b = *$ of comp of 10 may.

$\ll$	15-	45-	31.0
*		46-	37.8

b	"
5-	30

The tail of comet at 12' from nucleus is 4' broad,
much the brightest on the preceding side

a	15-	50-	14.1
-----	-----	-----	------

a	15-	50-	32.0
b			4.4 ?

 a is 10' 20" north of b about

	51	33.2
--	----	------

comet continued

June 21, 1860

p at 5^h 30^m hr

15 52 16.8

a 29.0

L 41.2 ?

2

a = 9th in tail of comet

Telescope set at alt only 1° or 2°

53 2.5
4.0

Dec 132° 15' H.C. 9 23 44

The alt. of Comet at this Dec 1° 15' !

Instrument not altered.

15 54 38.0

53.4

11.2

Scale

5' 20

Star.

9m 16 1 17.0
21.3 } first wire
40.8

9

7

3 00

C

9m 2 11.4 over last wire

6m 16 6 22.5 (59 Anriga)

4 20

d

6 55.0

10m 8 11.0

8

7-8m 13 32.0

1 34

e

14 4.7

9m 15 30.2

11 0

f

9m 20 54.0 scale

— 0 25

g

24 11.0 last

The star 58 Aurigae of 5th mag. was scarcely as bright as the nucleus without envelope -

6 40 9.17	42.54	42.54 48" 2' 51".5	+ 35	48 3 26	41 56 34	+ 0.50	June 21 st 1960
AR 6 ^h 29 ^m 07.7		42.54 48" 2' 51".5			41 57 24		at 9 ^h 55 ^m m.s.t.

Comet - d

15 54 55
Ref.- 11 44.15
+ 0.25+ 0' 50"
+ 5

Comet - e

15 54 55

- 18 54.25
+ 1.13+ 3 45
22.6

Comet - Star

Δα Δδ

- 11 43.90 + 0' 55.0

- 18 52.92 + 4 8.6

20 - 40 34
only 7 9.7157

10' 10" 6.7655

57.0 7.4637

K 1.08

1.78

8.7827

7.6287

0.1194

8.3308

172 236 (Time) at

15 54 55

fact. 24

by d 29 9.25

" e 8.66

41 57 28.4

23.8

15 54 31

- 2 24

5 59 36

M.T. (center) 9 52 31

Comet R Dec

9.3 + 1.1 57.29

Compared with 58 Aurigae.

The refraction and zero-corrections given above are somewhat uncertain. Comparison with a however indicates no great discrepancy.

Comet dis. by H.P.T.

1860 June 28st

Reduction of stars' places

~~Johnson~~ 405. (1853 index) 12.13
 Gr. 1224 3.10 11.13 - 3.4. 6.7
 — 1246 6.12. 5.7 11.13

~~Star~~ 405. Star a is T. 405.
~~Gr. 1224~~ d - 58 Arizpa
 e - Gr. 1246.

The star places are obtained farther on.

Reduction of comparisons with β .

15	34	41.5	- 30.1	- 34"
	35	19.0	30.0	
	36	41.4	29.6	28 26.5
	37	19.0	29.5	
	45	31.0	26.8	22
	52	16.8	26.4	

15	40	18	- 28.40	- 26.8"
	Ref.		- 0.05	- 0.9
Comet	- Star.		- 28.45	- 27.7

Sid. Time 15. 39 54
 - 2 22
 - 5 59 36
 9 37 50

New Comet

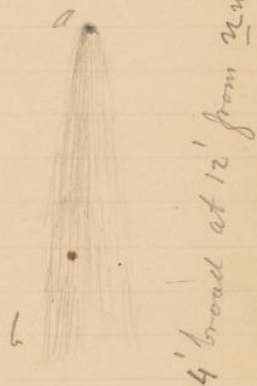
860 June 21 Continued. Sky hazy

The Comet was first seen about 15^h 25^m ^{*} local time by H.P.T. in a narrow opening near the horizon & in strong twilight.

In the great telescope it shows a very bright nucleus perhaps = $\star$ 4th mag. but its altitude is so low that it is difficult to judge. Nucleus & brightest light contiguous about 10" in diameter. From its centre nebulosity can be discerned only for 20" towards Sun.

My Sketch Incl. a to axis 219°

I notice no dark streak or hollow in the axis but the side a b. which preceeds in R is much the brightest I should say that the half section of tail on that side of axis was twice as bright as the other half. Comet low.



Sketch

4' 8' 12' 16'

Fancied once the brush of light towards Sun I think the nucleus envelope inclined to the direction marked a .

