KG
11365
924

KG 11365-924

Ex

E. S. King.

KG 11365.92

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Reduction of Measures C. Sm 17

c = −129946
log d = 3.38245 n

c' = −88577
log d' = 3.48387n

Line.	5896.0	5890.0	~~5785.0~~ 5783.3 #	5410.0	5397.3	5172.9	5167.6	5041.6
* Micom. Reading *	16526	16646	18725	27113	27437	33515	33670	37579
x = Dist fr. ## γ	✓+50144	+50024	+47945	+39557	+39233	+33155	+33000	+29151
x + c	−79802	−79922	−82001	−90389	−90713	−96791	−96946	−100795
log x	✓4.70022	4.69918	4.68075	4.59723	4.59365	+4.52055	4.51851	4.46466
(1) log xd	8.08267n	8.08163n	8.06320n	7.97968n	7.97610n	7.90300n	7.90096n	7.84711n
(2) log (x+c)	4.90201n	4.902~~23~~67n	4.91382n	4.95612n	4.95767n	4.98583n	4.98653n	5.00344n
(3) = (1) − (2) = log y	3.18066	3.17896	3.14938	3.02356	3.01843	2.91717	2.91443	2.84367
y	1515.9	1510.0	1410.5	1055.8	1043.4	826.~~3.6~~4	821.2	697.7
λ = 4340.7 + y	5856.6	5850.7	5751.2	5396.5	5384.1	5167.1	5161.9	5038.4
Residuals.	− 39.4	− 39.3	~~− 33.8~~ − 32.1	− 13.5	− 13.2	− 5.8	− 5.7	− 3.2

X = dist fr 5172.9	+16989	+16869	+14790	+6402	+6078	0	− 155	− 4004
~~log X~~ ~~c' = −88577~~	4.2301~~6~~7	4.22~~8~~709	4.16997	3.80632	3.78376		2.19033n	3.60249n
(X + c')	−71588	−71708	−73787	−82175	−82499		−88732	−92581
log X d' (1)	7.7140~~3~~4n	7.71096n	7.65384n	7.29019n	7.26763n		5.67420n	7.08636n
log (X + c') (2)	4.85484n	4.85557n	4.86798n	4.91474n	4.91644n		4.94808n	4.96652n
log y' = (1) − (2)	2.859~~19~~20	2.85539	2.78586	2.37545	2.35119		0.72612n	2.11984n
y'	+723.1	716.8	610.7	237.4	224.5	0	−5.3	−131.8
λ = y' + ~~4461.5~~ 5172.9	5896.0	5889.7	5783.6	5410.3	5397.4	5172.9	5167.6	5041.1
Residuals.	0	− 0.3	~~+ 1.4~~	+ 0.3	+ 0.1	0	0	− 0.5

+0.3 Change made Dec 19 1900 according to Miss Cannon

#ff

Checked by A. J. C. Jan. 11, 1901.

page 84 for wave lengths of α Scorpii
Constants c d & c' d' are from J. S. R.'s Book No. 1, pp 215, 219.

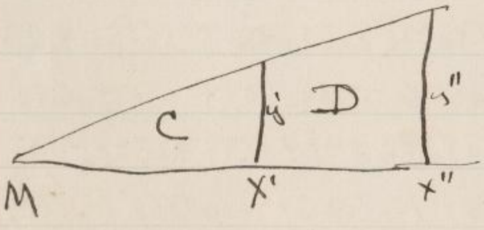
		×			×		×	
4924.6	4920.8	4861.5 Hβ	4668.0	4482.5	Hγ 4340.7	Hδ 4101.8	Hε 3970.2	
41350	41533	43598	51070	59403	66670	81121	90248	33513 16910
+25320	+25137	+23072	+15600	+7267	0	-14451	-23578	16605
-104626	-104809	-106874	-114346	-122679		-144397	-153524	
4.40346	4.40032	4.36309	4.19812	3.86136		4.15990n	4. ~~3~~.37250 n	
7.78591n	7.78277n	7.74554n	7.57557n	2.43381 7.[illegible]n		7.54235	5 7.7~~4~~495 n	
5.01964 n	5.02040n	5.02887 n	5.05822n	5.08877n		5.15956n	5.18618 ~~5.78618~~ n	
2.76627	2.76237	6 2.71~~8~~67	2.51735	.15504 ~~2.25642~~		2.38279n	5 2.~~4~~6877	
583.8	578.6	+520.8	329.1	~~180.5~~ 142.9	0	-241.4	-370.5	
4924.5	4919.3	4861.5	4669.8	~~4340.7~~ 4483.6	4340.7	4099.3 ~~4582.1~~	3970.2	
-0.1	-0.7	0	+1.8	+1.1	0	-2.5	0	

