KG
11365
182

H.28

Equatorial Vol. VII.
1858
Sept. 25 to Nov 11th

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Const log = 2.6686
log Δ = 9.8941
2.5627
log 23.1 1.3636
3.9263
log 10.7 1.0294
3.5921
log 591 1.7716
4.3343
log 5.8 0.7634
3.3261
log 4.9 0.6902
3.2529
log 20.5 1.3118
3.8745

N B.

The computations of distances in miles have been derived from Mr Watsons Ephemeris & have been carefully checked from Sept 24th to Oct 20th incl. –

Suns hor par 8".50 (Chili Expedition)

1" subtends 365 miles

Sept 27. 1858 Donati's Comet

G. P. B. obs. (at about 7h

l' is the vertex of the outer edge of the brightest envelope

(l l' l'' has hitherto been the centre of the dark arch outside of this envelop,
but perhaps on 25th the vertex of l' was used

n to l'

Zero of wires

47.r91 50.27

50.27 50.28

2 36 = 23".1 = 8,440 miles 50.26

5

inclined 19°

n to m' m' is the centre of a dark interval

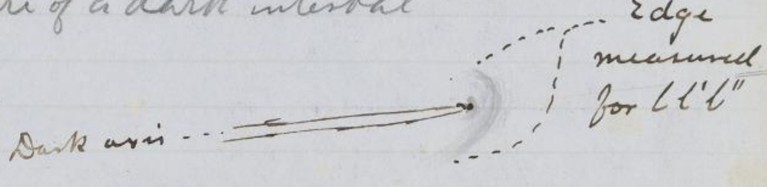
49.r18

50.27

1 09 = 10".7 = 3,910 miles

1/2 (Breadth of dark space) = 1.5 550

vertex of new envelope from n = 9.2 3360



Transverse diameter of l l'' through the nucleus perp. to axis

44.r24

50.27

6 03 = 59".1 = 21,600 miles
12

Breadth of bright rim, inside of l l' l'' about.

49.r68

50 27

59 = 5".8 = 2,120 miles
1

The dark space, in the axis of the tail has its vertex at the nucleus ~~where~~ near which its breadth is (say 30" from it)

50.r77

50.27 This dark axis may perhaps have its

miles 1,790 = 5.0 = 4".9 vertex a little on the following side of the nucleus.* ~~(Ditto~~ ~~Notes~~ ~~appearance~~

The inner envelope is eccentrically situated, its breadth is, (or its transverse diameter)

52.r36

50.27

2 09 = 20".5 = 7,490 miles
4

The outline of k k' k'' is becoming very indistinct.

* Note added Sept 29th This was the effect of the first appearance of the ray seen on 29th

The dark line as it were (very elongated hyperboloid) representing the axis of the tail is a remarkable object. The hyperbolic outline at its vertex seems just to touch the nucleus on the side furthest from the Sun.

The tail is seen bright ½ way from nucleus to star κ of Great Bear &
may be just

Dr

it

lo

Reduction of the Stars for Planet Sept. 27. th

101.54
2.71

				+ 3.08	+ 19.85	16.
588	0 32 45.71	+ 2 40 52.0				
608	33 43.87	2 49 5.25		1825	3	
595	33 1.97	2 49 15.0		33y5.		
				1		

0 33 37 | 0 ~~33~~ 32 | 0 32 36
+ 2 46.4 | 2 54.75 | 2 55.4

1.30224

7.850 874 885
9.152 176 185

c 46.220 46.228 46.231

log ω = cos δ − sin α sin δ
log ω 9.6374

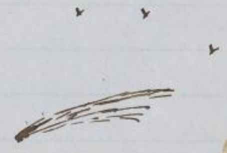
9.6369 68 69
− 7.850 874 885

log A + 1.2717
B + 0.2153
C + 1.52970
D − 0.9533

cos α	9.99531	9.99524	9.99504
sin α	9.16494	9.16812	9.17693
cos δ	9.99949	9.99944	9.99944
tg δ	8.685	8.706	8.7081
sin δ	8.685	8.706	8.708
a	+ 9.9958	9.9958	9.9956
b	+ 9.1654	9.1687	9.1775
log c	1.66483	1.66490	1.66484
d	+ 8.680	8.702	8.703
a′	9.6297	9.6293	9.6291
b′	+ 8.680	8.701	8.703
c′	+ 1.29755	1.29748	1.29728
d′	∓ 9.1649	− 9.1681	9.1769

The dark line as it were (very elongated hyperboloid) representing the axis of the tail is a remarkable object. The hyperbolic outline at its vertex seems just to touch the nucleus on the side furthest from the Sun.

The tail is seen bright ½ way from nucleus to star K of Great Bear & may be just traceable 1° or 2° further



Strongly curved & with

its upper outline best defined longest & brightest.

Sept. 27. 1858 Asteroid (54) Searle

p is the planet

			Scale		
236= 21	2	30.2	0 .. 00	A	Weisse Stars
		46.0	8 .. 26	B	
	3	28.1	9 .. 02	C	

x)

Zero of Scale
88° 00″

~~p~~ 21	9	49.0	5	39
~~q~~	10	8.8	3	40

p 21	10	41.0	6 ..	06
q	11	0.8	4	07

AR got on Spr. Gov. Spr Gov set off EC = 21h 16m

A	21	23	13.2	0 14	EC = 21	20	58.4 - 62.5	58.45	+53.50
B			28.7	8 41	×A + 5 08	22	14.0 - 18.0	14.00	+37.95
p				5 22	×B - 3 19	21	51.9 - 56.0	51.95	-4.05
C	first wire lost			9 15	+C - 3 53	22	— 0.0	56.00	

A	24	55.7	0 04		22	41.0 - 45.0	41.00	+53.45
B	25	11.1	8 30	+ 5 08	22	56.5 - 60.5	56.50	+37.95
p		49.0	5 12	- 3 18	23	34.4 - 38.5	34.45	-4.05
C	first wire lost		9 05	- 3 53	23	— 42.5	38.30	

A	26	56.8	0 .. 41		24	42.0 - 46.0	42.00	+53.35
B	27	16.1	9 05	+ 5 07	24	57.4 61.5	57.45	+37.90
p		49.9	5 48	- 3 17	25	35.4 39.3	35.35	-3.95
C	first wire lost		9 52	- 3 54	25	— 43.3	39.30	

probably 42

Sept 27. 1858 planet continued

Spr Gov clock EC = 21 44
21 45

Scale

A	EC = 21	26	25.2	29.0	0	27	+ 5′ 06″	25.10	+ 53.15	
B			40.6	44.6	8	52	− 3 19	40.60	+ 37.65	EC = 22 56 00
p		27	18.3	22.2	5	33	− 3 55	18.25	− 4.25	236 = 22 58 14.7
b		27	—	26.5	9	28		22.50		

B D B

		Diff AR	Diff Dec
p − A	=	+ 53.36	+ 5′ 07″.2
p − B	=	+ 37.86	− 3 18.3
p − b	=	− 3.90	− 3 53.7

EC =	21	21	51.95
		23	34.45
		25	35.35
		27	18.25
		98	20.00
EC =	21	24	35.00
EC slow			29.15
sid time	21	25	4.15

12	23	56.46
		46.74
12	24	43.20
21	25	4.15
9	0	20.95
	1	28.52
8	58	52.43 Camb. m. s. t

1825.0	A	0	32	46.71	+ 2	40	52.0
	B	0	33	1.97	2	49	15.0
	b	0	33	43.87	2	49	52.5

+ 18.51 18.51 18.51
+ 0.24 0.24 0.25
+ 1565.1 1565.3 1565.5
− 0.43 0.45 0.46
+ 1587.4 1583.6 1583.8
+ 105.56 105.57 105.59

0 34 32.27 0 34 47.54 0 35 29.46
53.36 37.86 3.90

0 35 25.63 0 35 25.40 0 35 25.56
25.62 25.40 25.40

+ 7.97 7.96 7.96
0.79 0.83 0.83
671.82 671.70 671.40

+ 680.58 680.49 680.19

+ 2 52 12.58 2 57 19.78 19.4
3 0 35.49 57 17.19 17.5
b 13.69 18.99 19.4

0h 35m 25s.53 + 2° 57′ 18″.65 Planet M. De

8 58 52.43

Note Feb. 1861

Taking 21° for radius of curvature of front edge of tail we have for scale of sketch on next page $21^{\circ} = 7^{\text{in}}.50$ Hence $1^{\circ} = 0^{\text{in}}.3571$

At 60' Breadth of Tail 39'.3 } From Sketch
240 " 60.8 }

Perhaps as the edges of field must have exaggerated or affected the curvature the scale is not safe.

1858. Sept 28. Donati's Comet. Photography

Took off the micrometer for photographing

236 18 37 Pendulum was lengthened 5 half-turns to regulate the comet's motion

Pendulum again lengthened 5 more in all 10½ t
Clock well regulated.
Comet moves S in Dec.

Plate II

Plate I. had an Exp. of 2^{m}

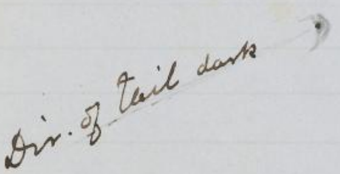
Exp. $2^{m}..00^{s}$
$1..00^{s}$
$0..30$
$2..00$

Plate III
Exp. $6^{m}..00^{s}$ Think this took. On Examination with Microscope this plate exhibits an undoubted image of 15" diam - Oval.

Sky not quite clear & clouded suddenly.

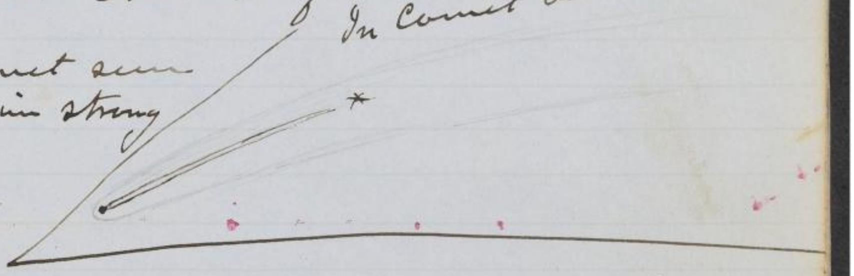
Looked by glimpses at Comet. It increases very rapidly. Extremity of tail now reaches 2/3 from nucleus to * K of 27th.

In the Comet seeker the dark outline of axis is distinct for 1° or 2° from nucleus and is 1/12 as broad as whole breadth of tail.



Shape of comet seen in finder in strong twilight

In Comet Seeker



* I have always seen this dark axis in the Comet seeker nearest to the faint concave side of tail.

1" subtends 337 miles

Sept 29. 1858 Donati's Comet.

Between the 27th & the 29th the zero of Micr. was probably disturbed either by visitors or in removing the Micrometer for photographing. I shall use that of Oct 2nd & Oct. ~~4~~ 8th 87°. 35' also Oct 7. 87° 35' but between Sept 7 & 27 Zero = 87°. 10' as by discussion on sheets

n to ~~outer~~ inner edge of the m m' m'', (at the vertex of inner envelop)

52ʳ. 39
50 . 57
1 82
4 = 17".8 = 5990 miles

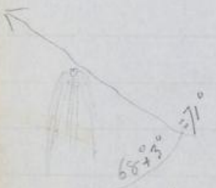
n to inner edge of second (envelop or bright arch) which is the outer edge of m m' m'' which is darker space outside of what is now the brightest envelope

53ʳ. 13
50 . 57
2 56
5 = 25".1 = 8.450 miles

n to outer edge of second envelop
53ʳ. 76
50 . 57
3 19
6 = 31".3 = 10.500 miles

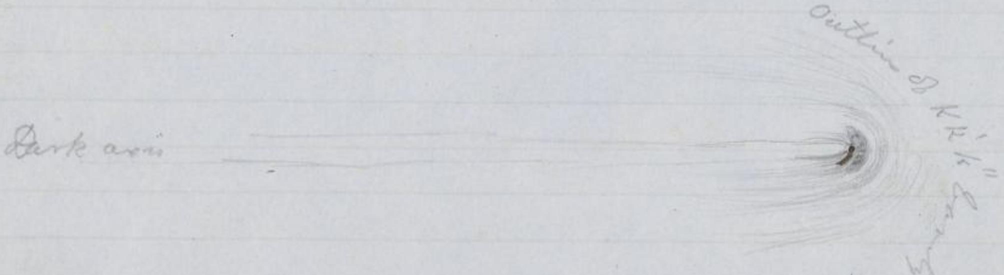
(From Searle's Ephem. cos 745 has

	68° 00'	
Zero	87 35	Oct 2
Pos.	19 35	
Comp. bearing	16 31	Dir. at 7h m.t. fr. Sun
ratily c-o	-3 04	

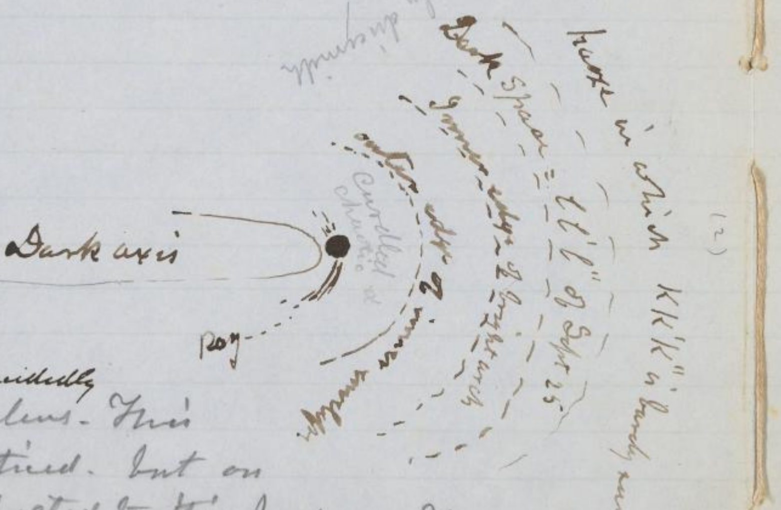


angle of position of tail 68°. (I usually took the dark ray) as axis of tail

dark spaces are narrow compared with the brighter of which they are the outer boundary


Dark axis
Outline of KK'K'' sharply distinguished

For description see some pages further on.


Dark axis
Ray
Curdled chaotic
outer edge of appears narrow
Inner edge of bright arch
Dark space = LL'L'' of Sept 25
hence in which KK'K'' is barely seen
(2)

This outline was not seen decidedly curved as represented near the nucleus. This I distinctly remember not having noticed. But on Oct 2nd attention was expressly directed to this feature. That is if the expression Dark axis refers to the narrow well defined dark axial stripe

* of 8 mag. Clouded suddenly-

				1 wire	2 wire	Scale	
236	☄	19	38	9.1	$\overset{s}{3}5.7$	4' 37"	
	*			15.8	42.1	4 35	02"
	☄		39	59.8	26.2	4 35	
	*		41	5.7	32.0	4 37	2

const log = 2.6686
log Δ = 9.8587
2.5273
~~log~~ + 17.8 1.2504
3.7777
log 25.1 1.3997
3.9270
log 31.3 1.4935
4.0208

236 152 fast

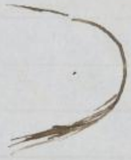
19 38 23
~~4~~0 15
19 39 18
4 1 57
Sid time 19 37 26 α $15^h\ 1^m\ 9^s$
S. T. Mr. N. Cambr. 12 32 36 δ +31° 8'
7 4 50
−1 10
M. T. Cambr. 7 3 40

+0.488
+5.45

Sept. 29th Continued (Per: Paſs.age)

Sept 29th (cont.) Vide Sketch

The change in the region surrounding the nucleus is a very marked since the 27th The little [illegible] half-moon envelope then scarcely distinguishable from the nucleus has now become the most prominent & brightest part of ~~the~~ & its outline is very distinct it looks almost circular for an amplitude of 160°



It is perhaps a very little brighter near the outer edge. It is certainly in a disturbed - clouded - curdled or chaotic state not evenly diffused - ~~like~~ as the outer envelopes are.

Besides the outline of the dark axis of the tail (perhaps 20" broad at 4' from nucleus) there is evidently a ray proceeding from the nucleus on the following side which seems to have been imperfectly suggested on the 27th & another (I think) on the opposite side but less bright

A concourse of Visitors make it very difficult to observe

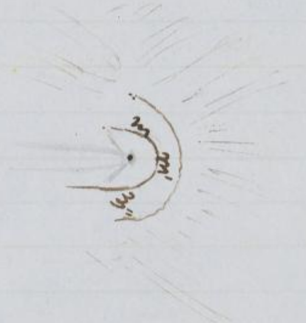
G.P.B.

Sept 30th We have great difficulty in finding an opportunity of observation on account of visitors. Amplitude of brightest part of inner envelope is 270° quite nearly.

$$\begin{array}{l} \overset{\prime}{} \\ 0.3 = 34'' \\ \underline{0.7} = \underline{80} \\ 1.0 = 114'' \end{array} \qquad \begin{array}{r} 11.4 \\ \underline{5.7} \\ 17.1 \end{array}$$

edge very distinct.

Nucleus not round - but well defined on side opposite the Sun - This is always the case Qu. is not this the phase? and the narrow dark central axis the Shadow of the Nucleus. It has been a remarkable feature - especially in the fact of its vertex touching the nucleus - the latter being truncated on side opposite the Sun



NB to trace carefully the outline of the axis quite up to the nucleus

Oct 2nd found straight near nucleus seen in G.R. seems to be confounded at a little distance from nucleus with - the hollow axis

The inner envelope inside of m m' m'' is very bright but curdled as it were with an evident ray towards m''

N.B. To look in the Comet seeker & see whether the axis continues *straight* without regarding the *curvature* of the tail (On subsequent examination I think that the dark axis is plainly curved with the tail as seen in the Comet seeker. But it is possible that a shadow also exists superimposed this seems to be the case with ~~of the~~ view given by the 'Great Refractor') Measure the *inclination* of the edges of the dark axis. This should be

Sept. 30. 1858.

The tail of Donati's comet appears to the naked eye full 15 degrees long. The sky is hazy and seeing bad.

A. H.

1" subtends ~~267~~ 297 miles

Oct 2. 1858 Donati's Comet.

Fine clear night G. P. B. obs.

Com. observing at 6 P.M.

Diameter of nucleus perpendicular to axis

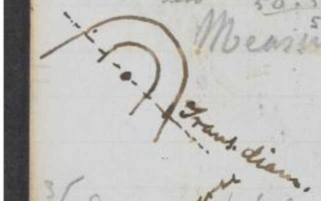
51.16
51.05
51.10
Zero 50.57
53
= 5".2 = 1560 miles

Measure may be a little too large on account of atmospheric disturbance

comp. log.	2.6686
Δ	~~9.7928~~ 9.8028
	2.4614
log 5.2	0.7160
	3.1874

2.4614
1.8007
4.2621

Fig (1). Scale 1 in. = 160"



Through nucleus

Transverse Diameter of bright envelop perpendicular to axis, outer edge.

57.02
Zero 50.57
6 45
13
63".2
(miles 18920) =

This is the envelop inside of m m' m'' & I see no new one forming as yet although the nucleus may be rounded on side next the Sun

Transverse Di… outer edge of … inside of (l l' l'') … ~~dark not discerned~~

61
50
11

11

nucle

53
50
2

2

nucle

53
50
4

4

1858 Oct 2nd

This outline of tail is correct

(Drawn Oct. 30th

Probably 9/10ths of the light of the train was included between the dotted lines.

The darkest part of the interval between the inner and second envelop is close to outter edge of the inner envelop. say 5" broad

The angle between the ~~asymptotes~~ tangents of the outer margin of the tail, taking ~~for~~ the ~~asymptotes~~ the tangents 6' or 8' from nucleus is 31°

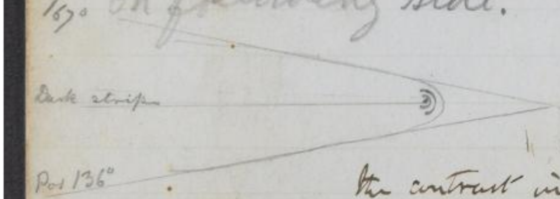
Angle of position of dark stripe in axis of tail = 152°.0' (exact).
on following side. = 152.55 (2d obs.

152 . 28
Zero 87 35
64 . 53
90 00
25 07

Comp.

Ang. of Pos.