* First seen at 15^h nearly

New Comet

June 21 Cont

For diagram of tail see Note book of
H. P. Y. Its breadth was not above $30'$ at 5° from
nucleus but the sky was quite hazy. 6° to 7° long
(According to his sketch breadth at 5° was $13'$)

Reduction of Obs. of Feis.

1860 June 18

Zero of scale seems not far wrong (see June 22^d)

1) Place of comparison = star.

Aug. 23^d 18

	19	9	12.50	-26	11	18.7
			-34.14			+1.6
			+ .01			-3.2
						-0.1

R (p. 20)

1850.0

19	8	36.37	-26	11	20.4
		+36.99			+59.4

1860.0

19	9	15.36	-26	10	21.0
		+2.23			+2.7

App. Place	19	9	19.59	-26	10	18.3
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2. Comparisons

Planet - Star	-57.14	-	1' 0.5"
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1979 Motion

At 19 7 9 ft. Refr.

-	0.1
---	-----

+	0.1
---	-----

-57.14	-	1' 0.5"
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(42) α	19	8	22.45	-26	11	18.8
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Comp. of m. s. t.

19 7 9

- 49

19 6 20 Lat.

5 50 45

13 15 35 Cambridge mean solar time

1860 June 18.	13 15 35	h. f. Lamb.
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Parallax

Longit + Aberration

5 29 56

18 45 29

Scaling ephemeris (13 7 1862)

(42) α	19	8	22.45	-26	11	18.8
						+ 0.1

19	8	41.98	26	11	9.0
		+ 19.53			+ 9.17

h	m	s
19	8	57
-16	10	9

1st α	-9.6917
2nd α	-9.9200
3rd α	1.3022
4th α	+9.4718
	+ 9.416
	+ 0.628
	3.699

1st α	34.2	49
2nd α	28.7	19
3rd α	18.1	49
4th α	-7.1917	
5th α	-0.800	
6th α	1.926193	
7th α	0.0670	
8th α	+ 5.925	
9th α	1.3100	
10th α	-9.516	
11th α	-9.6464	
12th α	34.3	
13th α	+ 27.8	
14th α	+ 21.5	
15th α	+ 29.5	
16th α	-0.25	

6 45.5
24.496
1.6137
9.4496
2.7237

Mid. continued

1860. June 18.

7
0
2
8
16
28
99

7
193

70
5
00
6
44

0
95
25

5
6
32
96
37

0
2

Star = places for Comet.

1860 June 21st

1850 + t

Johnson 405

6 28 40.5 + 4.27 t 42 7 48 - 2.5 t

Prec. for 1750.

1850.

Joh 405 = 51.150.

1115.

~~42~~
 α 6 28 40.5
 δ 42 7 48
 $\log \delta$ 9.95747
 $\log \alpha$ 9.99808
 $\log \alpha$ 1.30243
 α - 8.97278
 $\log \delta$ 1.25798
 $\log \alpha$ 1.2075
 $\log \delta$ 3.0686
 $\log \alpha$ 4.2701
 $\log \delta$ - 1.885

6 28 40.5
 42 7 48
 9.95642
 9.99659
 1.30222
 - 9.09619
 1.25523
 1.1999
 3.0706
 4.2705
 - 2.502

Joh. 1851.

6 28 44.76 (2) 47 52 14.9
 38.43 84 59 37.2
 1852 28 49.24 (1) 39
 36.16

Johnson (1860.9)

6 29 23.26 + 42 7 22.3
 % Mar. - 0.05 - 1.5

Incl. P.m.

58 Aurigae

1858.11

6 40 9.191 41 57 5.43
 42.493 - 36.47

$\log \delta$ + 4.2580
 $\log \alpha$ - 3.004

6 40 30.52
 21.24
 1858.11 6 40 34.76 41 56 43.5
 17.00 - 14.7

1246 Gr.

1750. 1850.
 6 40 13.3 6 47 17.9
 42 0.43 42 53.99

1860.7.2. 6 40 51.74 41 56 31.4
 N. 6 40 51.68 + 41 56 29.0 27.34
 N. 2 51.76 - 0.01 28.870.3 5.2
 7 2 51.74 - 0.05 31.4 - 0.2 3.2
 Ad. 6 40 51.70 41 56 29.2

$\log \delta$ 9.95455
 $\log \alpha$ 9.99327
 $\log \alpha$ 1.30243
 α - 9.24204
 1.25025
 1.1862
 4.2548
 - 3.503

9.95291
 9.99069
 1.30222
 - 9.31157
 1.24582
 1.1741
 4.2447
 - 4.110

Gr. 1246
 Gr. (1810) 6 44 28.04 41 56 34.1
 3 32.31 - 3 20.9
 Runk. 2034 6 46 18.40 41 54 50.9 7.4
 1 41.88 - 1 38.3

Joh.

