KG
11365
.500

KG 11365.500

~~140°~~

~~M.P. No.~~ ~~D.M. No.~~

T = Sid. Time,
R.A. = Right Ascension.

For Parallax.

H.A. = Hour Angle.
T − R.A. = H.A.

For all Hour Angles from 0^h to 12^h East of the meridian, give the par. the negative sign in R.A.

For all Hour Angles from 0^h to 12^h west of the meridian, give the parallax the positive sign in R.A.

For sign in R.A.

If the H.A. is − the parallax factor will be −.
if +, the factor will be +

For sign in Dec.

$$\frac{\tan\varphi'}{\cos t} = \tan\psi \qquad \frac{\sin(\psi - \delta)}{\sin\psi} = ?\ + \text{or} - .$$

HARVARD
UNIVERSITY
LIBRARY
MAY 8 1956

+9.216 n9.216

To convert Log. p. Δ. from basis 0.″57 to 0.″55, add the constant log. 0.0139^5

Comets of 1882

Parallax Computations of Comets.
1882 – 1887.

Mar. 19.

H. A. Dec.

–6h 14 +33°.4

Log 0.505 = 9.7034 ∴ Log 5.02 = 0.7007
–9.7175 +0.7148

Mar. 19

H. a. Dec.

–1h 8 +33.5

Log. 0.169 = 9.1732 ∴ 1.45 = 0.1614
–9.1873 +0.1755

Mar. 22

H a. Dec.

–1 13 +35.0

Log. 0.162 = 9.2095 1.27 = 0.1038
–9.2236 +0.1179

Mar. 22

H a. Dec.

–1 0 +35.2

Log. 0.134 = 9.1271 1.18 = 0.0719
–9.1412 +0.0860

Mar. 23

H. a. Dec.

+35.6 =

Mar. 24

H. a. Dec.

+36.2 =

Comet Wells

Mar. 25

H.a. Dec.

-5 51 +36.8

Log. 0.528 = 9.7226 4.46 = 0.6493

-9.7367 +0.6634

Mar. 28

H.a. Dec.

-5 5 +38.6

Log. 0.525 = 9.7202 3.55 = 0.5502

-9.7343 +0.5643

Mar. 29

H.a. Dec.

-5 4 +39.3

Log. 0.530 = 9.7243 3.48 = 0.5416

-9.7384 +0.5557

Mar. 30

H.a. Dec.

-5 29 +39.9

Log. 0.~~4~~548 = 9.7388 3.86 = 0.5866

-9.7529 +0.6007

Mar. 31

H.a. Dec.

-5 50 +40.6

Log. 0.556 = 9.7451 4.19 = 0.6222

-9.7592 +0.6363

Apr. 3

H.a. Dec.

-5 48 +42.7

Log. 0.576 = 9.7604 3.99 = 0.6010

-9.7745 +0.6151

1882phue.proj..502.

Comet Wells

apr. 5

H.a. Dec.

-5 12 +44.2 ~~323~~

Log. 0.575 = 9.7597 3.23 = 0.5092

-9.7738 +0.5233

---

apr. 8

H.a. Dec.

-4 55 +46.6 ~~266~~

Log. 0.591 = 9.7716 2.66 = 0.4249

-9.7857 +0.4390

---

apr. 12

H.a. Dec.

-5 26 +50.0

Log. 0.651 = 9.8136 2.97 = 0.4728

-9.8277 +0.4869

---

apr. 17

H.a. Dec.

-4 33 +54.7

Log. 0.682 = 9.8338 1.41 = 0.1492

-9.8479 +0.1633

---

apr. 18

H.a. Dec.

-5 23 +55.6

Log 0.739 = 9.8686 2.42 = 0.3838

-9.8827 +0.3979

---

apr. 20

H.a. Dec.

-4 17 +57.6

Log. 0.712 = 9.8525 0.76 = 9.8808

~~0.712~~ -9.8666 +9.8949

Comet Wells

Apr. 22

H.A. Dec.

-3 47 +59.7

Log. 0.694 = 9.8414   0.15 = 9.1761

-9.8555   -9.1902

Apr. 25

H.A Dec.

-5 55 +62.8

Log. 0.911 = 9.9595   2.52 = 0.4014

-9.9736   +0.4155

June 22

H.A. Dec

+6 Log. +14.4 =

June 26

H.A Dec.

+6 37 +13.3

Log. 0.429 = 9.6325   5.83 = 0.7657

+9.6466   +0.7798

June 28

H.A Dec.

+6 33 +12.7

Log 0.429 = 9.6325   5.81 = 0.7642

~~0.429~~ +9.6466   +0.7783

July 6

H.A. Dec.

+5 58 +10.5

Log. 0. 430 = 9.6335   5.65 = 0.7520

+9.6476   +0.7661

Comets Wells & Cruls

July 17

H.A. Dec.

+5 59 +10.2

Log. 0.430 = 9.6335 5.66 = 0.7528 .

+9.6476- +0.7669

Sept 30 Comet Cruls

H.A. Dec.

-4 55 -7°.0

Log 0.409 = 9.6117 5.93 = 0.7730

-9.6258 +0.7871

Oct 1

H.A. Dec.

-4 48 -7.5

Log. 0.407 = 9.6100 5.96 = 0.7752

∓ 9.6241 +0.7893

Oct 3.

H.A. Dec.

-4 32 -8.4

Log. 0.396 = 9.5977 6.~~16~~ 02 = 0.7796

-9.6118 +0.7937

Oct. 9

H.A. Dec.

-4 20 -11.1

0.391 = 9.5922 61.6 = 0.7896

-9.6063 +0.8037

Oct. 12

H.A. Dec.

-12.4

Comet Curls

Oct 14

H.a. Dec.

~~3~~h ~~23~~ -13.2

~~6~~ ~~32~~.

-3 48 0.365 = 9.5623 6.39 = 0.8055

-9.5764 +08196

Oct 19

H.a. Dec.

-2 42 -15.2

Log. 0.284 = 9.4533 6.82 = 0.8338

-9.4674 +0.8479

Oct 20

H.a. Dec.

6 ~~23~~

-3 57 + ~~6~~ ~~14~~ -17.1

Log. 0.380 = 9.5798 6.45 = 0.8096

-9.5939 +0.8237

Oct 24

H.a. Dec.

-3 16 ~~6~~ ~~50~~ ~~Log.~~ -17.1 =

0.334 = 9.5238 6.72 = 0.8274

-9.5379 +0.8415

Oct 30

H.a. Dec.

-2 46 ~~7~~ ~~2~~ ~~Log~~ ~~=~~ -19.3 =

0.297 = 9.4728 6.99 = 0.8445

-9.4869 +0.8586

Oct. 30

H.a. Dec.

Log. -19.3 =

Comet Auls

Dec: 29

-0 26 H.a. ~~12~~ ~~18~~ Dec.
~~6 54~~ ~~+5 3~~ -29.8

~~Log. 0.473~~ = ~~9.6749~~ 0.056 = 8.7482~~7~~ 8.12 = 0.9096
~~9.6890~~ - 8.7623 +0.9237

~~Dec. 29~~

- 0 25
6 ~~56~~ H.a. Dec.
~~+5 3~~ -29.8

~~Log. 0.473~~ = ~~9.6749~~ 0.053 = 8.7243 8.12 = 0.9096
~~9.6890~~ - 87384 +0.9237

Jan. 12 1883

+1 32 H.a. Dec.
~~8 15~~ ~~+6 6~~ ~~-27.2~~

~~Log. 0.475~~ = ~~9.6767~~ 0.186 = 9.2695 7.79 = 0.8915
~~9.6908~~ + 9.2836 +0.9056

Jan 12

+1 33
~~8 15~~ H.a. Dec.
~~+6 6~~ ~~-27.0~~

~~Log. 0.474~~ = ~~9.6758~~ 0.188 = 9.2742 7.77 = 0.8904
~~9.6899~~ + 9.2883 +0.9045

Jan. 15

+1 8 H.a. Dec.
~~7 45~~ ~~+5 29~~ ~~-26.4~~

~~Log. 0.469~~ = ~~9.6712~~ 0.139 = 9.1430 7.85 = 0.8949
~~9.6853~~ + 9.1571 +0.9090

Jan. 23

+1^h 20 H.a. Dec.
~~7 42~~ ~~+5 9~~ ~~-24.3~~

~~Log. 0.452~~ = ~~9.6551~~ 0.158 = 9.1987 7.70 = 0.8865
~~0.452~~ 9.~~6692~~ + 9.2128 +0.9006

Comet Wells

Feb. 1

+0 36 H.a. Dec.
~~6 45~~ + ~~3 50~~ − ~~21.9~~
~~Log. 0.384~~ = ~~9.5843~~ ~~9.5984~~ 0.071 = 8.8513 +8.8654 7.68
+ 0.8854 0.8995

Feb. 5

+2 46
~~8 51~~ H.a. Dec.
~~+5 44~~ − ~~20.8~~
~~Log. 0.451~~ = ~~9.6542~~ ~~9.6683~~ 0.300 = 9.4771 +9.4912 7.06
+ 0.8488 0.8629

Feb. 5

+2 46 H.a. Dec.
~~8 51~~ ~~+5 44~~ − ~~20.8~~
Log. 0.451 = 9.6542 9.6683 0.300 = 9.4771 +9.4912 7.06
+ 0.8488 0.8629

Feb. 7

~~0~~
+3 26 H.a. Dec.
~~9~~ 29 ~~+6 16~~ − ~~20.3~~
Log. 0.450 = ~~9.6532~~ 9.6673 0.353 = 9.5478 +9.5619 6.76
+ 0.8300 0.8441

Feb. 17

+3 26 H.a. Dec.
~~9~~ 29 ~~+6 16~~ ~~−20.3~~
~~Log. 0.450~~ = ~~9.6532~~ ~~9.6673~~ 0.353 = 9.5478 +9.5619 6.76
+ 0.8300 0.8441

Feb. 13

+2 40 H.a. Dec.
9 38 +3 40 ~~−18.7~~
~~9~~
~~Log. 0.365~~ = ~~9.5623~~ ~~9.5764~~ 0.365 = 9.5623 +9.5764 4.28
+ 0.6314 0.6455

Comet Wells

Mar. 7
Ha. Dec.
~~-12.7~~

Mar. 13
Ha. Dec.
-12.7

Mar. 13
Ha. Dec.
-12.7

Apr. 2
Ha. Dec.
- 9.6

Apr. 2
Ha. Dec.
-9.6

Apr. 6
H. a. Dec.
-9,1

Comet Wells & Barnard, 1882

Apr. 6
H.A.   Dec.
Log. −9.1

Sept 14, 1882   Comet Barnard
H.A.   Dec.
−4 51   +16.1
Log. 0.420 = 9.6232   5.01 = 0.6998
−9.6373   +0.7139

Sept. 15
H.A.   Dec.
−3 47   +15.2
Log. 0.366 = 9.5635   4.64 = 0.6665
−9.5776   +0.6806

Sept. 16
H.A.   Dec.
−4 10   +14.4
4.76
Log. 0.388 = 9.5888   ~~6.30~~ = 0.6776
−9.6029   +0.6917

Sept. 18
H.A.   Dec.
−4 39   +12.8
Log. 0.407 = 9.6096   5.12 = 0.7093
~~0.407~~ −9.6237   +0.7234

Comets of 1883

Comet Brooks-Swift

Feb. 24, 1883

H.a. Dec.

+6 25 +30.5

Log 0.488 = 9.6884 5.31 = 0.7251
+9.7025 +0.7392

Feb. 26.

H.a Dec.

+3 23 +31.2

0.383 = 9.5832 2.84 = 0.4533
+9.5973 +0.4674

Feb. 27

~~6^h~~ ~~9~~ Dec.

−17 27 +31.5

Feb. 27

Dec.

+31.5

Feb. 28

H. a. Dec.

7 50
~~13~~ ~~55~~ +31.7

Log 0.441 = 9.6444 6.43 = 0.8082
9.6585 +0.8223

Mar. 1

17^h 3 Dec.

+31.7

Comet Brooks Swift

Mar. 2

Dec.

+32.0

Mar. 4

H.a.	Dec.
+5 32	+32.0

Log 0.495 = 9.6946   4.48 = 0.6513
+9.7087   +0.6654

Mar. 5

H. a.	Dec.
+5 44	+32.0

Log 0.497 = 9.6964   4.64 = 0.6665
+9.7105   +0.6806

Mar. 8

Dec.

+31.7

Mar. 16

H.a.	Dec.
+5 9	+28.8

Log. 0.469 = 9.6712   4.37 = 0.6405
+9.6853   +0.6546

Mar. 25

H. a.	Dec.
+5 0	+24.~~4~~3

Log 0.448 = 9.6513   4.57 = 0.6599
+9.6654   0.6740

Comet Brooks Swift & Barnard (884)

Mar. 26

H.a.	Dec.
+4 24	+23.8

Log. 0.422 = 9.6253　　4.23 = 0.6263
+9.6394　　+0.6404

Apr. 25

H.a.	Dec.
10^h 54 ~~+1 28~~	+11.1

July 25, 1884 = Barnard 1884

H.a.	Dec
+1 28	-37.3

Log. 0.200 = 9.3010　　8.14 = 0.9106
+9.3151　　+0.9247

July 28, 1884

H.a.	Dec.
+1 49	-37.3

Log 0.244 = 9.3874　　7.99 = 0.9026
+9.4015　　+0.9167

Aug. 14, 1884

H.a.	Dec.
+1 23	-36.5

Log 0.186 = 9.2695　　8.15 = 0.9112
+9.2836　　+0.9253

Aug 14, 1884

H.a.	Dec.
+1 50	-36.6

Log. 0.243 = 9.3856　　7.97 = 0.9015
+9.3997　　+0.9156

Barnard (1884) & Wolff.

Aug. 15, 1884
H.a. Dec.
+1 31 -36.4
Log. 0.203 = 9.3075 8.10 = 0.9085
+9.3216 +0.9226

Aug. 16
H.a. Dec.
+1 2 $-36.\overset{3}{5}$
Log. 0.139 = 9.1430 8.25 = 0.9164
+9.1571 +0.9305

Sept 12
H.a. Dec.
+0 13 -30.5
Log. 0.028 = 8.4472 8.17 = 0.9122
+8.4613 +0.9263

Sept 13
H.a. Dec. ~~30.0~~
+0 25 -30.0
Log 0.053 = 8.7243 8.14 = 0.9106
+8.7384 +0.9247

Sept. 21, 1884 Comet Wolff.
H.a. Dec.
+0 41 +21.9
Log 0.081 = 8.9085 3.01 = 0.4786
+8.9226 +0.4927

Sept. 22,
H.a. Dec.
-1^h 16 +21.5
Log. 0.147 = 9.1673 3.16 = 0.4997
-9.1814 +0.5138

Comet Wolff

Sept. 26, 1884

H. a. Dec.

+1 12 +19.6

Log 0.139 = 9.1430 3.41 = 0.5328

+9.1571 +0.5469

Sept 29.

H. a Dec.

−0 10 +18.2

Log. 0.019 = 8.2788 3.49 = 0.5428

−8.2929 +0.5569

Oct. 1

H. a. Dec.

+0 12 +17.2 =

0.023 = 8.36173 3.62 = 0.5587

+8.3758 +0.5728

Oct. 6

H. a Dec.

+0 8 +14.8

Log. 0.015 = 8.1761 3.95 = 0.5966

+8.1902 +0.6107

Oct 11

H. a. Dec.

+3 38 +12.3

Log. 0.352 = 9.5465 4.84 = 0.6848

+9.5606 +0.6989

Oct. 13

H. a. Dec.

+0 45 +11.4

0.084 = 8.9243 4.40 = 0.6434

+8.9384 +0.6575

Comets Wolff & Brooks 1885 V

Oct 18, 1884
H.a. Dec.
+0 43 +9.0
Log 0.080 = 8.9031 4.70 = 0.6721
+8.9172 +0.6862

Nov. 6, 1884
H.a. Dec.
+1 36 +1.3
Log. 0.172 = 9.2355 5.62 = 0.7497
+9.2496 +0.7638

Dec. 28, 1885 Comet Brooks 1885 V
H.a. Dec.
5 7 +4.5
0.413 = 9.6160 5.62 = 0.7497
9.6301 +0.7638

Dec. 30,
H.a. Dec.
5 12 +5.5
0.416 = 9.6191 5.60 = 0.7482
9.6332 +0.7523

Dec 30
H.a. Dec.
5 +5.5
~~0.4~~

Jan 1, 1886
H.a. Dec.
5 4 +6.4
0.413 = 9.6160 5.55 = 0.7443
96301 +0.7584

Comets Brooks 1885 V & Brooks 1885 III

Jan. 1 1886
H.a. Dec.
5 15 +6.4
0.417 = 9.6201 5.59 = 0.7474
9.6342 +0.7615

Jan. 5 " Dec.
H.a.
4 47 +8.2
0.406 = 9.6085 5.41 = 0.7332
9.6226 +0.7473

May 6 " Dec.
H.a.
5 36 +35.3
Log. 0.515 = 9.7118 4.50 = 0.6532
9.7259 +0.6673

Dec. 28 1885
H.a. Dec.
5^h 8 +4.5
0.414 = 9.6170 5.63 = 0.7505
9.6311 +0.7646

Dec. 28
H.a. " Dec.
+ 5^h 0 +4.5
0.410 = 9.6128 5.61 = 0.7490
+9.6269 +0.7631

Comet Brooks 1885 III

Sept. 2. 1885
H.a. Dec.
+6 21 +36.6
0.525 = 9.7202 4.97 = 0.6964
+9.7343 +0.7105

Comet Brooks 1885 III

Sept 3, 1885

H.a.	Dec.
5 22	+37.1

Log 0.523 = 9.7185 3.96 = 0.5977
9.7326 +0.6118

" 3, "

H.a.	Dec.
5 42	+37.1

Log 0.528 = 9.7226 4.29 = 0.6325
9.7367 +0.6466

Sept. 6 "

H.a.	Dec.
5 35	+38.5

Log 0.538 = 9.7308 4.07 = 0.6096
9.7449 +0.6237

" 6 "

H.a.	Dec.
5 47	+38.5

Log 0.540 = 9.7324 4.29 = 0.6325
9.7465 +0.6466

Sept. 7, "

H.a.	Dec.
6 37	+38.9

Log 0.536 = 9.7292 5.12 = 0.7093
9.7433 +0.7234

Comet Barnard (1885 a)

July 9, 1885

H. a.	Dec.
+2 28	−6.0

0.256 = 9.4082 6.25 = 0.7959
+9.4223 +0.8100

Comet Barnard 1885 a

July 10, 1885
H. a. Dec.
−0 18 −6.5
Log. 0.033 = 8.5785 6.43 = 0.8082
−8.5326 +0.8223

July 11. "
H. a. Dec.
−0 33 −7.1
Log. 0.061 = 8.7853 6.48 = 0.8116
−8.7994 +0.8257

July 12 "
H. a. Dec.
−0 20 −7.7
Log 0.037 = 8.5682 6.55 = 0.8162
−8.5823 +0.8303

July 15, "
H. a. Dec.
+2 52 −9.4
Log. 0.292 = 9.4654 6.43 = 0.8082
+9.4795 +0.8223

July 17, "
H. a. Dec.
+2 28 −10.5
Log 0.259 = 9.4133 6.58 = 0.8182
+9.4274 +0.8323

Aug 6, "
H. a. Dec.
$+1^h$ 31 −20.5
Log. 0.174 = 9.2406 7.44 = 0.8716
+9.2547 +0.8857

Comets Finlay & Barnard (1886 IX)

Finlay's Comet

Oct. 19, 1886

H.a.	Dec.		
+2 41	-26.6		
		Log 0.305 = 9.4843	7.31 = 0.8639
		+9.4984	+0.8780

Oct. 20 "

H.a.	Dec.		
+2 21	-26.6		
		Log 0.273 = 9.4362	7.46 = 0.8727
		+9.4503	+0.8868

Jan. 3, 1887

H.a.	Dec.		
+3 39	+0.8		
		Log 0.345 = 9.5378	5.70 = 0.7559
		+9.5519	+0.7700

Comet Barnard 1886 IX

Oct. 6, 1886

H.a.	Dec.		
-4 39	+1.2		
		Log. 0.397 = 9.5988	5.70 = 0.7559
		-9.6129	+0.7700

Oct. 8, "

H.a.	Dec.		
-4 42	+1.5		
		Log. 0.399 = 9.6010	5.69 = 0.7551
		-9.6151	+0.7692

Comets Barnard, Brooks (1886 IX) (1886 III)

Nov. 25, 1886

H.a. Dec.

-3 41 +16.4

0.362 = 9.5587 4.50 = 0.6532

-9.5728 +0.6673

Comet Brooks 1886 IX

May 28, 1886

H.a. Dec.

+2 10

~~14~~ ~~9~~ +5.8

0.228 = 9.3579 5.19 = 0.7152

+9.3720 +0.7293

June 1, "

H.a. Dec.

+2 34

~~14~~ ~~26~~ +13.5

0.271 = 9.4330 5.44 = 0.7356

+9.4471 +0.7497

Comet Brooks 1886 III

May 1, 1886

H.a. Dec.

-4 33 +24.6

0.432 = 9.6355 4.25 = 0.6284

-9.6496 +0.6425

May 6, "

H.a. Dec.

-5 15 +35.3

0.508 = 9.7059 4.00 = 0.6021

-9.7200 +0.6162

Comet Brooks (1886 V) &
" Barnard (1886 II)

Comet Brooks 1886 V

Apr. 30, 1886

H.a. Dec.

$+11^{h}\ 23$ +60.8

Log p. Δ = +9.1506 ✓ + 0.9314

May 1, "

H.a. Dec.

11 6 +60.2

~~+9.7519~~ ✓ +9.3134 +0.9280 ✓

May 6, "

H.a. Dec.

16 21 +57.2

+9.8903 +0.7419

Comet Barnard 1886 II

Dec. 6, 1885

H.a. Dec.

$-3^{h}\ 6$ +5.0

0.308 = 9.4886 5.36 = 0.7292
-9.5027 +0.7433

Dec. 7, 1885

H.a. Dec.

$-2^{h}\ 50$ +5.1

0.287 = 9.4579 5.32 = 0.7259
-9.4720 +0.7400

Comets Barnard 1886 II & Comet Fabry

Dec. 10, 1885

H.a.		Dec.
+3	23	+5.4

0.329 = 9.5172 5.36 = 0.7292
+9.5313 +0.7433

Dec. 11, 1885

H.a.		Dec.
-4^h	14	+5.5

0.381. = 9.5809 5.46 = 0.7372
-9.5950 +0.7513

Comet Fabry

Dec. 2, 1885

H.a.		Dec.
+3	59	+21.0

0.391 = 9.5922 4.22 = 0.6253
+9.6063 +0.6394

Dec. 2, "

H.a.		Dec
+4	17	+21.0

0.400 = 9.6021 4.29 = 0.6325
+9.6162 +0.6466

Dec. 2 "

H.a.		Dec.
-0	44	+21.0

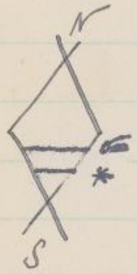
0.087 = 8.9395 3.14 = 0.4969
-89536 +0.5110

(Comp. Star 52° 1645)

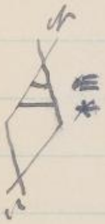
1st " set.