Pos 167°



Pos 136°

Note added in Nov. It seems that the contrast in intensity of light & outline between the prec. and the following sides had now nearly disappeared

1" subtends ~~287~~ 297 miles

Oct 2. 1858 Donati's Comet.

Fine clear night G. P. B. obs.

Com. observing at 6 P.M.

Diameter of nucleus perpendicular to axis

51.16

51.05

51.10

Zero 50.57

53 = 5".2 = 1560 miles

Measure may be a little too large on account of atmospheric disturbance

ar. log. 2.6686

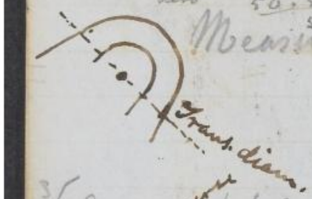
Δ 9.7928

2.4614

log 5.2 0.7160

3.1774

Fig (1). Scale 1 in = 160"



2.4614

1.8007

4.2621

through nucleus

Transverse Diameter of bright envelop perpendicular to axis, outer edge.

57.02

Zero 50.57

6 45

1 3

(miles 18920) = 63".2

This is the envelop inside of m m' m" & I see no new one forming as yet although the nucleus may be rounded on side next the Sun

Transverse diam of outer edge of second envelop inside of l l' l" ~~dark not discerned~~ ~~[illegible]~~

61.81

50.57

11 24

2.2

110".2 = 32,970 miles

2.4614

2.0422

4.5036

nucleus to vertex of inner envelop, edge of envelop very distinct (inside of m m' m"

53.11

50.57

2 54

5

24".9 = 7,460 miles

2.4614

1.3962

3.8576

nucleus to vertex of outer edge of second envelop or inner edge l l' l"

55.05

50.57

4 48

9

43".9 = 13,160 miles

2.4614

1.6425

4.1039

The darkest part of the interval between the inner and second envelop is close to outer edge of the inner envelop. say 5" broad

The angle between the ~~asymptotes~~ tangents of the outer margin of the tail, taking ~~for~~ the ~~asymptotes~~ the tangents 6' or 8' from nucleus is 31°

Angle of position of dark stripe in axis of tail = 152°.0' (exact)

on following side. = 152 55 (2d obs.)

152 28

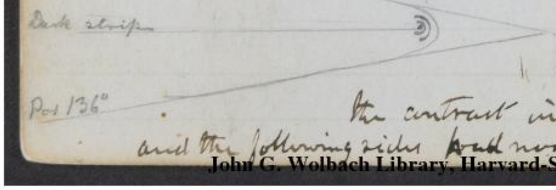
Zero 87 35

64 59 | Comp.

90 00

25 07

Ang. of Pos.



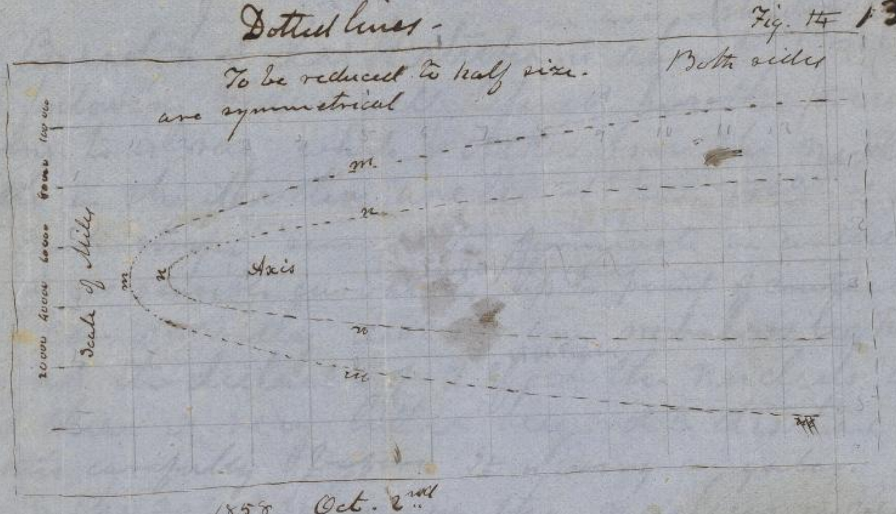
Note added in Nov. It seems that the contrast in intensity of light & outline between the prec. and the following sides ~~had~~ now nearly disappeared

Note June 16 1860 I find that this [illegible] the breadth of the tail if the numbers [illegible] t not 40 otherwise

2.6 2.4 ?

2.4771
4.9?485

Belongs to Comet figures



—miles

nucleus ?)

miles)

from nucleus)

y side less so.

s on the preceding

cting the vision

with the nucleus &

carefully examined

light of the comet

ward the sun

1' 30'' = 26748 miles have

intense, as a

ew envelope to be thrown

looked very carefully for symptoms of it but none were apparent

Zero of position 87°.35

Zero of wires
50.57
50.38
50.56

The outlines of the envelopes ~~penetrate~~ the light behind the nucleus so that the tail outline is not a continuation of the envelope outline

At a is a decided dark opening in the envelope (inner) at b one less decided and at c another pretty certain

These with the brighter spaces between give the appearance of a kind of cross division into segments

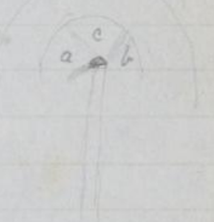


Fig (2) Scale = 1in = 100'' by mean of the 4 observations [illegible]

Vide ap. an india ink sketch 6×8 in which gives a satisfactory view as seen on 2nd

~~Angle~~ Dark stripe extends square up to the nucleus which certainly appears truncated or rounded on the side next the Sun & cut off on the side opposite

By putting the wire of the finder on the following edge of the dark stripe it seems quite straight. In the comet seeker the dark line is on the (faint) prec. side of the tail & does not cross (but was subsequently found to do so vide obs of Oct [See Sept 30] note in pencil

167
136
31

Note June 16 1859 I find that this remark as to the breadth of the tail if the numbers are transposed will accord perfectly with other obs. But not otherwise

=142,560 miles

2.4771
4.91,185

Oct 2. 1858

Donati's Comet

Breadth of tail 8' ~~(5'?)~~ from nucleus = 5' = ~~86,800~~ 89 000 miles

Breadth of dark stripe in axis is about 6" = 1734 miles (30" from nucleus) ~~(8'?)~~ (shadow of nucleus?)

The following side is well defined but the preceding side less so. owing to a ray which proceeds from the nucleus on the preceding side in the direction, angle of pos. 199°. distracting the vision

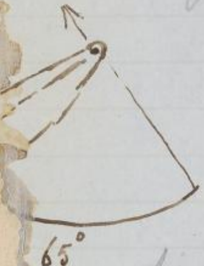
Dark stripe seems to terminate in contact with the nucleus & there is no sensible curvature of outline up to point of contact. carefully examined

I can scarcely discern any nebulous light light of the comet beyond the distance of 2' = 35669 miles from the nucleus toward the sun and there is very little beyond a distance of 1' 30" = 26748 miles have noted this carefully before. It is very singular.

In the great telescope the nucleus is large & very intense, as a star of the second magnitude. Expecting a new envelope to be thrown off looked very carefully for symptoms of it but none were apparent

Zero of position
87°.35

Zero of wires
50.57
50.58
50.56

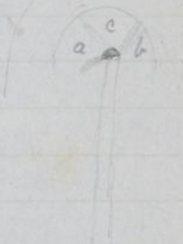


The outlines of the envelopes penetrate the light behind the nucleus so that the tail outline is not a continuation of the envelope outline

At a is a decided dark opening in the envelope (inner) at b one less decided and at c another pretty certain

These with the brighter spaces between give the appearance of a kind of cross division into segments

Fig (2)



Scale = 1in = 100" [illegible]

Vide a pr an india ink sketch 6×8in which gives a satisfactory view as seen on 2nd

~~Angle~~ Dark stripe extends square up to the nucleus which certainly appears truncated or rounded on the side next the sun & cut off on the side opposite

By putting the wire of the finder on the following edge of the dark stripe it seems quite straight. In the comet seeker the dark line is on the (faint) prec. side of the tail & does not curve (but was subsequently found to do so vide obs of Oct [See Sept 30] note in pencil

Fine clear night

There is evidently a secondary tail or stream of light visible with the naked eye above the tail

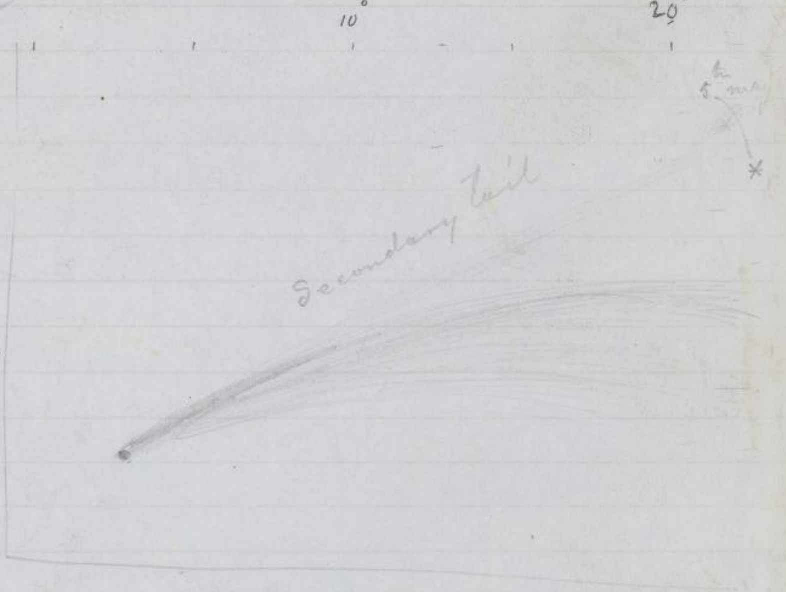
First seen on

Tuesday evg by H.P.T.

when it was plainer

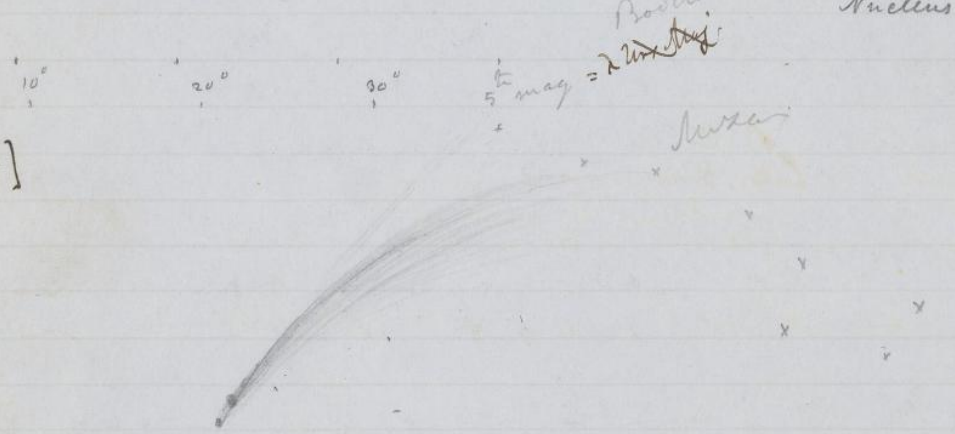
than tonight and on the prec. Monday evg. by R.F.Bond & S.C.B.

Tail is tolerably bright as far as Benetnasch



Nucleus to Mizar = 29°

[8h m s t]


10°
20°
30°
5th mag = λ ~~Urs Maj~~ Bootis
Mizar

Tail barely reaches Mizar by glimpses

The supplementary tails were not much if any brighter near the [origin in sides of principal tail]

By lowest sketch	1° 20'
upper " N.ye	1 00
Dist. axis secondary tail to λ Bootis	1 10

1" subtends 279 miles

Oct 4. 1858 Donati's Comet

6 P.M. A new envelope has been thrown off - since the 2nd -

n to $m\,m'\,m''$

n to vertex of $m\,m'\,m''$

$53^r.80$
50.54
$3\;26$ = 32".0 = 8940 miles

Zero 50.54

const log 2.6686
Δ 9.7775
2.4461
log 32.0 1.5051
3.9512

10.9
s.d. of n 2.6
8.3

in 8".3 5.604
log Δ 9.80
95.00 7.98
3.58

n to vertex of $p\,p'\,p''$ new envelop

$51^r.65$
50.54
$1\;1\tfrac{1}{2}$ = 10".9 = 3045 miles
10.9

2.4461
log 10.9 1.0374
3.4835

2400 miles Trans Diam,

n to $m\,m'\,m''$

$41^r.96$
50.54
$8\;58$ = 84".1 = 23500 miles
17

log 84.1 1.9248
4.3709

Angle of pos. of fol. edge of dark ~~spa~~ line in tail

143° by a measure taken before it was dark enough to see distinctly.

Trans Diam $p\,p'\,p''$

n to $p\,p'\,p''$

$47^r.15$
50.54
$3\;39_7$ = 33".2 = 9270 miles
33.2

2.4461
log 33.2 1.5211
3.9672

Angle of position of dark spot in envelope

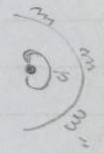
76° (−76° 00' + 87° 35' + 90° 00' + 180° 00') = 281° 35' = ang pos

Outline pretty correct

Dist from n to dark spot B

$49^r.90$
50.54
64 = 6".3 = 1760 miles

2.4461
0.7993
3.2454

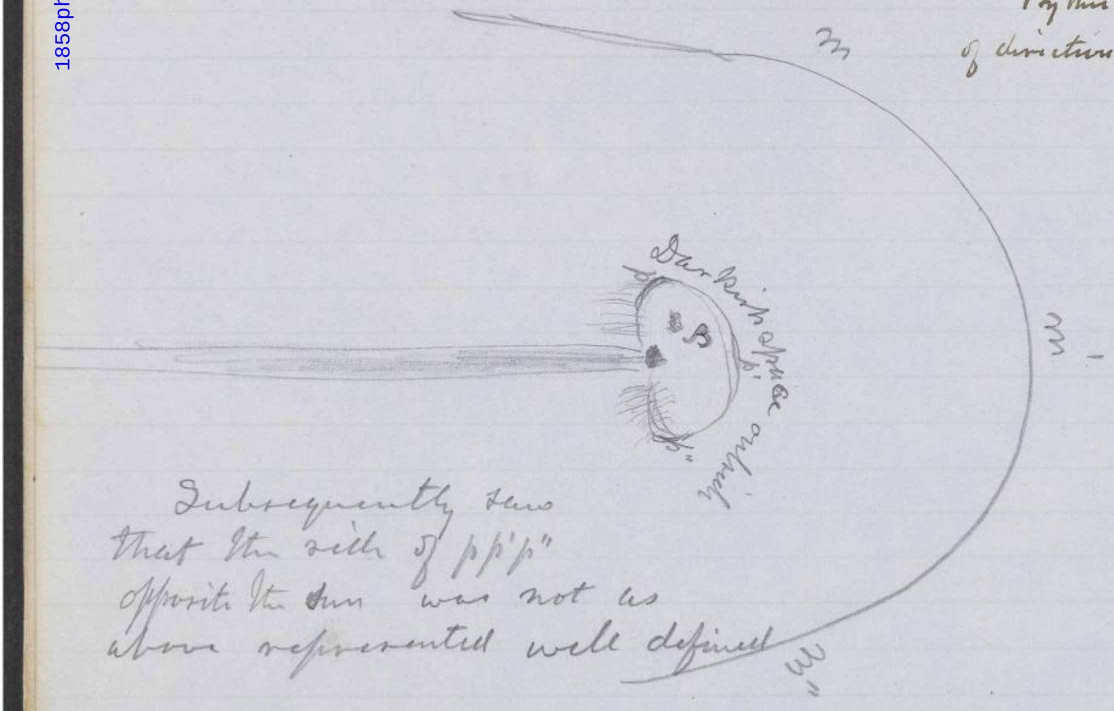


The new envelope was projected at vertex from the nucleus 2400 miles between the 2nd & 4th

There is a new very bright envelope forming. ~~p~~ Its outer edge we denote by $p\,p'\,p''$ It is bounded by a darker space outside of it. beyond which is the former inner envelope now first completely separated from the nucleus by the above mentioned dark space

There is a strongly marked dark spot at B

By this diagram the inclination of direction of β to axis = 238° 30'



Subsequently seen that the side of pp'p'' opposite the sun was not as above represented well defined

The nucleus tonight seems to be smaller & less bright than on 2nd as though expended in forming new envelope

Comet in Centre

+ 21° 46'   20 44 36 by 236
Ref. − 7   6 43 2
Dec Comet 21° 39'   2 . 04 fast
20 42 32
13.. 59 30
Ref − 30
R.A. 13 59 00

The secondary tail tonight is 35° long! & the sky is not by any means transparent. It is decidedly stronger than on last evg. & ~~It appears~~ seems to me to be two of them forming together a regular bifurcated tail

20 42 32
12 52 19
7 50 13
1 17
7 48 56

Oct 4. 1858 Comet continued.

124 00
177 35
53 35

164.00
177.35
13 35 = 90° + 87° 35′

Angle of position of (tangent) (m m′ m″ (at intersection?)) with Trans Diam 124° following side = Pos. 53° 35′

preceding side 164° = 13° 35′ Pos.

Angle of position of dark stripe, following edge side 142
2 pages back [By prev obs] 143

142 30
87 35
54 55
90 00
Ang of Pos 35 05
Comp. " 37 37 7h

(7h 30m ?) Curved bright tail extends over Benetnasch and Mizar.

8) 12 . 25
7
8) 84
10 .. 30

8) 175
22

Oct 4th At 7h 48m 56s m s t app. R = 13 59 00
10 52
R 14 .. 9 .. 52

app. Dec = 21 39
− 2 11
Dec 19 .. 28 At 4h 48m of 5th (Computed)

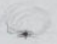
At 4h 30m P.M. (Oct 5) Dec of Comet was found to be 19° 25′ α in R of Arcturus

4 .. 48

5) 62
12m 24s

During 1st week in October the Comet became the leading object of public interest. We had fine skys & no Moon light. Experienced much pressure of applications for a sight. & had difficulty in reserving time enough for the Observations.

Oct 5th 4h PM Set on Arcturus & thence at once found the Comet in full Sunlight It is however extremely faint so that even the distraction of vision caused by placing near it one of the wires puts it out of sight.
Comet as in margin



Diam of whole object say 20" or 30" but only the nucleus is evident the rest by fitful impressions until sunset when it proved to be no illusion

Diam of brightest part not very well defined but as above = 2" or 3"

Father came up to see it at about sun set. It was his last view at any object through the Great Refractor.

[Oct 5 was a very fine clear evg]

1″ subtends 270 miles

Oct 5 1858 Comet of Donati

Arcturus 14h. 9m 13s Dec + 19° 55°

4
2.6686
9.7623
2.4309
9.1761
2.6070

Beautifully situated close to Arcturus

Note Oct 11th The Comet was **brightest** on 5th but train not as long as on subsequent evgs.

Note Nov 9th head came in sight nearly as soon as Arcturus.