-7835	-8018	-10083	-17555	-25888	-33155	-47606	-56733	-88577 +16605
3.89404 n	3.90407 n	4.00359 n ~~-98660~~	4.24440 n	4.41310 n	5 4.5205~~4~~n	4.67766n	4.75383n	3.48387n 4.22024
-96412	-96595	-98660 ~~-65505~~	-106132	-114465	-121732	-136183	-145310	-71972
7.37791n	7.38794n	7.48746 ~~7.84696~~n	7.72827n	7.89697n	8.00441n	8.16153	8.23770	7.70411n
4.98413 n	4.98495n	4.99414n ~~4.81628~~n	5.02585n	5.05868n	4 5.085~~5~~0n	5.13413n	5.16230n	4.85716n
2.39378n	2.40299n	2.49332n ~~3.03068~~	2.70242n	2.83829n	2.91901n	3.02740n	3.07540n	2.84695n
-247.6	-252.9	-311.4	-504.0	-689.1	-829.9	-1065.1	-1189.6	+703.0
4925.3	4920.0	4861.5	4668.9	4483.8	4343.0	4107.8	3983.3	+5172.9
+0.7	-0.8	0	+0.9	+1.3	+2.3	+6.0	+13.1 ~~-86.9~~	5875.9

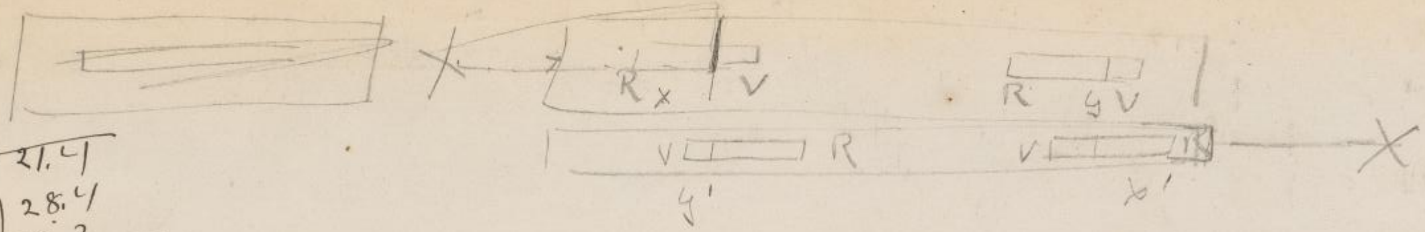
Saturday May 13 1899

By reference to Book 1, page 89. it will be seen that by a numerical example it is shown for a particular prism upon the condition stated, the 2nd diff. of the angles of emergence is nearly constant. Assuming the scale of the plate receiving the rays of monochromatic points to be identical with these angles, we may say that, as the scale at any particular point may be represented as a straight line and the total difference of position by an area bounded by straight lines. A loose sheet made ~~many~~ soon after the original computation is on the opposite page.