Comet Pons Brooks

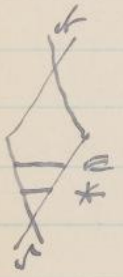
Oct 4, 1883



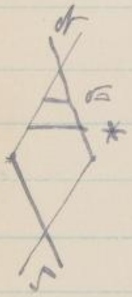
☄		*		☄ − *			
56	50.9	57	10.0				
56	58.2	57	15.6				
57	52.2	57	34.0				
57	59.7	57	40.0				
229	41.0 ✓	229	39.6 ✓	+0	1.4 ✓	+0	0.35
5							



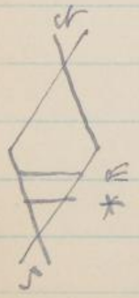
59	34.0	59	16.5				
59	41.3	59	22.8				
0	21.7	0	40.2				
0	28.9	0	46.7				
0	25.9 ✓	~~239~~ 0	26.2 ✓	−0	0.3 ✓	−0	0.08



1	19.1	1	37.4				
1	26.1	1	43.5				
2	25.2	2	9.4				
2	33.8	2	15.3				
7	44.2 ✓	7	45.6 ✓	−0	1.4 ✓	−0	0.35



3	22.3	3	4.9				
3	29.9	3	10.9				
4	3.7	4	21.3				
4	11.3	4	27.8				
15	7.2 ✓	15	4.9 ✓	+0	2.3 ✓	+0	0.58

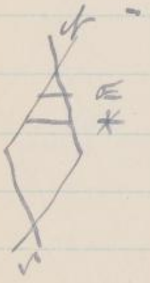


5	3.8	5	21.2				
5	11.6	5	27.6				
6	17.0	5	58.9				
6	23.6	6	5.1				
22	56.0 ✓	22	52.8 ✓	+0	3.2 ✓	+0	0.80

Δ

1	1.40 ✓	0	24.2 ✓	37.20
0	47.6 ✓ ✓	1	23.80	36.1 ✓ ✓
1	6.9	0	32.0	34.9
0	41.4	1	16.7	35.3
1	12.6	0	37.6	35.0

1st set   Comet Pons-Brooks.
Oct. 8, 1883 con- from pre. page,



☄		*					
7	8.3	6	52.3				
7	18.2	6	57.9				
7	27.7	7	45.4				
7	35.0	7	51.5				
29	29.2 ✓	29	27.1 ✓	+0	2.1 ✓	+0	0.52 ✓
						+0	0.30

0 18.2 -0 53.3 $\frac{35.10}{0\ 35.61}$

Log. 35.61 = 1.55157 1.55157

" 7.5 = 0.87506 0.87506

" cos. α = 9.72309 9.72285

(141.2 2.14972 141.1 = 2.14948

70.6 = +1 10.6

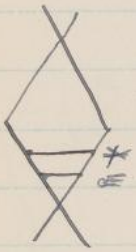
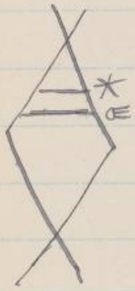
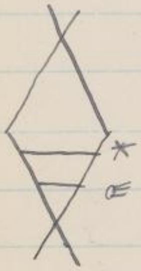
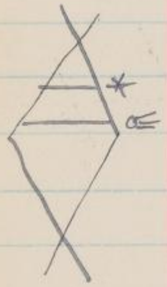
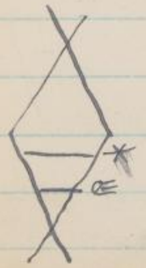
58 5 32.0 +2 21.1

58 6 42.6

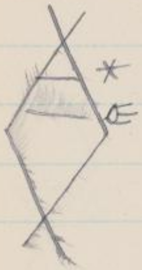
2nd series

Oct. 4, 1883

Pons - Brooks Comet

	☄	*	☄ - *	
	16 39.3	16 14.7		
	16 46.1	16 21.0		
	17 14.8	17 20.6		
	17 23.1	17 26.8		
	68 3.3	67 23.1	0 40.2	0 20.10
	18 8.1	18 13.9		
	18 17.0	18 20.6		
	19 17.4	18 51.2		
	19 23.8	18 58.0		
	75 6.3	74 23.7	0 42.6	0 21.30
	20 20.2	~~20~~ 19 ~~20.2~~ 54.8		
	20 28.0	20 ~~28.0~~ 0.9		
	21 0.8	21 ~~0.8~~ 5.9		
	21 8.4	21 ~~8.4~~ 13.1		
	82 57.4	82 ~~57.4~~ 13.7	0 43.7	0 21.85
	21 58.4	22 4.7		
	22 7.7	22 11.0		
	22 52.2	22 25.8		
	22 58.5	22 32.1		
	89 56.8	89 13.6	0 43.2	0 21.60
	24 5.0	23 38.8		
	24 11.5	23 45.0		
	24 32.0	24 37.9		
	24 39.2	24 44.2		
	97 27.7	96 45.9	0 41.8	0 20.90

Δ☄	Δ*	☄-*
0 36.25	1 5.85	0 29.60
1 8.05	0 37.35	0 30.70
0 40.50	1 11.15	0 30.65
0 52.30	0 21.10	0 31.20
0 27.35	0 59.15	0 31.80



25	15.7	25	21.0
25	22.1	25	27.1
26	13.9	25	48.0
26	20.2	25	54.2
103	11.9	102	30.3

0 41.6 0 20.80

2 | + 0 21.09

+ 0 10.54

1 1.85 0 26.05 0 35.80

0 31.63

Log 31.63 = 1.50010 1.50010

" 7.5 = 0.87506 0.87506

" cos. α = 9.72223 9.72245

125.1 = 2.09739 125.2 = 2.09761

62.55 = -1 2.6

+58 9 44.3 - 2 5.2

58 8 41.7

Comet Pons Brooks

Oct 5, 1883

DM. +58 1646 8.0 A

Oe.a. 16314	16	28	41.44	+58	6	7.6	(1842)
		+0	22.39		− 2	38.9	
	16	29	3.83	+58°	3	28.7	
	247	15	57.45				

Log. $\frac{n}{15}$ = +0.12610
" sin α = −9.96488
" tan δ = +0.20519
−1.9777 = −0.29617
+3.0708
+1.0931 = 0.03866
41 = 1.61278
44.82 = 1.65144

Log. n = +1.30219
" cos α = −9.58711
" 41 = +1.61278
−317.7 = −2.50208

* 1842.0 =	16	28	41.44	+58°	6	7.6
		+0	44.82		− 5	17.7
* 1883.0 =	16	29	26.26	58°	0	49.9
			−0.78			+16.0
ap. Pl. * =	16	29	25.48	+58°	1	5.9
		+0	27.64		−7	43.2
ap. Pl. ☄ =	16	29	53.12	+58	53	22.7

Oct 14, 1883
Comet Pons Brooks

Dm. +55 1862 9.1 A

Dc.a. 16435	16^h	35	~~8~~56.61	$+55^\circ$	59	49.5	(1842)
		+0	25.05		−2	27.2	
	16	36	21.66	$+55^\circ$	57	22.3	
	249	5	24.90				

Log $\frac{u}{15}$ = +0.12610
" sin α = −9.97041
" tan δ = +0.17030
−1.8485 = −0.26681
+3.0708
+1.2223 = 0.08718
41 = 1.61278
+50.11 = 1.69996

Log. u = 1.30219
" cos α = −9.55254
" 41 = 1.61278
293.4 = −2.46751

(* 1842) =	16^h	35	56.61	$+55^\circ$	59	49.5
		+0	50.11		−4	53.4
(* 1883.0) =	16	35	6.50	+55	54	56.1
			−0.75		+	14.9
ap. Pl. * =	16	35	5.75	+55	55	11.0
		+0	58.70		+6	56.7
ap. Pl. ☾ =	16	36	4.45	+56	2	7.7

Comet Pons-Brooks

Oct. 30, 1883.

Comp. Star = Dm. +53° 1916 (Oeltz.)
Selected Star = +52° 2027 9.3 B, which is to be joined to Oeltz. ✶.

B.B. VI +52 2027 =	17	4	4.80	+52	52	21.8 (1855)
		+0	19.00		−1	7.9
	17	4	23.80	+52	51	13.9
	256	5	57.00			

Log $\frac{\mu}{15}$ = 0.12609
" sin α = −9.98709
" tan δ = 0.12058
−1.7130 = −0.23376
+3.0710
+1.3580 = 0.13290
28 = 1.44716
38.02 = 1.58006

Log μ = 1.30218
" cos α = −9.38065
" 28 = 1.44716
−134.9 = −2.12999

(✶ 1855.0)	17	4	4.80	+52	52	21.8
		+0	38.02		−2	14.9
(✶ 1883.0) =	17	4	42.82	+52	50	6.9
			−0.55			+15.8
Ap. Pl. ✶ =	17	4	42.27	+52	50	22.7

Comet Pons-Brooks

Oct 30, 1883

{ap. Place Reduction}

$f = +3.026$
$\mathcal{G} = 1^h\ 25.3$
$H = 3\ 20.5$
Log. g = 1.3262
" h = 1.2877
" i = +0.8103

$\mathcal{G} = 1\ 25.3$
$\alpha = 17\ 4.7$
$\mathcal{G}+\alpha\ \ 18\ 30.0$

$\delta = +52\ 50\ 6.9$

$H = 3\ 20.5$
$\alpha = 17\ 4.7$
$H+\alpha = 20\ 25.2$

Log $1/15$ = +8.8239
" ~~sin g~~ = +1.3262
" sin $\mathcal{G}+\alpha$ = −9.9963
" tan δ = +0.1203
−1.848 = −0.2667

Log $1/15$ = +8.8239
" h = +1.2877
" sin $H+\alpha$ = −9.9063
" sec. δ = +0.2189
−1.725 = −0.2368
−1.848
−3.573
+3.026
−0.547 = cor. in R.A.

Log. g = +1.3262
" cos $\mathcal{G}+\alpha$ = +9.1157
+2.77 = 0.4419

Log h = +1.2877
" cos ~~$H+\alpha$~~ = +9.7723
" sin δ = +9.9015
+9.15 = +0.9615

Log i = +0.8103
" cos δ = +9.7811
+3.90 = +0.5914
+2.77
+9.15
+15.82 = cor. in Dec.

Comet Pons-Brooks

Nov. 8, 1883

Lettered ★ = +51° 2206 8.3 A, which is to be joined ‸a to Mulet. Comp. ★.

Oe.A. 17089 = 17 19 30.69 +51 42 1.1 (1842)
+0 28.80 −1 11.3
17 19 59.49 +51 40 49.8
259 59 52.35

Log $\frac{\mu}{15}$ = +0.12610
" sin α = −9.99335
" tan δ = +0.10221
−1.6660 = −0.22166
+3.0708
+1.4048 = 0.14762
41 = 1.61278
+57.60 = 1.76040

Log. μ = 1.30219
" cos α = −9.23977
" 41 = 1.61278
−142.8 = +2.15474

★ 1842.0 = 17 19 30.69 +51 42 1.1
+0 57.60 −2 22.8
★ 1883.0 = 17 20 28.29 +51 39 38.3
−0.50 +15.7
ap. Pl. ★ = 17 20 27.79 +51 39 22.6

Comet Pons-Brooks

Nov. 8, 1883

$f = +3.110$ $\mathcal{G} = 1\ 24.9$ $H = 2^h\ 44.2$

$\mathcal{G} = 1\ 24.9$ $\alpha = 17\ 20.5$ $\alpha = 17\ 20.5$

$H = 2^h\ 44.2$ $\mathcal{G}+\alpha = 18\ 45.4$ $H+\alpha\ \ 20\ \ 4.7$

Log g = +1.3377

" h = +1.2936

" i = +0.7485 $\delta = +51\ 39\ 38$

Log 1/15 = +8.8239

" g = +1.3377

" sin $\mathcal{G}+\alpha$ = −9.9914

" tan δ = +0.1019 ~~+9.7926~~

−1.799 = −0.2549

Log. 1/15 = +8.8239

" h = +1.2936

" cos $H+\alpha$ = −9.9324

" sec. δ = 0.2074

−1.808 = −0.2573

−1.799

−3.607

+3.110

−0.497 = cor. in R.A.

Log. g = +1.3377

" cos $\mathcal{G}+\alpha$ = +9.2940

+4.28 = +0.6317

" h = +1.2936

" cos $H+\alpha$ = +9.7140

" sin δ = +9.8945

+7.98 = +0.9021

Log. i = +0.7485

" cos. δ = +9.7926

+3.48 = +0.5411

4.28

7.98

+15.74 = cor. in Dec.

Computation of Parallaxes
(Continued)

Comet Fabry

Dec. 2, 1885

H.a.	Dec.		
-0 33	+20.7		
	0.065 = 8.8129		3.16 = 0.4997
	-8.8270		0.5138

Dec. 3

H.a.	Dec.		
+0 12	+21.0		
	0.024 = 8.3802		3.10 = 0.4914
	+8.3943		0.5055

Dec. 3

H.a.	Dec.		
+0 34	+21.0		
	0.067 = 8.8261		3.12 = 0.4942
	+8.8402		0.5083

Dec. 3

H.a.	Dec.		
+3 51	+21.0		
	0.383 = 9.5832		4.16 = 0.6191
	+9.5973		0.6332

Dec. 3.

H.a.	Dec.		
+3 58	+21.0		
	0.390 = 9.5911		4.21 = 0.6243
	+9.6052		0.6384

Dec. 6

H.a.	Dec.		
+0 6	+20.9		
	0.012 = 8.0792		3.11 = 0.4928
	+8.0933		0.5069

Comets Fabry & Barnard 1886 VIII

Dec. 6

H.a.	Dec.
2h 9	+20.9

0.241 = 9.3820 3.45 = 0.5378
9.3961 0.5519

Dec. 7

H.a.	Dec.
+1 28	+20.9

0.169 = 9.2279 2.87 = 0.4579
+9.2420 0.4720

Dec. 11

H.a.	Dec.
−1h 5	+20.8

0.126 = 9.1004 3.21 = 0.5065
−9.1145 0.5206

Dec. 12

H.a.	Dec.
+2 24	+20.8

0.266 = 9.4249 3.55 = 0.5502
+9.4390 0.5643

Comet Barnard 1886 VIII

Jan. 24, 1887

H.a.	Dec.
−4 58	+26.0

Log. 0.454 = 9.6571 4.43 = 0.6464
−9.6712 0.6605

Comet Barnard 1887 IV

Comet Barnard 1887 IV

May 13, 1887

H.a.	Dec.
−1 15	−30.1

Log 0.157 = 9.1959 — 7.99 = 0.9026
9.2100 — 0.9167

May 13, 1887

H.a.	Dec.
✓	−30.1

already on sheet

May 14, 1887

H.a.	Dec.
−1 6	−29.6

Log. 0.138 = 9.1399 — 8.01 = 0.9036
9.1540 — 0.9177

May 19, "

H.a.	Dec.
−0 - 18	−26.6

Log 0.037 = 8.5682 — 7.98 = 0.9020
8.5823 — 0.9161

May 25, "

H.a.	Dec.
−0 43	−22.6

Log. 0.086 = 8.9345 — 7.71 = 0.8870
8.9486 — 0.9011

May 30 "

H.a.	Dec.
−1 18	−18.8

Log. 0.~~235~~149 = 9.1732 — 7. 7.38 = 0.8681
9.1873 — 0.8822

Comet Barnard 1887 IV

June 7, 1887
H.a. Dec.
-1 11 -12.5
Log. 0.132 = 9.1206 6.93 = 0.8407
9.1347 0.8548

June 8, "
H.a. Dec.
-1 23 -11.7
Log 0.153 = 9.1847 6.83 = 0.8344
9.1988 0.8485

June 13 "
H.a. Dec.
+1 12 -7.8
Log. 0.132 = 9.1206 6.52 = 0.8142
9.1347 0.8283

June 14 "
H.a. Dec.
-0 46 -7.1
Log. 0.085 = 8.9294 6.46 = 0.8102
8.9435 0.8243

June 15, "
H.a. Dec.
-0 59 -6.4
Log 0.108 = 9.0334 6.40 = 0.8062
9.0475 0.8203

June 25
H.a. Dec.
+0 19 +0.1
Log. 0.036 = 8.5563 5.74 = 0.7589
8.5704 0.7730

Comets Barnard 1887 IV & III

June 27, 1887
H.a. Dec.
− 0 43 +1.1
Log. 0.078 = 8.8921 5.63 = 0.7505
8.9062 0.7646

July 12, "
H.a. Dec.
+2 4 +6.8
Log. 0.219 = 9.3404 5.07 = 0.7050
9.3545 0.7191

July 12, "
H.a. Dec
+2 16 +6.8
Log. 0.238 = 9.3766 5.09 = 0.7067
9.3907 0.7208

Comet Barnard 1887 III

Feb. 17, 1887
H.a. Dec.
− 1 − 40 − 12.4
Log. 0.183 = 9.2624 6.86 = 0.8363
9.2765 0.8504

Feb. 17, 1887
H.a. Dec.
− 0 42 − 12.2
Log. 0.078 = 8.8921 6.95 = 0.8420
8.9062 0.8561

Feb. 19, 1887
H.a. Dec.
+0 28 − 2.6
Log. 0.051 = 8.7076 6.03 = 0.7803
8.7217 0.7944

Comets Barnard 1887 III, Brooks 1887 II & Olbers

Feb. 25, 1887

H.a	Dec.
+2 14	+17.9

Log. 0.245 = 9.3892
9.4033

3.85 = 0.5855
0.5996

Feb. 28, 1887

H.a.	Dec.
+3 12	+23.2

Log. 0.341 = 9.5328
9.5469

3.62 = 0.5587
0.5728

Jan. 24, 1887

Comet Brooks 1887 II

H.a.	Dec.
8h 28	+73.8

Already in book

Jan. 27, 1887

H.a.	Dec.
13 17	+76.3

Already in Book.

Sept 16, 1887

Olbers Comet

H.a.	Dec.
5 51	+29.9

Log. 0.488 = 9.6884
9.7025

4.84 = 0.6848
0.6989

Oct. 19, 1887

H.a	Dec.
5 51	+22.4

Log. 0.458 = 9.6609
9.6750

5.22 = 0.7177
0.7318

Olbers Comet & Comet Sawerthal

Oct. 21, 1887
H.a. Dec.
6 1 +21.7
Log. 0.455 = 9.6580 5.35 = 0.7284
9.6721 0.7425

Oct. 30, "
H.a. Dec.
5 38 +18.3
Log. 0.444 = 9.6474 5.27 = 0.7218
9.6615 0.7359

Jan. 11, 1888
H.a. Dec.
3 36 -2.3
Log. 0.342 = 9.5340 5.90 = 0.7708
9.5481 0.7849

Jan. 18, 1888
H.a. Dec.
3 52 -3.3
Log. 0.359 = 9.5551 5.94 = 0.7738
9.5692 0.7879

Comet Sawerthal

Mar. 23, 1888
H.a Dec.
-4 13 -6.6
Log. 0.380 = 9.5798 6.04 = 0.7810
95939 0.7951

Apr. 6. "
H.a. Dec.
-4 58 +9.2
Log. 0.413 = 9.6160 5.41 = 0.7332
96301 0.7473

Comet Sawerthal

Apr. 16, 1888

H.A.	Dec.
−4 55	+17.7

Log 0.426 = 9.6294
9.6435

4.94 = 0.6937
0.7078

Apr. 24, "

H.A.	Dec.
−4 59	+23.2

Log. 0.444 = 9.6474
9.6615

4.70 = 0.6721
0.6862

June 29

H.A.	Dec.
−7 38	+47.6

Log 0.570 = 9.7559
9.7700

5.83 = 0.7657
0.7798

July 5

H.A.	Dec
−7 50	+48.0

Log 0.561 = 9.7490
9.7631

6.03 = 0.7803
0.7944

For computations of these parallaxes see B 7, page 99 – 105

Comet f, 1888 Barnard

Nov. 1 1888

H.a.	Dec.
-2^h 49	−15.0

Jan. 25, 1889

H.a.	Dec.
−2 24	+16.5

Jan. 29, "

H.a	Dec.
−2 17	+18.6

Jan. 30, "

H.a.	Dec.
−3 20	+19.3

Feb. 1, "

H.a.	Dec.
−2 58	+20.3

Feb. 28, 1889

H.a.	Dec.
− 1 31	+31.6

Mar. 1, 1889

H.a.	Dec.
−2 44	+31.9

Mar. 7, 1889

H.a.	Dec.
−1 23	+33.4

Oct. 29, 1888 Comet e 188 Barnard

H.a.	Dec.
−3 41	+3.5

Oct 30

H.a.	Dec.
−3 40	+3.2

Oct. 31 1888

H.a.	Dec.
– 3 $\overset{2}{\cancel{4}}$0	+2.0

Nov. 1

H.a.	Dec.
– 3 $\overset{1}{\cancel{2}}$0	+2.7

Nov. 3

H.a.	Dec.
– 3 1.0	~~+0.8~~

Nov. 7

H.a.	Dec.
– 2 33	+0.8

Nov. 12

H.a.	Dec.
– 1 44	$-\overset{0.8}{\cancel{1.4}}$

Nov. 14

H.a.	Dec.
−3 44	−1.4

Nov. 14

H.a.	Dec.
−3 26	−1.4

Nov 21

H.a.	Dec.
−2 0	−3.8

Dec. 6

H.a.	Dec.
+2 20	−7.1

Dec. 12

H.a.	Dec.
+1 44	−7.5

Dec. 14

H.a.	Dec.
+0 42	-7.6

Dec. 14

H.a.	Dec.
+1 49	-7.6

Dec. 18

H.a.	Dec.
+2 7	-7.7

Dec. 19

H.a.	Dec.
+1 23	-7.7

Dec. 22

H.a. Dec.

Jan 3, 1889

	H.a.	Dec.
	+3 56	-7.2

Jan. 19

	H.a.	Dec.
	+4 32	- 6.3

Jan. 21

	H.a.	Dec.
	+4 24	-5.9

Apr. 2 1889 Comet Barnard (1889 b)

H.a. Dec.

Apr. 6, "

H.a. Dec.

Apr. 19, 1889

H.a.	Dec.

Apr. 23, "

H.a.	Dec.

Comp. Œ d 1889
Oct 18 3rd obs.

H.A.	Dec.
$+1^h$ 30	−3.9

0.162 = 9.2095 6.13 = 0.7875
+9.2236 +0.8016

Comet g 1889 Borelly ~~Nov 17~~ Dec. 12

Dec. 16, 1889

H.a.	Dec.
+7^h 35	+44.6

Log. 0.544 = 9.7356 5.89 = 0.7701
9.7497 +0.7842

Dec. 21, 1889

H.a	Dec.
+7 43	+39.1

Log. 0.492 = 9.6920 6.20 = 0.7924
9.7061 +0.8065

Dec 23, 1889

H.a	Dec.
+8 3	+36.8

Log 0.462 = 9.6646 6.56 = 0.8169
9.6787 +0.8310

Nov. 18 1889

Comet f 1889 Swift (Nov 17)

H.a	Dec.
+1^h 18	+12.1

Log. 0.144 = 9.1584 4.56 = 0.6590
9.1725 +0.6731

Nov. 22, 1889

H.a.	Dec.
+2 53	+13.3

Log. 0.298 = 9.4742 4.53 = 0.6561
9.4883 +0.6702

Nov. 23 1889

H.a	Dec.
+2 56	+13.6

Log 0.302 = 9.4800 4.53 = 0.6561
9.4941 +0.6702

Comet f 1889 (Swift Nov 16)

Nov. 26 1889

H.a	Dec.
✓ $+3^{h}$ 24	+14.5

Log. 0.339 = 9.5302   4.57 = 0.6599
9.5443   + 0.6740

Dec. 13, 1889

H.a	Dec.
+1 51	+19.4

Log. 0.209 = 9.3202   3.55 = 0.5502
9.3343   +0.5643

Dec. 21 1889

H.a	Dec.
✓ +2 21	+21.6

Log. 0.262 = 9.4183   3.45 = 0.5378
9.4324   +0.5519

Dec. 23 1889

H.a.	Dec.
2^{h} 0	+22.2

Log. 0.228 = 9.3579   3.25 = 0.5119
9.3720   + 0.5260

Comet d 1889 Brooks
Disc. July 6

Oct. 2 1889

H.a. Dec.
-1h 24 -5.0

Log. 0.152 = 9.18184 6.25 = 0.79588
-9.1959 +0.8100

Oct. 15, 1889

H.a. Dec.
-1h 57 -4.2

Log. 0.207 = 9.31597 6.15 = 0.78888
-9.3301 +0.8030

Oct. 16, 1889

H.a. Dec.
-1h 21 -4.1

Log. 0.147 = 9.16732 6.16 = 0.78958
-9.1814 +0.8037

Oct. 17, 1889

H.a. Dec.
-2h 14 -4.0

Log. 0.233 = 9.36736 6.13 = 0.78746
-9.3815 +0.8016

Oct. 18 1889

H.a. Dec.
? -2h 14 -3.9

Log 0.233 = 9.36736 6.13 = 0.78746
-9.3815 +0.8016

Oct 23 1889

H.a. Dec.
? -0h 36 -3.4

Log. 0.066 = 8.81954 6.12 = 0.78675
-8.8336 +0.8008

Comet d 1889 Brooks July 6

Nov. 5, 1889 (using 1st set only)

H.a. Dec.

-0^h 27 −2.0

Log. 0.050 = 8.69897
−8.7134

5.97 = 0.77597
+0.7901

Nov. 5 1889 (using 3 sets)

H.a. Dec.