18 53
12 56
5.57
= 5h 56m m s t

= 5h 56m m st

Sunset 5h 35m

[Feb 1862 By this sketch
Ang. Pos ß = 38° 15 + 238° 20
= 276° 35
Dist = 10″]

2362
At 18 55 2nd Envelope begins to be seen Comet is already visible by naked eye!

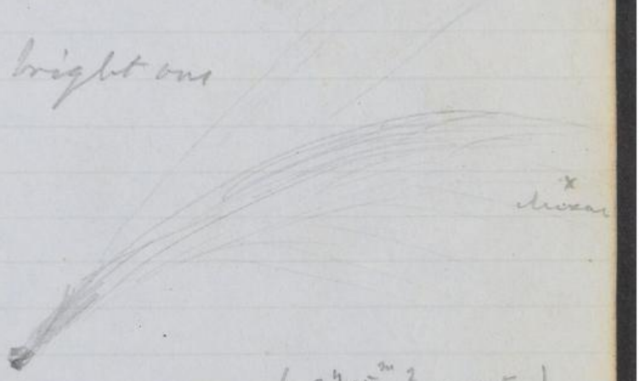
At 18h 50m of 236
pretty good

very Dark - gulf - (end of dark axis)

Diam of nucleus 1″5 = 405 miles It is certainly less than 2″ = 540 miles in strong twilight & well defined

The curved bright tail extends over Benetnasch to Mizar say & is very broad 5 or 6°

The double new tail very faint but evidently curved towards the bright one it is at least 50° long probably 60°



Examined with powers up to No 8 but saw no certain phase in bright Kernal

[8h 15m ? m s t]

[Oct 1859] By this diagram the extrem- of tail front edge was ∠ 4° from Mizar

2' = 120" =

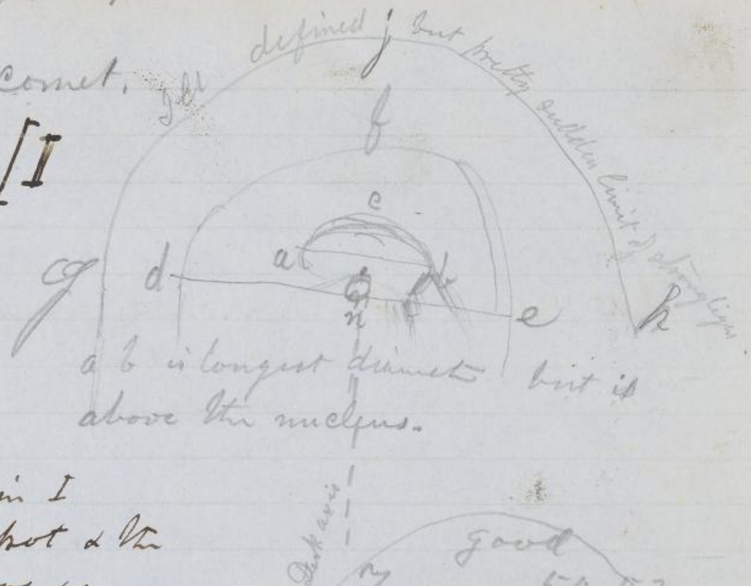
1" subtends 270 miles

Oct 5 1858 Donati's Comet.

a c b is the new envelope of Oct

shape is crown like

[I

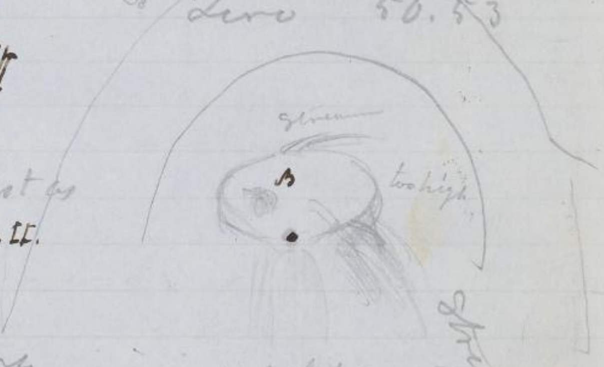


a b is longest diameter but is above the nucleus.

These frightful objects represent the outlines of the envelopes

The form is best in I with the dark spot & the bright streamers as represented in II.

[II



Dist of B just as represented in II. relation to nucleus & outer envelope

The inner envelope is crown shaped

[Feb. 20 1862 By this sketch ang. pos. B = 38° 15' + 221° 30' = 259° 45']

bracketed

Dist. 10"

Streams down like the rain commencing to fall from a distant thunderstorm or like the cloud cap summit seen over the summit of Mt Washington

ab = 53.92
50.53
3 39
7
33.2 = 8950

de = 60.72
50 53
10 19
2 0
99.9 = 26950 miles

gh = 65.85
50.53
15 32
51
= 150".1 = 40,500 miles

n to c = 52.12
50.53
1.59
3
15.6
= 15.6" = 4210 miles

n to f = 54.14
50.53
3 61
7
= 35".4 = 9550 miles

n to j = 55.89
50.53
5 36
11
= 52".5 = 14,160 miles

Note in 1863 [I suppose from recollection of the circumstances under which the en... observed ~~the~~ remarks at end of book & on prev. page that these measurements were made between $6^h 40^m$ and $7^h 00^m$ m.s.t.

angle of position of dark stripe - Zero

139° 20'
87 . 35
51 45
90 00
38 15
43 9
54
+ 4

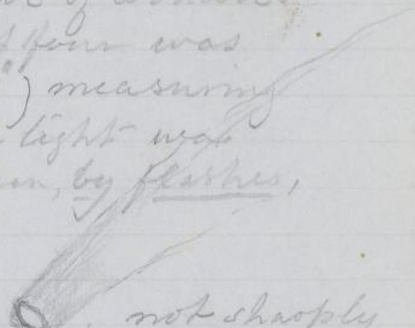
ang pos. Comp dir from Sun c-o

2.4309
lg 15.6 1.1931
3.6240
lg 35.4 1.5~~4~~490
3.9799
lg 52.5 1.7202
4.1511

2.4309
lg 33.2 1.5211
3.9520
lg 999 1.9996
4.4305
log 150.1 2.1764
4.6073

1858. Oct^{r}. 5^{t} — From Notes registered at the time. W.C.B.

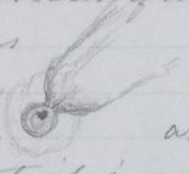
At $8^{h}..10^{m}$ p.m. I took four measures of the tail of Donati's Comet, with a Ramsden Sextant, the mean of four was Thirty one degrees, forty five minutes (31°..45′) measuring from the nucleus to the extremity where the light was steadily seen, — The light of the tail was seen, by flashes, several degrees beyond, this steady light.



The Head of the Comet appeared gibbous , not sharply defined, interior not so brilliant as on 2^{d} inst or on the 30th of September, The tail has, I think about the same curvature, that it had on the 30th ult°. and is much better defined on the upper, or preceding, side than it is below, or following

a Frauenhofer Opera Glass was used.

Sept^{r}. 30 — The tail, where it issued from the head of the Comet, [the Nucleus proper, cannot be distinguished with the glass I used] was less in breadth than the diameter of the head — but suddenly curved outward, as if there was a violent rush of gas, or fluid, and then rapid expansion soon subsiding into a steady stream with moderate expansion. at $7^{h}..30^{m}$



The upper, side of the tail is well defined for a long distance, the lower side is fainter, much, The tail was two degrees broad at the part opposite the Star Cor. Caroli, as measured by the field of the glass which just took in the "Pointers" of the Great Bear which are five degrees apart. —

The tail sweeps away to near, not touching, the tail of the Great Bear — vertically between Benetnasch and Mizar. and is most curved at the extremity. so as to bring the direction below Mizar. — at $7^{h}..35^{m}$ the flashing appearance extends two or three or more degrees further, the head appears round.

Oct. 2^{d} — 7 P.m. N The tail of the Comet after issuing from the nucleus, has a direction to the Southward of Benetnasch. but curves gradually until it reaches to one or two degrees below that Star between it and Mizar. the head is flattened a little

Oct 5 1858 Tuttle. Comet VII.

G.P. Bond Attn records

angle of position of scale 268° 47′
Cor −1 00 ?
Wires 267 47

236 α = * of 11 mag.

	AR				Scale	
☄	22 41	4.8	16.9	44.8	4′ 36″	0 31
α	42	22.0	34.1	2.0	5 07	
	1	17.2	17.2	17.2		
						~~3~~ 14.8
☄	43	24.0	36.1	4.0	4 22	0 46 . − 30.6
α		42.9	55.2	23.1	5 08	
	1	18.9	19.1	19.1		
☄	47	18.8	30.6	58.1	2 37	1 18
α		39.6	51.8	19.7	3 55	
	1	20.8	21.2	21.6		3) 2 35

22 41 4.8
41 16.9
41 44.8
43 24.0
43 36.1
44 4.0
47 18.8
47 30.6
47 58.1
397 58.1
22 44 13.12
2 11.90
22 42 2.22
1 2 56 15.62
9 45 46.60
1 35.96
9 44 10.64 Camb. m.s.t.

21.6
21.2
20.8
19.1
19.1
18.9
17.2
17.2
17.2
9)172.3
$\delta\alpha = 19^s.14$

12 55 28.88
46.74
12 56 15.62

0 51.7
−2.4
$\Delta\delta = 0\ 49''.3$

22 41 44.8
44 4.0
47 58.1
133 46.9
22 44 35.63
22 44 13.12
22.51

motion in dec in one minute
−6″.5 8″.1
.375
325
455
195
−2″.4375

1858phae.proj..182S

Oct 5 1858 Tuttle comet continued

Stars α and β * β of 8 may

					Scale	
236						
α 22	50	23.0	35.6?	3.8	355	
β	57	19.0	31.0	59.2	428	0 53
	6	56.0	55.4	55.4		

α	59.	9.4	21.6	50.0	521	
β	6	5.0	17.3	45.2	636	0.55
	6	55.6	55.7	55.2		

$\alpha - \beta = -6^m\ 55^s.55$

β in center of field

236 =	23	7	23
236 fast		2	11.9
	23	5	11
H =		1	25 east
AR =	23	6	36

EC	23	15	0
236	23	17	50.6
		2	50.6
EC slow			38 70
		2	11 90

Dec + 28° 42′

Daily mo in Dec 5^h to 6^h is $-2^\circ 45'$
R $+12^m 24^s$

* β of Oct 5. 1858 = B.2 329.

	Tab AR =	23	4	21.63	Tab Dec	$+28^\circ$	$30'$	$41''.1$
	k =			+ 13.67	d =	−	1	6.4
	$\frac{\delta - \mathfrak{D}}{100} k'$ =			0.00	$\frac{\delta - \mathfrak{D}}{100} d'$ =	+		0.5
1825.0	AR =	23	4	35.30	Dec =	+28	29	35.2

$2^\circ.893$	+19.451
+ 0.004	+ 0.042
+ 2.896	+ 19.493
33	33
8688	58479
8688	58479
95.568	643.269

	23	4	35.30	28	29	35.2
		+ 1	35.57		+ 10	43.3
1858.0	23	6	10.87	+ 28	40	18.5

Giving B2 double weight

1858.0 AR =	23	6	10.76	Dec	+ 28	40	20.5
Red to app P			+ 3.52				+ 26.2
β	23	6	14.28		28	40	46.7
α − β		− 6	55.55			− 0	54.0
α	22	59	18.73		28	39	52.7
☄ − α =		1	− 19.14				− 49.3
☄ AR =	22	57	59.59	☄ Dec	+ 28	39	3.4

Oct 5 9^h 44^m $10^s.6$ Camb. m. t.

* β of Oct 5 = Lalande 45445 Also in Rümker

1800. AR = $23^h\ 3^m\ 22^s.56$ N.P.D. = $61°\ 38'\ 25''.4$

$+2^s.893$
+.003
+2.896
58
23168
14480
+167.968 = $+2^m$ 47.97
23 3 22.56
1858.0 23 6 10.53

$-19''.451$
−0.029
−19.480
58
155840
97400
1129.840 = −18 49.8
61 38 25.4
61 19 35.6
Dec 28 40 24.4

Red to app Place

f = +40″.73 g = 19″.84 G = 333° 19′ h = 18″.84 H = 76° 28′ i = 7″.94

α = 346 33
679 52
G+α = 319 52

α = 346 33
423 1
H+α = 63 1

log g = 1.29754
sin(G+α) = 9.80927n
tan δ = 9.73787
0.84468n

1.29754
cos(G+α) = 9.88340
1.18094

log h = 1.27508
sin(H+α) = 9.94995
sec δ = 0.05681
1.28184

19.135
40.730
+59.865
− 6.993
15) +52.872(
corr = +3.52

1.27508
cos(H+α) 9.65680
sin δ 9.68106
0.61294 corr = +26″.236

+6.967
+4.101
15.168

cos δ = 9.94319
i = 0.89982
0.84301

1" subtends 265 miles

Oct 6. 1858. Donati's comet

angle of position of scale 268° 10

	2.6686
log 4	9.7547
	2.4233
log 38?	1.5821
	4.0054
log 104.4	2.0191
	4.4424
log 17.8	1.2504
	3.6739
Zero	50.53

Com. at 236 = 19h 00m
fast 2 16
18 57 44
13 2nd 00 12
5 57 32
59
m.s.t. 5 56 33

Lettering as on 2nd

2)38.2
19.1

Line ab is 8" = 2120 miles above transverse of nucleus

ab 54.46
54.40
38".2 = 10.100 miles

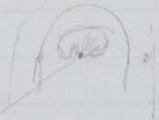
54.43
50.53
390
8
38".2

de 61.18
Zero 50.53
10 65
2 1
104".4 = 27.700 miles

The dark outlines of envelopes are well defined far below the nucleus & the outermost one can scarcely be seen excepting below

Sketch(1)

Jets of brighter light from nucleus



~~traced to this dot~~

f outermost seen on both sides

n to c 52.35
Zero 50.53
1 8 2
4
4.720 miles = 17".8

n to f 54.40
54.46
54.43
50 53
~~39".0~~ 38".2 = 10.100 miles

3.90
8
38.2

Mr Fette drew a sketch [always after microm. meas] to night which we both compared with care. It will contain many details not here mentioned

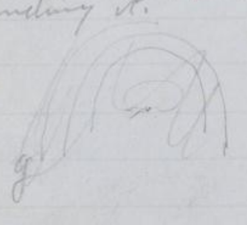
His crayon sketch shows the dark intervals too strong & the inside of the inner ~~[illegible]~~ envelope is too smooth & regular in outlines of the dark spaces

the outline dfe can be traced below the nucleus 54".40 in dir of axis?
50.53
387 = 37".9
8

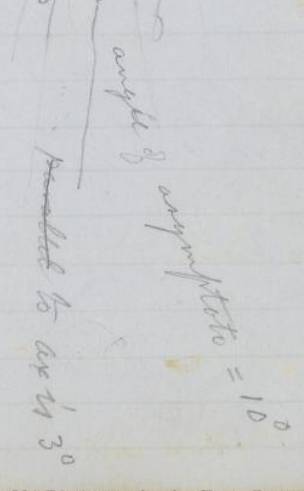
and the outer envelop perhaps further.
Can trace df a third dark interval outside the 3rd envelope besides the outer edge of light on background.

Pos Angle of centre of axis 137° not the fol. edge of dark stripe

Nucleus is very small 3".7 795 miles with bright jets surrounding it. Sketch (2)



137 00
Zero 87 35
49 25
90 00
Ang pos. axis 40 35



Note 1863 – Measures concluded to have been taken between 5h 56m 33s and then 6h 30m Mr. Fette sketched 6h 30m

Light Polarised

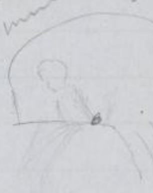
Prof. Lovering brought up a Nichols prism & each of us tried 5 or 6 times for position of maximum & minimum intensity

There was no doubt as to the fact that the image changed its intensity twice in the revolution for we always turned through 90° from a maximum to a minimum. We used the image as seen through the great refractor power 141.

On the 8th the test by lines of interferance was still more decisive

Feb 1862 [upper figure Angle of Position of Dark spot. 224°.00 + 40° 35' = 264° 35'] Dist 12".7] of Bright streak centre 257° + 40 35 = 297° 35'] Dist. = 7".1

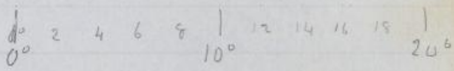
Nucleus very small with fiery jets - in the ~~mm~~ envelope - & dark opening

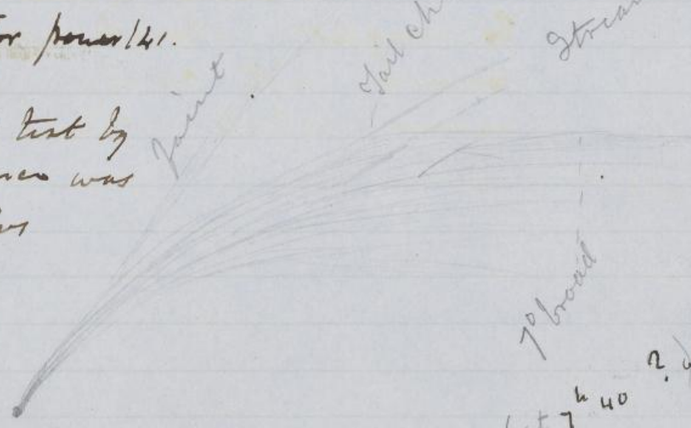


More carefully given by Mr Fette.

Feb 1862 [Angle of Pos. Dark spot Lower Fig 221° 30' + 40° 35' = 262.. 5' Distance 11".8 Of Bright spot 252° + 40 35 = 292° 35' Distance 6".8]

Scale of figures below derived from curvature.





(at 7h 40 ? appeared

Curved Tail extends 50° extremity reaches to α Draconis impending over Ursa Major-

Nucleus fainter than usual

Vide a sketch of course of tail among stars in back part of book

Supplementary ray to 80. 81 & 85 Herculis or (3°) S of ζ Draconis 55° long [This is nearly in a line from Sun through point of junction with tail say 10° from nucleus]

N.B. There with other obs fix the path of tail & ray precisely

Oct 6. 1858 Tuttle Comet VII. 1858

no star of comparison

Comet (of Tuttle III) VII of 1858

1858 Oct. 7

Star of 8 2/~~10~~ mag = of

236 23 34 00
EC 23 36 „ 58.4

+22° 46′

236	22	48	28.5
Lm	0	15	22.0
	22	33	6.5
		2	21.2
AR =	22	30	45.3

Angle of Pos of Wires
87° 35′
carefully determined.

The obs in AR were taken with Spring Gov. Owing to deposit of moisture on object glass the last obs. in AR were not as good as first

Zero of wires 50.ʳ53

~~Star is~~

Dif. Dec

236	23	15	37	47.74
		17	23	48.75
		19	50	50.53
			110	147.02
236 =	23	17	36.67	49.ʳ01
				50.53

Δδ = 1.ʳ52 = 14.″9

Comet is n.f. Star

Difficult from dimness occasioned by deposition of Moisture

Comet is plainly visible to naked eye

			AR	1st wire	2d	δ − *	
γ/δ	EC =	23ʰ	7ᵐ	51.4	− 56.8	+ 31.ˢ4	+ 31.ˢ6
			8	22.8	28.4	30.9	30.6
γ/δ			8	42.1	47.9	30.3	29.7
			9	13.0	18.5		
γ/δ			9	35.6	41.3		
			10	5.9	11.0		

		AR			δ − *	
	EC = 23	18	55.8	− 62.2	+ 26.ˢ0	+ 25.ˢ5
		19	21.8	27.7	25.5	25.2
		19	50.5	56.8	26.0	24.5
		20	16.0	22.0	23.8	24.2
		20	46.0	52.4	23.5	
		21	12.0	16.9		
γ/δ		22	3.1			
		22	26.9			
γ/δ		22	44.5			
		22	68.7			
γ/δ		23	24.7			
		23	48.3			

Tuttle comet oct 7. 1888

				$☾ - *$
2 E C	23	8	25.60	$+31\overset{s}{.}50$
		9	15.75	30.75
		10	8.45	+30.00
			49.80	
	23	9	16.60	$30\overset{s}{.}75$

E C	23	19	24.75	$+25\overset{s}{.}75$	25.45 23 20 19.40
		20	19.00	25.35	
		21	~~48.45~~ 14.45	25.25	
		22	26.90	24.20	$\frac{1}{2}$ weight – 1 wire only
		23	8.70	23.80	
		23	48.30	23.60	
		128	176.10	147.85	
	23	21	49.35	$24\overset{s}{.}64$	
	23	9	16.60	30.75	
E C =	23^h	15^m	$32\overset{s}{.}97$	$27\overset{s}{.}69$	
			39.20	0.50	
sid time	23	16	12.17	$\Delta\alpha = 28\overset{s}{.}19$	

$0\overset{s}{.}531$ = motion in one minute
945
2655
2124
4779
.501795

236 =	23	17	36.67
236 for		2	21.20
sid time =	23	15	15.47
	13	4	8.73
	10	11	6.74
		1	40.12
Cmb. m.s.t	10	9	26.62

13	3	21.99
		46.74
13	4	8.73

obs of Oct 7 *y = 44219 Lalande 7½ mag.