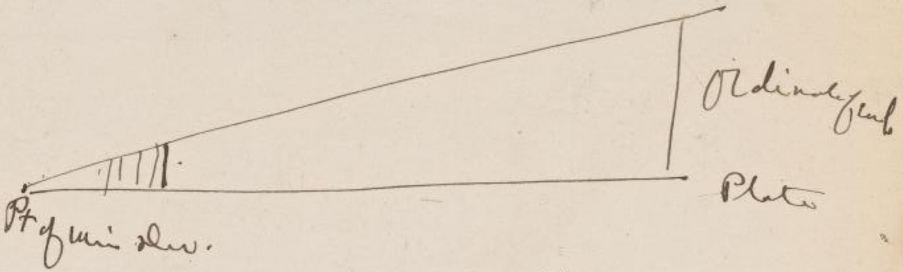
See formulae Book 1 page 89. this is found ~~to~~ give ψ within the limits given, to about 0".2



In diagram y' & y" would ~~represent~~ show ~~equal~~ scale ratio at point x' & x" while areas C. and C+D enclosed by these ordinates represent the total distance from M the point of minimum deviation.



6.0)21.4
)28.4
6.0)1.2.2

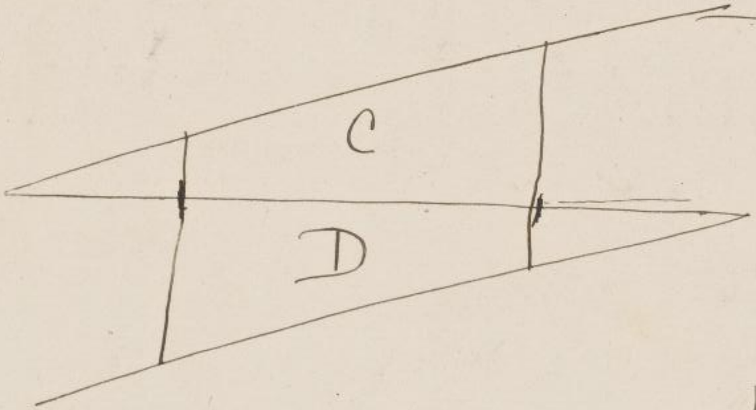


An advantage in that ~~trace~~ total dist. reduced to plate of min. dev.

d + a

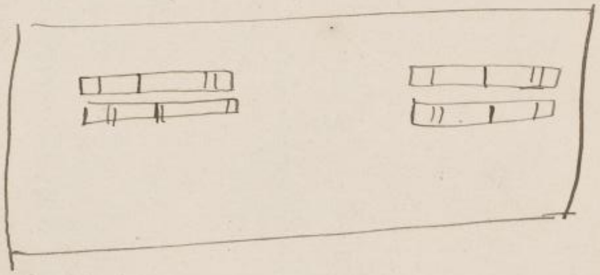
36)1.22
6)0.20
.003

6)21.4
6).036
.006



C − D = diff of dist.

~~C + D = Constant~~.