+0 13 −2.0

Log. 0.024 = 8.38021
+8.3943

5.85 = 0.76716
+0.7813

Nov. 14, 1889

H.a Dec.

? ~~+1 42~~ −0.8

Log. 0.182 = 9.26007
+9.2742

5.83 = 0.76567
+0.7798

Nov. 15, 1889

H.a. Dec.

$+0^h$ 15 −0.7

Log. 0.027 = 8.43136
+8.4455

5.82 = 0.76492
+0.7790

Nov. 16 1889

H.a. Dec.

+0 22 −0.5

Log. 0.041 = 8.61278
+8.6269

5.80 = 0.76343
+0.7775

Nov. 22 1889

H.a Dec.

$+2^h$ 40 +0.4

Log. 0.272 = 9.43457
+9.4487

5.72 = 0.75740
+0.7715

Comet d, 1889 Brooks July 6

Nov. 25, 1889

H.a.	Dec.
$+2^h$ 35	+0.9

Log. 0,265 = 9.42325   5.67 = 0.75358
+9.4373   +0.7677

Nov. 26, 1889

H.a.	Dec.
$+3^h$ 7	+1.0

Log 0.3$\overset{0}{2}$8 = 9.48855   5.67 = 0.75358
+9.5027   +0.7677

Nov. 29, 1889

H.a.	Dec.
$+0^h$ 53	+1.5

Log. 0.096 = 8.98227   5.59 = 0.74741
+8.9964   +0.7615

Dec. 7, 1889

H.a.	Dec.
$+1^h$ 40	+2.9

Log. 0.179 = 9.25285   5.44 = 0.73560
+9.2669   +0.7497

Dec. 13, 1889

H.a.	Dec.
$+2^h$ 52	+3.9

Log 0.289 = 9.46090   5.42 = 0.73400
+9.4750   +0.7481

Dec 16 1889

H.a	Dec.
$+2^h$ 23	+4.4

Log. 0.247 = 9.39270   5.34 = 0.72754
+9.4068   +0.7416

Comet d 1889 Brooks July 6

Dec. 19, 1889

H.a	Dec.

Star Mulet, and not yet joined

Dec. 21, 1889

H.a.	Dec.
+3h 2	+5.3

Log 0.304 = 9.48287 | 5.31 = 0.72509
+9.4970 | +0.7392

Dec. 23 1889

H.a.	Dec.
+2 46	+5.8

Log 0.281 = 9.44871 | 5.25 = 0.72016
+9.4628 | +0.7343

Dec. 26 1889

H.a	Dec.
+3 18	+6.3

Log .0.323 = 9.50920 | 5.27 = 0.72181
+9.5233 | +0.7359

Dec. 27 1889

H.a	Dec.
+3 18	+6.4

Log 0.323 = 9.50920 | 5.26 = 0.72099
+9.5233 | +0.7351

Jan. 14, 1890

Ha.	Dec.
+2 45	+9.8

Log. 0.282 = 9.45025 | 486 = 0.68664
+9.4643 | +0.7007

Comet d 1889 Brooks July 6

Jan. 16 1890

H.a.	Dec.
+2 52	+10.2

Log. 0.293 = 9.46687   4.84 = 0.68485
+9.4810   +0.6989

Jan. 17, 1890

H.a.	Dec.
$+3^h$ 10	+10.3

Log 0.317 = 9.50106   4.90 = 0.69020
+9.5152   +0.7043

Jan. 18, 1890

H.a.	Dec.
$+3^h$ 26	+10.5

Log. 0.337 = 9.52763   4.93 = 0.69285
+9.5417   +0.7069

Jan. 20 1890

H.a.	Dec.
$+4^h$ 36	+10.9

Log. 0.403 = 9.60531   5.22 = 0.71767
+9.6194   +0.7318

Jan. 21, 1890

H.a.	Dec.
+2 47	+11.1

Log. 0.286 = 9.45637   4.74 = 0.67578
+9.4705   +0.6899

Jan. 22 1890

H.a.	Dec.
+3 0	+11.3

Log. 0.305 = 9.48430   474 = 0.67578
+9.4984   +0.6899

Comet d Brooks July 6

Jan. 24, 1890

H.a. Dec.

+3h 27 +11.7

Log 0.339 = 9.53020 4.83 = 0.68395

+9.5443 +0.6980

Feb. 11, 1890

H.a. Dec.

+3 51 +14.9

Log. 0.370 = 9.56820 4.69 = 0.67117

+9.5823 +0.6853

Feb. 12, 1890

H.a Dec.

+4 24 +15.1

Log. 0.399 = 9.60097 4.88 = 0.68842

+9.6151 +0.7025

Feb. 15, 1890

H.a Dec.

+4 24 +15.6

Log. 0.399 = 9.60097 4.85 = 0.68574

+9.6151 +0.6998

Feb. 20, 1890

~~+4 3~~ H.a. Dec.

+4 34 +16.5

Log 0.411 = 9.61384 4.86 = 0.68664

+9.6279 +0.7007

Feb. 21, 1890

H.a. Dec.

+5h 15 +16.8

Log. 0.434 = 9.63749 5.15 = 0.71187

+9.6516 +0.7259

Comet d Brooks July 6

Mar. 17, 1890

H.a. Dec.

$+5^h\ 36$ +20.4 5.1

Log 0.448 = 9.65128 5.16 = 0.71265

+9.6654 +0.7267

Mar 18, 1890

H.a. Dec.

$+5^h\ 41$ +20.6

Log. 0.450 = 9.65321 5.20 = 0.71600

+9.6673 +0.7301

Comet a, 1890 Brooks Mar. 19

Mar. 21, 1890

H.a. Dec.

$-4^h\ 13$ +6.4

0.380 = 9.57978 5.40 = 0.73239

− 9.5939 +0.7465

Mar. 24, 1890

H.a Dec.

$-4^h\ 1$ +7.7

0.370 = 9.57 ~~978~~ 6820 5.28 = 0.72263

− 9.5823 +0.7367

Mar. 30 1890

H.a Dec.

− 4 28 +10.3

0.396 = 9.59770 5.10 = 0.70757

− 9.6118 +0.7217

June 10, 1890

Comet e 1888 Barnard

H.A.	Dec.
– 0. 56	–6.9

Log 0.103 = 9.01284   6.45 = 0.8096
– 9.0269   + 0.8237

[illegible]

[illegible]

Refraction Computations of Comet d 1889 Brooks July 6

July 20, 1889

ζ = 63.2

Log cos φ = 9.86~~97~~ 84

" sin t = −9.8276

− −9.69~~76~~ 80

" sin ζ +9.9506

q = −33.~~9~~ 8 6 = −9.74~~67~~ 54

2q = −67.~~8~~ 6

Log K = +6.4389

Log sec² ζ = +0.6919

~~sin 1"~~ = ~~+4.6856~~

= ~~1.8164~~

Log r = +7.1308

H.A. = −2 49.0

Dec = −7 51

Δδ = +140.9"

No ref. in R.A.

Log r = +7.1308

" Δδ = +2.1489

" cos 2q = +9.5810

+0.0725 = +8.8607

July 23, 1889

$\zeta = 62.4$

Log cos φ = 9.86$\overset{8}{\cancel{9}}\overset{4}{\cancel{7}}$

" sin t = -9.8173

$-9.68\underset{5}{\cancel{7}}\underset{7}{\cancel{0}}$

" sin ζ = 9.9475

$q = -\overset{33.2}{\cancel{33.3}} = -9.73\underset{8}{\cancel{9}}\underset{2}{\cancel{5}}$

$2q = -66.\overset{4}{\cancel{6}}$

Log K = 6.4393

" sec$^2\zeta$ = 0.6683

Log r = 7.1076

H.A. = $-2\ 44.2$

Dec = $-7\ 37$

$\Delta\delta = -2'\ 7.1''$

Ar-ref. in R.A.

Log r. = +7.1076

" $\Delta\delta$ = -2.1038

" cos 2q = +9.6024

-0.06 = -8.8138

July 24, 1889

ζ = 70.5

Log cos φ = $9.86\overset{8}{9}\overset{4}{7}$ 80 61

" sin t = −9.~~9120~~ 6745

−9.~~7847~~ 6 0 4

" sin ζ = 9.9744

q = −39.$\overset{8}{7}$' = −9.807$\underset{6}{7}\underset{0}{3}$

2q = −79.$\underset{6}{8}$

Log K = +6.4318

" sec² ζ = 0.9530

− Log r = 7.3848

H.A. = −2 39.1

Dec. = −7° 32'

Δα = +2' 16.8"

No ref. in R. A.

Log r = +7.3848

" Δδ = +2.1361

" cos 2q = +9.2565

+0.06' = +8.7774

+0.06 = cor.

July 25 1889

ζ = 61.8

Log cos φ = 9.86~~17~~ 84
" sin t = −9.8061
−9.67~~58~~ 45
" sin ζ = +9.9451
ψ = −32.~~5~~ 4 = −9.7~~307~~ 294
2ψ = −6~~5.0~~ 4.8

~~[illegible]~~

Log $\frac{1}{30}$ = +8.5229
" sec δ = +0.0037
" r = +7.0907
" Π₀ = +2.9474
" sin 2ψ = +9.9566
+0.033 = +8.5213

+0.033 in RA

Log K = +6.4396
" sec² ζ = 0.6511
Log r = 7.0907

HA = −2 39.1
Dec = −7 28
Δδ = +6 53.6

Log r = +7.0907
" Π = +2.9474~~8~~
" sin² ψ = +9.4588
Sum logs = +9.4969
2ψ = +0.31

Log r = +7.0907
" Δδ = +2.6166
" cos 2ψ = +9.6292
Sum logs = +9.3365
2ψ = +0.22
+0.31
+0.53 in Dec.

Jan. 20 1890

$\zeta = 68.3''$

Log cos φ = +9.86~~97~~ 84

" sin t = +9.9699

+9.83~~96~~ 83

" sin ζ = +9.9681

q = +~~40.0~~ 47.8 = +9.8~~077~~ 702

$2q$ = +~~80.0~~ 95.6

Log K = +6.4347

" sec²ζ = 0.8642

Log r = 7.2989

H.A = +4 35.6

Dec = +10 56

$\Delta\delta$ = +2 27.7

No refract. in R.A.

Log r = +7.2989

" $\Delta\delta$ = +2.1694

" cos $2q$ = −8.9894

~~R~~ −0.03' = −8.4577

−0.03 in Dec.

Feb. 12 1890

$Z = 62.2$

$\text{Log} \cos \varphi = +9.86\overset{84}{\cancel{97}}$
$\text{" } \sin t = +9.9607$
$+9.8\underset{291}{\cancel{351}}$
$\text{" } \sin Z = +9.9467$
$q = +49.\overset{7}{\cancel{9}}' \quad = +9.88\underset{24}{\cancel{37}}$
$2q = +99.\underset{4}{8}$

$\text{Log } K = 6.4394$
$\text{" } \sec^2 Z = 0.6625$
$\text{Log } r = 7.1019$

H.A = +4 24.0
Dec = +15 7
$\Delta\delta$ = +7 15.4

$\text{Log } 1/30 = 8.5229$
$\text{" } \sec \delta = 0.0153$
$\text{" } r = +7.1019$
$\text{" } \Pi = 2.9474$
$\text{" } \sin 2q = 9.9941$
$+0.038 = +8.5816$

+0.038 in R.A

$\text{Log } r = +7.1019$
$\text{" } \Pi = 2.9474$
$\text{" } \sin^2 q = 9.76\overset{48}{\cancel{64}}$
sum logs = 9.8141
$9 \quad +0.65\cancel{2}$

$\text{Log } r = +7.1019$
$\text{" } \Delta\delta = +2.6389$
$\text{" } \cos 2q = -\overset{9}{8}.2131$
sum logs = −8.9539
~~in Dec~~ −0.09
+0.65

in Dec = +0.56

Feb. 15 1890

$\zeta = 62.0$

Log cos φ = +9.86~~97~~ 84
" sin t = +9.9609
+9.8~~306~~ 293
" sin ζ = +9.9459
q = ~~50.4~~ 49.9 = 9.88~~47~~ 34
$2q$ = ~~100.8~~ 99.8

Log K = 6.4395
" sec² ζ = 0.6568
Log r = 7.0963

H.A = +4 24.2
Dec. = +15 39
$\Delta\alpha$ = −4 33.1

Log 1/30 = +8.5229
" sec δ = 0.0164
" r = 7.0963
" Π = 2.9474
" sin $2q$ = +9.9936
+0.038 = +8.5766

+0.038 in R.A

Log r = +7.0963
" Π = 2.947~~3~~4
" sin² q = 9.7668
sum logs. = 9.8105
+0.65

Log r = +7.0963
" $\Delta\alpha$ = −2.4363
" cos $2q$ = ∓9.2310
sum logs ±8.7636
−0.06
+0.65
+0.59 in Dec.

Feb. 20 1890

$\zeta = 63.7$

Log cos φ = 9.86~~77~~ 84

" sin t = 9.9698

9.83~~75~~ 82

" sin ζ = 9.9525

= 9.88~~70~~ 57

q = 50.~~4~~ 2

$2q$ = 100.~~8~~ 4

Log K = 6.4386

" sec$^2 \zeta$ = 0.~~6949~~ 7071

Log ν = 7.1457

H.A = +4 35.5

Dec. = +16 30

ΔL = +1 47.0

~~Log 1/30 =~~

~~" sec. δ =~~

~~" ρ =~~

~~" Π =~~

~~" sin $2q$ =~~

Log ν = +7.1457

" $\Delta\delta$ = +2.0294

" cos $2q$ = −9.2565

−0.027 = −8.4316

No Refraction in R.A. − 0.03 in Dec.

Feb. 21 1890

Z = 70.9

84
Log sin φ = 9.8697
" " t = +9.9916
+9.8613
00
" sin Z = 9.9754
1 9
φ = 50.3 = 9.8857
46
2
2φ = 100.6

Log K = 6.4312
" sec² Z = 0.9703
Log r = 7.4015

HA = +5 15.1
Dec = +16 40
Δδ = +6 33.0

~~Feb. 21~~ =

Log 1/30 = 8.5229
0.0186
" sec δ = ~~9.9813~~
" r = 7.4015
" Π = 2.9474
" sin 2φ = +9.9931
6
+0.079 = +8.8462
835

+0.076 in R.A

Log r = +7.4015
" Π = 2.9474
2
" sin 2φ = 9.7692
sum logs = ±0.1181
+1.31

Log r = 7.4015
" Δδ = +2.5944
" cos 2φ = −9.2482
sum logs = −9.2441
−0.18
+1.31
+1.13 in Dec.

Mar. 17 1890

ζ = 72.1

84
Log sin φ = +9.869~~7~~
" " t = +9.9977
+9.86~~74~~ 61
" sin ζ = 9.9784
50.6 '8
φ = ~~44~~.5 = 9.84~~58~~
877
2φ = ~~89.0~~
101.2

Log K = 6.4290
" sec² ζ = 1.0247
Log r = +7.4537

H.A. = 5 36.4
Dec. = +20 26
Δδ = −9 47.6

Log 1/30 = 8.5229
" sec. δ = 0.0282
" r = +7.4537
" Π = 2.9474
" sin 2φ = +9.9916
+0.088 = +8.9438

+ 0.088 in R.A.

Log r = +7.4537
" Π − 2.9474~~3~~
" sin² φ = 9.7754
" sum logs = 0.1765
+1.50

Log r = +7.4537
" Δδ = −2.7691
" cos 2φ = 9.2883
sum logs = 9.5111
−0.32
+1.50
+1.18 in Dec.

Mar. 18 1890

$\zeta = 72.9°$

$\log \sin \varphi = +9.86\overset{84}{97}$

$\text{"} \quad \text{"} \quad t = +9.99\overset{}{65}$ 69

$+9.86\cancel{82}$
$\quad\quad 69$

$\text{"} \sin \zeta = 9.9804$

$q = 50.\overset{3}{6}' \quad = 9.88\underset{6\,5}{78}$

$2q = \cancel{101.2}'$
100.6

$\log \overset{K}{\cancel{72.9}} = 6.4274$

$\text{"} \sec^2 \zeta = 1.0632$

$\log \mu \quad 7.4906$

H.A = 5 41.1

Dec. = +20 35

$\Delta\zeta$ = −1 8.3

No refraction in R.A.

$\log \mu = +7.4906$

$\text{"} \Delta\zeta = 1.8344$

$\text{"} \cos 2q = -9.2647$

$-0.04 = -8.5897$

−0.04 in Dec.

~~Apr. 11~~

New Var. disc. by Photography

Feb 21, 1890

$\zeta = 84.3$ 　　　　 $*a$

Log $\sin\varphi = +9.8684$
" " $t = +9.6418$
$+9.5102$

" " $\zeta = +9.9978$
$\psi = 19.0 \quad = 9.5124$
$2\psi = 38.0$

Log $K = 6.3\overset{127}{\cancel{214}}$
" $\sec^2\zeta = 2.0059$
Log r = ~~8.3273~~
8.3156

$\Delta\delta = -3\ 37.6$

Log $r = +8.3\overset{156}{\cancel{273}}$
" $\Delta\delta = \pm 2.3376$
" $\cos 2\psi = +9.8965$
~~+3.64~~ 　 ~~= +0.5614~~

No refraction in R. A.

Cor. for Ref. = $+3''.57 = \pm 0.5527$

$\therefore$ Corrected $\Delta\delta = -3'\ 41''.2$

Feb. 21, 1890

*b

$\zeta = 84.3$

$2\varphi = 38.0$

$\Delta\delta = +4' 7.3''$

Log $1/30$ = +8.5229 ✓
" sec ζ = +0.1060 ✓
" r = +8.3~~273~~ 186
" D = +2.9474 ✓
" sin 2φ = +9.7893 ✓
sum logs = +~~9.6929~~ ✓
9.6842
~~+0.493 = cor. in R.A.~~
+0.483 ✓ = cor. in R.A.

∴ Corrected $\Delta\alpha = +0^m\ 4^s.88$

Log r = +8.3~~273~~ 186 ✓
" D = +2.9474 ✓
" $\sin^2 \varphi$ = +9.0248 ✓
sum logs = ~~+0.2995~~
+0.2908
~~+1.99~~
+1.95 ✓

Log r = +8.3~~273~~ 186 ✓
" $\Delta\delta$ = +2.3932 ✓
" cos 2φ = +9.8965 ✓
sum logs ~~+0.6170~~
+0.6083
+4.06 ~~+4.14~~
+1.95 ✓+1.99
Cor. for Ref. = +6.01
+~~6.1~~3 = Cor. in Dec.

∴ Corrected $\Delta\delta = +4'\ 13.3''$

Refractions for Comets 1882 - 89

Comet Barnard 1882 III
Sept 14 1882

Z = 67.0'

log cos φ +9.8684'
log sin t −9.9806'
sin δ log −9.8490'
log sin Z +9.9675'
−49.6' dif. log −9.8815'
−99.2'

log K = 6.4352'

~~H.a =~~
Comet in N. * in S

H.a = −4 52
Δδ = +10 14.4
Dec = +18 59

log K. +6.4350'
" $\frac{1}{30}$ +8.5229'
" sec δ +0.0171'
log tan Diag +0.7916'
" tan² 3 +2.9474
" sin 2q. −9.9944
−0.051 = n8.7084'

log K +6.4350'
" + D +2.9474'
" tan² 3 +0.7916'
" sin² Q +9.7634'
+0.87 = +9.9374'

log K +6.4350'
" (α'−α) +2.7885'
" tan² 3 +0.7916'
" cos 2q. −9.2038
−0.17 = n9.2189'
+0.87
+0.70

Re computed in book on Ref. p. 15.

Comet Barnard 1882 III

Sept 18, 1882

$\zeta = 66.7$

$\text{Log} \cos\varphi = +9.8684$

$\text{"} \sin\delta = -9.9723$

-9.8407

$\text{"} \sin\zeta = 9.9631$

$-49.0 \qquad -9.8776$

-98.0

$\text{Log } K = 6.4364$

Both in S. half. ✓

$-4 \; 39$

$H.a = \cancel{-2 \; 57.2}$

$\Delta\delta = -2 \; 57.2$

$\text{Dec} = +12 \; 46$

no refract. in R.A.

$\text{Log } K' = +6.4364$

$\text{"} (\delta'-d) = -2.2485$

$\text{"} \tan^2\zeta = +0.7318$

$\text{"} \cos 2\varphi = -9.1436$

~~Alt. more less than 30°~~ $+0.04 = +8.5603$ ✓

Comet Cruls 1882 II

Sept 30 1882

$\zeta =$ ~~77.8~~ 82.9 ✓

Log K = 6.~~3865~~ 530 ?

log cos φ = +9.8684 ✓

" sin t = n9.9823 ✓

n9.8507 ✓

" sin ζ = 9.9967 ✓

~~−46.1~~ −45.6 = n9.8540 ✓

2q = ~~−922~~

2q = −91.2

E in S, and ✱ in N. ✓

H.a. = −4 55 ✓

$\Delta\delta$ = −6 56.3

Dec. = −6 55 ✓

Log K = ~~+6.3865~~ +6.3530 ✓

" 1/30 = +8.5229 ✓

" sec δ = +0.0032 ✓

" $\left(\pm\frac{q'}{2} \mp \frac{q}{2}\right)$ = −2.9474 ✓

" tan² ζ = ~~+1.4898~~ +1.8092 ✓

" sin 2q = −9.9999 ✓

~~+0.224~~ = ~~+9.3495~~ ✓ ✓

+0.432 ✓ = +9.6356

Log K = ~~+6.3865~~ +6.3530 ✓

" $\left(\pm\frac{\delta'}{2} \mp \frac{\delta}{2}\right)$ = −2.9474 ✓

" tan² ζ = ~~+1.4898~~ +1.8092 ✓

" sin² q = ~~−8.7152~~ +9.7080

~~+3.459~~ = ~~+0.5389~~ ✓

−6.570 ✓ = −0.8176

Log K = ~~+6.3865~~ +6.3530

" $(\delta'-\delta)$ = n2.6194 ✓

" tan² ζ = ~~+1.4898~~ +1.8092 ✓

" cos 2q = ~~−8.8862~~ +9.3250

~~−0.120~~ = ~~−9.0809~~

~~+3.459~~

~~+3.339 = cor in Dec~~

+1.276 ✓ = +0.1066 ✓

−6.570 ✓

−5.292 ✓ Cor in Dec

(Fully checked.)

X

Comet Cruls 1882 II.

Oct. 1, 1882.

ζ = 62.0 ✓

Log K = 6.3702 ✓

Log cos φ = +9.8684 ✓
" sin δ = −9.9782 ✓ Both in s. half. ✓
−9.8466 ✓
" sin ζ = +9.9958 ✓
−45.2 ✓ = −9.8508 ✓
2ψ = −90.4 ✓

H.A. = ~~−1 36.2~~ −4 48 ✓
Δδ = −1 36.2 ✓
Dec. = −7 27 ✓

5h 46m

No refrac. in R.A.

~~5h 46m = S.T.~~
~~6 41 = R.A.~~ ~~−6° 59' = dec.~~
~~−4 55 = H.A.~~

~~6 6 52 = S.T.~~
~~10 26 43 = R.A.~~
~~−4 19 51 = H.A.~~

~~−11° 51' = Dec.~~

Log K = +6.3702 ✓
" (δ′−δ) = −1.9832 ✓
" tan² ζ = +1.7044 ✓ ✓
" cos 2ψ = −7.2432 ~~8.0000~~
~~−1.142~~ = ~~−0.0578~~ ✓
+ ~~±~~0.008 ✓ = +7.9017

No ref. in either coördinate. ✓

(Fully checked)

5 51 = S.T.
10 38 = R.A.
−4 47 = H.A. −7° 27'

✓ X

Comet: Cruls 1882 II

Oct 3, 1882

$\zeta = 80.0$ ✓

Log k = 6.3947 ✓

Both in 2. half. ✓

$\log \cos \varphi = +9.8684$ ✓
$\text{"} \sin t = -9.9672$ ✓
-9.8356 ✓
$\text{"} \sin \zeta = +9.9934$ ✓
-44.1 ✓ $= -9.8422$ ✓
$2\psi = -88.2$

H.A. = −4 32 ✓
$\Delta\delta = +0\ 45.1$ ✓
Dec = −8 25 ✓

No refrac. in R.A.

$\log k = +6.3947$ ✓
$\text{"} (d'-d) = +1.6542$ ✓ ✓
$\text{"} \tan^2 \zeta = +1.5073$ ✓
$\text{"} \cos 2\psi = +8.4971$ ✓
~~+0.013~~ = +~~7~~8.0533 ✓
+0.0113 ✓ =

6 3 45 = S.T.
10 34 = R.A.
−4 30 = H.A.