1800.0 AR = 22h 27m 38s.96	NPD = 67° 33' 33".8
+ 2s.843	− 18".453
+ 0.001	− 0.045
+ 2.844	− 18.498
58	58
22752	147984
14220	92490
164.952	− 1072.884
22 27 38.96	67 33 33.8
+ 2 44.95	− 17 52.9
1858.0 AR = 22h 30m 23s.91	NPD = 67° 15' 40".9
	Dec = + 22 44 19.1

*y is in BZ 319

Tab AR = 22h 28m 42s.05	Tab. Dec = + 22° 35' 15".4
k = + 9.22	d − 1 9.7
$\frac{\delta - D}{100}$. k' + 0.00	$\frac{\delta - D}{100}$. d' + 0 0.8
1825.0 AR = 22h 28m 51s.27	Dec + = 22° 34' 6".5
+ 2.843	+ 18.453
+ 0.002	+ 0.068
2.845	+ 18.521
33	33
8535	55563
8535	55563
93.885	611.193
22 28 51.27	22 34 6.5
1 33.88	+ 10 11.2
1858.0 AR = 22 30 25.15	Dec = + 22 44 17.7

Reduction of * γ of Oct 7 to apparent Place

$f = +40''.94$ $g = +19''.91$ $G = 333^\circ\ 30'$ $h = +18''.87$ $H = -74^\circ\ 20'$ $i = +7''.88$

α = 337 36
671 6
360
$G + \alpha$ = 311 6

α = 337 36
411 56
360
$H + \alpha$ = 51 56

log g = 1.29907
sin(G + α) = 9.87712 n
tan δ = 9.61736
0.79355 n

1.29907
cos(G + α) 9.81781
1.11688

13.088
4.434
7.280
corr = + 24.822

log h = 1.27577
sin(H + α) = 9.89614
sec δ = 0.03440
1.20631

1.27577
cos(H + α) 9.78999
sin δ 9.58296
0.64872

+ 40''.940
+ 16.081
57.021
6.217
15) + 50.804
corr = + 3^s.39

cos δ = 9.96560
i = 0.89653
0.86213

1" subtends 256 miles

Oct 8. 1858 Donati's Comet. Power always 141 excepting where otherwise stated

Measures are always to edge of bright light of envelopes - not to middle of dark intervals

n to c
47.67
47.61
47.64
50.50
2 86 = 28".0 = 7,160 miles

2.6686
log Δ 9.7394
2.4080
log 28.0 1.4472
3.8552

a to b through the nucleus the largest diameter now is through the nucleus.
44.19 difficult to measure
50.50
6 31 = 61".8 = 15,800 miles

2.4080
1.7910
4.1990
log 4.1 0.6435
3.0515

50.05 diameter of nucleus
50.50
45 = 4".4 = 1,120 miles

Breadth of dark outline outside of a c b is between ½ and ⅓ of the distance between its inner edge and the inner edge of the outline d f e.

Outline d ~~f e are~~ plainest on the preceding side* There are traces of still another dark outline on the prec side below the nucleus. We fancied that there were still others outside as at g.

d to e
37.90
50.50
123".5 = 12 60
= 31,600 miles
apex f rather ill defined

2.4080
2.0917
4.4997
log 48.5 1.6857
4.0937

n to f
45.55
50.50
4 95 = 48".5 = 12,400 miles

nucleus is brighter than on last date of observation

Angle of position of dark stripe 119° 05
Angle of Zero Position 177 35
58 30

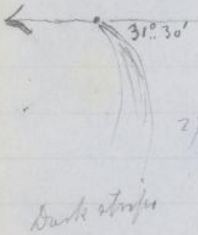
* The order before perihelion is now reversed. This was also the case with the brightness of the envelopes & tail

Mr. Fette made [sketch No 2 of Comet Clear but not good definition
[with another by naked eye

Oct 8. 1858 Donati Comet continued

Angles of tangents to envelope d g e at d and e

prec fol



141° = 141.00 98° 30'
177 35 177 35
36..35 79 05 = Ang. pos

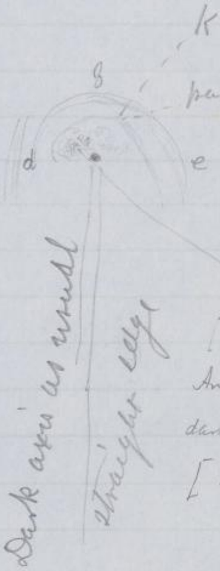
98 30
2) 239 30
119..45
119 05
87 35
31 30
30

Ang pos = 58

~~This is in~~ line from Sun pos ang 61° 23'

Zero of Pos. = 87.35

Nucleus tonight is decidedly brighter than on the 6th and is preparing for throwing off a new envelope



[By the diagram
Ang. Pos of point midway between two dark spots = 226° 00' + 58° 30' = 284° 30']
Distance = 14".2
[By Fette's sketch .. 284.30]
Distance 19".3

~~Over~~ across the dark halo bounding the envelope a.c.b. the light fills in at K' probably the result of the streamers Noted Oct 5th. The envelope inside of K' is rather brighter than elsewhere

~~The diam~~

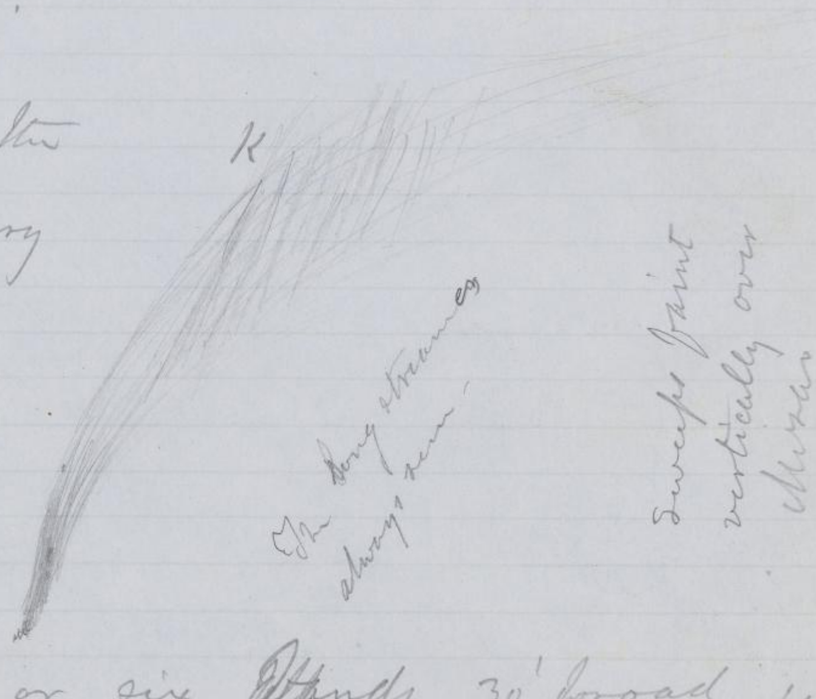
At φ ~~aisle~~ the faint outlines of perhaps ~~another~~ other envelopes

The interior of the envelope a c b is still in a tumultuous state ~~of Cons~~ but the convolutions are not as plainly traceable as on 6th

The dark spot B of the 4th seemed to develope for several days about in proportion with the rest of envelope

The light of the envelopes is altogether too strong to admit of seeing a star of less than the 10th mag - near them - I think the nucleus would obliterate a star of the 9th magnitude if within 10" or 20" of it - by the mere excess of its light - Have always kept a look out for a transit of a bright star.

To the naked eye the tail presents a very curious division in bands at K above & to left (?) of Corona Borealis


K
The long streamers always seen.
Sweeps faint vertically over these

There are five or six Bands 30' broad just like Auroral streamers pointing a little nearer the nucleus than as above represented but not diverging from it - but rather from the Sun - They are very distinct & sharply defined (RFB & WCB both saw these as well as HT & others)

1" subtends 252 miles

Oct 9. 1858 Donati's Comet not quite clear

A new envelope has been thrown off since the 8th as predicted last evng.

new envelop

α to g

48.81

50.46

$\frac{50.46}{165_{3}} = 16''.2$ = 4,070 miles

Mr Fette Made sketch No 3 A very good one.

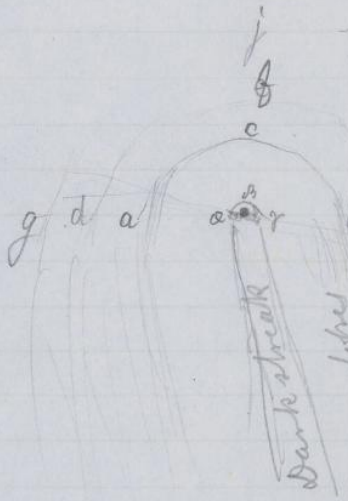
a to b

42.75

$\frac{50.46}{771_{5}} = 75''.6$ = 19,000 miles

I think g & h are still discernible below the line of nucleus

The proportional distances here drawn are good



The envelopes always set away over axis of tail But the line a b c is always taken at transverse perpendicular to axis.

d to e

37.85

$\frac{50.46}{1261_{25}} = 123''.6$ = 31,100 miles

angle of pos. of square termination of dark stripe under the nucleus and new envelop

220° 30

177° 35' + 360°

Ang Pos

220 30
537 35
317 05
180 00
137 05

n = centre of nucleus

n to β

49.68

$\frac{50.46}{78_{2}} = 7''.6$ = 1,910 miles

2,4004
0,8808
3,2812
1,5366
3,9370
1,7202
4,1206

2,6686
4 9,7318
2,4004
log 16.2 1,2095
3,6099
1,8785
4,2789
2,0920
4,4924

The new envelope thrown off since yesterday evng is very bright - its lower edge very suddenly truncated sharp edge

making a sensible angle with darkline of axis. Which comes ~~remarkably~~ square full up to the line of the nucleus

n to c

46.95

$\frac{50.46}{351_{7}} = 34''.4$ = 8,650 miles

n to f

45.10

$\frac{50.46}{536_{11}} = 52''.5$ = 13,200 miles

Donati comet continued

[For star A see Mr Fettes figure]

236 = 19ʰ 41ᵐ 45ˢ *A was in brightest part of train on following side.

Diameter of dark stripe 3' from nucleus is

49ʳ.30
50.46
1 16 / 2 = 11".4 2870 miles

2.4004
1.0569
3.4573

Zero of wires
50.43
47
48
50.46

Angle of pos of dark stripe 114° 57'
177 35
62 38

Angle of pos at a, bright outline 137° 10
Zero 177 35
40 25

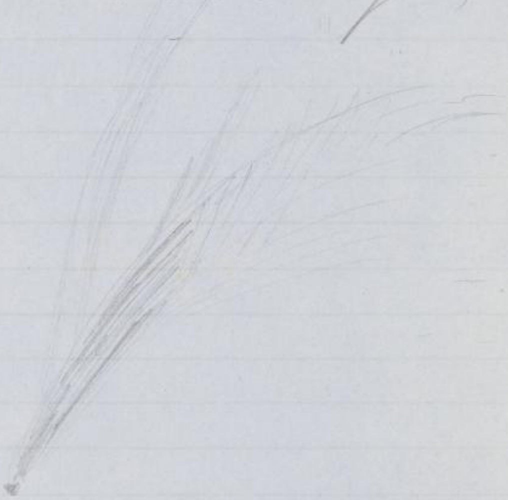
" " " at d " " 133 55
177 35
43 40

Angle of pos of bright edge at b 100.35
177 35
77 00

The formation of a new envelope is preceded by an increased brightness & size in the nucleus — & they seem to shine with same quantity of light as nucleus — less intensity at their first appearance they are exceedingly bright & the nucleus though much brighter than the envelope is fainter than it was before the latter was thrown off

Oct 9th Cont

To the naked eye the tail passes ~~through~~ or to left of Cor. Borealis & 20° or more beyond faintly



1" subtends 251 miles

502
121

Oct 10^h 1858 Donati's Comet

Good definition & clear

According to Mr Hind Comet was nearest the earth at midnight Gr. or Oct 10th 7h P.M. Camb m s t just the time of Obs.
His determination agrees nearly with Mr Watsons.

αγ 47.92 βn 49.32

50.44 / 2 52 (5) = 24".7 = 6,200 miles 50.44 / 1 12 (2) = 11".0 = 2,760 miles

ab 41.84 cn 46.87

50.44 / 8 60 (1.7) = 84".3 = 21,150 m 50.44 / 3 5.7 (7) = 35".0 = 8,780 miles

nf

de 36.84 44.70

50.44 / 13 60 (2.7) 133".3 = 33,500 m 50.44 / 5 74 (1.1) = 56".3 = 14,100 miles

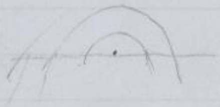
Dist
~~αγ~~
2.6686
9.7310
2.3996
1.3927
3.7923
1.9258
4.3254
2.1249
4.5245
1.0414
3.4410
1.5441
3.9437
1.7505
4.1501

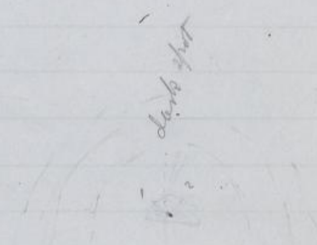
47.72
50.44
2 72 (5)
26".7

48.82
50.44
1 62 (3)
15".9

αβγ sets much awry, 30°, to the axis of tail

All the transverse diameters through the nucleus are measured with difficulty because of the divergence of the tangents at the points of intersection with transverse





Scale = 1' = 100" good

The new envelope αβγ has some ~~dark~~ luminous rays proceeding from the nucleus n (which is now very small say 2" or 3" when best seen) 2".5 = 628 1 & 2 are the brightest of ~~them~~ their position & effect are given in Mr. Feltes drawings of this date No 4

By above sketch Ang pos dark spot in new envelope p + 194° Dist = 7/10 11".8 = 8".3
p = Ang. pos. Tail.

From 2 there proceeded a wisp when I saw the comet highest & under best definition bent as though projected from the envelope towards the sun & driven back as by an opposing blast

The envelope within a c b has still convolutions with brighter & darker places but intrinsically its whole surface is much less bright than that of α β γ. The dark interval between the two (α β γ & a c b) I do not yet recognise though I did not look expressly for it.

The new envelopes just projected have so brilliant an aspect that with small telescopes they must be confounded with the true nucleus & lead to errors of determining the place of the Comet.

=100" good

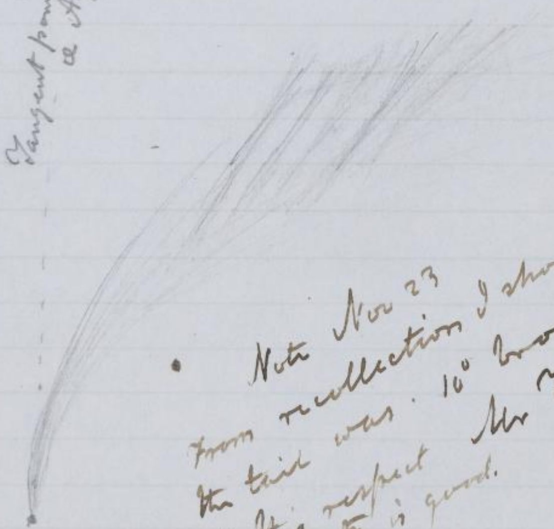
I see 4 Envelopes besides the external haze.

To night we see the envelope a c b rather the best defined & brightest on the preceding & upper side. & the contrast between the intensity of light on the two sides of the tail is far less marked than it has been

8".3

~~I still~~ and the portions near the axis are less dark. The dark stripe is hard to trace beyond 2' or 3' from nucleus its square termination near nucleus is far less evident than on last evg. as though faint streams of light were crossing it

To the naked eye the tail shows clearly the strange alternating intersections of dark & light bands - like a bundle of new Comets forming (as expressed by Mr. Sophocles). Faint traces of tail extend almost to line from α Lyrae to β Ur. Min

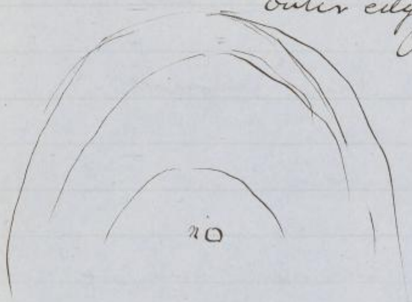

Tangent points to α Aquilae!

The light bands are 5° or more long & but slightly divergent

Just like auroral streamers breaking up the continuity of the arch - Streamers are say 20' to 30' wide

Note Nov 23 from recollection I should say that the tail was 10° broad a little past α Cor. Bor. In this respect Mr Tuttle's of full length of the 4to is good.

Almost Extends to line α Lyrae & β Ur Min outer edge of 3rd envelope in Mr Tuttle's drawing of Oct 10th 1858 as sent to engraver



1″ subtends 254 miles

Oct. 11th Comet of Donati

Seen at times distinctly through thin clouds

New envelope, $\alpha\beta\gamma$ much larger than on 10th Clouded suddenly preventing more measures

$\alpha\gamma$ = 46.14 $\qquad$ ab 39.86 difficult

$\frac{50.44}{4.30}$ = 42″.1 = 10,700 miles $\qquad$ $\frac{50.44}{10.58}$ = ~~5″.7~~ 103″.7 = 26,300 miles

9 $\qquad$ 21

Edge of $\alpha\beta\gamma$ is but little less than half way from nucleus to edge of acb by

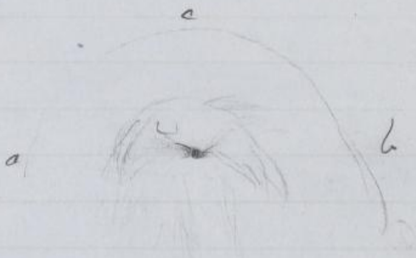
26300
7
18)184100(10228
18
41
36
50
36
140

good estimates

By sketch

$\frac{nc}{ab} = \frac{35}{90} = \frac{7}{18}$ nc = 10228 miles

$\frac{n\beta}{\alpha\gamma}$ $\frac{16}{40} = \frac{2}{5}$ $n\beta$ = 4200



The best measures are always those of vertex of envelopes from nucleus - There is considerable trouble in measuring the transverse diameters.

By sketch

$n\beta$ = 17″.7

n to spot

½ ab = 13″.0

Ang pos 218° + p

p = pos Tail.

1in = 57″.6

5083 miles

Nucleus well seen it is 2″ diam with two bright rays and a darkish spot above the prec. ray.

A good sketch this evg. by Mr. Fette

Envelopes $\alpha\beta\gamma$ & acb are now brightest on the prec. sides. And the axis of the tail is far less dark than has been the case- To night the dark stripe is scarcely discernible - possibly this may be owing to the diffusion of light caused by the haze in the sky but I think it is real- and that even to the naked eye the prec. side of train near the nucleus is scarcely as bright as the following side

I think Mr Tuttle has his envelopes rather high at vertex in his early sketches-

2.6686
9.7360

2.4046
1.6243

4.0289

2.0157

4.4203

Oct 12th Cleared suddenly after the head of Comet had set - The tail appeared nearly vertical reaching to within about 12° of α Lyrae length 45° The bright & dark bands are not so evident as they have been but there is one prominent streak rising higher than the rest. The light of the train is evidently waning

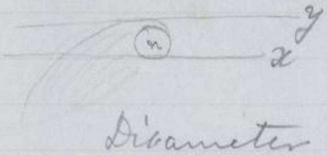
1858phae.proj..18dB

1'' subtends 275 miles

Oct 15th 1858 Comet of Donati
Still another envelope formed or forming
nucleus very bright

n y — a y

	n y	a y
	47.41	43 41
	50.44	50.44
8,160 miles	3 03 / 6 = 29''.7	7 03 / 1.4 = 68''.9 = 18,900 miles

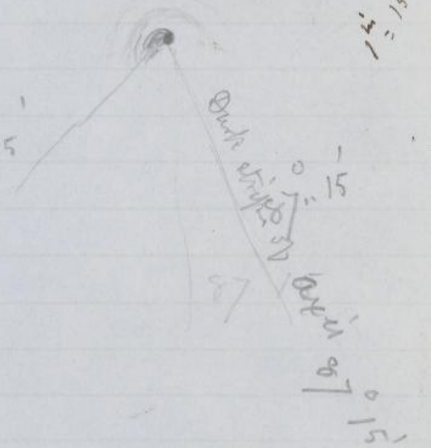


Outside of the new envelope δ ε G there is a darker space bordering it.

87 15
Zero 177 35
Ang pos 90 20

Diameter x y (~~notation~~ as inferred from recollection)

49''.11
50.44
1 33 / 3 = 13''.0 = 3557 miles = 3557 = s.d. of nucleus
400
3157 = n to ε



1'' = 152''

Ang of pos = p + 360 − (171° 15' − 87° 15') = p + 276°

There is a new feature tonight — The nucleus has thrown off ~~still~~ another ~~irregular~~ eccentric envelope altogether on the north side of nucleus as represented

Tail now nearly follows in R

Mr Fette made a good sketch —
Counting this new one
~~But~~ 3 envelopes are visible besides outside ~~nebulosity~~

The brightest part of the envelope is now decidedly that on the n. prec. side that is towards the concavity of the tail = This corresponds to the effect of phase? — We have always seen it brightest on the side towards the sun.