~~A dist =~~

~~$C = a + bx + cy$~~

~~$D = a' + b'x' + c'y'$~~

795/4
9 7/3
180/7

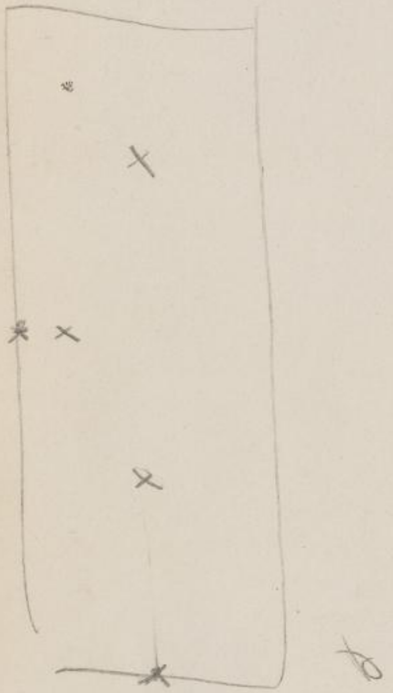
A 180° − A

~~$X + a + bx + cy$~~

~~$X' + a + bx' + cy'$~~

~~$dist = d + bd + c(y' - y)$~~

$dist = d' + bd + c$



~~May~~ Saturday May 13 1899

To prove conclusion in Book 1, page 89

Assume ϕ = 11 17 27.0
4 23 12.5
6° 54′ 14.5

To find ψ. presumably equal to 18° 17′ 27″.0

69 54′.24166
6°.904028
2 ~~7~~ 3.952014

3.555457
0.839102
4.394559

59′ 53″.0
60
3540
53
3593

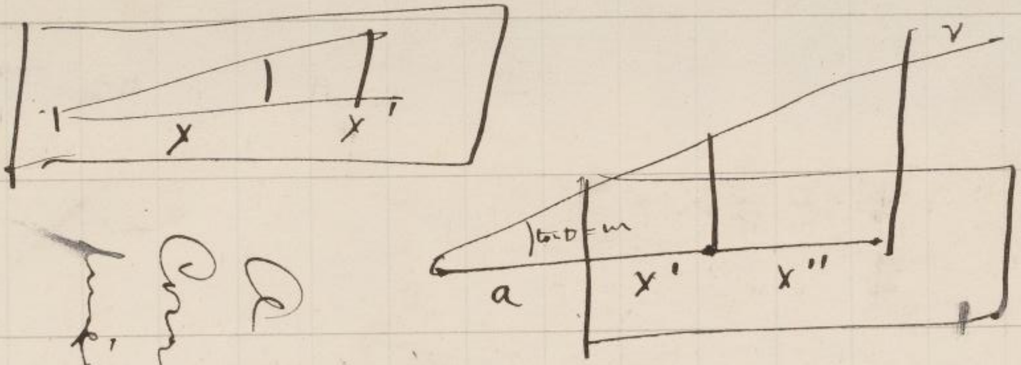
0.5568~~8~~18
1.150449
0.839102
~~0.470118~~
2.586369

24806.1
385.8
69 25191.9
60 419′ 51″.9
6° 59′ 51″.9
~~11~~ 17 27.0
18 17 18.9

sin 4° 23′ 12.5 8.883601
μ = 1.5 0.176091
sin ϕ' 8.707510
ϕ' = 2° 55′ 22.6
ψ' = 12 04 37.4
sin ψ' = 9.320617^8
0.176091
sin ψ 9.496708^9
ψ = 18° 17′ $\overset{7.0}{26.1}$

4

1.0



$$D = m(a+x'')^2 - m(a+x')^2$$

$$= m\left((a+x''+a+x')(x''-x')\right)$$

$$= m(2a+x'+x'')(x''-x')$$

~~= m(b+~~

$$= \left\{2am + m(x'+x'')\right\} x''-x'$$

In this we have a term in m

$$D = a(xy + by)$$

$$= axy + by$$

.0002

153
2.5
15300 min
3700
3
.07400

A rough determination of form of Corona from dist between corresponding fringes in two stars.

$$a + nb + \frac{n(n-1)}{2}c$$

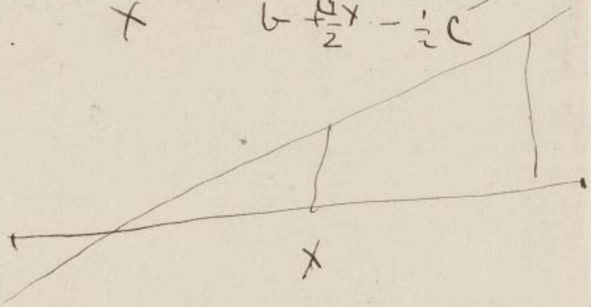
~~$nb +$~~

$$n\left(b + \frac{(n-1)}{2}c\right)$$

$x \quad b + \frac{a}{2}x - \frac{1}{2}c$

| 120° 28.4

120 | 120°.4733 (1:0039
120
473
360
1130
1080
500



2
2
1
2
2
2
0
1
2
3
4
21

11 | 23
.02

.02

75
60

.005

$\frac{1}{200}$ m.m.

200) .51.6
0.25

005
200
1,000

Saturday May 13 1899

sin $18^\circ\ 17'\ 27''$ 9.4967090

log 1.5 0.1760913

sin ϕ' 9.3206177

$\phi' =$ 12° ~~30~~ $04'$ $37''.4$

Tuesday May 16 1899

Measures for C.S.M. No 17 pp 84, 85 & 92 arranged for purpose of using formula derived for χ 8729 (See pp 172) to reduce χ 9184.