−8°.4 Dec.

No ref. in either coördinate. ✓

(Fully checked)

✓ X

Comet Wells

Oct 9, 18~~70~~ 82

ζ = 79.9 ✓

Log K = 6.3956 ✓

Log cos φ = +9.8684 ✓
" sin t = −9.9573 ✓
−9.8257 ✓
✓
+ sin ζ = +9.9932
~~−9.8189~~
~~2q~~ ~~−41.2~~ −82.4 −9.8325 = −42°.85 = q ✓
2q = −85.70 ✓

Both in n. half. ✓

H.A. = ~~+4 6.1~~ −4 20 ✓
Δζ = +4 6.1 ✓
Ded = −11 7 ✓

No refract. in R.A. ✓

Log K = +6.3956 ✓
" (d′−d) = +2.3911 ✓
" tan² ζ = +1.4986 ✓
" cos 2q = ~~+9.1214~~ +8.8749 ✓
~~+0.255~~ = ~~+9.4066~~ ✓
+0.145 = +9.1602 ✓

6h 7m = S.T.
10 25 = R.A.
−4 18 = H.A.

−11′.7

(Fully checked.)

X

Comet Anal.

Oct 19 18~~70~~ 82

$\zeta = 68.^{\circ}7$ ✓

~~$\zeta = 67.7$~~

$\log \cos \varphi = + 9.8684$ ✓

$\text{"} \sin t = - 9.81~~25~~$ 67 ✓

$- 9.68~~59~~$ 53 ✓

✓

$\text{"} \sin \zeta = \pm 9.9~~722~~$ 683

~~30.8~~ ~~-9.7087~~

~~$\varphi = -59.2$~~ $= 9.7$ ~~-9.7116~~

~~$2\varphi = -118.4$~~ -9.7160 ✓ $= -31.^{\circ}3$ ✓ $= \varphi$

61.6 -62.6 ✓ $= 2\varphi$

Log K = ~~6.4330~~

Both in s. half. ✓

H.A. = −2 ~~42~~ 4 ✓

Δα = −3 33.6 ✓

Decl. = −15 9 ✓

no refrac. in R.A. ✓

$\log K = + 6.43~~30~~$ 43 ✓

$\text{"} (\delta' - \delta) = - 2.3296$ ✓

$\text{"} \tan^2 \zeta = ~~+0.8638~~$ +0.4142 ✓

$\text{"} \cos 2\varphi = ~~+9.6773~~$ +9.6630

~~-0.201~~ $=$ ~~9.3037~~ ✓

~~-0.197~~ ✓ ~~$= n9.2993$~~

-0.176 ✓ $= n9.2451$ ✓

(Fully checked)

✓ X Comet Calcs

Oct 20 18~~70~~82

$\zeta = 79.0'$

Log K = 6.4032 ✓

Log cos φ = 9.8684 ✓
" sin t = −9.9211 ✓
−9.7895 ✓
" sin ζ = +9.9920 ✓
q = −38.9 ✓ = −9.7975 ✓
2q = −177.6 ✓

Both in W. half.

H.A. = ~~+0~~ −3 46 ✓
Δδ = +0 8.7 ✓
Decl. = −17 3 ✓

No refrac. in R.A.

Log K = +6.4032 ✓
" (d′−d) = ~~+0.7076~~ +0.3222
" tan² ζ = +1.4227
" cos 2q = +9.8819
~~+0.007~~ = ~~+7.8654~~
+0.003 ✓ = +7.4800

No ref. in either coör. ✓

(Fully checked)

Comet Calcs

Dec. 29 18~~80~~ 82

$\zeta = 72.5$

Log cos φ = +9.8684
" sin t = −9.0702
−8.9386
" sin ζ = +9.9794
q = −5.2 = −8.9592
2q = −10.4

Log K = 6.4282

σ in N half ∗ in S half.

H.A = −0 27
Δδ = +8 ~~26.3~~ 46.3
Dec. = −29 ~~44~~ 50

Log K = +6.4282
" 1/30 = +8.5229
" sec δ = +0.0617
" ±$\frac{q}{2}$ ∓ $\frac{q}{2}$ = +2.9474
" tan²ζ = +1.0025
" sin 2q = n9.2565
−0.017 = n8.2192

~~Log K = +6.4282~~
~~" ($\pm\frac{q}{2} \mp \frac{q}{2}$) = +2.9474~~
~~" tan²ζ = +1.0025~~
~~" sin²q = +7.91~~84~~ 46~~
~~−0.020 = −8.2965~~
+0.020 = +8.2927

2d reckons.

Lg K = +6.4282
" 1/30 = +8.5229
" sec δ = +0.0617
" δq = +2.9474
" tan²ζ = +1.0025
" sin 2q = n9.2565
−0.017 = n8.2192

Dec. 29. 1882.

Lg K = +6.4282
" (d′−d) = +2.7495
" tan²ζ = +1.0025
" cos 2q = +9.9928
+1.49 = +0.1730
+0.02
+1.51

log K = +6.4282
" (d′−d) = +2.~~7044~~ 7212
" tan²ζ = +1.0025
" cos 2q = +9.9928
+1.343 = +0.1279
+0.020
+1.363

H.A. = −0 27
Δδ = +9 21.7
Dec. = −29 46

✓ X

Comet Culs.

Jan. 12, 188~~2~~3.

$\zeta = \overset{72.8}{\cancel{73.3}}$ ✓

Log K = ~~6.4254~~ 6.4275

Log cos φ = 9.8684
" sin t = +9.5963
$+9.4647$
" sin ζ = 9.98~~73~~81
$= +9.48\overset{46}{\cancel{34}}$

φ = +17.~~6~~8
2φ = +35.~~2~~6

☾ in N half, ★ in S. half. ✓

H.a. = +1 33 ✓
Δδ = +7 52.4 16.7
Dec. = −27 11 ✓

Log K = +6.42~~54~~85 ✓
" 1/30 = +8.5229 ✓
" sec δ = +0.0508
" $\left(\pm\frac{g}{2}\mp\frac{g}{2}\right)$ = +2.9474
" tan² ζ = +1.04~~57~~186
" sin 2φ = +9.76~~08~~50
~~8.7580~~
~~+8.7~~ +8.7322
~~+0.057~~ = +0.054 ✓

Log K = +6.42~~54~~75 ✓
" $\left(\pm\frac{g}{2}\mp\frac{g}{2}\right)$ = +2.9474
" tan² ζ = +1.04~~57~~186
" sin² φ = +8.9~~868~~706
+0.238 ✓ = +9.3641
~~9.3~~

Log K = +6.42~~54~~85
" (d′−d) = +2.6961
" tan² ζ = +1.04~~57~~186
" cos 2φ = +9.91~~23~~01
+1.13 ✓ = +0.0523
~~+0.0795~~
+1.36

Comet Curls

Jun 12, 1883.

ζ = ~~78.3~~ 72.8

log cos φ = +9.8684

" sin t = +9.5963

+9.4647

+9.98~~73~~ 01

+9.98~~34~~ 46

ψ = +17.~~6~~ 8 = +9.9846

2ψ = +35.~~2~~ 6

log K = 6.~~4254~~ 4275

Comet N, * S.

H.a = +1 33

Δδ = ~~+8 16.7~~ +7 52.4

Dec = −27 11

log K +6.4275

" 1/30 +8.5229

" sec δ +0.0509

~~D~~ +2.9474

" tan² ζ +1.0186

" sin ~~2ψ +~~ 9.7650

+0.05 +8.7323

~~+0.057 = cor. in R.A.~~

log K +6.4275

" D +2.9474

" tan² ζ +1.0186

" sin² Q +8.9706

+0.23 +9.3641

log K = +6.~~4254~~ 42~~6~~75

" (d′−d) = +2.6743

" tan² ζ = +1.04~~57~~ 186

" cos 2ψ = +9.912~~3~~ 01

+1.07

~~+1.142~~ = ~~+0.0577~~ +0.0305

~~+0.242~~

~~+1.384~~ = cor. in Dec.

+1.30

Comet Ands

Jan 15, 1883

$\zeta = 70.6$

Log cos φ = 9.8684

" sin t = +9.4659

+9.3343

" sin ζ = 9.9746

$q = +13.2 = +9.3597$

$2q = +26.4$

Log K = 6.4317

☄ in N half ★ in S half.

H.a. = +1 8

$\Delta\delta$ = +4 ~~32.4~~ 34.1

Dec. = −26 24

Log K = +6.4317

" 1/3c = +8.5229

" sec ζ = +0.0480

" $\left(\pm\frac{q}{2} \mp \frac{q}{2}\right)$ = +2.9474

" $\tan^2 \frac{\zeta}{2}$ = +0.9065

" sin 2q = +9.6480

+0.032 = +8.5045

Log K = +6.4317

" $\left(\pm\frac{q}{2} \mp \frac{q}{2}\right)$ = +2.9474

" $\tan^2 \frac{\zeta}{2}$ = +0.9065

" $\sin^2 q$ = +8.71~~74~~ 72

+0.107 = +9.00~~5~~ 28

Log K = +6.4317

" $(d'-d)$ = +2.43~~62~~ 80

" $\tan^2 \zeta$ = +0.9065

" cos 2q = +9.9522

+0.5~~32~~ = +9.72~~56~~ 84

+0.107

~~+0.63~~ = cor in Dec.

+0.64

X

Comet Cruls

Jan. ~~15~~ 23, 1883

$\zeta = 69.2$

$\log \cos \varphi = +9.8684$ ✓
$\quad$ " $\sin t = +9.5341$ ✓

$= +9.4025$ ✓
~~$\varphi = +14.6$~~
~~$d\varphi = +29.2$~~ $\quad +9.9707$ ✓
$q = +15.7$ ✓ $\quad = +9.4312$ ✓
$2q = +31.4$ ✓

$\log K = 6.4336$

☾ in S. $\quad$ * in N

$H.A. = +1\ 20$ ✓
$\Delta\delta = -9\ 16.~~2~~4$ ✓
$Dec = -24\ 15$

$\log K = +6.4336$
" $\frac{1}{30} = +8.5229$
" $\sec \delta_0 = +0.0401$
" $\left(\pm \frac{g'}{2} \mp \frac{g}{2}\right) = -2.9474$
" $\tan^{-2} \zeta = +0.8407$
" $\sin 2q = +9.~~6883~~$ 7166
~~-0.030~~ $= -$~~8.4730~~
-0.03 $\quad$ n 8.5015

$\log K = +6.4336$
" $\left(\pm \frac{g}{2} \mp \frac{g}{2}\right) = -2.9474$
" $\tan^2 \zeta = +0.8407$
" $\sin^2 q = +8.~~8050~~$ 8646
~~0.106~~ $= -$~~9.0267~~
-0.12 $\quad$ n 9.0863

$\log K = +6.4336$
" $(d' - d) = -2.745~~2~~4$
" $\tan^2 \zeta = +0.8407$
" $\cos 2q = +9.9~~410~~$ 312
-0.89 $-$ ~~0.913~~ $\quad = -$~~9.9605~~
-1.01 $-$ ~~0.106~~ $\quad$ n 9.9509
~~-1.019~~ = cor in Dec.

Comet Cruls

Feb 1, 1883

$\delta = 64.8$

Log cos φ = 9.8684
" sin t = +9.1943
+9.0627

* in N ε in S.

+9.9566
+9.1061

+7.3
+14.6

Log K = 6.4379

H.a. = +0 36
$\Delta\delta$ = -13 18.3
Dec = -21 50

log K +6.4379
" D ~~-2.9474~~
" tan² δ +0.6548
" sin² q +8.2080
-0.02 -8.2481

Log K = +6.4379
" 1/30 = +8.5[illegible]29
" sec δ = +0.0323
" $\frac{tg'}{\gamma^2}$ $\frac{Tg}{\gamma^2}$ = -2.9474
" tan² δ = +0.6548
" sin 2q = +9.4015
-0.01 n7.9968

log K +6.4379
" ($\alpha'-\alpha$) n2.9022
" tan² δ +0.6548
" cos 2q +9.9857
-0.96 n9.9806
-0.98

Comet Wells

Feb 5, 1883

$\zeta =$ ~~73.9~~ 73.8

Log cos φ = 9.8684
" sin t = +9.8213
+9.6897
" sin ζ = +9.982~~6~~
g = +30.6 = +9.70~~71~~ 73
$2g$ = +61.2

Log k = 6.42~~49~~ 51

σ in S, ✱ in N

H. a = +2 46
Δα = ~~−9 36.6~~ 9. 24.7
Dec = −20 45

Log k = +6.42~~49~~ 51
" 1/30 = +8.5229
" sec δ = +0.0291
" $\left(\pm\frac{g'}{2} \mp \frac{g}{2}\right)$ = −2.9474
" tan² ζ = +1.07~~93~~ 36
" sin 2g = +9.9427
= −8.94 ~~03~~ 08

−0.09 ~~0.088~~

Log K = 6.42~~49~~ 51
" $\left(\pm\frac{g}{2} \mp \frac{g}{2}\right)$ = −2.9474
" tan² ζ = +1.07~~93~~ 36
" sin² 2g = +9.41~~42~~ 36
= −9.8 597

−0.72 ~~0.734~~

For 1st nucleus with Δδ = −9.35.6 −
cor in α = −8.09
in δ = − 1.6

−0.72
−0.89
−1.61

Log K = 6.42~~49~~ 51
" (d′−d) = ~~−1.7602~~ −2.7518
" tan² ζ = +1.07~~93~~ 36
" cos 2g = +9.6828
= −9.94~~71~~ 9.9333

−0.~~09~~ 86 − ~~0.088~~
− 0.734
~~−0.817~~
−1.58
−0.822 = cor in Dec.

✓ · X

Feb. 7, 1883

Comet Cruls

ζ = ~~79.2~~ 78.5

Log cos φ = 9.8684

" sin t = +9.8905

+9.7589 ☾ in N. ✱ in S.

" sin ζ = 9.99~~22~~

+35.~~8~~9 = +9.76~~6~~77

2ψ = +71.~~6~~8

Log K = 6.40~~16~~67

H.a. = +3 24 ✓

Δδ = +11 37.2

Dec. = −20 23 ✓

Log K = +6.40~~16~~67

" 1/3d = +8.5229

" sec δ = +0.0281

" $(\pm\frac{g'}{2}\mp\frac{g}{2})$ = +2.9474

" tan² ζ = +~~1.4370~~ +1.3830

" sin 2ψ = +9.977~~3~~

~~9.3162~~

~~+0.207~~ +0.18 = +9.2658

Log K = 6.40~~16~~67

" $(\pm\frac{g}{2}\mp\frac{g}{2})$ = +2.9474

" tan² ζ = ~~+1.4390~~ +1.3830

" sin² 2ψ = +9.53~~24~~64

~~+2.096~~ = ~~0.3214~~

+1.83 +0.2735

Log K = +6.40~~16~~67

" (d'−d) = +2.8434

" tan² ζ = +~~1.4390~~ +1.3830

" cos 2ψ = +9.49~~92~~46

+1.32 ~~+1.525~~ = +~~0.1832~~

+3.15 +2.096 +0.1217

~~+3.621~~ = cor in Dec.

✓ X

Comet Cruls

Feb. 7, 1883

ζ = ~~79.2~~ 78.5

Log cos φ = 9.8684
" sin t = +9.8905
+9.7589
" sin ζ = 9.99~~22~~ 22
= +9.76~~6~~77 7
+35.~~8~~ 9
2q = +71.~~6~~ 8

Log K = 6.40~~16~~ 67

E in N * in S.

H.A. = +3 24 ✓
$\Delta\delta$ = +11 53.8
Dec = −20 22 ✓

Log K = +6.40~~16~~ 67
" 1/30 = +8.5229
" sec δ = +0.0280
" $\left(\frac{tg'}{2} \mp \frac{g}{2}\right)$ = +2.9474
" tan² ζ = +~~1.4390~~ 1.3830
" sin 2q = +9.977~~4~~ 7
+0.207 = ~~+9.3161~~
+0.18 +9.2657

Log K = +6.40~~16~~ 67
" $\left(\pm\frac{g}{2} \mp \frac{g}{2}\right)$ = +2.9474
" tan² ζ = +~~1.4390~~ 1.3830
" sin² q = +9.53~~84~~ 64
~~+2.096~~ = ~~+0.3214~~
+1.88 +0.2735

Log K = +6.40~~16~~ 067
" (d′ − d) = +2.8536
" tan² ζ = +~~1.4390~~ 1.3830
" cos 2q = +9.49~~46~~ 46
+1.37 ~~+1.561~~ = ~~+0.1934~~
+2.096 +0.1379
3.25
+~~3.657~~ = corr in Dec

X

Comet Culs

Feb 13, 1883

ζ = ~~80.3~~ 79.0

Log K = 6.~~3917~~ 4032

Log cos φ = 9.8684
" sin b ±9.9107   ★ in N. ☉ in S.
+9.7791
" sin ζ = 9.99~~38~~
+37.6 = +9.78~~53~~ 72
2φ = +75.2

H.α = +3 38
Δδ = −10 27.5
Dec = −18 39

Log K = ~~+6.3917~~ +6.4032
" 1/30 = +8.5229
" sec δ = +0.0234
" $\left(\frac{\pm g'}{2} \mp \frac{g}{2}\right)$ = −2.9474
" tan² ζ = +1.43~~43~~ 226
" sin 2φ = ±9.98~~64~~ 61
~~−0.202~~ = ~~−9.3061~~
−0.20 −9.3056

Log K = +6.~~3917~~ 4032
" $\left(\frac{\pm g}{2} \mp \frac{g}{2}\right)$ = −2.9474
" tan² ζ = +1.43~~43~~ 226
" sin² φ = +9.5746
~~−2.208~~ = ~~−1.3440~~
−2.23 = n0.3478

Log K = +6.~~3917~~ 4032
" (α′ − α) = n2.7976
" tan² ζ = ±~~1.5343~~ 1.4226
" cos 2φ = ±9.40~~73~~ 3957
−1.04
~~−1.352~~ = ~~−0.1309~~
~~−2.208~~ n0.0191
~~3.560~~ = corr in Dec.
−3.27

sec p. 123

X

Comet Barnard 1884 II

Aug 14, 1884

$\zeta = 81.2$

Log K = 6.3812

☾ = S, ✱ N

~~Both in Shaft.~~

H.a = +1 23 / −3 55.0

Δδ = ~~+1 59.3~~

Decl = −36 34

$\log\cos\varphi = 9.8684$

" $\sin t = +9.$~~6967~~ 5494

~~.4178~~

~~+9.5651~~

" $\sin\zeta = 9.9949$

$\vartheta +$ ~~21.8~~ 15.7 $= 9.$~~5702~~ .4229

30.8

$2q =$ ~~+43.6~~

~~No refrac. in R.A.~~

log K +6.3812

" $\frac{s}{30}$ +8.5229

" sec δ +0.0952

" D −2.9474

" $\tan^2\zeta$ +1.6204

" sin 2q +9.7093

n9.2764

−0.19

Log K = +6.3812

" $\sqrt{(d'-d)}$ = +2.~~0766~~ 3711

" $\tan^2\zeta$ = +1.6204

" cos 2q = +9.~~8078~~ 9340

~~+0.867~~ = ~~+9.9380~~ +0.3067

+2.03

log K +6.3812

" D −2.9474

" $\tan^2\zeta$ +1.6204

" $\sin^2 Q$ +8.8484

n9.7974

−0.63

~~−2.66~~

+1.40

✓ X

Comet Brooks-Swift

Feb 24 1883

☊ = ~~76.0~~ 74.3

Log K = 6.~~4188~~ 4238

Log cos φ = 9.8684
″ sin t = +9.9974
+9.8658
″ sin δ = 9.98~~69~~ 35
= +9.8~~789~~ 823

q = +49.~~2~~ 7
2q = +~~98.4~~ +99.4

* in N, E in S.

H.A. = +6 25
Δδ = −3 ~~21.1~~ 18.8
Dec = +30 29

Log K = +6.~~3988~~ 4238
″ 1/30 = +8.5229
″ sec δ = +0.0646
″ $\left(\pm\frac{q'}{2}\mp\frac{q}{2}\right)$ = −2.94~~6~~74
″ tan² δ = +~~1.2064~~ 1.1024
″ sin 2q = +9.99~~03~~41
= −~~9.1564~~
−9.0552
~~−0.143~~
−0.11

Log K = +6.~~4188~~ 4238
″ $\left(\pm\frac{q}{2}\mp\frac{q}{2}\right)$ = −2.9474
″ tan² δ = ~~+1.2064~~ 1.1024
″ sin² q = +9.~~7578~~ 7646
~~−2.140~~ = ~~−0.3384~~
−1.73 −0.2382

Log K = +6.~~4188~~ 4238
″ (α′ − α) = −2.~~3084~~ 2985
″ tan² δ = ~~+1.2065~~ 1.1024
″ cos 2q = −9.~~9946~~ 2131
+0.11 ~~+0.124~~ = ~~+9.0933~~
−1.62 ~~−2.140~~ ~~+9.0378~~
~~−2.016~~ = cor in Dec.

✓ X

Comet Brooks-Swift

Feb 26, 1883

$\delta = 72.9$

Log k = 6.4274

Log cos φ = 9.8684
" sin δ = +9.9983

~~"o~~ +9.8667
" sin δ = 9.9804

ψ = 50.3 = +9.8863
2ψ = +100.6

Both in ~~south~~ north half.

H.a. = +6 20
$\Delta\delta$ = +1 13.4
Dec = +31 10

Correction in R.A.

Log K = +6.4274
" $(\alpha' - \alpha)$ = +1.8657
" $\tan^2 \delta$ = +1.0239
" cos 2ψ = -9.2647
~~-0.038~~ = -8.5817
-0.04

✓

Comet Brooks-Swift

Feb 27, 1883

Z = ~~71.5~~ 71.6

Log K = 6.43~~02~~11

Log cos φ = 9.8684
" sin t = +9.9993
+9.8677
" sin Z = 9.97~~70~~57
+9.89~~07~~20

q = +51.~~0~~2 =
2q = +102.~~0~~4

~~Both in N. half 2nd 1st *~~
~~1st * in N. "~~

☾S, *N,

H.a. = +6 13
ΔL = -5 32
Dec = +31 29

Comet S, Star, N half.

Log K = +6.43~~02~~11
" 1/30 = +8.5229
" sec Z = +0.0692
" (±q' ∓ q)/2 = ∓ 2.9474
" tan² Z = +0.9560
" ~~cos~~ sin 2q = +9.9897
-0.08 -8.9163

log K	+6.4311
" D	-2.9474
" tan² Z	+0.9560
" sin² Q	+9.7834
-1.31	-0.1179

log K	+6.4311
" (d'-d)	-2.5211
" tan² Z	+0.9560
" cos 2q	-9.3319
+0.17	+9.2401
-1.14	

Comet Brooks-Swift

Feb 27 1883

✓

ζ = ~~71.5~~ 74.9 ✓

log K = 6.4~~302~~ 221

log cos φ = 9.8684
" sin t = +9.99~~73~~ 55
+9.86~~47~~ 39
" sin ζ = 9.97~~70~~ 47
= +9.8~~907~~ ~~86~~ 882

q = +51.~~0~~ 6
2q = +~~102.0~~ 103.2

☄ s * n ;
* n. outside, ☄ s. inside
see B2 P212

+6 33 ✓
R.a = ~~+6 13~~
Δζ = −14 10.5
Dec = +31 29

log K + 6.4221
" $\frac{1}{30}$ + 8.5229
" sec δ + 0.0692
" D n 2.9474
" tan² ζ + 1.1378
" sin 2q + 9.9884
−0.12 −9.0878

lg K + 6.4221
" D n 2.9474
" tan² ζ + 1.1378
" sin² q + 9.7882
−1.97 − 0.2955

lg K + 6.4221
" (α′ − α) − 2.9297
" tan² ζ + 1.1378
" cos 2q − 9.3586
+0.70 + 9.8482
−1.27

✓ X

Comet Brooks-Swift

Feb 28, 1883

Z = ~~86.7~~ 73.1°

Log cos φ = 9.8684
" sin t = +9.9~~469~~ 978
+9.8~~153~~ 662
" sin Z = 9.9~~493~~ 808
q = +~~42.1~~ 50.2 = +9.~~8260~~ .8854
2q = ~~+84.2~~ 100.4

Log K = 6.~~1604~~ 4269

Both in a half.