I do not think the envelopes have

a rotation because there is a general permanence of form & a certain resemblance of conformation in each to its predecessor

May be as bright to the naked eye as a star of the 3rd mag- with a tail of 15°

8160
3264
By sketch
or $nc = n\mathfrak{B}(1 + \frac{2}{5}) = 11424$

2,6686
9,7703
2,4389
1,4728
3,9117
1,8382
4,2771
1,1139
3.5528

Comet of Donati

For finding the scale to which the sketch is drawn on next page

$33''.2 = 0^{in}.35$

$33.3 = 0.24$

$\underline{72.8} = \underline{0.63}$

$139.3 \quad 1.22$

$1.22 = 0.0864$

$139.3 = \underline{2.1440}$

7.9424

$100'' = 0^{in}.876$

Comet in Desc. Node

1" subtends 299 miles

~~pretty good definition~~

Oct 18 1858 Comet of Donati - Cirri gathering

The new envelope of the 15th has now extended to the right of the nucleus.

From nucleus

Breadth of last new envelope of 15th

47.05
50.44
3 39
7
= 33".2 = 9.920 miles

Height to vertex

48.93
50.44
1 51
3
= 14".8

4440

Centre of field

Dec - 21° 52'
2 53
- 24 45 for Oct. 19

Of next outside

Q of

43.01
50.44
7 43
15
= 72".8 = 21,750m

n B

47.04
50.44
3 40
7
= 33".3 = 9.950 miles

Through clouds

Angle of pos. of tail is about 80° very difficult

zero $\frac{177\ 45}{97\ 35}$ following end is South

Under good definition

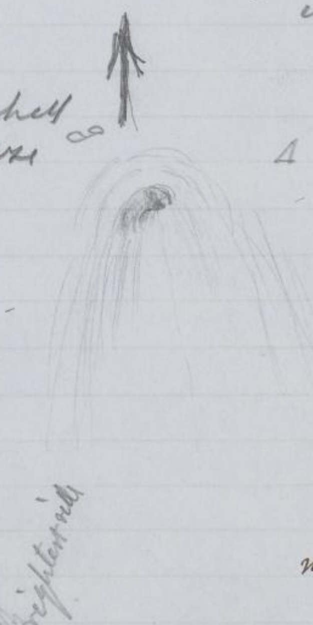
Nucleus quite small & pointed say only 3" = 900 but with luminous rays especially on towards g.

The Comet greatly diminished in brightness. low in the SW & in haze

The dark line in axis is scarcely discernible if at all

3 Envelopes are seen besides the outer hazy nebulosity

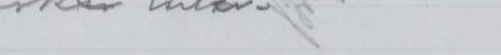
The outer boundary of the inner one is well marked on the n. p. side thus leaving a comparatively darker interval just outside of it.



2.6686
Δ 9.8070
2.4756
1.5211
3.9967
1.5224
3.9980
1.8621
4.3377

By sketch

$nc = \left(1 + \frac{45}{100}\right) nB =$



Scale - Vide prec. page

Mr Fetter made a drawing to night comet

Comet 16 44 -24°45'

16 43 24 16

For the Comet of Donati Oct 19. 1858

	AR			Dec			mag
5633 18 ophiuchi	16	40	36.8	24	22	11.5	6
			29.1			54.5	
	16	41	5.9	−24	23	6.0	
5641 B.A.C	16	42	13.0	24	34	12.3	6½
			29.1			53.4	
	16	42	42.1	−24	35	5.7	
5650* B.A.C	16	43	4.9	25	20	34.9	7
			29.4			52.9	
	16	43	34.3	−25	21	27.8	
5687 B.A.C*	16	46	33.7	25	17	36.7	7
			29.4			50.6	
	16	47	3.1	−25	18	27.3	
5709 B.A.C*	16	50	46.9	24	51	39.0	6
			29.3			48.0	
	16	51	16.2	−24	52	27.0	
5711 B.A.C	16	50	58.6	24	45	23.0	6
			29.3			48.0	
	16	51	27.9	−24	46	11.0	

Comet of Donati

Oct 19th 1858 Clear & fine

Zero of Pos of Scale $88^{\circ} 25'$ Zero of Wire 50.42

Compared with 18 Ophiuchi = BAC 5633. = B = Lalande 30549
by an intermediate star C.

& also by 236 AR got on S.p. Gov

Scale

C 19 = 48 18.1 Micr. wire $3' 32''$ EC = 19^{h} 44^{m} $25^{s}.7$ $52^{s}.8$ $57^{s}.2$
48 45.0 1st wire of Scale

☄ 19 50 5.7 $\frac{5\ 32}{2\ 00}$ 19 46 13.3 40.2 43.8
32.6 1 47.6 47.4 47.6
— 1 47.6
1 47.5

C 19 51 17.1 3 09 19 47 24.8 51.7 56.0
51 44.0

☄ 19 53 5.2 $\frac{4\ 51}{1\ 42}$ 19 49 12.9 40.1 44.7
53 32.4 1 48.1 48.4 48.7
— 1 48.1 EC = 19 46 42.50
1 48.4 49 42.40
53 40.65
148 125.55

EB = 19 49 61.85

$2'\ 00''$
1 42
1 20
3) 4 62
1 40.7

48.7
48.4
47.6
47.4
49.5
49.7
6) 291.7

☄ − * $+1'\ 48''.62$
☄ − * $+1'\ 40''.7$

n to vertex
42 & 30 & 20

Comet continued
Another star c' transits 32^s before c
Long Break

9^h c' 19 54 42.0 Seeing 7 47"

8/9 c 55 14.0 41.0 3 18 Ec = 19^h 51^m 21.7^s 48.7^s 53.0^s
c' 57 3.8 31.0 4 38 53 11.2 38.4 42.9
1 49.8 50.0 1 20 1 49.5 49.7 49.9

B. B.B

A 20 0 29.9 0 03
B 40.0 07.0 1 09
C 1 24.6 51.0 8 27

Long D.

~~B 20 2 37.0 -~~ 1 19 spoiled
C 4.

B 20 3 42.8 1 57
C 9 10

B 1 59 }
C 9 14

B B

B 2 03
C 9 20

Preceding B by 181 beats = $90.^s5$ is a star 1/2 mag smaller which is 7' .. 2" N of B

There is another 1 mag smaller about 10' or 12' S of B & following it by 198 beats = 99^s

B is 23' N of BAC 5711

and precedes it by 18^m?

$10^m\ 23^s$ approx. by transit in finder

There is no ~~brighter~~ star as bright in the intermediate region

$$\begin{array}{rrr} 20^h & 39^m & 11^s \\ 20 & 49 & 34 \\ \hline & 10 & 23 \end{array}$$

B is BAC 5633.

March 1863

Σε 19 50

End of Spr Gov. obs 20 07

17

Σε 19 50 = mst 5 58 26

For time of ending micr. obs 6 .. 15 26 mst

* B of Oct 19. = BAC 5633

1850.0 16h 40m 36s.81 114° 22′ 11″.5

3.640 × 8 = 29.120 6.79 × 8 = 54.32

16 40 36.81 114 22 11.5
+ 29.12 + 54.3
1858.0 AR 16 41 05.93 NPD = 114 23 5.8

a.	b	c	d
8.3953 n	8.8379n	0.5611	8.0109
1.2256	0.9575	9.9622	0.9395n
9.6209n	9.7954n	0.5233	8.9504n

a′	b′	c′	d′
7.8573 n	9.1464n	0.8331	9.9734 n
1.2256	0.9575	9.9622	0.9395n
9.0829n	0.1039n	0.7953	0.9129

- 0.418
- 0.624
- 0.089
-1.131
+3.337
+2s.206

-0.121 +6.242
-1.270 +8.183
-1.391 +14.425
-1.391
+13″.034

16 41 5.93 - 24 23 5.8
+ 2.21 - 13.0
app Place of B 16 41 8.14 Ref. -24 23 18.8 Ref.
C-B~~B - c~~ + (44.18 + 0.10) + (7 15.7 + 2″.5)
C 16 41 52.32 -24 16 3.1
☾ - * +(1 48.62 + 0.02) +(1 40.7 + 0″.5)
☾'s AR = 16 43 ~~40.94~~ +0.12 Dec = ~~- 24 14 22.4~~ + 3.0
41.06 24 14 19.4

Eb = 19 49 61.85 13 50 40.64
Eb slow 50.02 46.74
Sid Tim = 19 50 51.87 13 51 27.38
13 51 27.38
5 59 24.49
58.88
Oct 19 5h. 58m 25s.61 Camb. m t.

Revised

1" subtends 307 miles

Good definition Oct. 19th Cont.

n to vertex of new envelope (of 15th) 5

52.27
50.44
$\overline{1\ 83}$ = 17".9 = 5,500 miles
4

nucleus brighter as if preparing for ~~another~~ the evolution of still another envelope

n vertex of a d γ v. faint Diam 3"

54.15
50 44
$\overline{3\ 71}$ = 36".4 = 11.200 miles
7

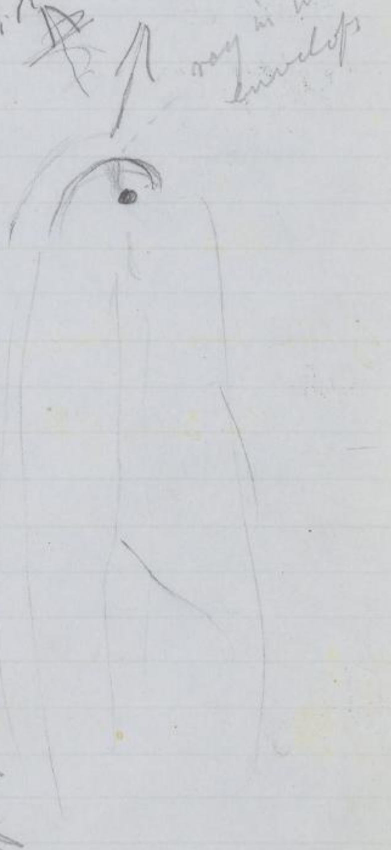
Nucleus is far brighter than either B.A.C 5709 - 5711 or 5633 as compared with it at the same alt. They are of the 6th mag.

Nucleus must be of 5th at least without surrounding envelopes

Angle of pos of tail 75° pretty good

75 00
177 35
p = $\overline{102\ 35}$

Shape & proportion



ray in new envelope

At 1 field of finder from nucleus tail is only 6' wide!

as seen in finder

Vide Obs of Sept 25 & Oct. 2.

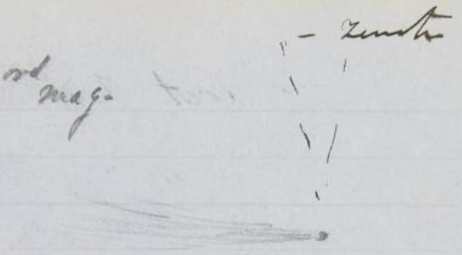
In the Gr. Ref. at dist of 12' the breadth is 5'

It looks in the finder much more compressed towards the axis than usual - with its outlines nearly parallel say 15' from nucleus.

The tail follows the nucleus almost in the same parallel but lies a little to the South of it.

This collapse of the tail may be the first appositions of the reconstruction of the tail an ~~steps~~ way suggested by Sir J. Herschel

To the naked eye the tail is still curved as usual but an arc of 5 or 6° only is plainly seen – head is a star of 3rd mag.

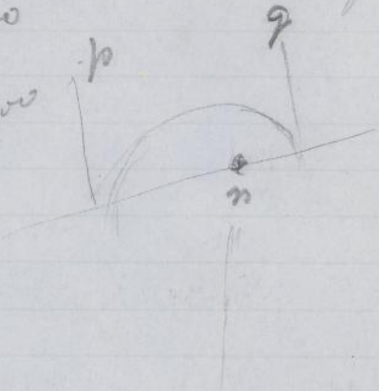


The outline of the last formed envelope of the 15th is now much more regular than it was. But is still eccentrically placed although the vertex is nearly in the axis of the tail

Outside of this the darkest part of the next one is close to the N. edge – The outlines of both are seen best on the N. edge

The dist pq is about 42" = 13.000

np = 30" or perhaps less say 28" = 8.900



The difference of illumination of the two sides of tail is ~~not~~ noticeable

For Scale of Diagram on prec. page

$42'' = 0^{in}.73 \sim x^{in} = 58''.3$

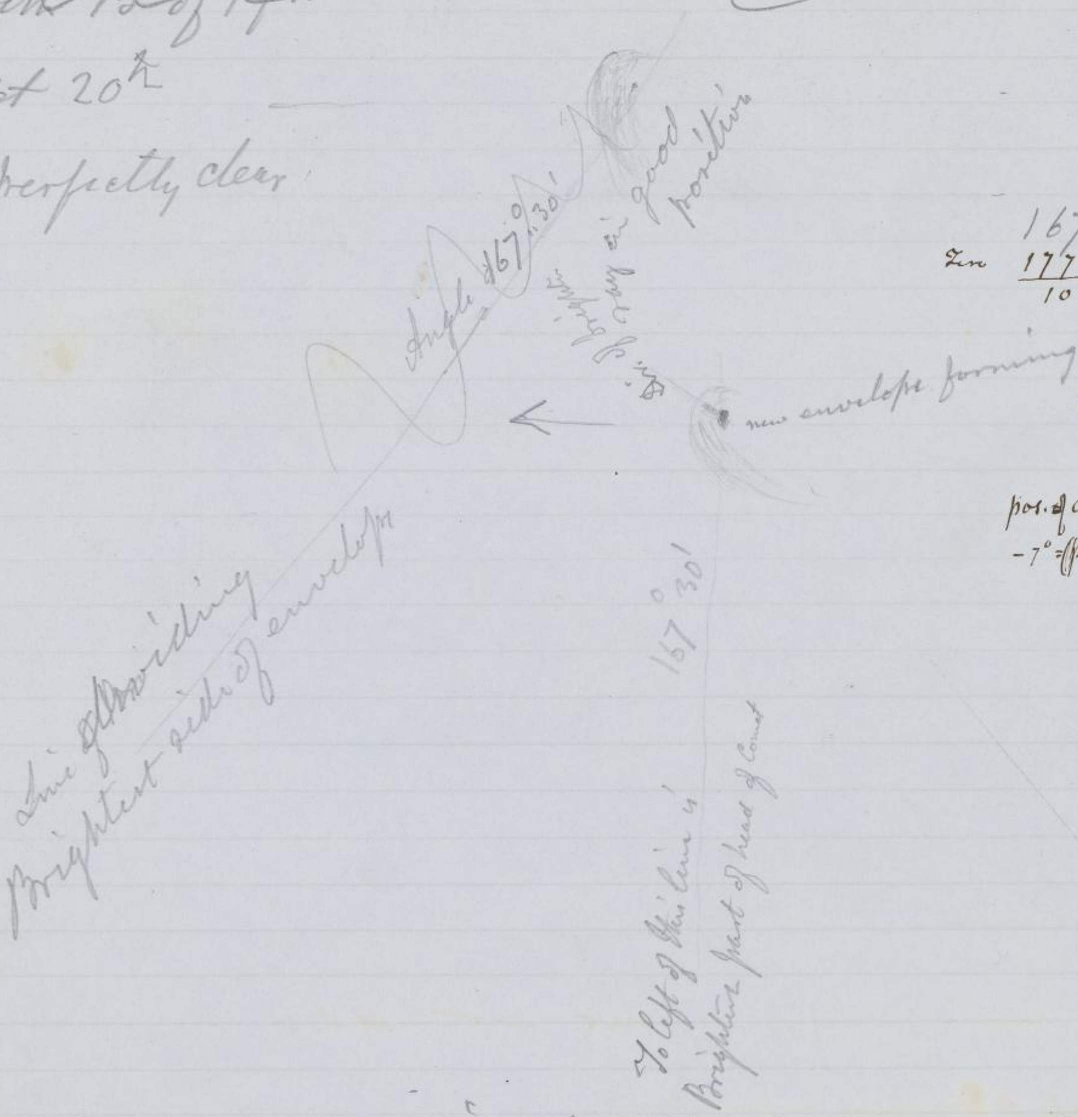
$1^{in} = 75''.0$ from all the measures

2.6686
Δ 9.8192
2.4878
1.2529
3.7407
1.5611
4.0489

1858 Oct 20th ~~reobservation of Star c compared with B of 19th~~

Oct 20th

Not perfectly clear


Angle 167°.30'
brighter ray in good position
new envelope forming
Line dividing Brightest side of envelope
167° 30'
To left of this line is Brighter part of head of Comet

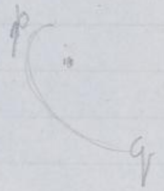
	167°		30'
Zen	177		35
	10	"	05

From this diagram angle of pos. of ray = 270° - 30°
pos. of axis is 95° about = [Calculated -7° = (p - p₀)]

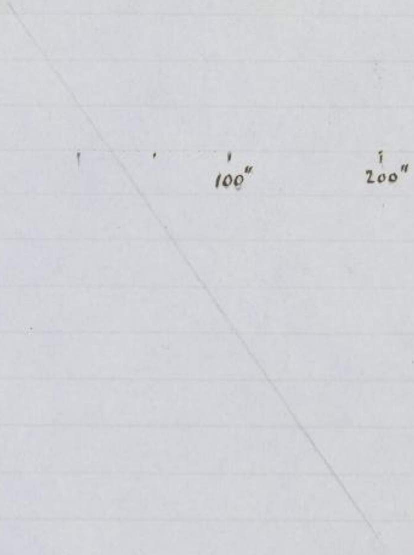
Envelope is decidedly brighter on N side

Diam of nucleus 2" = 658 miles I have little doubt that a new envelope is forming as on Oct 15th by an irregular projection from the N. side of nucleus but the comet is so near the horizon that it is very difficult to observe it on account of haze &c

The envelope of Oct 15th is now the most conspicuous part of the comet – reaching 100'' 32900 miles from p to q of pretty decided light



I believe from repeated observation that the nucleus actually gives out more light just before each new evolution of an envelope



Not merely an increase of size but in quantity of light – This would correspond to reflection from more surface

1858 Oct 20. Donati's Comet

$-24^{\circ}\,15'$ $16^{h}\,42^{m}\,40^{s}$
$-2\;25$ Daily mo $\underline{+9\;\;20}$
$-26\,..\,40$ $16\,..\,52\,..\,00$ = Comp. place of Comet Oct. 20^t

AR on S. pr Gov. and 236.

						Scale		
236.	B	19	41	19.0	46.2	1	12	
	c			not seen				
	B		44	12.0	39.2	1′	21″	
	c		44	56.7	23.2	8	36	7 15
	B		45	61.2	28.6	1	24	
	c			45.8	12.7	8	39	7 15
	B		48	1.4	28.6	0	48	
	c			46.2	12.9	8	05	7 17

S pr. Gov

B	EC = 20	40	42.0	46.3
c		41	26.2	30.5
			44.2	44.2
B		42	31.4	35.7
c		43	15.4	19.9
			44.0	44.2
B		44	31.4	35.9
c		45	15.8	20.0
			44.4	44.1

$B - c = -\;44^{s}.18$ and $-7'\;15''.7$

Oct 20 Donati Comet

153 45
155 45
2 00
7
1° 57'

Song B
AR on Spr Goo and 236

Scale
236 ☄ 19 57 29.2 Micr. 56.7 7 53
7/8 k 36.2 Scale 3.9 2 16 5 37 . scend wire lost
7.0 7.2

Comet has moved just 2°..00' in Dec since last evg.