λ	α Scorpii χ8729	ε Scorpii p 92 χ8735	Diff. for χ8729	θ Carinae χ9184	Diff for χ8729	Diff χ9184 for χ8735	Diff of χ9184 from χ8729 on assumption that measured line 60258 corresponds to λ5410.0 of α Scorpii
5896.0	49856	49435	+ 421				
5890.0	49976	49583	+ 393				
5785.0	52055	51669	+ 386				
5410.0	60443 60505			60258 **	+ 247 *		+185
5406.0	60567				+ 185 **		
5397.3	60767						
5172.9	66845	66609	+ 236				
5167.6	67000	66770	+ 230				
5041.6	70849	70656	+ 193				
4924.6	74680						
4920.8	74863						
4861.5	76928	76780	+ 148	76875	+ 53	− 95	+ 53
4668.0	84400	84327	+ 73				
4482.5	92733	92718	+ 15				
4340.7	100000	100000	0	100000	0	0	0
4101.8	114451	114426	+ 25	114499	− 45	− 73	− 48
3970.2	* 123578	123908	− 330	123775	− 197	+133	− 197

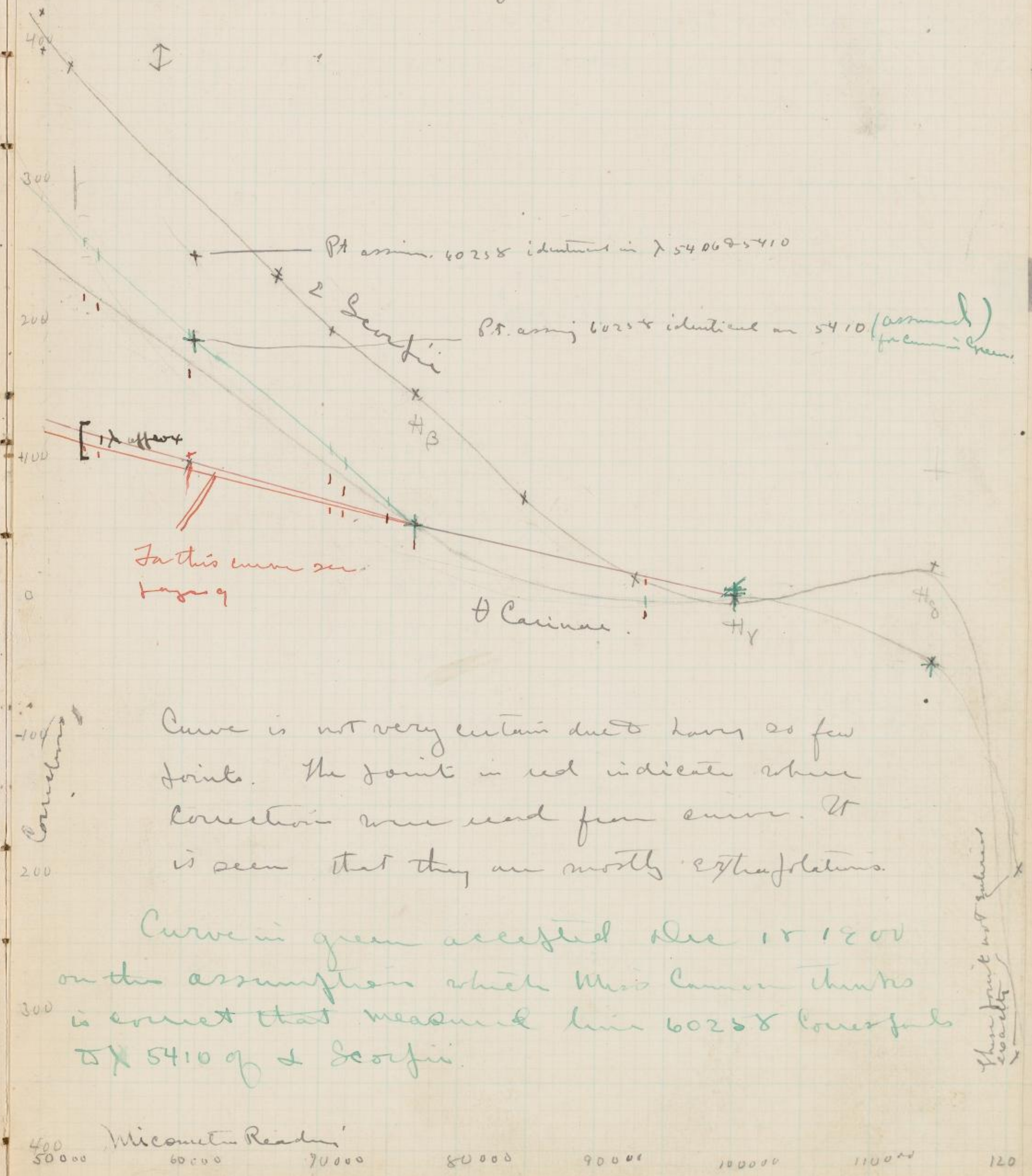
* See note C.S.M. B17 p 84

* assumed identical with 5410 & 5406 (perhaps for mean 5408)

** assumed identical with 5410

Over

Curves of Correction for ε Scorpii & θ Carinae to make available formulae applying to ε Scorpii.



Curve is not very certain due to having so few points. The points in red indicate where corrections were read from curve. It is seen that they are mostly extrapolations.

Curve in green accepted Dec 18 1900 on the assumption which Miss Cannon thinks is correct that measured line 60258 corresponds to ~~λ~~ 5410 of ε Scorpii.