$\log \delta$
 $\log \alpha$
 $\log \alpha$

Gr. 1246 continued

S. S. 7. 11. 12. 13

Jan. 1844

R

41 54 19.16 (1)

- 1. 6.0

1845 6 46 56.78

1 3.66

(2)(.)

1846

41 54 11.0 (.) (1)

- 57.8

1850

41 53 53.7 (.) (1)

- 41.4

1851 6 47 22.31

+ 38.15

(1)(.)

1852

41 53 46.8 (.) (1)

- 33.2

S. S.

1844

to apparent place

Apr

Gr. 1246 Reduced to 1860.0

Auth. Ep. No.

L.

S

Gr. * 5 6.48 0.35-10.13 41 53 13.20

R. 74 48 0.28-04 12.6-26

J. 1848. 3.4 48 0.45-05 13.1-15

Ad. 1860.0 -0.32 that 11.1

1860.0 Rev. to Müller

7.405 6 29 23.21 + 42 7.20.8

Rev. + 1.43 + 4.3

58. Anrigae 6 40 51.70 41 56 29.2

+ 1.45 + 4.2

Gr. 1246 6 48 0.32 41 53 11.1

+ 1.46 + 4.1

Rev. to Bessel.

Johnson 6 29 23.26 42 7 22.3

Rev. to Bessel. + 0.04 - 1.3

+ 0.00 23.30 21.0

Müller (Hun)

G			348 3			
x	97 21		100 13	102 0		
H			179 15			
Gr	42 7	9.9562	41 56	9.9534	41 54	9.9529
ln(G+x)	80 24	9.9939	83 16	9.9970	85 3	9.9984
D		1.1991		1.1991		1.1991
ln(G+x)		9.2221		9.0691		8.9359
i		9.04				
ln d		0.1297		0.1285		0.1283
ln(H+x)		-9.9971		-9.9960		-9.9916
h	276 36	1.3106	279 28	1.3106	281 15	1.3106
ln(H+x)		+9.0605		7.9261		+9.2902
ln d		9.8265		9.8250		9.8247
f	34.75		34.75		34.75	
g	+ 14.10		+ 14.11		+ 14.14	
h	- 27.38		- 27.11		- 26.95	
Δd	+ 21.47		21.75		21.94	
g	+ 2.63		1.86		1.37	
h	+ 1.58		2.24		2.67	
i	+ 0.08		+ 0.08		+ 0.08	
Δd	+ 4.29		+ 4.16		+ 4.13	

Comet.

June 22. 1860

Good, Obs.

G. P. B. obs.

Zero of Wires $83^{\circ} 47'$ on Merid

Star is of 7th mag. Comet north of star
 obs on chain first wire of star and first wire of comet: only

Chron. 236

236 fast - 24.9

* 14 27 58.0
 2nd wire 28 29.6

4' 56"
 6 02

* 29 10.0
 2nd wire 29 41.4

5' 19"
 6 37

* 30 21.1
 30 32.5

3 58
 5 17

* 31 55.6
 32 27.4

4 09
 5 28

* 33 15.0
 33 46.4

4 14
 5 00

Mean wire taken for Comet
 The Spring Equinox or obs on the next
 page in comet

The Comet followed the star by $6''$ or $8''$ and was
 1' or 2' north of it

* in 236 = 14 36 00.0
 center of field HC = 7 57 49

Dec. C = $132^{\circ} 14'$

4 2.3
1579E.C. fan at 15^h 20^m, 51.47

15 15

48 beats

52

50

25^s17

8

Motion in 45"

	Star	Comet	
28 =	28.24.4 _{31.4}	31.7	1.6
	55.8	3.7	

Star

Comet

1.4

9.0

15

29	36.4	44.3
30	79 _{31.5}	16.2

13.4 21.7

30	47.8	55.9
31	19.3 _{31.5}	28.0

24.7 33.2

32	22.2	31.0
	54.0 _{31.8}	02.8

59.2 8.2

33	41.5 _{31.4}	50.8
	12.9	22.6

18.2 28.0

31.52

Recurve to 14 32 0 el.

50
90
100
150

m
ca
h
2

For Suhl $a=0$ $b=1'$ or $<1'$

Comet

June 22. 1860

G. P. B. obs.

Very good definition at first

Diameter of nucleus 2".5- strong twilight

a good obs.