☄ 59 31.0 58.6 7 48
k 20 0 37.2 4.8 2 22 5 26
6.2 6.2

☄ 1 23.8 51.2 7 46
k 2 29.1 57.0 2 29 5 17
5.3 5.8
Mean 5' 26.7

Spr Goo

☄ EC = 19 53 59.5 19 53..59.5
k 55 6.6 56 1.3
1 7.1 56 5.9
☄ 56 1.3 5.9. 57 54.0
k 57 7.6 12.2 57 58.6
1 6.3 6.3 5)29 179.3
☄ 57 54.0 58.6 19..56..23.9
k 58 59.7 64.1 19 56 00.6
1 5.7 5.5 + 23.3
5.7
6.3
6.3
7.1
30.9
☄ – * – 1m 6.16s and 5' 26".7

For last transit of Micr wire
Comet
236 20 1 24
3 6 9
16 55 15.0
2 38.5
16 52 36.5
180
Dec 153..48'
26 17

EC = 19 54 1.8
56 3.6
57 56.3
EC = 19 56 0.57 ~~+23.3~~ +23.3
EC slow 51.20

13 54 37.20
46.74
13 55 23.94

19 56 51.77
13 55 23.94
6 1 27.83 +23.3 +23.3
39.22
Oct 20 ~~6 0 28.61~~ Camb. m.t.
6 .. 0 .. 51.9

* k = 30882 Lalande

1800.0   16 49 2.51   116 19 49.6

$+3\overset{s}{.}700$ +6.112
+0.003   −0.159
3.703   +5.961
58   58
29.624   47.688
18515   29805
60) 214.774 (+3   60) 345.738 (5
180   300
34.   45.

16 49 2.51   116 19 49.6
+3 34.77   +5 45.7
1858.0   16 52 37.28   116 25 35.3

* k = Arg Zone 212 No 81

Tab AR = 16^h 52^m $39^s.04$ -26° $24'$ $45''.8$
k, = − 31.39   + 0.3 d
−0.03 X −.25   k′ + 0.01   − 7.7
AR = 16 52 7.66 Dec −26 24 53.2

+3.700   +6.112
.005   −0.281
+3.705   +5.831
8   8
+29.640   +46.648

16 52 7.66   −26 24 53.2
+29.64   −46.6
1858.0 AR = 16 52 37.30 Dec = −26 25 39.8

Giving Arg. double weight

1858.0 AR = 16 52 37.30 Dec = −26 25 38.3

Comet of Donati.

Oct 20. 1858. Reduction to apparent place of ✱k.

$f = +42''.36$ $g = 20''.38$ $G = 334^\circ\ 47'$ $h = 19''.13$ $H\ 60^\circ\ 37'$ $i = +7''.23$

$\alpha = 253\ \ 9$ $\alpha\ 253\ \ 9$

$G + \alpha = 227\ \ 56$ $H + \alpha = 313\ \ 46$

log g 1.30920 1.30920

sin(G+α) 9.87062 n cos 9.82607 n

tan δ 9.69635 n 42.36 1.13527 n −13''.654

0.87617 +7.519 −5.889

+49.879 −19.543

log h 1.28171 −15.427 1.28171 +6.475

sin(H+α) 9.85864 n 15) 34.452 cos 9.83993 −13''.068

sec δ 0.04793 +2^s.297 sin δ 9.64842 n

1.18828 n 0.77006 n

cos δ 9.95207

i 0.85914

0.81121

AR = 16^h 52^m 37^s.30 Dec = −26° 25' 38''.3

+2.30 −13.1

app AR = 16 52 39.60 app Dec = −26 25 51.4

☾ − ✱ −1 6.16 + ref 0.12 +5 26.7 + 2''.1 Ref

☾ AR = ~~16 51 33.44~~ ☾ Dec = ~~−26 20 24.7~~ + 2.1

16 .. 51 33.56 cor for ref − 26 .. 20 .. 22.8

Oct 20 ~~6^h 0^m 28^s.6~~ Camb. m.s.t

6 0 51.9

120/24 10/2 5

Sum = +4.2

Cor for ref = +0.12, motion in −23^s.3 is −0^s.12 Sum = 0^s.00 In Dec ref. +2''.1 motion +2''.1

+7.52 − 2° .. 6'

1858 Oct. 20^d 6^h 00^m .. 28^s.6

Places corrected for Ref & for error in reduction of m.s.t.

☾ AR 16^h .. 51^m .. 33^s.44

Dec −26° .. 20' .. 20''.5

Revised

36 / 420 / 472 / 36 / 11 (13

5 21

1858 Oct 25th Saw Donati's Comet at alt of 3° with Comet Seeker—

Nucleus still bright tail visible in the dense atmosphere of horizon & twilight only 1° long! Sky very clear—

Weisse H, 0^h 196

9^m 0^h 10^m $20^s.9$ +2° 6' 8".0
1 42.0 11 6
ℛ 0 .. 12 02 9 Dec 2 17 14
+ 50.1 − 2 27
$8,9^m$ ℛ 0 · 12 53.0 Dec 2 .. 14 47

Searle, Planet (54 ?)

ℛ 0^h 11^m 28^s Dec +2° 18'.8
0 12 15 - 2 .. 19 5

* 21 5 58.0
* 6 47.6

a 13.5 precedes B at 21 10
B
o 43 [illegible] follows B

Oct 25 1858 Searle's Planet E.C. slow 56.47

AR on S pr. Gov Zero of scale 268 25

				Scale						Red. to. 1st wire	
B 236 =	21	26	1.9	2′ 53″		Eb = 21	21	41.3	45.4	21 21 41.35	
C			27.7	5 32	2′ 39″		22	2.2	6.3	22 2.25	20.90
D			52.0	0 28	5 4		22	31.7	35.7	22 31.70	29.45
B	21	27	59.6	4 22			23	39.1	43.2	23 39.15	
C			20.7	7 03	2 41		24	0.0	4.1	24 0.05	20.90
D			50.0	1 59	5 4		24	29.3	33.3	24 29.25	29.20

B

B	21	29	26.8	4 31			25	6.3	10.4	25 6.35	
C			47.8	7 11	2 40		25	27.3	31.3	25 27.30	20.95
D		30	17.2	2 07	5 4		25	56.7	60.8	25 56.75	29.45
B	21	31	5.8	3 46			26	45.2	49.3	26 45.25	
C			26.3	6 26	2 40		27	5.9	10.0	27 5.95	20.70
D			56.0	1 21	5 5		27	35.4	39.4	27 35.40	29.45

D. B

B	21	32	31.3	3 46			28	10.8	14.7	28 10.75	
C			52.1	6 25	2 39		28	31.6	35.4	28 31.50	20.75
D		33	21.6	1 21	5 4		29	1.0	5.0	29 1.00	29.50

$\Delta\delta = 2' \, 39''.50$ and $5' \, 4''.20$ $\Delta\alpha = 20^s.84$ & $29^s.41$

$Eb = 21^h \; 25^m \; 19^s.81$

Eb slow 56.74

Sid Time = 21 26 16.55

Weisse 196 & 212 Oct 25

0h	10m	20.93s	+2°	6'	8".0	0h	11m	11.12s	+2°	3'	41".1

+3°.072	+20".04	+3.072	+20.03
+0.001	−0.006	0.001	−0.006
3.073	+20.034	3.073	+20.024
33	33		33
9219	60102		60072
9219	60102		60072
101.409 =	+661.122		660.792

	0	10	20.93	+2°	6'	8.0	0	11	11.12	+2	3	41.1
		+1	41.41		+11	1.1		+1	41.41		11	0.8
1858.0	0	12	2.34	+2	17	9.1	0	12	52.53	+2	14	41.9
			+3.94			26.4			+3.94			26.4
	0	12	6.28	+2	17	35.5	0	12	56.47	+2	15	8.3
			+20.84		+2	39.4			−29.41		+5	4.2
Planet's AR	0	12	27.12	+2	20	14.9	0	12	27.06	+2	20	12.5

Sid Time	21	26	16.55	14	14	19.97	
	14	15	6.71			46.74	
	7	11	9.84	14	15	6.71	
−		1	10.64				
Oct 25	7	9	59.20	Camb. m.t.			

Reduction of stars of Oct 25 to apparent place

$f = +42''.95$ $g = +20''.57$ $G = 335^\circ\ 21'\ h + 19''.26$ $H = 55^\circ\ 26'$ $i' = +6''.87$

$\alpha = \underline{3\ \ 1}$ $a = \underline{3\ \ 1}$

$G + \alpha = 338\ \ 22$ $H + \alpha = 58\ \ 27$

$\log g = 1,31323$ 1.31323

$\log.\sin(G+\alpha) = 9.56663n$ $\log\cos$ $\underline{9.96828}$

$\tan\delta = \underline{8.60115}$ $1,28151$

$9,48101n$

$\log h = 1.28466$ $f = +42''.950$ 1.28466 $+19''.121$

$\log.\sin(H+\alpha) = 9.93053$ $\underline{-0,303}$ $\cos$ $9,71870$ $+0,402$

$\sec\delta = \underline{0.00034}$ $+42,647$ $\sin\delta$ $\underline{8.60081}$ $+\underline{6,864}$

1.21553 $+\underline{16.426}$ 9.60417 $+26,387$

$13\,)\,\underline{59,073}$

$+3''.938$ $\cos\delta = 9.99966$

$\log i = \underline{0.83696}$

$0,83662$

$G = 335^\circ\ \ 21'$ $H = 55^\circ\ \ 26'$

$\alpha = \underline{3\ \ 14}$ $\alpha = \underline{3\ \ 14}$

$G+\alpha = 338\ \ 35$ $H+\alpha = 58\ \ 40$

$\log g = 1.31323$ 1.31323

$9.56247n$ $\underline{9.96893}$

$\log\delta$ $\underline{8.59332}$ 1.28216

$9.46902n$

$\log h$ 1.28466 $f = +42.950$ 1.28466 $+19''.150$

9.93154 $\underline{-0.294}$ 9.71602 $+0.392$

$\sec\delta$ $\underline{0.00033}$ $+42.656$ $\sin\delta$ $\underline{8.59298}$ $+\underline{6.865}$

1.21653 $\underline{16.464}$ 9.59366 $+26.407$

$15\,)\,\underline{59.120}$

$+3.941$ $\cos\delta$ 9.99967

i $\underline{0.83696}$

0.83663

20 36 -11° 24' Oct 27th 1858

Comet VII- (Tuttles)

Found in same AR with Ephemeris & in the Dec -11°.. 50' at 7^h PM. or 20' S of Ephem-.

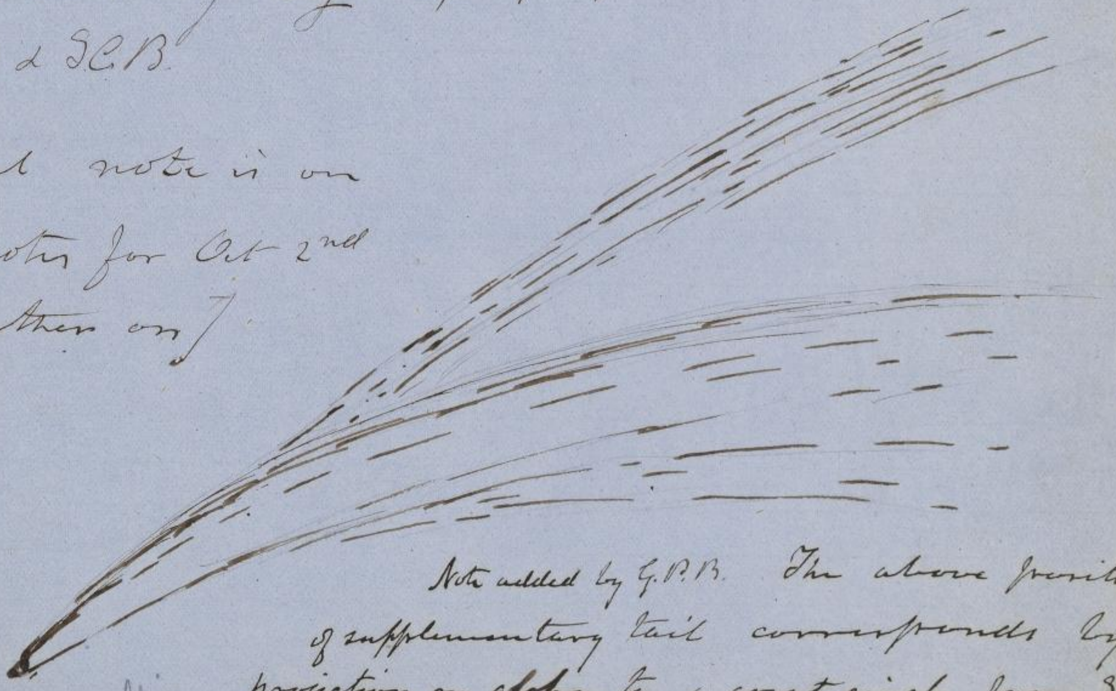
Still pretty bright but evidently much smaller than when last seen Diam 1'

Collection of Memoranda relating to naked eye view of Comet of Donati in Sept. & Oct. 1858.

1858 Sept. 27th R. F. B.

Second tail of Donati's Comet
seen Monday evg. Sept 27th $7^h 45^m$ P.M
by R F B & S.C.B.

[Original note is on
back of notes for Oct 2nd
inserted further on]



Note added by G.P.B. The above position of supplementary tail corresponds by projection on globe to a great circle from Sun through point of junction with main stream

I like this sketch

27th The tail is curved, convex towards the * Cor. Caroli. The star is above, the tail is much better defined on the side next the star, than it is below or on the concave side.

a–t

2 - 7.30 p.m the comets tail reaches to Benetnasch - more than 20 degrees

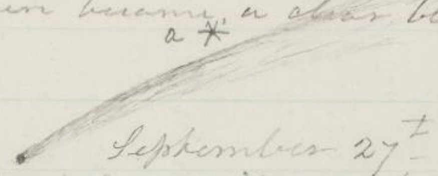
Oct 2nd?

1858 Sept. 27th

Septr 27th. thick fog at sun rise

The Hygrometer this morning indicates, the nearest approach to entire saturation that I have noticed, and yet the dense wet fog - suddenly dispersed, and the atmosphere became a clear blue - light airs from N.E.

a, is Cor. Caroli



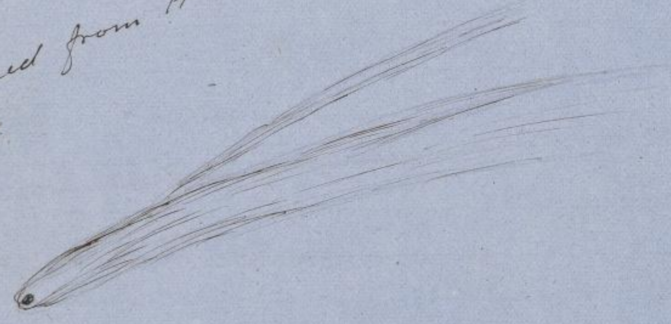
Donati's Comet

September 27th 7h.15m p.m, length of tail to the naked eye about 9° or 10° it is as bright as the great Comet of 1811. and length of tail nearly the same

0° 5° 10°

1858 Sept 28th H. Tuttle noticed (in Dover N.H.) a new Tail to Donati's Comet

Traced from HPT's sketch



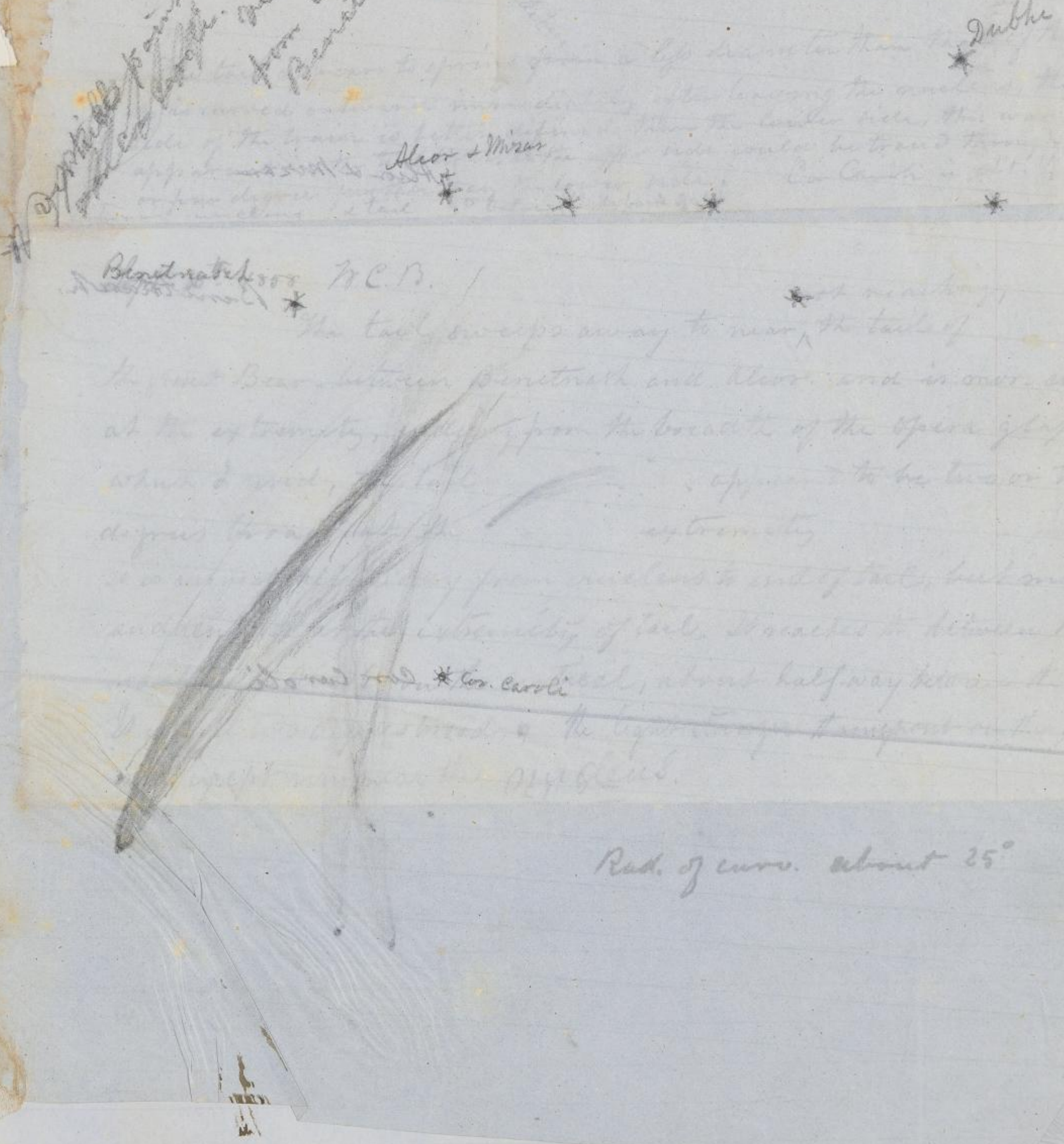
On 27th By R F B. Diagram rad of curvature of tail = 1 1/5 × 13° = 15°
" W C B. " " axis of Tail 32° = 2 1/2 × 10 = 25
Mean = 1 1/2 × 12° = 18°

R F B Breadth of tail at extremity P 1/6 × 12° = 2
W C B 1/8 × 10° = 1 1/4,
Mean = 1/7 × 11 = 1°.35

1858. Septr 30 – 7 hm p.m.
Donati's Comet.
at 7.35 – as seen with
a Fraunhofer Opera glass
by W. C. B.

Stars taken from the Globe

noticed fine spaces from Cor. Caroli through Benetnasch



W. C. B.

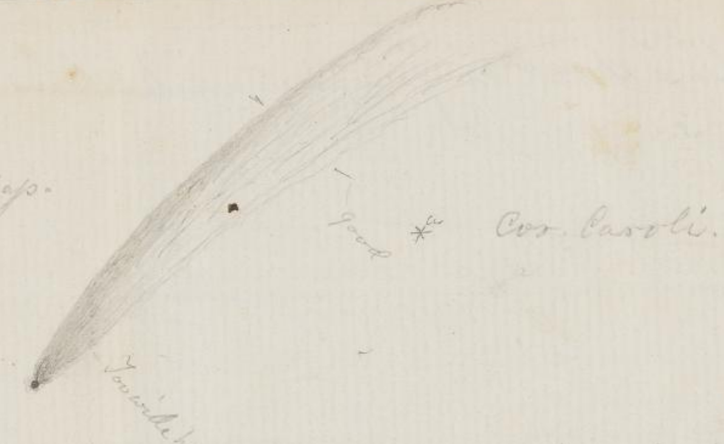
The tail sweeps away to near the tail of the Great Bear between Benetnash and Alcor and is over curved at the extremity, [illegible] from the breadth of the Opera glass which I used, the tail [illegible] appears to be two or three degrees broad at the extremity

It is [illegible] from nucleus to end of tail, but more [illegible] extremity of tail. It reaches to between Benet[illegible] [illegible] about half way between the two [illegible] broad [illegible] the light [illegible] transparent [illegible] nucleus.