On Jan 29 1901. Accepted value of 5413.6 for Hβ, I assumed that equal to line in θ Carinae measured 60258

λ 5413.6 = λ 5413.9 on plate of α Scorpii.

5
3172.9
y + 241.0
d − 3047.0
d = y − 3288.0 log 2.38202n
4.94733
7.32935n
3.51693
3.81242
x = 6493

66845
6493
60352

66845
60352
+ 6493
− 88577
− 82084

3.81244
3.48387
7.29631
4.91426
2.38205

241.0
5172.9
5413.9

60352
60258
+ 94

Wednesday May 17 1899

Determination of Cor. to measures α Crucis C Sm 17 p 51

λ	X8729	X8997	Diff X8997 of X8729	X8735	Diff X8735 fr X8997
~~5896.0~~	~~58~~				
5875.9	5024 6* 50240#	50206	+40 ~~+36~~	49840 #	−366 ~~634~~
4861.5	76928 ~~77002~~	77002	− 74	76780	−222
4471.8	93318 ##	## 93284	+ 34	93303 #	+ 19
4340.7 γ	100000	100000	0	100000	0
4101.8	114451	114374	+ 77	114426	+ 52
3970.2	123578	123744	−166	123908	+164

← Was intersected, does not interfere

*Corrected for Resid.

after ~~corr~~ computed or obtained from curve p. 9

~~52~~
50240
33330
16910

---

y = 5875.9 − 5172.9 = + 703.0

Computation for x when λ is given (See pp. 92)

$x = \cfrac{\cancel{(\lambda - \lambda_0)\,d}}{\lambda - 5772.9 - c}$ or $\cfrac{\cancel{yd}}{\cancel{y - c}}$

* Computed. $\cancel{x = \cfrac{xd}{x + c}}$

** Computed see Opp. page. $x = \cfrac{cy}{d - y}$

checked = same as page ?