H.a = ~~+7 51~~ +6 23 ✓
Δδ = -4 50.9
Dec. = +31 43

No refrac in R.A.

Log K = 6.~~1604~~ 4269
" (δ'-δ) = -2.4637 8
" tan² Z = +~~2.4783~~ 1.0348
" cos 2q = +~~9.0046~~ −9.2565
~~−1.279~~ = −~~0.1070~~
−0.15 −9.1819

Comet Brooks-Swift

Mar. 2, 1883

73.0
ζ -- ~~84.9~~

Log cos φ = 9.8684

278
Cos. sin t = ~~9.9564~~

667
+9.8 ~~248~~ Both in south half.

806
Log sin ζ = 9.99 ~~83~~

50.2
q = ~~42.1~~ = +9.~~8265~~
8856

2q = ~~84.2~~
100.4

+6 23
H.a. = ~~+7 41~~
Δα = −4 4.8
Dec. = +32 0

No refrac. in R.A.

4271
Log K = ~~6.2890~~

4271
Log K = +6.~~2890~~
" (d′-d) = −2.3888
1.0 294
" tan² ζ = ~~+2.0988~~
− 9.2565
" cos 2q = ~~+9.0046~~
~~−0.604~~ = −~~9.7819~~
+0.13 +9.1018

Comet Brooks-Swift

Mar. 4, 1883

$\zeta = 64.3$ ✓

Log K = 6.4382

Log cos φ = 9.8684
" sin t = +9.9968
+9.8652
+9.9548

+54.4 +9.9104

+108.8

☄ S * N

☄ ~~1st * in [illegible] half~~

2 ~~nd * in m. "~~

H.a. = +5 32'

Δζ = −9 20.4

Dec = +32 6'

log K +6.4382
" $\frac{1}{30}$ +8.5229
" sec δ +0.0721
" D n −2.9474
" tan²ζ +0.9528
" sin 2q. +9.9762
−0.08 −8.9096

log K +6.4382
" D n 2.9474
" tan²ζ +0.9528
" sin²q +9.8202
−1.44 −0.1586

log K +6.4382
" (d′−d) −2.7485
" tan²ζ +0.9528
" cos 2q −9.5082
+0.44 +9.6477

−1.00

Comet Brooks-Swift

Mar. 8 1883

Z = ~~70.0~~ 60.3 √

Log $\cos \varphi$ = 9.8684

Log $\sin t$ = +~~9.9999~~ 9.9887

5 7 1

+~~9.8683~~

β = +9.9388

+9.9183

+55.9

+111.8

Log K = 6.4403

~~Both in south half~~

☉ in N. ✱ in S. half.

H.a. = ~~+6 4~~ +5 4 ✓

$\Delta \varphi$ = +10 ~~11.1~~ 17.0

Dec = +31 38 ✓

log K +6.4403

" $\frac{1}{30}$ +8.5229

" $\sec \delta$ +0.0699

" D +2.9474

" $\tan^2 z$ +0.4876

" $\sin 2q$ +9.9907

+0.03 +8.4588

log K +6.4403

" D +2.9474

" $\tan^2 z$ +0.4876

" $\sin^2 q$ +9.8362

+0.51 +9.7115

log K +6.4403

" $(d'-d)$ +2.7903

" $\tan^2 z$ +0.4876

" $\cos 2q$ −9.3107

−0.11 −9.0289

+0.40

Comet Brooks-Swift

Mar. 16 1883

S = ~~62.3~~ 62.4 √

log K = 6.4393

Log cos φ = 9.8684
" sin t = 9.9896 * in S. and E in N.
9.8580
+9.9475
+54.5 +9.9105
+109.0

H.a = +5 10
Δα = +723.2
Dec. = +28° 43

log K	+ 6.4393
" $\frac{1}{30}$	+ 8.5229
" sec δ	+ 0.0570
" D	+ 2.9474
" tan² 3	+ 0.5634
" sin 2q.	+ 9.9757
+0.03	+ 8.5057

log K	+ 6.4393
" D	+ 2.9474
" tan² 3	+ 0.5634
" sin² q	+ 9.8214
+0.59	+ 9.7715
log K	+ 6.4393
" (α′ − α)	+ 2.6466
" tan² 3	+ 0.5634
" cos 2q.	− 9.5126
−0.15	− 9.1619
+0.44	

1882phae.pr0J..502.

Comet Brooks Swift

Mar. 25, 1888

S = ~~6[illegible]~~ 65.1 ✓

log K = 6.4377

log cos φ = 9.8684 ; ☾ in s. half inside.
" sin t = 9.9~~849~~ 900 ; 1st ~~✳ in n. half outside~~;
~~8584~~
q = ~~45.5~~ 52.7 ; = +~~9.8533~~ ; 2nd ✳ " n " inside.
2q = ~~91.0~~ +105.4 ; +9.9576
+9.9008

H. a. = ~~+5 0~~ +5 11 ✓
Δδ = −10 13.3 ✓
Dec = +24 24

log K	+ 6.4377
$\dot{z}_0$	+ 8.5229
sec δ	+ 0.0406
D	− 2.9474
$\tan^2 z$	+ 0.6666
sin 2q	+ 9.9841
−0.04	−8.5993

log K	+6.4377
D	−2.9474
$\tan^2 z$	+ 0.6666
$\sin^2 q$	+9.8012
−0.71	−9.8529

log K	+ 6.4377
(d′−d)	− 2.7877
$\tan^2 z$	+ 0.6666
cos 2q	− 9.4242
+0.21	+ 9.3162
− 0.50	

✓ X

Comet Brooks-Swift

Apr. 25 1883

ℑ = 81.9

Log K = 6.3718

Log cos φ = 9.8684
" sin t = +0.0000
+9.8684
" sin ℑ = 9.9956
= +9.8728

+48.~~2~~3

2φ = +96.~~4~~6

* in N. half
α " δ "

H.a. = +5 57
Δα = −6 21.3
Dec = +11° 9

Log K = +6.3718
" 1/3c = +8.5229
" sec δ = +0.0083
" $(\pm\frac{g'}{2} \mp \frac{g}{2})$ = −2.9474
" tan² ℑ = +1.6935
" sin 2φ = +9.~~0472~~ 9971
~~−0.348~~ = −9.5412
−0.35

Log K = 6.3718
" $(\pm\frac{g}{2} \mp \frac{g}{2})$ = −2.9474
" tan² ℑ = +1.6935
" sin 2φ = +9.74~~56~~62
~~−5.732~~ = −0.75~~83~~89
−5.74

Log K = 6.3718
" (d′−d) = −2.5812
" tan² ℑ = ~~1.6935~~ 0.605
" cos 2φ = 9.~~0672~~
+0.51 — ~~0.494~~ = −~~9.6938~~
~~— 5.782~~ +9.7070
−5.23
~~−6.226~~ = cor. in Dec

Comet Barnard 1884 II

July 25, 18~~8~~4

L = 82.0

log R = 6.3702

Log cos φ = 9.8684
" sin t = +9.5592
+9.4276
" sin L = 9.9958
= +9.4318

q = +15.7
2q = +31.4

☾ in N half inside
* " δ " outside

H.a = +1 25
ΔL = +12 ~~14.3~~ 15.2
Dec = −37 22

log R +6.3702
$\frac{1}{30}$ +8.5229
sec δ +0.0998
D +2.9474
tan² 3 +1.7044
sin 2q +9.7168
+0.23 +9.3615

log R +6.3702
" D +2.9474
" tan² 3 +1.7044
" sin² q +8.8646
+0.77 +9.8866

log R +6.3702
" (d′d) +2.8664
" tan² 3 +1.7044
" cos 2q +9.9312
+7.45 +0.8722
+8.22

Comet Barnard 1884 II.

✓ X

July 28, 1884

$\mathfrak{J} = 83.4$

Log K = 6.3409

Log cos φ = 9.8684
" sin t = +9.6570
+9.5254
" sin $\mathfrak{J}$ = 9.9971
= +9.5283

q = +19.7
2q = +39.4

☄ in S half * in N half

Ha = +1 48
$\Delta\mathfrak{J}$ = −6 55.6
Dec = −37 12

Log K = +6.3409
" 1/30 = +8.5229
" sec $\mathfrak{J}$ = +0.0988
" $\left(\pm\frac{q'}{2} \mp \frac{q}{2}\right)$ = −2.9474
" $\tan^2\mathfrak{J}$ = +1.8733
" sin 2q = +9.8026
= −9.5859
~~−0.385~~
−0.39

Log K = 6.3409
" $\left(\pm\frac{q}{2} \mp \frac{q}{2}\right)$ = −2.9474
" $\tan^2\mathfrak{J}$ = +1.8733
" $\sin^2 q$ = +9.05$\overset{5}{2}$6
~~−1.653~~ = −0.2172
−1.63

Log K = +6.3409
" (d′ − d) = −2.6189
" $\tan^2\mathfrak{J}$ = +1.8733
" cos 2q = +9.8880
−5.26 ~~−5.259~~ = −0.7208
−6.91 ~~−1.653~~
~~6.912~~ = cor in Decl

(See P. 109) ✓

Comet Barnard 1882 II

Aug. 14, 1882

$\zeta = 82.8$

Log K = 6.3551

Log cos φ = 9.8684
〃 sin t = +9.6570
+9.5254
〃 sin ζ = 9.9966
q = +19.7 ~~q~~ = +9.5288
2q = 39.4

~~x' are in S half~~
〃 in S half
+ v in north half

H.a = +1 48
$\Delta\delta$ = +1 59.3 ✓
Dec = −36 34

Log K = +6,3551
〃 1/30 = +8.5229
〃 sec d = +0.0952
〃 $(\pm \frac{q'}{2} \mp \frac{q}{2})$ = −2.9474
〃 tan² ζ = +1.7970
〃 sin 2q = +9.8026
−0.331 = −9.5202

See p 109-

Log K = +6.3551
〃 $(\pm \frac{q}{2} \mp \frac{q}{2})$ = −2.9474
〃 tan² ζ = +1.7970
〃 sin² q = +9.0576
~~−1.436~~ = −0.1551
−1.43

Log K = +6.3551
〃 (d' − d) = +2.0766
〃 tan² ζ = +1.7970
〃 cos 2q = ±9.8880
+1.31
~~+1.308~~ = +0.1167
~~−1.436~~
~~−0.128~~ = cor. in Dec.

−0.12

✓ X

Comet Barnard 1882 II

Aug 15, 1884

$\zeta = 81.3$ ✓

Log K = 6.3800

Log cos φ = 9.8684
" sin t = +9.5782
+9.4466
" sin ζ = 9.9950
= +9.4516

~~C s. half~~. Both in N. half.
~~*e s "~~
~~*f n "~~

$q = +16.4$
$2q = +32.8$

H.a = +1 29 ✓
Δδ = +3 6.2 ✓
Dec = −36 25 ✓

No refrac in R.A.

Log K = +6.3800
" $(\alpha' - \alpha)$ = +2.2700
" $\tan^2 \zeta$ = +1.6305
" $\cos 2q$ = +9.9246
−1.604 = +0.2051

✓ X Comet Barnard 1884 II

Sept 12, 1884

$\zeta = 72.9$

Log $K = 6.4274$

Log cos $\varphi = 9.8684$
" sin $t = 8.7188$
+8.5872
Log sin $\zeta = 9.9804$
= +8.6068

☄ in n half
* " s "

$q = +2.3$
$2q = +4.6$

H.a. = +0 12 ✓
$\Delta\delta = +7\ 22.5$ ✓
Dec. = $-30^\circ\ 36$ ✓

Log $K = +6.4274$
" $1/30 = +8.5229$
" sec $\zeta = +0.0652$
" $(\pm\frac{q}{2} \mp \frac{q}{2}) = +2.9474$
" $\tan^2\zeta = +1.0239$
" $\sin 2q = +8.9042$
~~+0.008~~ = +7.8909
+0.01

Log $K = +6.4274$
" $(\pm\frac{q}{2} \mp \frac{q}{2}) = +2.9474$
" $\tan^2\zeta = +1.0239$
" $\sin^2 q = +$ 7.2076 ~~7.2136~~
~~+0.005~~ = ~~+7.6123~~
+0.00 + 7.6057

Log $K = +6.4274$
" $(\delta' - \delta) = +2.6459$
" $\tan^2\zeta = +1.0239$
" $\cos 2q = +9.9986$
+1.25 ~~+1.247~~ = +0.0958
+1.25 ~~+0.005~~
~~+1.252~~ = cor in Dec

Comet Barnard 1884 II

Sept 13, 1884

ζ = ~~72.6~~ 72.4

Log K = 6.428~~0~~4

Log cos φ = 9.8684
" sin t = ±8.9403
±8.8087
" sin ζ = 9.979~~7~~2
= +8.829~~0~~5

q = +3.9
2q = +7.8

α = in 2. half
[illegible] " " "

H.a. = +0 20
Δδ = −10 27.8
Dec. = −29 ~~39~~ 55

Log K = +6.428~~0~~4
" 1/30 = +8.5229
" sec δ = +~~0.0640~~ 0.0621
" $(\pm\frac{q'}{2} \mp \frac{q}{2})$ = −2.9474
" tan ζ = +~~1.0079~~ 0.9972
" sin 2q = +9.1326
~~−0.013~~ = −~~8.0998~~
−0.01 −8.0966

Log K = +6.428~~0~~4
" tan² ζ = +1.0079
" $(\pm\frac{q}{2} \mp \frac{q}{2})$ = −~~2.9474~~
" sin² q = +~~7.6580~~ 7.6652
~~−0.011~~ = ~~−8.0413~~
−0.01 −8.0489

Log K = +6.428~~0~~4
" (α'−α) = −2.7979
" tan² ζ = +~~1.0079~~ 0.9972
" cos 2q = +9.9960
~~−1.697~~ = −~~0.2297~~
−1.66 −0.2195
− ~~0.011~~

− ~~1.708~~ = corr in Dec.

−1.67

Comet Pons-Brooks 1884 I

3rd obs. Sept. 4, ~~626~~ 188$\overset{3}{\cancel{4}}$

$\mathfrak{Z} = 62.6$

Log K = 6.4392

Log cos φ = +9.8684 E in $\overset{u}{a}$ half.
" sin t = +9.9479 * " a "
~~" sin~~ +9.8163
+9.9483
+9.8680

+47.6
+95.2

H. a = +7 50 ✓
Δδ = +8 2~~6.0~~ 3.2 ✓
Dec = +64 31 ✓

Log K = +6.4392
" 1/30 = +8.5229
" sec δ = +0.3663
" $\left(\pm\frac{q'}{2}\mp\frac{q}{2}\right)$ = +2.9474
" tan² $\mathfrak{Z}$ = +0.5708
" sin 2q = +9.9982
+8.8448 ✓
+0.03

log K +6.4392
" D +2.9474
" tan² $\mathfrak{Z}$ +0.5708
" sin² q +9.7366
+9.6940 ✓
+0.49

log K + 6.4392
" (d′−d) + 2.7018
" sin² $\mathfrak{Z}$ + 0.5708
" cos 2q − 8.9573
− 8.6691 ✓
−0.05
+0.44

Comet Pons-Brooks

4^{th} obs. Sept 4, 188~~4~~3

$\mathcal{S}$ = 62.6

log R = 6.4392

Log cos φ = 9.8684

9.9479

C sin t = ~~1.783~~ 9.983

+9.8163

+9.9483

+9.8680

+47.6

+95.2

Both in n half.

H. a = +7° 50

Δ ∠ = −2 5~~0.7~~ 1.0

Dec. = +64 37

None in R. A.

log R	+6.4392
" (α′−α)	−2.2330
" tan² δ	+0.5708
" sin 2q	−8.9573
+0.02	+8.2003

✓ X

Comet Pons-Brooks

Sept. 26, 188~~4~~3 (2nd)

$\zeta = 74.4$ ✓

Log ~~74.4~~ K = 6.4235

Log cos φ = 9.8684

" sin δ = +9.7212

9.5896

" sin ζ = 9.9837

+23.8 = +9.6059

2φ = +47.6

Both in n half.

H.a. = +9 53 ✓

$\Delta\alpha$ = +4 55.~~7~~5

Dec = +59° 46 ✓

No refrac. in R.A.

Log K = +6.4235

" (d′−d) = ±2.470~~0~~5

" tan² ζ = +1.1082

" cos 2φ = +9.828~~8~~9

+~~0.677~~ +0.68 = +9.830

Comet Pons Brooks
Oct 5 188~~2~~3

Z = ~~64.9~~ 66.0

log K = 6.43~~79~~70

* n, E S.

Dec not certain

+9.8684
+9.9590
+9.8274

+9.9607
+9.8667

+47.4
+94.8

H.a = + 7.6 3.8k ✓
ΔZ = −7 4 $\frac{2.3}{3.2}$ ✓
Dec = + √7 √3 ✓

log K + 6.4370
" $\frac{1}{20}$ + 8.5229
" sec δ + 0.2744
" D − 2.9474
" tan² Z + 0.7028
" sin 2q + 9.9985
−0.07 n8.8830

log K + 6.4370
" D − 2.9474
" tan² Z + 0.7028
" sin² q + 9.7338
−0.66 −9.8210

log K + 6.4370
" (d′−d) − 2.6649
" tan Z + 0.7028
" cos 2q − 8.9226
+0.05 +8.7273
−0.61

Comet Pons-Brooks

Nov. 8, 1884

$\mathfrak{Z} = 65.9$

Log K = 6.4371

Log cos φ = 9.8684
" sin δ = +9.9849

+9.8533

+9.9604

+51.4 +9.8929

+102.8

E in s. half inside
* " " " outside

H.a = +7 0 ✓
$\Delta\delta$ = −13 19.0 ✓
Dec = +51 33 ✓

log K	+6.4371
" $\frac{1}{30}$	+8.5229
" sec δ	+0.2063
" D	−2.9474
" tan² z	+0.6988
" sin 2q	+9.9891
−0.06	−8.8016

log K	+6.4371
" D	−2.9474
" tan² z	+0.6988
" sin² q	+9.7858
−0.74	−9.8691

log K	+6.4371
" (α′−α)	−2.9025
" tan² z	+0.6988
" cos 2q	−9.3455
+0.24	+9.3839
−0.50	

Comet Barnard 1885 II

July 15, 1885

$\mathfrak{Z} = 65.\overset{6}{\cancel{7}}$

6.4373

Comet north, ★ south.

Log cos φ = +9.8684
" sin t = +9.8418

+9.7102

+9.9594

+9.7508

+34.3

+68.6

H.a — +2 56
+6 39.2
Δδ = ~~+11 44.8~~
~~Dec = −6 6~~ −9 28
Dec. = −9° 28

lg	R	+6.4373
	$\frac{1}{30}$	+8.5229
	sec δ	+0.0060
	D	+2.9474
	tan² Z	+0.6866
	sin 2q	+9.9690
+0.04		+8.5692

lg R	+6.4373
D	+2.9474
tan² Z	+0.6866
sin² q	+9.5018
+0.37	+9.5731

lg R	+6.4373
(α′−α)	+2.6012
tan² Z	+0.6866
cos² q	+9.5621
+0.19	+9.2872
+0.56	

Comet Barnard 1885 II

July 17 1885

✓

Z = ~~62.7~~ 62.6

log K 6.4392

Log cos φ = +9.8684

" sin δ = +9.7744

+9.6428

+9.9483

+9.6945

+29.7

+59.4

Both in south half.

Æ.a = +2 26 ✓

Δ L = −1 55.6 ✓

Dec = −10 30 ✓

Pro refrac. in R.A.

Log K = +6.4372

" (δ′−δ) = n 2.0130

" tan² ζ = +0.5708

7068

" cos 2φ = + ~~9.4349~~

8.7778

−0.06 = n ~~9.0059~~

Comet Barnard 1885 II

Aug 6, 1885

$z =$ ~~67.2~~ 66.2

6.4368

Both in north half.

Log cos φ = 9.8684

" sin t = +9.5828

+9.4512

+9.9614

+1.8.0 +9.4898

+36.0

H. a = +1 30 ✓

$\Delta\delta$ = −3 46.3 ✓

Dec = −20 30 ✓

No refrac in R. A.

log R +6.4368

$(\alpha'-\alpha)$ −2.3547

$\sin^2 z$ +0.7110

$\cos 2q$ +9.9080

−0.26 −9.4105

Comet 1885 III Brooks

Sept 2, 1885

ζ = ~~66.5~~ 69.3 ✓

6.4335

log cos φ = 9.8684
C_{11} sin t + 9.9985
+ 9.8669
+ 9.9710
+ 51.9 + 9.8959
+ 103.8

~~Outside in south half~~
~~* inside in " "~~
Comet N, star N

H. a. = + 6, 19 ✓
Δα = + 3 2.9 ✓
Dec = + 36° 36 ✓

~~log K + 6.4335~~
~~$\frac{1}{30}$ + 8.5229~~
~~sec δ + 0.0954~~
~~D~~
~~tan² ζ~~
~~sin 2q.~~

~~lg K + 6.4335~~
~~D~~
~~tan² ζ~~
~~sin² q~~

lg K + 6.4335
(d′-d) + 2.2622
tan² ζ + 0.8454
cos 2q − 9.3775
−0.08 − 8.9186

Comet Brooks 1885 III Brooks

Sept. 6, 1885

$\zeta = 60.7$ √

log K = 6.4401

$\log \cos \varphi = 9.8684$
" $\sin t = +9.9970$
$+9.8654$
$+9.9406$
$+9.9248 = +57.2$
$+114.4$

Both in north half.

$\Delta\alpha =$ ~~$+0\ 31.7$~~ $+5\ 33$
$\Delta\delta = +0\ 31.7$
Dec $= +38°\ 29$

No refrac in R.A.

log K $+6.4401$
" $\Delta\delta$ $+1.5011$
" $\tan^2\zeta$ $+0.5018$
" $\cos 2q$ -9.6161
-0.01 -8.0591

Comet Brooks 1885 III

Sept 6 1885

Z = ~~62.7~~ 62.0 ✓

log R = 6.4395

Log cos φ = 9.8684
" sin t +9.9988
+9.8672
+9.9459

+9.8213

+56.5°
+113.0

Both in south half.

Δa = +5 43 ✓
Δδ = −4 1.3 ✓
Dec = +38° 30 ✓

No refrac in R.A.

log R	+6.4395
" (d'α)	−2.3825
" tan² z	+0.5486
" cos 2q	−9.5919
+0.09	+8.9625

Comet Brooks 1885 III

Sept 7, 1885

ζ = ~~67.6~~ 72.0 ✓

6.4292

Log cos φ = 9.8684
" sin t = +9.9916
+9.8600
+9.9782
+9.8818 = +49.6
+99.2

Both in north half.

H.a = ~~+6 36~~ +6 45 ✓
$\Delta\delta$ = −2 ~~5~~4 9.6 ✓
Dec = +38 56 ✓

No refrac in R.A.

log k +6.4292
" (d′−d) −2.2295
" tan² ζ +0.9764
" cos 2q −9.2038
+0.07 +8.8389

look up
[illegible] 138

Comet Barnard 1886 II

Dec. 10, 1885

Z = ~~69.0~~ 68.1 ✓

6.4350^{n}

Log cos φ = 9.8684^{n}
ρ″ sin t = 9.4573^{n}
+9.8257^{n}
+9.9675^{n}
~~+46.2~~ +9.8582^{n}
+92.4^{n}

Œ S, ✱ N.
~~Both in north half~~

H.a = +4 20 ✓
Δℒ = −7 ~~50~~ 49.6 ✓^{n}
Dec. +5° 23′ ✓

~~No refrac in R.A.~~

log	K	+6.4350^{n}
	$\frac{1}{30}$	+8.5229
	sec δ	+0.0019
	D	−2.9474
	tan² 3	+0.7916
	sin 2q	+9.9996
	−0.05^{n}	−8.6984^{n}

log K	+6.4350
D	−2.9474
tan² 3	+0.7916
sin² q	+9.7168
−0.78^{n}	−9.8908^{n}

log K	+6.4350
(d′−d)	−2.6718^{n}
tan² 3	+0.7916
cos 2q	−8.6220
+0.03^{n}	+8.5204^{n}
−0.75^{n}	

3 1/4 9 5/4
47 12 35 7
19 8/ro 8 5 3
14 42 32 8 9 1
45 10

Comet Barnard 1886 II

Dec. 10, 1885

Ƶ = ~~69.0~~ 68.1 √

6.4350

Log cos φ = 9.8684
Sin t = 9.4573
+9.8257
+9.9675
~~+46.2~~ = +9.8582
+92.4

☾ S, ✱ N.