Rad. of curve. about 25°

10°
15°
25
18°
2
1 1/4
1°.35

1858. Sept. 30 – 7 h. p.m.
Donati's Comet.
at 7.35 – as seen with
a Fraunhofer Opera Glass.
by W. C. B.



The tail appears to spring from a less diameter than that of the head, it, is curved outward immediately after leaving the nucleus, the upper side of the train is better defined than the lower side, this was very apparent in the twilight, as the upper side could be traced through three or four degrees further than the lower side. Cor Caroli is ab't ½ way between nucleus & tail 5° below (Vide back of slip

tnasch.

Sept 30th 1858 W. C. B.

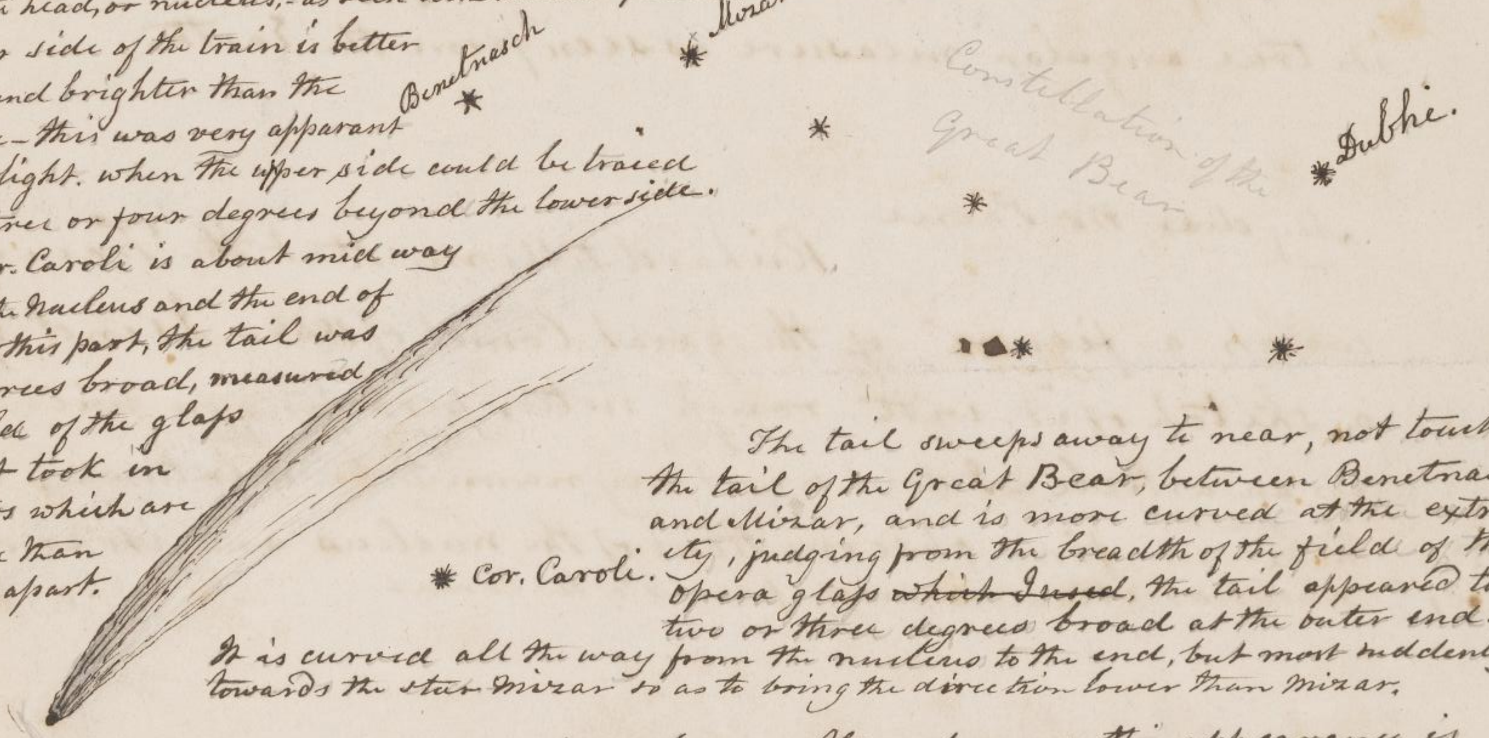
The tail sweeps away to near, not reaching, the tail of the great Bear – between Benetnash and Alior. and is more curved, at the extremity, judging from the breadth of the Opera glass which I used, the tail . appeared to be two or three degrees broad. at the extremity

It is curved all the way from nucleus to end of tail, but more suddenly so at the extremity of tail. It reaches to between Benetnash and Alioth on the vertical, about half-way between the two. It is full two degrees broad, & the light stronger throughout on the upper side except very near the nucleus.

Rad. of curv. about 25°

1858 – The Comet of Donati, as seen at Cambridge, Obs. September 30th 7h. 30m p.m.
within a day of the computed time of Perihelion paſsage.
a Munich Opera-glaſs being used.

at 7 p.m. The tail appears to spring from a leſs diameter than the nucleus, it is curved outward immediately after leaving the head, or nucleus, – as seen with this low power. – The upper side of the train is better defined and brighter than the lower side – this was very apparant in the twilight. when the upper side could be traced through three or four degrees beyond the lower side. The star Cor. Caroli is about mid way between the Nucleus and the end of the tail; At this part, the tail was Two degrees broad, measured by the field of the glaſs which just took in the Pointers which are a little more than five degrees apart.



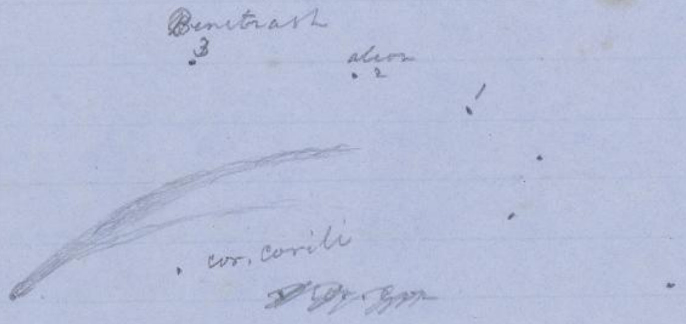
The tail sweeps away to near, not touching, the tail of the Great Bear, between Benetnasch and Mizar, and is more curved at the extremety, judging from the breadth of the field of the Opera glaſs ~~which I used~~, the tail appeared to be two or three degrees broad at the outer end.

It is curved all the way from the nucleus to the end, but most suddenly towards the star Mizar so as to bring the direction lower than Mizar.

At 7h..35m The flashing sometimes extends two or three degrees, this appearance is, probably, occasioned by vapours in our atmosphere. – The tail has the appearance of being more condensed, is brighter, and better defined, on the upper, or front side – as if it were preſsed together by a resisting medium – resembling the action of a strong wind on the foliage of the trees.

1858 Septr. 30th

At 7..35 I can, by side vision see the light of the train shoot as far as alcor. five degrees below it, the sudden curved appearance *may* be owing to the great expansion and the very faint light may be partially interrupted by light clouds



The flashing will extend 2 or 3 degrees the upper or forward side of the tail looks as if it were compressed by a resisting medium (The field of the Opera glass just took in the "Pointers) as the foliage of trees during a strong wind.

within a day of the time of perihelion passage

To the Editor of the Boston Post.

your correspondent who seems to be at a loss when reading an astronomical notice to understand such words as Node and perihelion, has not I fear the right Dictionary "Node" in his head, if he will consult his Dictionary he will find that "Perihelion" is "the short" for That part of a Planets orbit which is nearest the Sun.

Astronomically, Node means the point where the orbit of a planet intersects the plane of the Ecliptic

[illegible] It would be less trouble for him to learn the meaning than for writers to write and Printers to print, a long explanation to every word.

At 7^H..35^m The flashing sometimes extends two or three degrees, – this appearance is, probably, occasioned by vapours in our atmosphere. –
The tail has the appearance of being more condensed, is brighter, and better defined, on the upper, or front side – as if it were pressed together by a resisting medium – resembling the action of a strong wind on the foliage of the trees.

Taking the four sketches we find that the distance of the point in the tail where the tangent to the front edge is parallel to the line Cor. Caroli to Mizar – measured from the nucleus. is

26
17
18.2
26
4.42

0.26 × Dist C. Car – Mizar = 17°
0.28
0.33 ½ wt
0.17 ½ wt

Mean 0.26 × 17° = 4°.4

Donati's Comet
Sept. 30th 1858.

For Oct 2 6	1858.0	a			
BAC	4536	4627	4628	4632	4552
Mag	5.4	6 X	X 5	6	5
AR =	13 28 27	13 44 48	13 44 52	13 45 31	13 31 8
" =	202°7'	206°12'	206°13'	206°23'	202°.47'
Dec	37°55'	35 29	35 22	35.9	37 1

H 25 Dr. 1768 {202°49' / 37 1} 5th mag

ic

ygi u

m

Oct 2d 1858 at 7 P.M. R. F. Bond.

The Nucleus of the Comet is below a line joining C. Caroli & Arcturus; about 2/3 from C. Caroli 1/3 from Arcturus. The tail, first part, near the head is directed to the S. of Benetnasch. The extremity of the tail reaches to Benetnasch, one or two degrees below it between it & Mizar. Opposite C. Caroli the tail is 2 or 3 degrees broad, sweeps away like a feather. Same appearance as on the 30th with regard to light.

.B. at $7^h.40^m$ - by oblique vision the tail is seen beyond Benetnash

Or

Nucleus to Benetnasch = 23°

Rad. of Curve = 30° in this diagram

G.P.B. = 30

" = 35

Mean = 32°

4552 ind that

5 = 5/6 = BAC 4536

1331 8 . 5th = group com-

202°.47' ed of BAC Nos

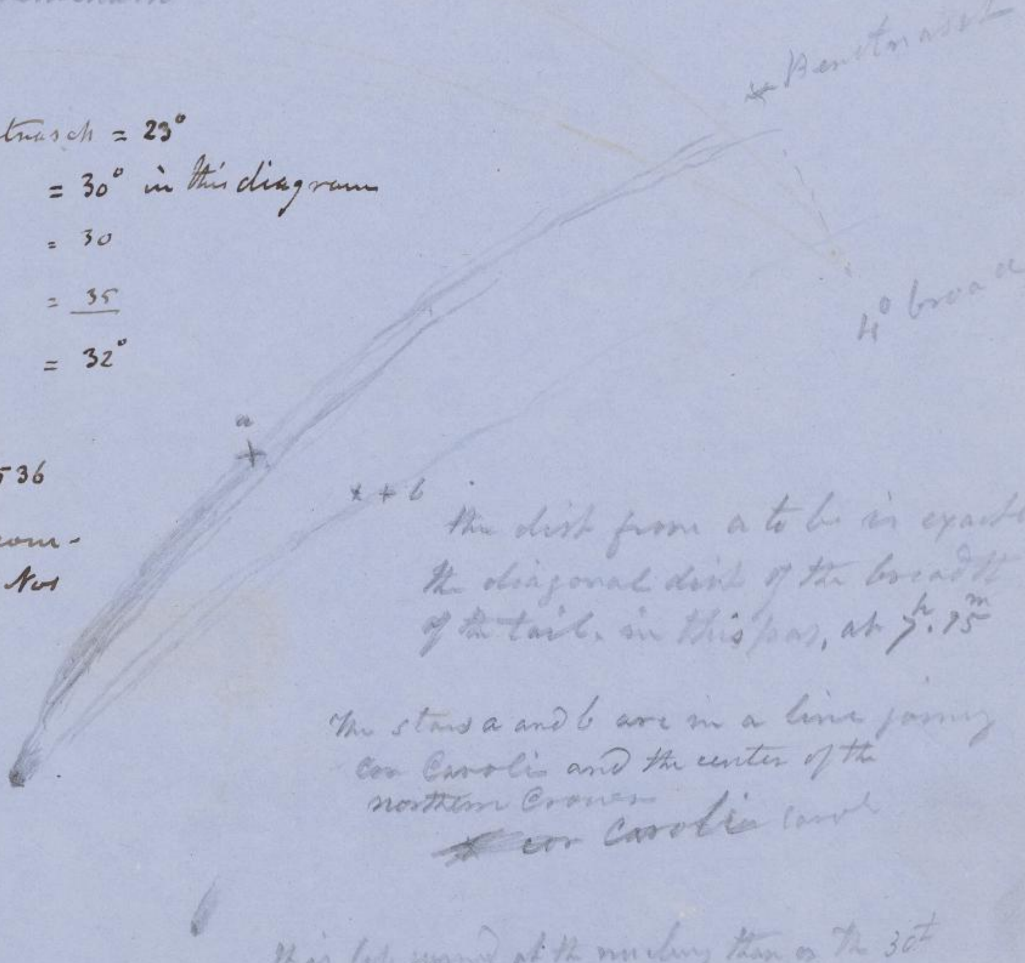
37' 7- 4628 - 4632

) (6) (6)

little star

b is .

AC 4552



the dist from a to b is exactly the diagonal dist of the breadth of the tail, in this pas, at $7^h.15^m$

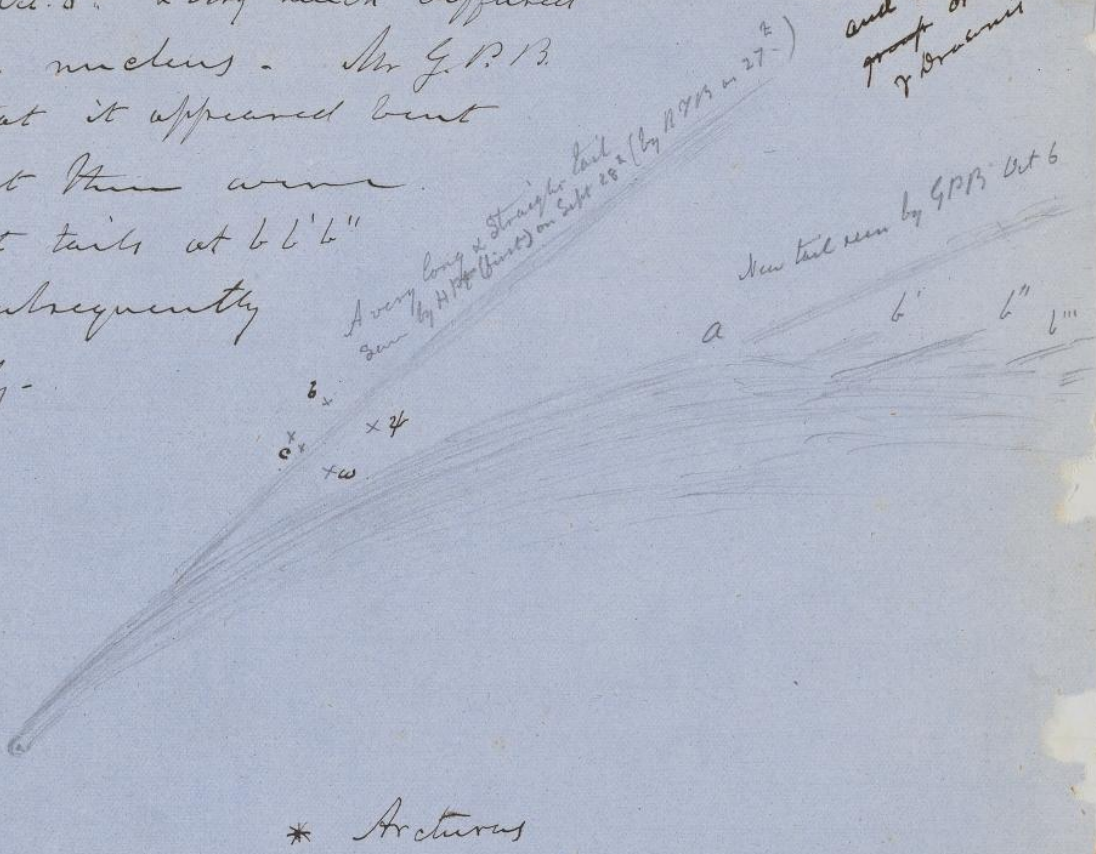
The stars a and b are in a line joining Cor Caroli and the center of the northern Crown

It is less curved at the nucleus than on the 30th

vide remark of WCB in notes Oct 5 at first part of this book.

Oct 6th? 1858 HPT (date found correct)

Tail 50° long Oct. 6th & very much diffused beyond 10° from nucleus. Mr G. P. B. remarked that it appeared bent at a & that there were several short tails at b b' b'' all of these I subsequently saw distinctly.



Reaches to 80 81 and 89 Herculis the group or 3° 9 of γ Draconis

A very long & straight tail seen by HBB (first) on Sept 28th (by RFB on 27th)

New tail seen by GPB Oct 6

The above stars we have recognized with certainly. The sketch as respects course of ray was carefully made - vide other obs Oct 6th

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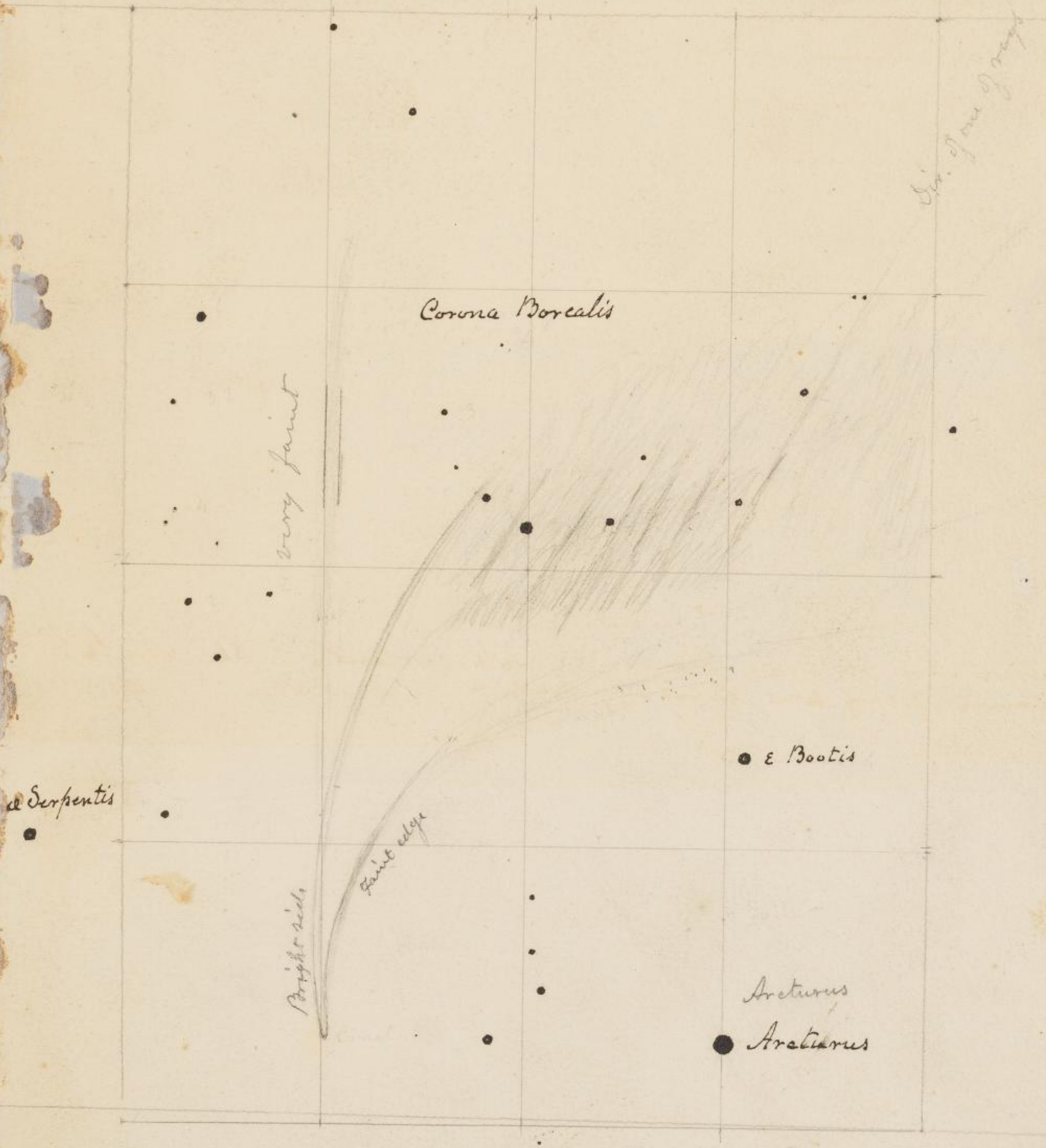
1858. Octo. 5th
at 8h.. 10 to 8h.15 - 8 20 - I measured the length of the tail of Donati's Comet with the Ramsden sextant - the mean was 31°.. 45'' = and by flashes it certainly extended some degrees beyond that

Oct 8

Oct. 8th 1858 Fig.