micrometer reading λ5172.9 66845 − 16605 = 50240

x = +16605

y = + 703.0

d = − 3047.0

d − y = − 3750.0

log y = 2.84696 n

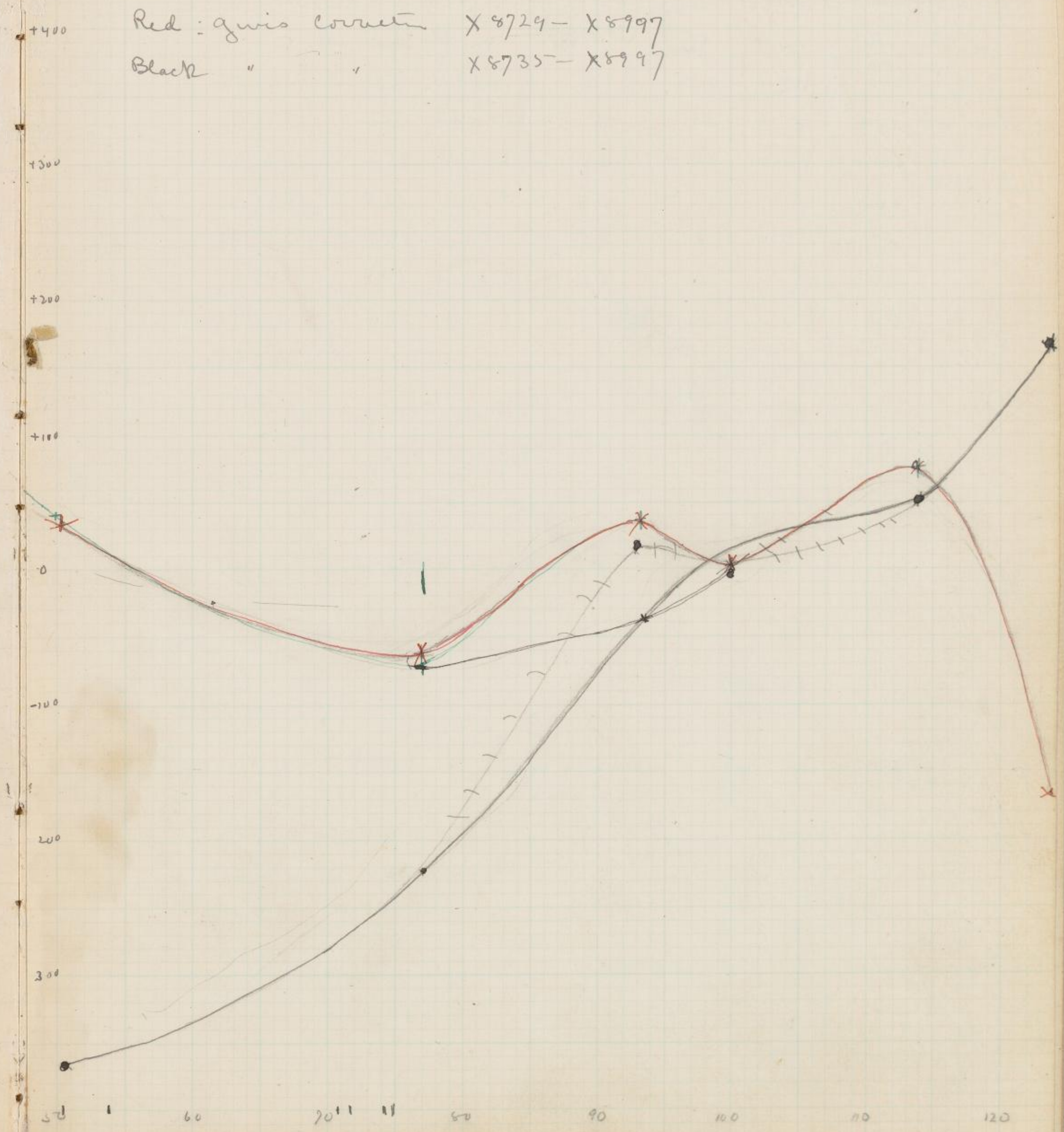
log c = 4.94733 ~~5.11376~~ n

log cy = 7.79429 ~~7.96072~~

log d − y = 3.57403 n

log x = ~~4.38669 n~~ 4 ~~.37~~ 326 n

x = − ~~24360~~ 4.22026


Red : gwis correction X 8729 – X 8997
Black " " X 8735 – X 8997
+400
+300
+200
+100
0
-100
200
300
50
60
70
80
90
100
110
120

Wednesday May 17 1899

Measurem corr. for curves. (See C. 8 M Vol 17 p 51)

	From Black (41)	(4) Stk p. 9.	Black (41)+(4) + R9	Grey Red.	Mean.	~~from~~ Green
50206	−365	+ 402 ~~49841~~	+ 37	+35	+36	+40 ~~+36~~
53789	−356	+ 360 ~~53433~~	+ 4	+12	+ 8	+12
70756	−275	+195	− 80	−58	−69	−60
71725	−268	+188	− 80	−60	−70	−60
74178	−248	+170	− 78	−60	−69	−70
74848	−242	+162	− 80	−60	−70	−70
77002	−222	+148	−74	−60 Slightly warm	−67	−74
73570						

This is entered to the explain of Comparison with 2 Scripts.