Zero

39.39

39 40

39 38

a is vertex of sudden cessation
of light visible in the strong twilight
measured in direction perpendicular
to $50^{\circ} 5'$ pos. circ.

$$50^{\circ} 5' + 180^{\circ} 00' = 230^{\circ} 5'$$

Zero

263 47

33 42

180 00

213 42

Ang pos a

Tail

12 50

Dir.

200 52

Pos Axis tail

160° 57'

uncertain be- Zero

263 47

cause only the bright
half of tail is clearly
seen.

102 50

$$\frac{90}{12} \frac{50}{50} = \text{Ang pos}$$

Nucleus when best seen very small
(2" to 3") & bright & round.

Could plainly see that the light
near nucleus was thrown off on
the side towards the Sun. Or rather
in the direction perpendicular to the wires
when set at 50° pos.

On the side towards the axis of tail
light sharply cut off in rear of nucleus
but I do not see a
black canal as in Donati

Star of Comp. = 7th mag.
n.a.

*

3".50

Zero

40.34

39 39

0.95

highest part of
envelope

V

a

n

twice as far
from axis

Axis tail

102° 50'

Comet

1860 June 22nd

All the nebulosity is within
 $cd = 1'$ difficult to estimate
 very hazy -

Pos. $156^{\circ} 10'$ axis, tail

Very faint & difficult because only one branch is certainly
 seen at beyond $1'$ from nucleus

There is a strong tendency to
 take nx for the axis of the tail
 instead of ny . Owing to the
 superior brightness of the px branch - I
 always try to get the ang. pos. of axis of figure
 not central axis of light



Comet of June 21 (Tuttle)

(June 24, 1860)

236

15^h 6^m 8^s

8 8 54

172° 18' 58" }
312 18 50 }

Concordia

The great Observatory at Cambridge
Massachusetts is respectfully
invited to observe the
faint planet Concordia with
the following exact elements
and ephemeris of Prof. Bruhns

(58) Ep. 1860 April 10.0 m. 1. Berlin

M 63° 18' 46.8
 $\pi - a - w$ 314 26 20.9
 a 162 3 25.1
 i 5 15 31.3
 q 2 57 40.0
 μ 808,640
 $\log a$ 0.428168

Ep. 12^h m. 1. Berlin
 1860 P.A. (58) Decl $\log A$
 May 26 11^h 46^m 10 + 5° 27.3
 27 37 24.5
 28 47 5 21.5 0.3359
 29 34 18.4
 30 48 5 15.2
 31 37 11.8
 June 1 49 9 8.3 0.3461
 2 42 4.7
 3 50 17 + 5 0.9
 4 53 4 57.0
 5 11 51 29 52.9 0.3562

May 24 magnitude = 11th
 April 16 magnitude = 11.12

To the Observatory at Cambridge College
Massachusetts.

From Dr Luther at Bilk
through Mr Ferguson

Continuation of
Ephemeris.

^h June 5.	α ^{h m} 11 51 30.5 + 4° 52.9	δ	$\log A$
6	52 7	46.8	
7	52 46	46.6	
8	53 26	40.3	
9	54 17	35.8	0.3662
10	54 49	31.2	
11	55 32	26.5	
12	56 16	21.7	
13	57 0	16.7	0.3760
14	57 46	11.6	
15	58 32	6.5	
16	11 59 20	4 1.3	
17	12 0 8	3 55.9 + 0.3857	

J. H. S.

Reinher's Comet

Continuation of the Comet-Ephemeris (Not no. 19)

^h 12 Wash.	δ	α	δ	α	δ	α
June 16	8 27 ⁵	3 59	51 56.1	15.9	0.4232	0.2963
17	12 26	3 56	50.2	16.2		
18	16 22	3 52	24.0	16.4		
19	20 14	3 48	7.6	16.6		
20	24 2	3 44	50 51.0	16.7	0.4320	0.3050
21	27 46	3 40	34.3	16.9		
22	31 26	3 37	17.4	17.1		
23	35 3	3 33	0.3	17.2		
24	38 36	3 30	49 43.1	17.4	0.4409	0.3137
25	42 6	3 26	25.7	17.4		
26	45 32	3 22	8.3	17.6		
27	48 54	3 19	48 50.7	17.6		
28	52 13	3 16	33.1	17.7	0.4498	0.3224
29	55 29	3 12	15.4	17.9		
30	8 58 41	3 9	47 57.5	17.9		
July 1	9 1 50	3 6	39.6	17.9		
2	9 4 56		47 21.7		0.4585	0.3309

S-Tube

 δ α δ α
 2.3968 0.2693

4055 2784

4143 2874

4232 0.2963

T. H. Safford.

1860phae.proj., 1898