Oct 8th 7.30 The Comet is situated on a line joining Cor Caroli and Arcturus about half as far beyond Arcturus as Arcturus is distant from Cor Caroli. The radius of curvature of the brighter part of the tail is about 40° — the light I trace steadily seven degrees beyond α Coronae — the tail has evidently increased in length and breadth, at the outer part it must be 7° to 10° broad.

R.F.B. Oct 8th 1858 Donati's Comet

very faint vertically over Mizar

Streaks of light & shade apparently radiating from the Sun

Length of Tail of Comet of Donati from our own determinations - The extremity is taken at furthest trace of light - & the length is measured on arc of a great circle -

1858 Aug 20th Trace of a tail first noticed

" 29 Tail 2° = 14 000 000
Sept 5/6 Curvature noticed
" 8/9 Tail 4° = 16 000 000
" 12 " 6° = 19 000 000
" 17 " [4°] = 10 000 000 (Moonlight)
" 23 " 7° --- = 12 000 000 "
" 24 " 7° --- = 12 000 000
" 25 " 11° --- = 17 000 000 ... 1° broad at extremity "
" 27 " 13° --- = 18 000 000

1 500 000 miles

On 24th tangent at nucleus points to δ Urs. Maj line of curvature to good 28 curve is on a small circle of 38° radius

2 500 000 miles

Sept 28 Tail 19° = 26 000 000 good
2° broad opposite Cor Caroli - " 30 " 22 = 26 000 000 2° to 3° broad good
4° broad Oct 2 " 25 = 27 000.000 good
" 4 " [35] = 34 000 000 Supplementary tail "
" 5 [55] = 53 000 000 " "
5 to 6° broad " 5 [35] = 33 000 000 Main stream "
" 6 50° = 45 000000 "
" 8 55° = 50 000 000 Supplementary tail
" 9 8 45 50 = 43 000 000 Main Stream
10° ? broad. " 10 60 = 51 000 000 " good
" 12 45 =
" 15 15° = 14 000 000

Diameter of nucleus Vide Vol I of Math. Monthly

Breadth of Extremity of tail

Sept 25 1° = 1.500 000
Sept 30 2 - 3 = 3 000 000
Oct 2 4° = 5 000 000
Oct 5 5 - 6 = 5 000 000
" 8 7 - 10 = 7 000 000
" 10 10° = 10 000 000

Notes on the Tail of the Comet of Donati.
From Observations made at the Observatory of Harvard College.
(Copy of a Letter to Prof. B. Peirce.)

Observatory of H. C. Cambridge
Feb. 21st 1859.

Dear Sir,

In reply to your note of this morning, I give below some memoranda from our observations upon the Comet of Donati. Our attention was, of course given specially to the phenomena exhibited in the neighbourhood of the nucleus; at the same time, the position and form of the tail were not entirely neglected. Even an incomplete theory of the tail will be of the greatest advantage to future observers, by directing attention to the collection of data for its confirmation and extension.

We first saw an "incipient tail" on the 20th of August; on the 29th it was 2° long in the Comet-Seeker. The curvature was first noticed on the 5/6th of Sept. 1858. Sept 8/9th "Tail 4° in Comet-Seeker, 2° to naked eye, is from 2' to 3' wide at a distance of 3' from the nucleus, in advance of which, (i.e. "towards the sun,) the nebulosity is very faint beyond 1'."

Sept 12th 7 to 8 P. M. In the Comet-Seeker, tail fully 6° long, and 4° to the naked eye. As on the 8/9th, the following side was the brightest! On the morning 12/13th the tail was, to the eye, 5° or 6° long.

Sept 17th Owing to the moonlight, the length was reduced to 4° with an evident curvature.

Sept. 20th Tail plainly bifurcated &c as in Math. Monthly.

Sept. 23d & 24th as in Monthly, but on the latter date occurs the additional remark that a line from δ Ursæ Majoris drawn tangent to the convex edge of the tail would touch it near the nucleus (probably within half a degree of it,) but the curve of the edge prolonged, would intersect γ Ursæ Majoris. "The tail is 5' or 6' broad, 12' from nucleus."

Sept. 25th At rising of the Moon, the tail reached a little more than half-way from nucleus to γ Ursæ Majoris, strongly curved, and one degree broad at extremity, where it was seen only by glimpses.

Sept 27th Vide Math. Monthly. The convex edge of the tail passed decidedly below Cor Caroli (probably within less than half a degree,) and prolonged, passed near δ Ursæ Majoris.

Sept. 28th The central darker portion of the tail was seen in the comet-seeker for 1° or 2° from the nucleus; it occupied one ~~half~~ twelfth of its breadth. $\frac{1}{12}$

Sept. 29th Near the nucleus the axis of the tail was inclined by an angle of 71° with the direction of diurnal motion.

Sept. 30th. The upper edge of the train could be traced 3° or 4° beyond the lower, in the twilight. Judging from rough diagrams, the radius of curvature of the middle of the convex edge was about 20° or 25°. Produced, it passed below Benetnasch and Mizar. Its breadth near Cor Caroli was 2°. The curvature increased near the extremity.

Oct 2d. At $7^h.15^m$, Camb. m. t. The convex edge of the tail passed through the group of stars B.A.C. 4627–4628–4632, and the concave edge through B.A.C. 4536. The convex edge, passing 1° or 2° or more below Benetnasch, reached by glimpses nearly to Mizar. The tail was 4° broad at its extremity; this position, determined by my father, should be a very good one.

The axis of the tail was inclined, at the nucleus, to the direction of diurnal motion by an angle of 64°.53'. The angle between the tangents to the outer margin of the tail (i.e. where its brightness pretty suddenly diminished,) was 31° at a distance of 6' or 8' from the nucleus. The supplementary tail reached nearly as far as λ ~~Urs. Maj.~~ Bootis. It was directed to a point 1° or 2° *above* it.

On the 4th Oct. another secondary tail was suspected, (seen plainly on the 5th.)

Oct 5th. The curvature of the supplementary rays could be perceived.

Oct 6th. Fig. 19 of the Math. Monthly gives the position of the tail among the stars tolerably well; it reached to α Draconis; the long *ray* extended to 80, 84 & 85 Herculis.

Oct 8th. Fig. 20 is from a drawing by Mr Fette. I did not feel entirely satisfied with the place of the ray.

Oct 9th. The two supplementary rays were seen; the outermost was slightly curved.

Oct. 10th. The tangent to the convex edge of the tail within a few degrees of the nucleus points to α Aquilæ. The tail could be traced to a line from α Lyræ to β Urs. Min.

Oct. 11th. The preceding side of the train had become scarcely as bright as the following side.

Oct. 12th. Tail reached to within 12° of α Lyræ.

Oct. 18th. The tail near the nucleus was inclined by about 10° with the direction of diurnal motion, and on the 19th 5° more; it still retained its curvature. It seemed to be more compressed towards the axis than it had been. At 12' from the nucleus it was 5' broad, and at 15' the edges were nearly parallel; its breadth at 1° from the nucleus was 6'. There was no perceptible difference in the brightness of the two sides.

Oct. 25th. Comet was last seen at an altitude of 3°, tail 1° long, sky perfectly clear.

Truly yours
(signed) G. P. Bond

Prof. B. Peirce

Comet 1858 VII VII (Tuttles)

					Comp						α				δ		
							m s		′ ″		h m s				° ′ ″		
Oct	13.	8. 4. 53. 8.			3	Weisse XXI. 692	+4. 16. 81	−	2. 48 29		21. 33. 44. 86			+	7. 12. 33. 27		
	16	7. 30 15. 4			4	Σ 2585. C.G	−0 2 12	−	8. 13 50		21 14 36 19			+	1. 17 35. 89		
	18	7. 59 54. 7			8	2477. Lamont	− 0. 4 06	−	9. 14. 02		21 4 11. 68			−	2. 1. 41 31		
	20	8. 6 10. 0			4	Weisse XX 1475	− 2 37. 90	+	4. 16 06		20 55 30 42			−	4 59 34. 68		
	23	7 42 35. 3			3	1082	+ 2. 27 71	−	18 44 55		20 44 59. 54			−	8. 19 21. 02		

Mean Places of Comparison Stars 1860.0

	Mag	α	δ	
		h m s	° ′ ″	
Weisse XXI 692	8	21. 29. 30. 73	+ 7. 15. 34. 79	Weisse Catalogue
Σ! 2555. Cat G	8.	21. 14 41 15	+ 1. 26 2. 45	Struve Cat. Gener
2477. Lamont	9	21 4. 18. 70	− 1. 52 10. 72	Lamonts Zones
Weisse XX. 1475	8	20 58 11. 37	− 4 55 2 82	Weisse Cat
1082	9	20 42 35 07	− 8 0 19 48	

National Observatory
Washington
Oct 21 — 58
M. F. Maury

There are observations of the 9. 14. and 19. but the stars are undetermined

Memoranda relating to the Comet of Donati (The Great Comet of 1858) written in October

Its first discovery in America was by H. P. Tuttle June 28th It had then as always after a remarkably bright nucleus & around a strongly condensed nebulosity. I have never seen a Comet which presented so much the appearance of a solid centre -

It is remarkable that when nearest the earth the nucleus was ~~no~~ scarcely larger in apparent diameter than when further off although surrounded by brilliant envelopes which at a greater distance might appear to form part of the nucleus. or at least form a strong central condensation.

The successive throwing off of the bright envelopes on the side next the Sun if a common law of development in Comets must have the effect of occasioning error in estimating the centre of gravity or of the true nucleus

With this Comet an observer with a very small telescope or with none at all would be pretty sure to place the centre between the true nucleus & the Sun.

The successive enlargement of the nucleus & its increase in brightness just before casting off a new envelope and its sudden diminution in both respects at that period were noticeable.

We were favoured with unusually fine skies during the brightest part of the Comets apparition With the exception of the annoyance of visitors the opportunities of observation were very good.

Expecting the subsequent brilliant display I often sought for traces of first formation of the tail in July & Aug. It was first noticed Aug 20th. I remember it appeared as a diffused faint train, not a narrow bright emission from the side of the nucleus opposite to the Sun as they are sometimes developed In fact the dark stripe running quite up point blank to the nucleus has from Sept 20 always been a characteristic feature. Another has been the

(Over one page

[For the Boston Daily Advertiser.

The Great Comet of 1858.

There are several distinctive features in the imposing spectacle of the great comet now attracting universal attention, which can scarcely have escaped the notice of even the most casual observer. We have first the majestic sweep of the train; not projected in a straight line from the head or nucleus, but in a curve of stupendous proportions, reaching far up towards the Polar circle. Another peculiarity is the regular contour of its upper or convex side; the lower side, on the contrary, has an ill-defined and uncertain outline. The upper edge is also plainly the brightest through its whole extent. The star-like concentration of light in the head, and its gradual diminution, until it is lost in a diffused light on the dark back ground of the sky, are other interesting phenomena. These are all prominent features, scarcely requiring an effort of attention to recognize them.

There are others not so strongly marked, but yet easily detected by a good eye without telescopic aid. There is, for instance, a decided but very narrow dark streak near the middle of the brightest part of the train, leading quite up to the nucleus.

Again by careful watching, one or more supplementary tails or faint rays can be seen diverging near the nucleus from the main stream of light on its upper or convex side, and extending for fifty or sixty degrees. These have a considerably less curvature than the principal tail, and diverge a long distance from it at their extremity.

When it is considered that the field of view of a powerful telescope is necessarily limited to an area of less than a thousandth part of the portion of the heavens occupied by the comet, it will at once appear why its aspect, through such an instrument, commonly disappoints the expectation of unpractised observers. The grand characteristics above enumerated are, for the most part lost, and they see only a star shining through dim envelopes of haze, and encircled with misty halos. The astronomer, however, will be far from sharing in the general disappointment.

Since the 28th of June, the present comet has been constantly watched with the Great Refractor of the Observatory of Harvard College. The extraordinary phenomena developed during this period, in the nucleus, and surrounding region, have scarcely been paralleled in astronomical history.

For many weeks succeeding its first discovery, the Comet exhibited an appearance not uncommon in bodies of its class, excepting the single fact of its being visible at all from the immense distance of more than two hundred millions of miles at which it was placed from the Earth. It was a mass of faint diffused nebulosity surrounding a starlike centre, far beyond the reach of any but superior telescopic vision.

In perfect accordance with its predicted course it continued to increase in brightness, and on the 19th of July it already surpassed the average of telescopic Comets; but the first traces of a tail were not noticed until the 20th of August. On the 29th it was visible to the naked eye, and a train of two degrees in length could be discerned in the Comet seeker. The intense central light at this time was about five thousand miles in diameter.

The curvature of the tail was noticed on the morning of the 6th of September. It is highly probable from this observation, that the plane of curvature does not lie in the plane of the orbit, as has commonly been supposed, for had this been the case, from the position of the earth at that date, being close to the line of nodes, the tail ought to have been seen straight.

On the 20th the first of a series of extraordinary phenomena manifested itself in the region contiguous to the nucleus. A crescent shaped outline, obscure and very narrow, was interposed, like a screen, between the nucleus and the sun; within this, instead of a softly blended nebulous light indicative of an undisturbed condition of equilibrium, the fiery mass was in a state of apparent commotion, as though upheaved by the action of violent internal forces. On the 23d two dark outlines were traced more than half way round the nucleus, and on the next evening still another. Each of these was evidently the outer boundary of a luminous envelope, the brightest being that nearest the nucleus.

On the 25th four envelopes were seen, and others have subsequently been formed, almost under the eye of the observer, their motion of projection from the nucleus being evident from night to night. The rapidity of their formation, and the enormous extent to which they are ultimately expanded, are phenomena extremely difficult to explain. The scene of chaotic confusion presented within the inmost envelope can only be accounted for as the result of sudden and violent disruptions from the central body, projecting immense volumes of its luminous substance towards the sun, which by some unknown law is in turn repelled by that body, and driven off to the distant regions of space, forming the vast train of light so characteristic of these mysterious bodies.

It is probable that the Comet has now passed its maximum of brightness, although the length of the tail may be on the increase for some days to come. Whether we are yet to witness the inverse operation of the reconstruction of the nucleus by the subsidence of the envelopes, and of the material of the tail, upon it, or whether it is incapable of restoration to its original condition, are interesting subjects of speculation; the latter however, would seem to be the most likely of the two alternatives.

Harvard College Observatory, Oct. 8, 1858.

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deficiency of diffused light $2'$ or $3'$ in advance of the nucleus (towards the Sun) remarkable in so large a Comet.

The increase of diffused light in the central regions of the tail (in & near its axis) was noticed after the 1st week of October Before this the axis had been dark, & the free side of tail & envelopes by far the faintest

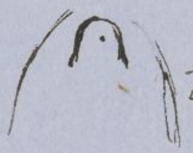
As the Comet in July & Aug just skirted the west horizon in the evg twilight we did not often examine its physical aspect & may have lost the view of the first envelope formation but from the indecision of the outline of that first seen & their rapid evolution subsequently. I think we saw them in a pretty early stage.

I frequently looked for but never saw any tail or ray of light directed towards the Sun.

We were in the practice of commencing observations as soon as the comet could be seen in the early twilight say 30^m after sunset.

The general form of the outline of the envelopes was retained throughout. When best seen the asymptotes (assuming their hyperbolic outlines) were nearer to parallelism with each other than ~~those~~ tangents to the edges of the tail

Although the envelopes soon after their projection were best defined at their vertex. it was noticed that ultimately their outlines ~~were~~ at that point were the first to fade out.



Ephemeris of Mr. Schubert's asteroid.

	α	δ	0h Berlin. log Δ	log r.
1858 Oct 1	7 1m.8	+15° 22′	0.4524	0.4606
5	5.0	15 6		
9	7.8	14 50	0.4367	0.4623
13	10.4	14 34		
17	12.6	14 18	0.4203	0.4638
21	14.5	14 2		
25	16.1	13 46	0.4034	0.4654
29	17.3	13 31		
Nov 2	18.1	13 16	0.3864	0.4668
6	18.6	13 2		
10	18.6	12 48	0.3696	0.4682
14	18.3	12 36		
18	17.5	12 24	0.3534	0.4696
22	16.3	12 13		
26	14.7	12 4	0.3385	0.4708
30	7 12.7	11 55		
~~Dec 4~~		° ′ ″	~~0.3~~	
Dec 4	7 10 18.3	+11 48 15	0.3257	0.4720
6	8 58.7	45 19		
8	7 34.1	42 46		
10	6 4.6	40 34		
12	4 30.5	38 45	0.3155	0.4732
14	2 52.3	37 19		
16	1 10.1	36 15		
18	6 59 24.4	35 34		
20	57 35.7	35 16	0.3086	0.4743
22	55 44.2	35 20		
24	53 50.5	35 47		
26	51 54.8	36 36		
28	49 57.8	37 47	0.3056	0.4753
30	47 55.8	39 20		
1859 Jan 1	46 1.5	41 14		
3	44 3.3	43 28		
5	42 5.7	46 3	0.3066	0.4763
7	40 9.2	48 57		
9	38 14.3	52 10		
11	36 21.4	55 41		
13	34 31.0	59 28	0.3118	0.4772
15	32 43.6	12 3 31		
17	30 55.6	7 49		
19	29 19.3	12 21		
21	27 43.0	17 7	0.3207	0.4781
23	26 11.1	22 5		
25	24 43.9	27 14		
27	23 21.6	32 33		
29	22 4.4	38 2	0.3329	0.4789
31	20 52.6	43 40		
Feb 2	19 46.5	49 25		
4	18 46.1	55 17		
6	17 51.7	13 1 15	0.3477	0.4796
8	17 3.3	7 18	~~0.3~~	
10	16 20.9	13 24		
12	15 44.6	19 33		
14	15 14.5	25 45	0.3644	0.4803
16	14 50.5	31 58		
18	14 32.6	38 11		
20	14 20.8	44 24		
22	14 15.0	50 37	0.3823	0.4809
24	14 15.3	56 48		
26	14 21.5	14 2 56		
28	14 33.2	9 1		
Mar 2	6 14 50.7	+14 15 3	0.4008	0.4815

Ephemeris of Comet - VII 5

	Wash. 0h		Dist. Earth
Oct. 5	23h 7m.7	+31°.0	0.49
7	22 40	24.7	
9	22 16	18.9	
11	21 56	13.7	0.56
13	21 39	9.0	
15	21 25	4.8	
17	21 14	+1.0	0.69
19	21 4	-2.2	
21	20 55.5	4.9	
23	20 49	-7.2	0.85
25	20 43	9.3	
27	20 38	11.1	
29	20 33	12.5	1.04

Safford.

Ephemeris of Comet. V.

1858.	Wash. m.t.	App α			App δ		
Sept.	29.5	$13^h\ 3^m\ 43^s$		+	$30°$	$52'.8$	
..	30.5	13 15 33			29	29.2	1..36
Oct	1.5	13 25 16	11..38		27	53.0	1 54
	2.5	13 36 54	11 58		25	58.8	2 37
	3.5	13 48 52	12 08		23	21.4	1 54
	4.5	14 1 0	12 25		21	27.2	2 38
	5.5	14 13 25	12 22		18	49.7	2 59
	6.5	14 25 47			15	50.1	3.25
	7.5	14 38 17			12	24.6	3 00
	8.5	14 50 49			9	25.1	
	9.5	15 3 29			5	59.5	
	10.5	15 15 36		+	2	43.5	
	11.5	15 27 17		−	0	58.6	
	12.5	15 38 48			4	15.5	
	13.5	15 49 57			7	56.7	
	14.5	16 0 38			10	50.9	
	15.5	16 10 44			13	51.0	
	16.5	16 20 40			16	48.6	
	17.5	16 29 28		−	19	45.4	