~~Both in north half~~

Δα = +4 20 √
Δδ = −7 ~~50~~ 49.6 √
Dec. +5° 23′ √

~~Parallax in R. A.~~

log K	+6.4350		log K	+6.4350
1/30	+8.5229		D	−2.9474
sec δ	+0.0019		tan² 3	+0.7916
D	−2.9474		sin² q	+9.7168
tan² 3	+0.7916		−0.78	−9.8908
sin 2q	+9.9996			
−0.05	−8.6984		log K	+6.4350
			(d′ − d)	−2.6718
			tan² 3	+0.7916
			cos 2q	−8.6220
			+0.03	+8.5204
			−0.75	

Comet Barnard 1886 II

Dec. 10, 1885

Z = ~~69.0~~ 68.1

6.4350

Log cos φ = 9.8684
J'' sin t = 9.4573
+9.8257
+9.9675
~~746.2~~ +9.8582
+92.4

☾ S, ✱ N.
~~Both in north half~~

Δα = +4 20
Δδ = −7 ~~5.0~~ 49.6
Dec. +5° 23′

~~No refrac in R.A.~~

log	K	+6.4350
	$\frac{1}{30}$	+8.5229
	sec δ	+0.0019
	D	−2.9474
	$\tan^2 z$	+0.7916
	sin 2q	+9.9996
	−0.05	−8.6984

log K	+6.4350
D	−2.9474
$\tan^2 z$	+0.7916
$\sin^2 q$	+9.7168
−0.78	−9.8908

log K	+6.4350
(d′−d)	−2.6718
$\tan^2 z$	+0.7916
cos 2q	−8.6220
+0.03	+8.5204
−0.75	

√ X

Comet Barnard 1886 II

~~Dec~~ 10 1885

ζ = ~~72.3~~ 70.7 √

Log K = 6.4~~276~~ 316

Log cos φ = 9.8684
" sin t = ~~9.9757~~ 9.9687
+ 9.8441 9.8371
" sin ζ = 9.9789
φ = + ~~47.2~~ 54.7 = 9.86~~52~~ 522
2φ = + ~~94.4~~ 90.8

α N, ✱ S.

~~Both in north half.~~

H.a. = ~~+4 44~~ 34 √
Δα = +9 46.2 √ = 586.2
~~Dec~~ = +5 18 √

~~No refrac. in R.A.~~

log K +6.4316
1/30 +8.5229
sec δ +0.0019
D +2.9474
tan ζ +0.9114
sin 2φ +0.0000
+0.07 +8.8152

Log K = +6.~~4276~~ 4316
" (α′−α) = +2.7680 √
" tan² ζ = +0.~~9990~~ 9114 1450
" cos 2φ = −8.~~8847~~ 8819

−~~0.118~~ = −~~9.0725~~
−0.02 −8.2560

log K +6.4316
D +2.9474
tan² ζ +0.9114
sin² φ +9.7050
+0.99 +9.9954
+0.97

Dec 10, 1885

Z = ~~69.0~~ 74.0

Log K = 6.4246

~~Both in north half during part of obs~~
~~" " south " " other " " "~~

☾ N, * N

log cos φ = 9.8684
σ_k sin t = +9.9889

+9.8490
+9.9828
+9.8662 = +47.3

+94.6

H. a. = ~~+5 2~~ +5 52
$\Delta\delta$ = +4 27.0
Dec = +5 20

Anything in R.A.

log R +6.4246
(d′−d) +2.4265
tan² 3 + 0.0850
cos 2q − 8.9042

See p.

Comet Barnard 1886 II.

Dec. 11, 1885.

$\zeta = 67.0$ ✓

Log R = 6.4361

same as on Dec 10.

+9.8684

−9.9518

−9.8202

+9.9640

−45.9 −9.8562

−91.8

H.α = $-4^h\ 14^m$ ✓

Δα = −3 √√ ✓

Decl = +√ 27 ✓

Sup 220 + 221

Comet 1886 III

May 1. ~~1885~~ 1886

$\mathcal{Z} =$ ~~6 ...~~ 59.6

Log K = 6.~~3824~~ 4406

Log cos φ = 9.8684
" sin t = −9.~~9923~~ 7376
−9.~~8607~~ 8421
" sin $\mathcal{Z}$ = 9.~~9947~~ 9356
φ = −~~47.3~~ −53.7 = 9.~~8660~~ 9063
2φ = −~~94.6~~ −107.4

Both in north half.

H a = ~~−6 43~~ −4 41
Δ𝓛 = ~~−6 43~~ −3′ 53.2″
Dec = +24 39

No refrac in R.A.

Log K = +6.~~3824~~ 4406
" (d′−d) = −2.3678
" tan² $\mathcal{Z}$ = ~~+1.6104~~ 0.4632
" cos 2φ = −9.4757
~~+0.184~~ +0.06 = ~~+9.2647~~ +8.7473

Comet 188~~8~~6 VII

May 6 1886

ζ = 63.~~5~~4 √

Log K = 6.4388

Log cos φ = 9.8684
Main t = 9.9980

Both in north half

−9.8664
+9.9514
−55.3 −9.9150
−110.6

H.A. = −5 38 ✓
Δδ = −3 24.3 ✓
Dec = +35 19 ✓

no refrac. in R.A.

log K +6.4388
(d′−d) −2.3102
tan²ζ +0.6008
cos²q −9.5463
+0.08 +8.8961

Comet Brooks 1885 V

Dec 28, 1885

$\mathfrak{I} = 7$ ~~1~~ 3 $.8$

Log K = 6.42~~96~~ 51

Log cos φ = 9.8684
" sin δ = +9.9782
+9.8466
" sin $\mathfrak{I}$ = +9.9~~771~~ 824
φ = 47.8 0 = +9.~~8695~~ ~~8225~~ .8642
2φ = ~~+95.6~~ +94.0

Both in ~~north~~ south half.

H.A. = +4 48
Δα = +4 8.0
Dec = +4 29

No refrac in R.A.

Log K = +6.42~~96~~ 51
" (d′-d) = +2.39~~50~~ 45
" tan² $\mathfrak{I}$ = + ~~0.9661~~ 1.07336 .78436
" cos 2φ = -8.~~7816~~
~~-0.059~~ = ~~-8.7723~~
-0.05 -8.7368

✓ X

Comet Brooks 1885 V.

Dec. 28. 1885.

5.
Z = 7~~7~~.8

Log cos φ = 9.8684
" sin t = +9.98~~84~~ 44
6
28
+9.85~~78~~
865
" sin Z = 9.9~~777~~

47.3
+~~48.4~~ = +9.8~~747~~
663
+94.6
2φ = +~~96.8~~

Log K = 6.4~~296~~ 195

Both in south half

H.a. = +4 59 ✓
−1 31.3 ✓
Δ d = ~~+4 58~~
Dec = +4 29 ✓

No refrac in R.A.

Log K = +6.~~4296~~ 4195
" (d′−d) = −1.8014
1.1936
" tan² Z = ±~~0.9661~~
−8.9042
" cos 2φ = ~~9.0789~~

~~+0.019~~ = +~~8.2785~~
+0.02 +8.3187

Comet Brooks 1885 V

Dec. 28, 1885

769
~~97.2~~
Z = ~~71.8~~

log ~~71.8~~ K = ~~6.4296~~ 136
6.4150

log cos φ = 9.8684
" sin t = ±9.98~~34~~ 83
567
+9.8~~518~~
891
9.9~~717~~

~~47.5~~
~~48.4~~ = 9.87~~91~~
676

2q = +~~96.8~~
+95.0

Both in south half.

5
H.a. = ~~+4 57~~
+1 37
ΔZ = ~~+4 6~~
Dec = +4 29

log cos φ = +9.8684
" sin t. = +9.9874
+9.8558
" sin Z +9.9885
+9.8673 = 47.5
95.0

No refrac in R.A.

See p 267

log K = +6.~~4296~~ 4150
" Δd-d = +1.~~9968~~ 9877
" tan² Z = +0.~~9661~~ +1.2872
" cos 2q = -~~9.0734~~ -8.9403
~~-0.029~~ = -~~8.4656~~
-0.047 -8.6302

X

Dec. 30, 1885

Comet Brooks 1885 V

$\zeta = $ ~~77.2~~ 74.6

Log cos φ = 9.8684
" sin t = +9.9828
+9.8512
" sin ζ = ~~9.9762~~ 9.9841

q = +~~48.6~~ 47.4 = +9.8~~750~~ 671
2q = ~~+97.2~~ +94.8

Both in n half.

Log ~~77.2~~ K = 6.~~4307~~ 4229

H.a = +4 56 ✓
ΔL = −5 47.1 ✓
Dec = +5 33 ✓

No refrac in R.A.

Log K = +6.~~4307~~ 4229   +6.4229
" (d′−d) = −2.5404   −2.5404
" tan² ζ = +~~[illegible]~~ 1.1900   +1.1900
" cos 2q = −~~[illegible]~~ ~~8.9226~~   −8.9226
= +~~8.2991~~
= +~~9.0071~~   +9.0759

+ ~~0.102~~
+ 0.12

✓ X

Dec. 30, 1885

~~Comet Brooks~~ 1885 V

$\zeta =$ ~~[illegible]~~ 66.4

Log cos φ = +9.8684

" sin t = +9.98~~28~~ 950

+9.85~~12~~ 84

" sin ζ = 9.97~~62~~ 621

q = ~~48.6~~ 52.0 = +9.8 ~~750~~ 963

2q = ~~97.2~~ +104.0

Log ~~7+2~~ K = 6.430~~7~~ 66

0 = δ inside × a. inside

H.a = ~~+4 56~~ +5 11 ✓

Δδ = − 12 1.9 ✓

Dec = +5 33 ✓

Log K = +6.430~~7~~ 66

" 1/30 = +8.5229

" sec δ = +0.0~~200~~ 020

" ~~(q′ ∓ q)~~ = −2.9474

" tan² ζ = +0.~~9359~~ 7192

" sin 2q = +9.9966 ~~9.9868~~

~~−0.071~~ −0.04 = ~~−8.8535~~ −8.6150

6.4366
8.5229
0.0020
2.9474
0.7192
9.9869
−8.6150

Log K = 6.43~~07~~ 66

" $\left(\frac{q}{2} \mp \frac{q}{2}\right)$ = −2.9474

" tan² ζ = +0.~~9359~~ 7192

" ~~cos 2q~~ sin² q = ~~+9.7506~~ +9.7930

~~−1.57~~ −0.79 = ~~−0.0640~~ −9.8962

Log K = +6.43~~07~~ 66

" (d′ − d) = −2.8885

" tan² ζ = +0.~~9359~~ 7192 −9.3837

" cos 2q = ~~9.0981~~

~~+0.210~~ +0.25 = +~~9.3233~~ +9.3980

~~1.159~~

~~−0.949~~ −0.54 = cor. for Dec.

Comet Brooks 1885 V

Jan. 1 1886

✓

F = ~~73.1~~ 73.2 ✓

Log K = 6.426~~9~~ 6

+ 9.8684
+ 9.9806 See Book
+ 9.8490
+ 9.9811
+ 47.5 + 9.8679
+ 95.0

Œ N, * S

H. a = +4 52 ✓
ΔL = +9 1.1 ✓
Dec = +6 17 ✓

~~Refrac in R.A~~ (cor.) = +0.12
" " Dec. = +1.3

log K + 6.4266
$\frac{1}{30}$ + 8.5229
sec δ + 0.0026
D + 2.9474
tan² z + 1.0402
sin 2q + 9.9983
+0.09 + 8.9380

log K + 6.4266
D + 2.9474
tan² z + 1.0402
sin² q + 9.7352
+1.41 + 0.1494
log K + 6.4266
(α′-α) + 2.7717
tan² z + 1.0402
cos 2q − 8.9403
−0.15 − 9.1788
+1.26

Comet Brooks 1885 V

✓

Jan. 1 1886 See p 213

ζ = ~~76.9~~ 76.0

Log K = 6.41~~50~~ 88

Log cos φ	+9.8684
" sin t	+9.9883 ~~+9.9904~~
	+9.8567 ~~+9.8588~~
" sin ζ	+9.98~~55~~ 69
q = +47.8 ~~+47.9~~	+9.8698 ~~+9.8703~~
2q = +95.6 ~~+95.8~~	

see Book

☾ S, ✱ S.

H.a = +5h ~~12~~ 07m

Δα = ~~+5 30~~ 5 ~~30~~ 20.9

Dec = +6 ~~23~~ 18

Refrac. in R.A = +0.11

" " Dec = +1.3

Nothing in R.A.

	log k	+6.4188
	(δ'-δ)	+2.5063
	tan² ζ	+1.2064
	cos² φ	-8.9894
-0.13		-9.1209

Comet Brooks 1885 V

May 6, 1886

ζ = ~~63.8~~ 63.9 ✓

☄ N, ✱ N

Log ~~sine~~ cos φ = 9.8684 ~~☄ south, ✱ north.~~

Cosmt t = −9.9982

−9.8666

+9.9533

−55.0 −9.9133

−110.0

Log k, 6.4385

H.a = −5 39 ✓

AΔ = −3 ~~2~~ 4.3

Dec = +35 19 ✓

Num in R.A.

log k	+6.4385
(α′−α)	−2.3102
tan² ζ	+0.6198
cos 2 φ	−9.5341
+0.08	+8.9026

✓ X

Comet 1886 IX

Oct 6, 1886

$Z = 74.9$

Log ~~74.9~~ K = 6.4221

Log cos φ = 9.8684
" sin δ = −9.9743
9.8427
" sin Z = 9.9847
−9.8580

Both in n. half

$q = -46.2$ =
$2q = -92.4$

H.A. = −4 42
$\Delta\delta$ = +2 9.0
Dec = +1 12

No refrac in R. A.

Log K = +6.4221
" $(\delta' - \delta)$ = +2.1106
" $\tan^2 Z$ = +1.1378
−8. ~~0052~~
" cos $2q$ = ~~+9.9996~~
~~9.6701~~

~~−0.019~~ = −~~8.2992~~5
−0.02
−8.2547

✓ X

Comet 1886 IX

Oct 8, 1886

Z = ~~78.0~~ 76.0

Log ~~78.0~~ K = 6.40~~97~~ 218

Log cos φ = 9.8684 Both in S Half.
" sin t = −9.~~6480~~ 9757
−9.~~5164~~ 8441
" sin Z = +9.9~~904~~ 849
q = −~~19.6~~ 46.3 = −9.~~5260~~ 8592
2q = −~~39.2~~ 92.6

H.a = ~~−4 59~~ −4 44
ΔZ = −1 45.6
Dec = +1 32

No refrac in R.A.

Log K = +6.40~~97~~ 218
" (d′−d) = −2.0237
" tan² Z = +1.~~3451~~ 1438
" cos 2q = −~~9.8893~~ 8.6567

−~~0.465~~ +0.02 = ~~−9.6678~~ + 8.2460

Comet Barnard 1887 IV

May 13 1887

✓

✓

ζ = 74.~~8~~7

Log K = 6.422~~4~~6

Both in N. half.

Log cos φ = 9.8684
,, sin δ = 9.5181
9.3865
,, sin ζ = 9.98~~45~~43
−14.6 = −9.40~~20~~22

q = −292

H.a. = −1 17

Δα = −34~~5~~2

Dec = −30 5

No refrac. in R.A.

Log K = +6.422~~4~~6
,, (α′−α) = −2.34~~46~~74
,, tan² ζ = +1.1~~371~~258
,, cos 2q = ±9.9410
~~−0.690~~ = −9.8368
−0.69

Comet Barnard 1887 IV

May 13, 1887

$\zeta = 74.8$

$K = 6.4223$

Log cos φ = 9.8684

" sin t = −9.5181

−9.3865

" sin ζ = +9.9845

$q = -14.6$ = −9.4020

$2q = -29.2$

Both in N half.

~~− 1 10~~

H.A. = ~~− 1 17~~

$\Delta\delta$ = −3 41.1

$\Delta\alpha$ = −30 5

Log K = 6.4223

" $(d'-d)$ = −2.3446

" $\tan^2 \zeta$ = +1.1318

" cos $2q$ = 9.9410

No refrac. in R.A.

see previous page

May 14 1887

X

ζ = ~~74.0~~ 73.6

Log cos φ = +9.8684
" sin t = −9.~~5015~~ 4533
−9.~~3699~~ 3217
" sin ζ = +9.982~~8~~ 0
q = ~~−14.1~~ −12.6 = −9.~~3871~~ 3397
$2q$ = ~~−28.2~~ −25.2

K = 6.42~~46~~ 56
Both in N. half.

H.a. = ~~−1 14~~ −1 6 ✓
$\Delta\delta$ = +4 ~~7.1~~ 6.4 ✓
Dec = −29 37 ✓

No refrac in R.A.

Log K = +6.42~~46~~ 56
" (d′−d) = +2.39~~29~~ 19
" tan² ζ = +1.0~~8850~~ 0.24
" cos 2q = +9.9~~454~~ 566
~~+0.704~~ +0.697 = +~~9.8376~~ +9.8362

May 19 1887

Comet Barnard 1887 IV

$\mathfrak{S}$ = 69.1

K = 6.4338

Both in N half.

+9.8684

−8.9181

−8.7865

+9.9704

−3.8 −8.8161

−7.6

H.A = −0 19

$\Delta\delta$ = +5′ 34.6″

Decl = −26 38

Nothing in R.A.

log K	+6.4338
(δ′−δ)	+2.5245
tan² z	+0.8362
cos² q	+9.9962
.. .. +0.62	+9.7907

Comet 1887 IV Barnard

May 25, 1887

$\mathfrak{S} = 65.9$

log K = 6.4371

+9.8684
-9.2806
-9.1490
+9.9604
-8.9 ✓ -9.1886
-17.8 ✓

HA = -0 44 ✓
Δδ = +6′ 45.5″ ✓
δ = -22 30 ✓
Comet N ✱ S ✓

	log K	+ 6.4371
	$\frac{1}{30}$	+ 8.5229
	sec δ	+ 0.0344
	D	+ 2.9474
	tan² ʒ	+ 0.6988
	sin 2q	- 9.4853
-0.01 ✓		- 8.1259 ✓ ✓

	log K	+ 6.4371
	D	+ 2.9474
	tan² ʒ	+ 0.6988
	sin² q	+ 8.3790
+0.03 ✓		+ 8.4623 ✓

	log K	+ 6.4371
	(d′ - d)	+ 2.5384
	tan² ʒ	+ 0.6988
	cos 2q	+ 9.9787
+ 0.45 ✓		+ 9.6530 ✓
+ 0.48 ✓		

Comet 1887 IV Barnard

May 30, 1887

$z = 64.0$

log k = 6.4384?

+9.8684

−9.5235

−9.3919

+9.9537

−15.9? −9.4382

−31.8?

HA = $-1^h 18^m$?

$\Delta\delta = +2' \; 4.7''$?

$\delta = -18° 51'$?

☉ N, ✱ N.?

No refr. in R.A.

log k	+6.4384
$(\alpha'-\alpha)$	+2.0958
$\tan^2 z$	+0.6236
cos 2q	+9.9294
+0.12?	+9.0872?

Comet Brooks 1887 II

Jan 27 1887

$\zeta = 60.7$

log K 6.4401

+9.8684
+9.4659
+9.3343
+9.9406
+14.3' +9.3937
+28.6'

HA = +10 52'
$\Delta\delta$ = +13 34.8'
δ = +76° 9''

œ N * s'

log K	+6.4401
$\frac{1}{30}$	+8.5229
sec δ	+0.6209
D	+2.9474
$\tan^2\zeta$	+0.5018
sin 2q	+9.6801
+0.05'	+8.7132'

log K	+6.4401
D	+2.9474
$\tan^2\zeta$	+0.5018
$\sin^2 q$	+8.7854
+0.05'	+8.6747'

log K	+6.4401
(d'-d)	+2.9110
$\tan^2\zeta$	+0.5018
cos 2q	+9.9435
+0.63'	+9.7964'

+0.68'

Olbers Comet

Oct 19, 1887

$\zeta = \cancel{73.7}\ 73.9$

$K = 6.42\cancel{57}\ 48$

Both in N half.

H.A. = −5 53 ✓

Δδ = +0 3.2 ✓

Dec. = +22 22 ✓

Log ~~cos~~ φ = +9.8684

" sin t = −9.9998

−9.8682

" sen ζ = +9.982~~2~~ 6

q = ~~−50.3~~ −50.2 = −9.88~~60~~ 56

$2q$ = −100.~~3~~ 4

No refrac in R.A.

Log K = 6.42~~57~~ 48

" d′−d = +0.505~~2~~ 1

" tan² ζ = 1.0~~680~~ 794 865

" cos 2q = −9.252~~4~~ 2

~~−0.002~~ = ~~−7.2513~~

−0.00 −7.2658

X

Olber's Comet

Oct. 21, 1887

$\mathcal{Z} = 76.3$ ✓

K = 6.4175

Both in S half.

$\log \cos \varphi = +9.8684$
$\text{"} \sin t = -9.9999$
-9.8683
$\text{"} \sin \mathcal{Z} = 9.9875$
$q = \cancel{+}-49.5 = -9.8808$
99.0

H.A. = −6 4 ✓
Δα = +3 47.3 ✓
Dec = +21 38 ✓

No refrac in R.A.

$\log K = +6.4175$
$\text{"}\ d'-d = +2.3566$
$\text{"} \tan^2 \mathcal{Z} = +1.2260$
$\text{"} \cos 2q = -9.1943$
~~−0.156~~ $= -9.1944$
-0.16

Olber's Comet

Oct 30, 1887

K = 6.42~~43~~ 35

Both in S half.

ζ = ~~74.1~~ 74.4

log cos φ = +9.8684
" sin ~~δ~~ = −9.9985
−9.8669
" sin ζ = 9.983~~7~~ 2
−9.883~~8~~
q = ~~−49.9~~ −49.8 = −9.8838
2q = ~~99.8~~ −99.6

H.A. = −5 41
Δζ = +4 22.8
Dec = +18 18

no refrac in R.A.

Log K = +6.42~~43~~ 35
" (α′ − α) = +2.4196
" tan² ζ = +1.~~0907~~ 1082
" cos 2q = −9.~~2310~~ 2221
~~9.1656~~
~~−0.146~~ = −9.1734
−0.15

Olbers Comet

Sept 16 1887

$Z = 69.0$ ✓

log. K = 6.4339 ✓

+9.8684

−9.9997

−98681

+9.9702

−52.2 ✓ −9.8979

−104.4 ✓

H.A = −5 52 ✓

$\Delta\delta$ = −14 37.3 ✓

Dec = +30° 3 ✓

ŒS ∗ n ✓

	log K	+ 6.4339
	$\frac{1}{30}$	+ 8.5229
	sec δ	+ 0.0627
	D	− 2.9474
	$\tan^2 z$	+ 0.8316
	$\sin 2q$	− 9.9861
−0.06 ✓		+ 8.7846 ✓

	log K	+ 6.4339
	D	− 2.9474
	$\tan^2 z$	+ 0.8316
	$\sin^2 q$	+ 9.7954
−1.02 ✓		− 0.0083 ✓

	log K	+ 6.4339
	$(\delta'-\delta)$	+ 0.8316 ?
	$\tan^2 z$	− 2.9431 ✓
	$\cos^2 q$	− 9.3957
+0.40 ✓		+ 9.6043 ✓
−0.62 ✓		

Olbers Comet

Jan. 11 1888

ζ = ~~6519~~ 6518 ✓

log K = 6.4372 ✓
☾ S, * N. ✓

+9.8684
−9.9052
−9.7736
+9.9600
−40.6 ✓ −9.8136
−812 ✓

H.A = −3 34 ✓
Δδ ± −9 19.5 ✓
Dec. ± −2 17 ✓

log K	+ 6.4372
$\frac{1}{30}$	+ 8.5229
sec δ	+ 0.0003
D	− 2.9474
tan²ζ	+ 0.6948
sin 2q	− 9.99~~55~~ 49
+0.04 ✓	+8.5975 ✓

log K	+6.4372
D	−2.9474
tan²ζ	+0.6948
sin²q	+9.6268
−0.51 ✓	−9.7062 ✓

log K	+6.4372
(d′−d)	−2.7478
tan²ζ	+0.6948
cos 2q	+9.1847
−0.12 ✓	−9.0645 ✓
−0.63 ✓	

Olber's Comet

Jan. 18. 1888

ℨ = ~~69.6~~ 69.5 ✓

log K = 6.4333'

σ = n, * s,'

H. A. = −3 52 ✓

Δδ. = +17 3.1 ✓

Dec = −3 20 ✓

+9.8684
−9.9284
−9.7968
+9.9716
−42.0' −9.8252
−84.0'

log K	+6.4333
$\frac{1}{30}$	+8.5229
sec δ	+0.0007
D	+2.9474
tan² z	+0.8546
sin 2q.	−9.9976
−0.06'	−8.7565'

log K	+6.4333
D	+2.9474
tan² z	+0.8546
sin² q	+9.6510
+0.77'	+9.8863'

log K	+6.4333
(d − d)	+3.0098.
tan² z	+0.8546
cos 2q.	+9.0192
+0.21'	+9.3169'

+0.98'

X

Comet Sawerthal, 1888 a

Mar. 23, 1888

$\zeta = 75.2$ – '

K = 6.4213

∗ in N, ε in Shalf:

Log cot φ = +9.8684
" sin t = −~~+~~9.9508
−9.8192
" sin ζ = +9.9854
= −9.8338
q = −43.0
2q = −86.0

H.A = −4 13 ✓
$\Delta\delta$ = −9 15.4 ✓
Dec = −6 31 ✓

Log K = +6.4213
" 1/30 = +8.5229
" sec δ = +0.0028
" $\left(\pm\frac{q}{2} \mp \frac{q}{2}\right)$ = −2.9474
" $\tan^2\zeta$ = +1.1560
" sin 2q = −~~9.8436~~ 9.9989
= −~~9.0493~~ +9.0493
−~~0.112~~
+0.11

Log K = +6.4213
" $\left(\pm\frac{q}{2} \mp \frac{q}{2}\right)$ = −2.9474
" $\tan^2\zeta$ = +1.1560
" $\sin^2 q$ = ±9.6676
~~+1.557~~ = −~~+~~0.1923
−1.56

Log K = +6.4213
" d′−d = −2.7449
" $\tan^2\zeta$ = +1.1560
" cos 2q = +8.8436
~~=~~ −0.15
−~~0.146~~ = −~~+~~9.1658
~~+1.557~~
~~+1.411~~ = cor. in Dec.
−1.71

Comet Sawerthal, 1888a

Apr. 6, 1888

$\zeta = 72.25$

$\log\cos\varphi = +9.8684$

$\quad\sin t = 9.9839$

$\quad -9.8523$

$\quad\sin\zeta = +9.9787$

$\quad = -9.8736$

$\varphi = -48.4$

$2\varphi = -96.8$

K = 6.4288
Both in S half.

H.A = −4 58
$\Delta\delta$ = −3 10.5
Dec = +9 ~~22~~ 12

No refrac in R.A

$\log K = +6.4288$

$\quad(\delta' - \delta) = -2.2799$

$\quad\tan^2\zeta = +0.9868$

$\quad\cos 2\varphi$ = −9.0734 ~~+9.8221~~

~~−0.329~~ = ~~−9.5176~~

+0.06 +8.7689

Comet Sawerthal 1888a

Apr. 16, 1888

66.5✓

$\angle\zeta$ = ~~66.5~~

/

log K = 6.4366✓

☄ N, ✱ S✓,

+9.8684

−9.8823

−9.8507

+9.9624

− 50.6✓ −9.8883

− 101.2✓

~~H. A.~~ = −4 55✓

Δδ = +7 ✓5.7✓

Dec. = +17 44✓

log K	+ 6.4366
$\frac{1}{30}$	+ 8.5229
sec δ	+ 0.0211
D	+ 2.9474
tan² ζ	+ 0.7234
sin 2q	− 9.9916 ·3
−0.04✓	− 8.6430✓

log K	+ 6.4366
D	+ 2.9474
tan² ζ	+ 0.7234
sin² q	+ 9.7760
+0.76✓	+ 9.8834✓

log K	+ 6.4366
(d′−d)	+ 2.6773
tan² ζ	+ 0.7234
cos 2q	− 9.2883
−0.13✓	− 9.1256✓
+0.63✓	

Apr. 24/1888

Comet Sawerthal

ζ = ~~63.5~~ 66.3 ✓

log K = 6.4367

☌ N, ✳ N,

+ 9.8684
− 9.9839
− 9.8523
+ 9.9647
−51.0 −9.8906
−102.0

H. A. = −4 58 ✓
Δδ = −0 35.8 ✓
Dec. = +23 15 ✓

No ref. in R.A.

log K	+6.4367
(α′−α)	−1.5539
tan 23	+0.7152
cosec 2q	−9.3179
+0.01	+8.0237

X

Comet Sawerthal

June 29, 1888

ζ = ~~73.0~~ 73.3

Log cos φ = 9.8684
" sin t = −9.9590
−9.8274
" sin ζ = +9.98~~06~~ 13
−9.846~~8~~ 1
q = −44.6
2q = −89.2

K = 6.42~~71~~ 64

σ in N ★ in S half.

H.A. = −7 38
Δδ = +11 34.8
Dec = +47 33

Log K = +6.42~~71~~ 64
" 1/30 = +8.5229
" sec ζ = +0.1707
" $\left(\pm\frac{q}{2} \mp \frac{q}{2}\right)$ = +2.9474
" tan² ζ = +1.0~~293~~ 458
" sin 2q = ~~±9.0000~~
~~+0.125~~ = ~~9.0974~~
− 9.1132
−0.137
~~0.125~~ = cor in R.A.

'54.0

Log K = +6.42~~71~~ 64
" $\frac{\pm q}{2} \mp \frac{q}{2}$ = +2.9474
" tan² ζ = +1.0~~293~~ 458
" sin² q = +9.69~~30~~ 24
~~1.251~~ = ~~−0.0974~~
~~±0~~ +1.29 +0.1120
Log K = +6.42~~71~~ 64
" (d′−d) = +2.8419
" tan² ζ = +1.~~0293~~ 0458
" cos 2q = +8.1450
+0.03
+ ~~0.028~~ = +~~8.4433~~
−~~1.251~~ +8.4591
−~~1.223~~ = corr in Dec.
+1.32

Comet e ~~888~~ Barnard.

Oct. 29, 1888.

$\mathcal{S}$ = ~~62.5~~ 62.6 ✓

log K = 6.4392

☾ S ☼ N

+9.8684
−9.9147
−9.7831
+9.9483
−43.1 −9.8348
−86.2

H.A = −3 41 ✓
Δα = −7 26.9 ✓
Dec = +3 30 ✓

log K	+ 6.4392
$\frac{1}{30}$	+ 8.5229
sec δ	+ 0.0008
D	− 2.9474
tan² ʒ	+ 0.5708
sin 2q.	− 9.9990
+0.03	+ 8.4801

log K	+ 6.4392
D	− 2.9474
tan² ʒ	+ 0.5708
sin² q	+ 9.6692
−0.42	− 9.6266

log K	+ 6.4392
(d′−d)	+ 2.6502
tan² ʒ	+ 0.5708
cos 2q.	+ 8.8213
+0.03	+ 8.4815
−0.39	

Comet ~~e~~ 1888 Barnard

Oct 30, 1888.

ℨ = 62.6 ✓

log k = 6.4392″
α N ✳ N,″

+9.8684
−9.9134
−9.7818
+9.9483
−43.0 −9.8335
−86.0″

H.A. = −3 40 ✓
Δδ = −1 37.5
Dec. = +3 14 ✓

No ref. in R.A.

log k	+6.4392
(α′−α)	−1.9890
$\tan^2 ℨ$	+0.5708
$\cos 2q$	+8.8436
−0.01″	−7.8426″

Comet e 1888 Barnard.

~~Oct~~ Nov. 14, 1888

$\zeta = 66.9$ ✓

log R = 6.4362

☌ N ✱ N.

+9.8684
−9.9186
−9.7870
+9.9637
−41.7 −9.8233
−83.4

H.A. = −3 44 ✓
Δδ = +0 39.4 ✓
Dec. = −1 29 ✓

None in R.A.

log R.	+6.4362
($\alpha'-\alpha$)	+1.5988
$\tan^2 \zeta$	+0.7400
$\csc 2q$.	+9.0605
+0.01	+7.8355

Comet 2 1888 Barnard

Nov. 14 1888

$\zeta = 63.9$ ✓

Log. K = 6.4385' ...

α N * N',

H. A = −3 26 ✓

Δδ = +0 28.8' ✓

Dec. = −1 30 ✓

+9.8684'
−9.8935'
−9.7619'
+9.9533'
−40.1' −9.8086'
−80.2'

Term in R.A.

log K − +6.4385
(d'−d) +1.3802
tan ζ +0.6198
sin 2q. +9.2310
+0.00' +7.6695'

Comet 2/1888 Barnard

~~Dec. 22 1888~~

G = ~~77.8~~ 78.9 ✓

K = 6.~~3965~~ 4039

Both in N half.

Log cos f = 9.8684
" sin t = +9.9640
+9.8324
" sin G = +9.99~~31~~ 18
= +9.8~~493~~ 506
q = ~~43.7~~ 43.8
2q = ~~87.4~~ 87.6

H.A. = ~~+~~4 28 ✓
Δα = ~~+~~1 58.9 ✓
Dec = −7 40 ✓

Nonrefrac. in R.A. =

Log K = ~~6.3965~~ +6.4039
" (d′ − d) = +2.0752
" tan² G = +1.4~~878~~ 146
" cos 2q = +8.6~~567~~ 220
~~+0.0358~~ = +8.~~5482~~
+0.03 +8.5157

X

Comet 2 1888 Barnard

Jan 3 1889

ζ = ~~73.1~~ 73.0 ✓

K = 6.42~~69~~ 71

Log cos φ = 9.8684
" sin t = +9.9331
+9.8015
" sin ζ = +9.9808
+9.8207

q = +41.4 = +9.8207
2q = +82.8

Both in N half.

H.A. = ~~+~~3 56 ✓
Δδ = −5 2.0 ✓
Dec = −7 7 ✓

No refrac. in R.A.

Log K = +6.42~~69~~ 71
" α′−α = −2.48~~00~~
" tan² ζ = +1.0~~347~~ 294
" cos 2q = ~~+~~9.0981
− 0.11~~0~~ 7 = −~~9.0297~~
−9.0346

Comet e 1888 Barnard.

X

Jan. 19, 1889

$\zeta = 79.6$ ✓

K = 6.3982

Both in south half.

$\log\cos\varphi = 9.8684$

$'' \sin\delta = +9.9716$

$+9.8400$

$'' \sin\zeta = +9.9928$

$q = +44.7 \quad = +9.8472$

$2q = +89.4$

H.A. = ~~+~~4 38 ✓

Δα = −0 52.2 ✓

Dec = −6 20 ✓

No. refrac. in R.A.

$\log K = +6.3982$

$'' (d'-d) = -1.7177$

$'' \tan^2\zeta = +1.4725$

$'' \cos 2q \; +8.0200$

$-0.004 \quad = -7.6084$

Comet 2 1888 Barnard.

Jan. 21 1889

78.0
ζ = ~~80.0~~

Log cos φ = 9.8684
" sin t = +9.9~~760~~ 656
9.8~~244~~ 340
4

" sin ζ = 9.9997

q = +~~47.1~~ 44.2 = +9.8~~6471~~ 436

2q = +~~94.2~~ +188.4

~~a″ = 1.2576~~ ☾ N half.
~~Log sin 1″ = 4.6856~~ ✱ S "
~~5.9432~~

H.A. = ~~+5 29~~ +4 30 ✓
Δα = +7 50.5 ✓
Dec = −6 1 ✓

Log K = + ~~5.9432~~ 6.4097
" 1/30 = + ~~8.4~~ 8.5229
" sec δ = + 0.0024
" $\frac{+g}{2} \mp \frac{g}{2}$ = +2.9474
" tan² ζ = + ~~2.9138~~ 1.3450
" sin 2q = +9.99~~88~~
~~+2.131~~ = ~~2.3285~~
+0.17 +9.2272

Log K = +~~5.9432~~ 6.4097
" $\frac{+g}{2} \mp \frac{g}{2}$ = +2.9474
" tan² ζ = ~~+2.9138~~ 1.3450
9.6866
" sin² q = +~~9.7294~~
~~+34.18~~ = ~~+1.5338~~
+2.45 +0.3887

Log K = +~~5.9432~~ 6.4097
" $\frac{\frac{+g}{2} \mp \frac{g}{2}}{\alpha' - \alpha}$ = +2.67~~26~~
" tan² ζ = +~~2.~~ 1.3450
8.4459
" cos 2q = +~~9.8647~~
+0.07
~~−2.487~~ = ~~−0.3943~~
+8.8732
~~+34.18~~
~~+31.70~~ = cor in Dec.
+2.52

Comet c 1888 Brooks

Aug 27, 1888

$\zeta = 65.0$ ✓

log K 6.4378'

☉'s , ✱ s'

Δ.A = +6 3 ✓

Δδ = −1 ✓2.9

Dec. = +39 42'

+9.8684
+0.0000
+9.8684
+9.9573
+54.6' +9.9111
+109.2'

Term in R.A.

log K	+6.4378
(α′−α)	−2.0526
$\tan^2\zeta$	+0.6626
cos 2ζ	−9.5170
+0.05'	+8.6700'

2nd obs

Comet c 1888 Brooks

Aug 27. 1888

ζ = ~~65~~ ~~70.2~~ 69.4

K = 6.43~~23~~ 34

Both in ζ half.

log cos φ = 9.8684

″ sin t = +9.~~7945~~ 9966

+~~9.6629~~ 9.8644

″ sin ζ = 9.97~~35~~ 32

q = ~~29.3~~ = ~~−9.6894~~

2q = ~~58.6~~ = +9.89~~09~~ 31

q = 51.4

2q = +~~102.2~~ +102.8

No refrac in R.A.

H.A. = +6 31 ✓

Δα = −2 34.2 ✓

Dec = +39 42 ✓

log K = 6.43~~23~~ 34

″ (δ′−δ) = −2.1881

″ tan² ζ = +0.88~~173~~ 500

″ cos 2q = ~~−8.5842~~ −9.3455

~~+0.212~~ +0.066 = ~~+8.0919~~ +8.6170

X Comet c 1888 Brooks

Aug 29, 1888 ✓

ζ = ~~79.4~~ 78.3

K = 6.400~~2~~76

Both in N half.

log cos φ = +9.8684
" sin δ = +9.96~~72~~68
q = +43.~~2~~37 = +9.83~~56~~52
2q = +86.~~4~~6

+9.8809
+9.8443

H.A. = +7 28 ✓
Δδ = +1 34.6 ✓
Dec = +38° 26 ✓

log. K = +6.400~~2~~76
" (d' − d) = +1.9759
" tan² ζ = +1.4~~656~~3676
" cos 2q = +8.~~7979~~7731
~~+0.043~~ = ~~+8.6276~~
+0.033 +8.5242

No refrac in R.A.

Comet c 1888 Brooks

Sept 5, 1888

ζ = ~~79.5~~ 79.7

K = 6.39~~94~~ 83

Both in s half.

Log cos φ = 9.8684
" sin t = +9.9776
= +9.8460
+ 9.9929
+9.8531

φ = +~~44.6~~ 45.5
2φ = +~~89.2~~ +91.0

H.A. = +17 13 ✓
Δδ = −0 51.6' ✓
Dec = +33° 34 ✓

No refrac in R.A.

Log K = +6.39~~94~~ 73
" (δ'−δ) = −1.7126
" tan² ζ = +1.4~~640~~ 812
" cos 2φ = −8.~~7480~~ 2419

~~0.005~~ +0.007 = ~~−7.7207~~ +7.8330

Comet c 1888 Brooks

Sept 6, 1888

$\mathcal{J}$ = ~~61.4~~ 61.5 ✓

log K = 6.4398'
☄ N, ✱ N.'

+9.8684
+9.9927
+9.8611
+9.9439
+55.7' +9.9172
+711.4'

H. A. = +5 18 ✓
Δδ = −2 39.4'
Dec. = +32 52 ✓

No ref. in R. A.

log K	+6.4398
(α'−α)	−2.2025
tan² δ)	+0.5304
cos² φ	−9.5621
+0.05'?	+8.7348'

X

Comet c 1888 Brooks

Sept 24 1888

$\zeta = 74.5$ ✓

$\log \cos \varphi = 9.8684$
$\text{"} \sin t = +9.9989$
9.8673
$\text{"} \sin \zeta = +9.9839$
$q = 49.9 \quad = +9.8834$
$2q = +99.8$

$K = 6.4232$
Both in S. half.

$H.A = +5\ 44$ ✓
$\Delta\alpha = -4\ 45.3$ ✓
$Dec = +19\ 0$ ✓

$\log K = 6.4232$
$\text{"} (\alpha' - \alpha) = -2.4553$
$\text{"} \tan^2 \zeta = 1.1140$
$\text{"} \cos 2q = -9.2310$
$+0.167 = +9.2235$

No refrac in R.A.

Comet c 1888 Brooks

Sept 26, 1888

ζ = ~~71.5~~ 71.0

K = 6.430~~2~~ 11

Œ N, * Shaff'

Log sin t = +9.99347
" cos φ = 9.86847
+9.86187
" sin ζ = 9.97~~70~~ 67
φ = +50.~~7~~ 3 = +9.88~~48~~ 61
2φ = +100.~~2~~ 6

H.A. = +5 20
Δα = +3 35.2
Dec = +17 30

Log K = +6.430~~2~~ 11
" 1/30 = +8.5229
" sec δ = +0.0206
" $\pm\frac{g}{2}\mp\frac{g}{2}$ = +2.9474
" tan² ζ = +0.9~~509~~ 260
" sin 2φ = +9.99~~87~~ 25
~~+0.0087~~ 73 = +~~8.8651~~
+0.07 +8.8405

Log K = +6.430~~2~~ 11
" $\pm\frac{g}{2}\mp\frac{g}{2}$ = +2.9474
" tan² ζ = +0.9~~509~~ 260
" sin² φ = +9.7~~676~~ 724
~~+1.254~~ = ~~+0.0981~~
+1.19 +0.0769

Log K = +6.430~~2~~ 11
" (α'−α) = +2.3328
" tan² ζ = +0.9~~509~~ 260 647
" cos 2φ = −9.24~~82~~
−0.09
~~−0.092~~ = ~~−8.9621~~
−8.9546
~~+1.254~~
~~+1.162~~ = corr in Dec.
+1.10

X

Comet a 1888 Brooks.

Oct 8, 1888

ζ = ~~78.8~~ 78.6

K = 6.40~~46~~60

E in S half, * in N half.

Log cos φ = 9.8684

" sin t = +9.9972

+9.8656

" sin ζ = +9.991~~6~~3

ψ = +48.4 5

= +9.874~~0~~3

2ψ = + ~~96.8~~ 97.0

H.A = +5 34 ✓

Δδ = -9 ~~27~~ 26.3 ✓

Dec = +9 50 ✓

Log K = +6.40~~46~~60

" 1/30 = +8.5229

" sec δ = +0.0064

" $\pm\frac{g}{2}\mp\frac{g}{2}$ = -2.9474

" tan² ζ = +1.~~4066~~ 3908

" sin 2ψ = +9.996~~7~~8

~~+0.198~~ 3 = + ~~9.2784~~ ~~1846~~

-0.19 -9.2703

Log K = +6.40~~46~~60

" $\pm\frac{g}{2}\mp\frac{g}{2}$ = -2.9474

" tan² ζ = +1.~~4066~~ 3908

" sin² 2ψ = +974~~80~~90

~~- 3.211~~ = -0.~~5066~~

-3.11 -0.4932

Log K = +6.40~~46~~60

" α' - α = -2.75~~62~~30

" tan² ζ = +1.~~4066~~ 3908

" cos 2ψ = -9.~~0786~~ 0859

-0.43

+ ~~0.436~~ = + ~~9.6398~~

- ~~3.211~~ +9.6359

- ~~2.775~~ = cosin Dec.

-3.54

Comet c 1888 Brooks

Oct 10, 1888.

$\zeta = 78.1$

$\log\cos\varphi = 9.8684$

" $\sin t = +9.9955$

9.8639

" $\sin\zeta = 9.9906$

$= 9.8733$

$q = 48.3$

$2q = 96.6$

$K = 6.4092$

* N. outside, E S inside

H.A $= +5\ 27$

$\Delta\delta = -12$ ~~25.8~~ 21.3

Dec $= +8\ 44$

log K $+6.4092$
$\frac{1}{30}$ $+8.5229$
sec δ $+0.0051$
D $+2.9474$
$\tan^2\zeta$ $+1.3526$
$\sin 2q$ $+9.9971$
$+0.17$ $+9.2343$

log K $+6.4092$
D $+2.9474$
$\tan^2\zeta$ $+1.3526$
$\sin^2 q$ $+9.7462$
$+2.85$ $+0.4554$

log K $+6.4092$
$(\delta'-\delta)$ -2.8700
$\tan\zeta$ $+1.3526$
$\cos 2q$ -9.0605
$+0.49$ $+9.6923$
$+3.34$

Comet f 1888 Barnard

Nov. 1, 1888

$\delta =$ ~~87.4~~ 69.7 ✓

log K = 6.4330^{n}

☌ S, ✱ N.^{n}

+9.8684^{n}

−9.8317^{n}

−9.7001^{n}

+9.9722^{n}

−33.2^{n} −9.7279^{n}

−66.4^{n}

H.A. = −2 51 ✓

$\Delta\delta$ = −11 10.8 ✓

Dec. = −15 2 ✓

log K	+ 6.4330
$\frac{1}{30}$	+ 8.5229
sec δ	+ 0.0151
D	− 2.9474
tan²3	+ 0.8638
sin 2q.	− 9.9821
+0.06^{n}	+ 8.7443^{n}

log K	+6.4330
D	−2.9474
tan²3	+0.8638
sin²q	+9.4768
−0.53^{n}	−9.7210^{n}

log K	+6.4330
(d′−d)	−2.8266
tan²3	+0.8638
sin 2q.	+9.6024
−0.53^{n}	−9.7258^{n}
−1.06^{n}	

Comet b-1882 Barnard

Apr. 2 188~~8~~2

61.8 ✓
S = ~~61.6~~

log K · 6.4400'
☄ N, ✳ N'.

+9.8684'
+9.9582'
+9.8266'
+9.9422'
+50.2' +9.8844'
+100.4'

H.A = +4 21 ✓
Δδ = −4 16.7 ✓
Dec. = ~~+46~~ 3 ✓

Diff in R.A.

log R	+ 6.4400
(α'−α)	−2.4084
sin'z	+0.5160
cos²φ	−9.2565
+0.04'	+8.6209'

Comet b 1889 Barnard

Apr. 6, 1889

δ = $\overset{60.9}{60.8}$ ✓

log K = 6.4400

☌ S, * N.

+9.8684

+9.9555

+9.8239

+9.9414

+49.7 +9.8825

+99.4

H.A = +4 18 ✓

$\Delta\delta$ = −6 16.5 ✓

Dec. = +15 5.5 ✓

log	K	+6.4400
	$\frac{1}{30}$	+8.5229
	sec δ	+0.0170
	D	−2.9474
	tan² 3	+0.5090
	sin 2q.	+9.9941
	−0.03	−8.4304

log K	+6.4400
D	−2.9474
tan² 3	+0.5090
sin² q	+9.7646
−0.46	−9.6610

log K	+6.4400
(d′−d)	−2.5758
tan² 3	+0.5090
cos 2q.	−9.2131
+0.05	+8.7379
−0.41	

Apr. 19, 1889

Comet b 1889 Barnard.

$\zeta = 72.0$ ✓

$K = 6.4292$

+9.8684

+9.9927

+9.8611

+9.9782

+49.8 +9.8829

+99.6

☉ N, * N.

H.A. = +5 18 ✓

$\Delta\delta = -2\ 20.8$ ✓

Dec = +15 30 ✓

Term in R.A.

log K.	+6.4292
$(d^1 - a)$	−2.1485
$\tan^2\zeta$	+0.9764
cos 2q	−9.2221
+0.06	+8.7762

Comet 1889 b Barnard.

Apr. 23, 1889

J = ~~73.8~~ 73.9

K = 6.42~~51~~ 48

E N inside, * S outside

+9.8684

+9.9955

+9.8639

+9.9826

+49.5 +9.8813

+99.0

H. A. = +5h 27

Δα = +13 12.8

Dec = +15 14

log R	+ 6.4248
$\frac{1}{30}$	+ 8.5229
sec δ	+ 0.0155
D	+ 2.9474
tan² J	+ 1.0794
sin 2q	+ 9.9946
+0.10	+8.9846

log R	+6.4248
D	+2.9474
tan² J	+1.0794
sin² Q	+9.7620
+1.64	+0.2136

log R	+ 6.4248
(α′−α)	+ 2.8991
tan² J	+1.0794
cos 2q	−9.1943
−0.40	−9.5976
+1.24	

X

Comet g Borelly 1889

Dec, 16, 1889

$\zeta = \overset{74.9}{\cancel{75.0}}$ ✓

$K = 6.42\overset{21}{\cancel{18}}$

Log cos φ = 9.8684
" sin t = +9.9616
+9.8300
" sin ζ = $9.984\overset{7}{\cancel{9}}$
γ = +44.4 = $+9.845\underset{3}{\cancel{10}}$
2γ = +88.8

Both in S half.

H.A. = +7 35 ✓
$\Delta\delta$ = − 2 32.1 ✓
Dec = $+44^\circ\ 35'$ ✓

No refrac in R.A.

Log K = $+6.42\overset{21}{\cancel{18}}$
" $(\delta' - \delta)$ = −2.1821
" $\tan^2\zeta$ = $+1.1\overset{378}{\cancel{439}}$
" cos 2γ = ±8.3210
~~−0.012~~ = ~~−8.0688~~
−0.01 − 8.0630

Dec 21, 1889

Comet g 1889 Borelly

ζ = ~~69.4~~ 79.8

log K = 6.3965

☌ N ✱ N

+9.8684
+9.9546
+9.8230
+9.9931
+42.5 +9.8299
+85.0

H. A = +7 43
$\Delta\delta$ = −4 9.5
Dec. = +39

Term in R. A.

log K +6.3965
(d'−a) −2.3971
tan² ζ +1.4898
cos² q_1 +8.9403
− −0.17 −9.2237

X

Dec. 23 1889

Comet g 1889 Borelly

$\zeta = \cancel{+84.0}$ 84.1

$k = 6.32\cancel{31}$ 197

Both in N half.

Log cos φ = 9.8684

" sin t = +9.9342

+9.8026

" sin ζ = +9.9976

$\psi = +\cancel{39.1}$ 39.6 = $+\cancel{9.8002}$ 9.8046

$2\psi = \cancel{78.2}$ 79.2

H.A = +8 3

Δδ = −2 10.7

Dec = +36° 50

No refrac in R.A.

Log k = +6.32~~31~~ 197

" δ′−δ = −2.1163

" tan² ζ = +1.95~~67~~ 714

" cos 2ψ = +~~9.3107~~ 9.2727

~~−0.509~~ = −~~9.7068~~

−2.40 − 0.3801

Comet Brooks 1890a

May 21, 1890

K = 6.4~~296~~ 368

E N inside, ✱ N outside

66.2

ζ = ~~71.8~~

Log cos φ = 9.8684

" sin t = −9.9~~763~~ 516

−9.8~~447~~ 202

" sin ζ = 9.9~~777~~ 614

= −9.8~~670~~ 588

~~For dec~~

Log K

q = ~~−47.4~~ −46.3

2q = ~~−94.8~~ −92.6

H.A = ~~−4 45~~ −4 14

Δα = −5 5.0

Dec = +6 28

Log K = +6.4~~296~~ 368

" (d′−d) = −2.4843

" tan² ζ = +~~0.9662~~ 0.7110

" cos 2q = −8.~~9226~~ 6567

~~+0.063~~ = ~~+8.8027~~

+0.02 +8.2888

No refrac in R.A

~~+0.06~~ in Dec.

X

Comet Brooks 1890 a

~~May~~ 24, 1890

63.3 ✓
ζ = ~~63.2~~
Log cos φ = 9.8684
" sin t = −9.9397
−9.8081
" sin ζ = +9.95~~06~~ 10
q = ~~46.1~~ −46.0 = −9.857~~5~~ 1
$2q$ = ~~92.2~~ −92.0

K = 6.4389
Both in S half.

H.A. = ~~+7~~ −4 2 ✓
Δδ = +1 10.8
Dec = +7 40 ✓

No refrac. in R.A.

log K = +6.4389
" d′−d = +1.8500
" tan² ζ = +0.~~5931~~ 5970
" cos 2q = −8.~~5842~~ 5428
~~−0.003~~ = −~~7.4662~~
−0.00 −7.4287

X

Comet Brook 1890 a

May 30, 1890

K = 6.436~~2~~ 9

Both in N half.

ζ = ~~67.1~~ 66.1

Log cos φ = 9.8684

" sin t = -9.9640

-9.8324

" sin ζ = +9.96~~44~~ 11

= -9.8~~680~~ 713

q = ~~-47.6~~ 48.0

2q = ~~-95.2~~ -96.0

H.A = -4 28 ✓

Δα = -0 15.2 ✓

Dec = +10 20 ✓

No refrac. in R.A.

Log K = +6.436~~5~~ 9

" d′-d = -1.1818

" tan² ζ = +0.~~7484~~ 7070

" cos 2q = ~~-8.957~~ -9.0193

~~+0.002~~ +0.00 = ~~+17.3635~~ +7.3449

X

Comet d 1889 Brooks July 6.

Mar. 17, 1890

$\zeta = 72.1$

$K = 6.4290$

$\odot$ S half, * N half.

$\varphi =$ ~~50.6~~
$2\varphi =$ ~~101.2~~

+9.8684
+9.9976
+9.8660
+9.9785
+9.8875

H.A. = +5 36.4 ✓
$\Delta\delta$ = −9 47.6 ✓
Dec = +20 ~~47.6~~ 37.6

+50.5
±101.0

Log K = +6.4290
" 1/30 = +8.5229
" sec δ = +0.02 ~~79~~ 64
" $\frac{g}{2} \mp \frac{g}{2}$ = −2.9474
" $\tan^2 \zeta$ = +0.9816
" sin 2φ = +9.99 ~~77~~ 19
~~−0.081~~ = − ~~8.9088~~ 8.9012
−0.08

Log K = 6.4290
" $\frac{g}{2} \mp \frac{g}{2}$ = −2.9474
" $\tan^2 \zeta$ = +0.9816
" $\sin^2 \varphi$ = +9.77 ~~54~~ 48
−1.36 ~~0~~ 7 = −0.13 ~~34~~ 28

Log K = +6.4290
" d′ − d = −2.7691
" $\tan^2 \zeta$ = +0.9816
" cos 2φ = − ~~8.3210~~ 9.2806
+0.29
~~+0.032~~ = ~~+8.5007~~ +9.4603
~~−1.360~~
~~−1.328~~ =
−1.07

Refrac. on Comet d checked by comp. with comp. by old formula.

X

Feb 15 1890

Comet Brooks d 1889

$\zeta = 62.0$

$\alpha = \vartheta_1 * N.$

$K = 6.4395$

+9.8684

+9.9607
+9.8291
+9.9459
+9.8832

$\varphi =$ ~~49.9~~ +49.8

$2\varphi = +99.$~~8~~ .6

$H.A = +4\ 24.2$ ✓

$\Delta\alpha = -4\ 33.1$ ✓

Dec. = +15 39 ✓

Log K = +6.4395
" 1/ρ = +8.5229
" sec δ = +0.0164
" $\frac{tg}{2} \mp \frac{g}{2}$ = −2.9474
" $\tan^2\zeta$ = +0.~~3487~~ 5486
" $\sin 2\varphi$ = +9.9939
− ~~0.019~~ = −~~8.2685~~
−0.03 −8.4687

Log K = +6.4395
" $\frac{tg}{2} \mp \frac{g}{2}$ = −2.9474
" $\tan^2\zeta$ = +0.~~3489~~ 5486
" $\sin^2\varphi$ = +9.7660
− ~~0.318~~ = −~~9.5024~~
−0.50 −9.7015

Log K = +6.4395
" d′−d = −2.4365
" $\tan^2\zeta$ = +~~0.3487~~ 0.5486
" $\cos 2\varphi$ = −~~9.2370~~ −9.2221
+0.04
+ ~~0.028~~ = +~~8.4555~~
− ~~0.318~~ +8.6466
− ~~0.290~~
−0.46

X

Feb 12 1890

Comet Brooks d 1889

$\zeta = 62.2$

~~Lo~~

Log. K = 6.4394

α = N, ~~A~~ S,

+9.8684
+9.9607
$\varphi = 49.7$ +9.8291
$2\varphi = +99.6$ +9.9467
+9.8824

Δα = +4 24.0
Δδ = +7 15.4
Dec = +15 7

Log K = +6.4394
" 1/30 = +8.5229
" sec δ = +0.01~~45~~ 53
" $\frac{\pm g}{2} \mp \frac{g}{2}$ = +2.9474
" $\tan^2 \zeta$ = +0.5559
" $\sin 2\varphi$ = +9.9941
+0.03~~8~~ = +8.47~~62~~ 59

Log K = 6.4394
" $\frac{\pm g}{2} \mp \frac{g}{2}$ = +2.9474
" $\tan^2 \zeta$ = +0.5559
" $\sin^2 2\varphi$ = +9.7646
+0.51~~0~~ = +9.7073

Log K = +6.4395
" α′−α = +2 6389
" $\tan^2 \zeta$ = +0.5559
" $\cos 2\varphi$ = −9.2131
−0.07~~0~~ = −8.8474
~~+0.510~~
~~+0.440~~ = cor. in Dec.
+0.44

Comet Brooks 1889d

X

July 25, $18\overset{89}{\cancel{90}}$

$\zeta = \overset{61.7}{\cancel{64.8}}$

$K = 6.4396$

∝ N, * S.

$+9.8684$
-9.8058

$\varphi = -32.4 \quad -9.6742$
$2\varphi = -64.8 \quad +9.9447$
-9.7295

H. A. = −2 39.1 ✓
Δδ = +6 53.6 ✓
Dec = −7 28 ✓

$\log K = +6.4396$
$\text{''}\ 1/3c = +8.5229$
$\text{''}\ \sec\delta = +0.0037$
$\text{''}\ t\tfrac{g}{2} \mp \tfrac{g}{2} = +2.9474$
$\text{''}\ \tan^2\zeta = +0.54\overset{378}{\cancel{13}}$
$\text{''}\ \sin 2\varphi = -9.9566$

~~0.026~~ = ~~−8.3980~~
−0.03 −8.4080

$\log K = 6.4396$
$\text{''}\ t\tfrac{g}{2} \mp \tfrac{g}{2} = +2.9474$
$\text{''}\ \tan^2\zeta = +0.54\overset{378}{\cancel{13}}$
$\text{''}\ \sin^2\varphi = +9.4580$

~~+0.244~~ = ~~+9.3871~~
+0.24 +9.3828

$\log K = +6.4396$
$\text{''}\ d'-d = +2.6166$
$\text{''}\ \tan^2\zeta = +0.54\overset{378}{\cancel{13}}$
$\text{''}\ \cos 2\varphi = +9.6292$

+0.17 + ~~0.168~~ = ~~+9.2267~~
+0.41 + ~~0.244~~ +9.2232
~~+0.412~~

X

Comet Brooks 1889d

Feb. 21 1890

ζ = ~~70.9~~ 26.8 ✓

+9.8684
+9.8916
+9.8600
φ = +50.2 +9.9751
2φ = +100.4 9.8853

Log K = 6.4312

E N, * P.

H.A. = +5 15.1 ✓
$\Delta\delta$ = +6 33.0 ✓
Dec = +16 40 ✓

Log K = +6.4312
" 1/30 = +8.5229
" sec δ = +0.0186
" $\pm\frac{g}{2}\mp\frac{g}{2}$ = +2.9474
" $\tan^2\zeta$ = +~~0.9211~~ 0.9161
28
" sin 2φ = +9.99 ~~31~~
~~+0.043~~ = ~~+8.6343~~
+0.07 +8.8292

Log K = 6.4312
" $\pm\frac{g}{2}\mp\frac{g}{2}$ = +2.9474
" $\tan^2\zeta$ = +~~0.9211~~ 0.9161
" $\sin^2\varphi$ = +9.7 ~~678~~ 710
~~+1.173~~ = ~~+0.0695~~
+1.16 0.0659

Log K = +6.4312
" d′−d = +2.5944
" $\tan^2\zeta$ = +~~0.9211~~ 0.9161
2565
" cos 2φ = −9.~~2682~~
−0.16
~~0.157~~ = ~~−9.1949~~
~~1.173~~ −9.1984
~~+1.016~~
+1.00

Comet Brooks 1889 d

New Values for all dates where difference between old method and Chandler's is appreciable.

	R.A	Dec.
July 20	0	+0.072
" 23	0	−0.06
" 24	0	+0.06
" 25	−0.026	+0.41
Jan 20	0	−0.03
Feb 12	+0.030	+0.440
" 15	−0.019	−0.29
" 20	0	−0.03
" 21	+0.0~~76~~43	+1.02
Mar. 17	−0.080	−1.33
" 18	0	−0.04

Comet Brooks 1885 V.

See p. 147.

Dec 28/85 4th obs.

ζ = 77.8

log cos φ 9.8684 +

" sin t. 9.9896 +

+9.8580

" sin ζ +9.9901

+47.5 = +9.8679

+95.0

Œ N, ✱ N;

HA = +5 10

Δ δ = +1 41.1

Dec = +4 29

Log K = +6.4108

Term in R.A.

log R	+6.4108
(d′-α)	+2.0047
tan² ζ	+1.3302
sin 2q.	−8.9403
−0.05	−8.6860

Comet Cruls. 1882
& Comet Wells 1882
Computation of Proper Motion Cor.

Date	a	d
Sept 30	−0.0017	−0.023
Oct 1	"	"
" 3	−0.0011	−0.020
" 9	−0.0011	−0.018
" 12	−0.0009	−0.017
" 14	"	"
" 19	"	−0.016
" 20	"	"
" 24	−0.0010	−0.015
" 30	−0.00~~45~~11	−0.015
" 30	"	"
Dec 29	−0.0020	+0.005
" 29	"	"
1883 Jan. 12	−0.0016	+.0~~8~~10
" 12	"	"
" 15	"	"
" 23	−0.0011	+0.011
Feb. 1	−0.0008	+0.011
" 5	−0.0007	+0.011
" 5	"	"
Feb 7	−0.0006	+0.011
" 7	"	"
" 13	−0.0005	+0.011
Mar. 7	0	+0.008
" 7	0	"
" 7	0	"
" 13	0	+0.007
" 13	0	0.007
Apr. 2	0	0.005
" 2	0	"
Apr. 6	0	0.005
" 6	0	"

Comet Wells.

Date	a	d
1882 Mar. 19		
" 19		
" 22		
" 22		
" 23		
" 24		
" 25		
" 28		
" 29		
" 30		
" 31		
Apr. 3	1	
" 5	+0.0016	+0.032
" 8	+0.0017	"
" 12	+0.0020	+0.036
" 17	+0.0024	+0.038
" 18	"	+0.039
" 20	+0.0031	+0.041
" 22	+0.0032	"
" 25	+0.0035	"
June 22		
" 26		
" 28		
July 6		
" 7		

C Barnard 1882 III

Date	a	d
1882		
Sept 14		
" 15		
" 16		
" 18		

Brook-Swift 1883

Date	a	d
1883		
Feb 24		
" 26		
" 27		
" 28		
Mar 1	0.0070	0.0050
" 2	"	"
" 4		
" 5		
" 8		
" 16		
" 25		
" 26		
Apr. 25		

Wolf 1884

Date	a	d
1884		
Sept 21		
" 22		
" 26		
" 29		
Oct 1		
" 6		
" 11		
" 13		
" 18		
Nov 6.		

Barnard 1884 II

Date.	a	d
1884		
July 25		
July 28		
Aug 14		
" 15		
" 16		
Sept 12		
" 13		

Comet Pons-Brooks

Date	a	d
Sept 3		
" 4		
" 5		
" 6		
" 7		
" 9		
" 21		
" 22		
" 26		
Oct 1		
" 3		
" 4		
" 5		
" 14		
" 15		
" 16		
" 17		
" 18		
" 30		
Nov 8		
Dec 22		

Date	Brooks, 1885 V
1885	
Dec 28	
" 30	
1886	
Jan 1	
" 5	
May 6	
	Barnard 1885a
July 9	
" 10	
" 11	
" 12	
" 15	
" 17	
Aug 6	
	Barnard 1886 IX
1886	
Oct 6	
" 8	
Nov 25	
	Barnard 1886 II
1885	
Dec. 6	
" 6	
" 7	
" 10	
" 11	
	Brooks 1885 III
1885	
Sept 2	
" 3	
" 6	
" 7	

Date	Brooks 1886 IV
May 28	
June 1	
	Brooks 1886 V
Apr. 30	
May 1	
" 6	
	Brooks 1886 III
May 1	
" 6	
	Barnard 1886 VIII
1887	
Jan 24	
	Comet Fabry 1886 I
1885	
Dec 2	
Dec 3	
Dec 6	
" 7	
" 11	
" 12	
	Barnard 1887 IV
1887	
May 13	
" 14	
" 19	
" 25	
" 30	
June 7	
" 8	
" 13	
" 14	
" 15	

Dates	Barn. '87 IV (con.)
June 25	
" 27	
July 12	
" 12	
1887	Barnard 1887 III
Feb 17	
" 19	
" 25	
" 28	
	Brooks 1887 II
Jan 24	
" 27	
1888	Brooks 1888 C
Aug 27	
" 29	
Sept 5	
" 6	
" 24	
" 26	
Oct 8	
" 16	
	Barnard 1888 e
Oct 29	
" 30	
" 31	
Nov. 1	
" 3	

Date	Barnard 1888 e
Nov 7	
" 12	
" 14	
" 21	
Dec 6	
" 12	
" 14	
" 18	
" 19	
" 22	
1889 Jan 3	
" 19	
" 21	
	Sawerthal 1888 a
1888 Mar. 23	
Apr. 6	
" 16	
" 24	
June 29	
July 5	
	Comet Olber.
1887 ~~O~~	
Oct 19	
" 21	
" 30	
Sept 16	
Jan 11	
" 18	

Date

Barnard 1888 f.

1888
Nov. 1
1889
Jan. 25
" 29
" 30
Feb 1
" 28
Mar. 1
" 7.

Borelly 1889 g.

1889
Dec 16
" 21
" 23

Swift 1889 f.

1889
Nov 18
" 22
" 23
" 26
Dec 13
" 21
" 23

Barnard b 1889.

1889
Apr. 2
" 6
" 19
" 23

Comet Brooks 1885 V.

Jan. 1, 1886. See p 151.

$\zeta = +77.7$

log. cos φ +9.8684 ✓
" sin t. +9.9919 ✓
+9.8603 ✓
" sin ζ +9.9899 ✓
$q = +47.9$ ✓ = +9.8704 ✓
$2q = +95.8$

H.A. ~~+5h 07m~~ +5h 16m
$\Delta\delta$. ~~+5 33.0~~ +5 33.0
δ = ~~+6° 18'~~ +6 20

Log K = +6.4112 ✓
of N, ✱ S.

log K + 6.4112
$\frac{1}{30}$ + 8.5229
sec δ + 0.0027
D + 2.9474
tan² ζ + 1.3230
sin 2q + 9.9978
+0.16 + 9.2050

log K + 6.4112
D + 2.9474
tan² ζ + 1.3230
sin² q + 9.7408 ✓
+2.64 + 0.4224

log K + 6.4112
$(\alpha' - \alpha)$ + 2.5224
tan² ζ + 1.3230
cos 2q − 9.0046
−0.18 − 9.2612
+2.46

Comet 1882 II = Comet Cruls.

Parallax Computations on special ~~at~~ dates,

Oct. 12. 1882.

S. T. = 6 42.7 −12° 14′ 6".39 = 0.8055
R.A. = 10 22.0 +0.8194
H.A. = − 3 39.3 0".353 = 9.5478
n9.5617

Mar. 7. 1883.

S. T. = 7h 49.2 −13° 49′ 6".84 = 0.8351
R.A. = 5 51.0 +0.8490
+1 58.2 0".215 = 9.3324
+9.3463

Mar. 13. 1883.

S. T. = 7h 25.8 −12° 41′ 6".89 = 0.8382
R. A. = 5 51.2 +0.8521
+1 34.6 0".174 = 9.2405
+9.2544

Apr. 2. 1883.

S. T. = 9h 26.8 −9° 34′ 6".32 = 0.8007
R. A. = 5 - 56.4 +0.8146
+3 30.4 0".340 = 9.5315
+9.5454

Apr. 6. 1883.

6".26 = 0.7966
S. T. = 9h 34.8 −9° 3′ +0.8105
R. A. = 5 58.2
+3 36.6 0".348 = 9.5416
+9.5555

Comet 1889 V. July 20, 1889

$\zeta = 63.3'$

log k 6.4388'

☄ S, ✱ S;

log cos φ +9.8684'

» −9.8297'

−9.6981'

+9.9510'

−34.0 = −9.7471'

−68.0'

H.A −2ʰ 50ᵐ

Δδ +2 20.9'

δ −7° 51'

Num in R.A.

log k. +6.4388'

(α'−α) +2.1488'

$\tan^2\zeta$ +0.5970

cos 2q +9.5736

+0.06' +8.7582'

Comet 1889 V. July 23/89

3 = 62.9'

log cos ϕ + 9.8684'

" sin t. − 9.8213'

− 9.6897'

+ 9.9495'

− 33.4 = − 9.7402'

− 66.8

log K = 6.4390'

δ S * S',

H.A. − 2 46'

$\Delta\delta$ − 2 7.1'

δ. − 7 57'

Done

log K	+ 6.4390
(d'−d)	− 2.1041
tan² 3	+ 0.5820
cos 2ϕ	+ 9.5954
− 0.05'	− 8.7205'

Comet 1889 V

July 24, 1889.

3 - 70.7'

+ 9.8684'
− 9.9134'
−9.7818'
+9.9749'
−39.9 = −9.8069'
−79.8

Now

log K = 6.4316'
☄ S   * S'.

HA	−3	40
Δδ	+2	16.8
δ	−7	32

log K	+6.4316
d'−d	+ 2 1361
tan 23	+ 0.9114
cos 2q	+9.2482
+0.05'	+8.7273'

21f

Comet 1886 II Dec 10, 1885 (Leip. (41))

ζ = +73.2'

log φ +9.8684'
" sin t +9.9788'
+9.8472'
" sin ζ +9.9811'
+9.8661'

q = +47.3
+94.6

none in R.A.

log K = +6.4266
α N, ★ N,

H.A. +4 49.0'
Δδ +4 30.0'
δ +5 21'

log K +6.4266
" (δ'−δ) +2.4314
" tan²ζ +1.0402
" cos 2q −8.9042
−0.067' −8.8024

(See p. 141.)

Comet 1886 II; Dec 10/85,

ζ +77°5.0

log φ +9.8684^n
· sin t +9.9839^n
+9.8523^n
· sin ζ
+9.9849^n
q = +47.5 +9.8674^n
+95.0

Min in R.A.

log R = +6.4218
δ S ∗ S.
HA + ~~4~~ 58
Δδ +4 24.0
δ' +5 21

log R	+6.4218
· (α'−α)	+2.4216
· tan^{2}ζ	+1.1438
· cos 2q.	−8.9403
−0.08^n	−8.9275^n

Comet 1886 II ; Dec 11/85.

See p 142

$\zeta = +67.3$

log cos φ $+9.8684^{n}$

sin t -9.9537^{n}

-9.8221^{n}

sin ζ $+9.9650^{n}$

-9.8571^{n}

$q = -46.0$

$2q = -92.0$

Num in R.A.

log R = $+6.4358$

δ S , $*$ S.

H.A. $-4\ 16$

$\Delta\delta$ $-3\ 54.7$

δ $+5\ 29$

log R - $+6.4358$

$(\alpha'-\alpha)$ -2.3705

$\tan^2\zeta$ $+0.7570$

cos $2q$ -8.5428

$+0.01^{n}$ $+8.1061^{n}$

See p 142. Comet 1886 II. Dec 11, 1885.

$\zeta = +66.5$

$\log\cos\varphi$	$+9.8684_n$
$\sin t$	-9.9499_n
	-9.8183_n
$\sin\zeta$	$+9.9624_n$
	-9.8559_n

$q = -45.9$

$2q = -91.8$

Now in R.A.

$\log K = 6.4366$

☄ N, ✱ N.

$\Delta\alpha$	-4	12
$\Delta\delta$	-3	55.2
δ	$+5$	29

	$\log K$	$+6.4366$
	$(\alpha'-\alpha)$	-2.3715
	$\tan^2\zeta$	$+0.7234$
	$\cos 2q$	-8.4971
$+0.01_n$		$+8.0286_n$