~~521~~

50206
36
50242

53789
12
53801

70756
60
70696

71725
60
71665

73578
68
73510

74178
70
74108

74848
70
74778

77002
74
76928

38
19

$y = -701.1$
$d = -3047.0$
$d - y = -2345.9$
$\log y = 2.84578\,n$
$\log c \quad 4.94733\,n$
$\log cy \quad 7.79311$
$\log (d-y) \quad 3.37031\,n$
$\log x \quad 4.42280\,n$

$x = $ 26473
66845
93318

50246
33515
−46731 = x
−88577
−115308 = x+c.
3.48387 n
log x = 4.42702 n
7.91089
log (x+c) 5.06213 n
2.84876 n
5172.9
−705.9
5878.8

50246
33330
16916

93318
33330
59988

.16916
33573
+16599 = x
−88577 = c
~~−105176 x+c~~
−71978 x+c
3.48387 n
log x = 4.22009
7.70396 n
4.85720 n
2.84676
+702.7
5172.9

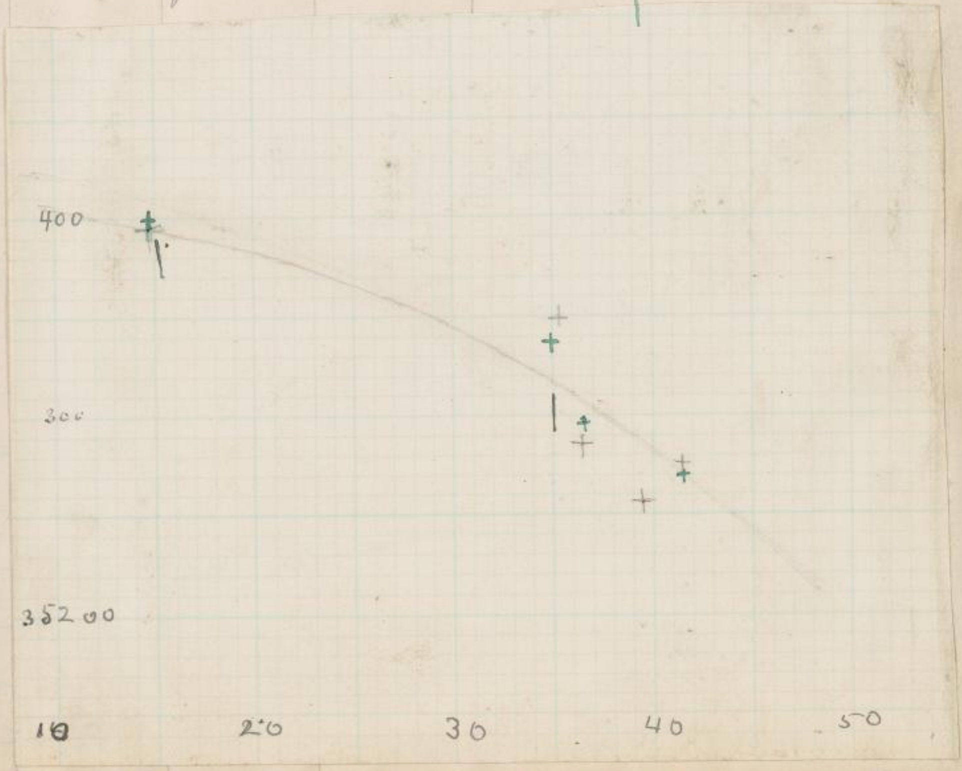
59988
33575
−88577
−26477 x 3
3.48387 n
4.42277 n
−115048
7.90667
5.06087 n
2.84576 n
+5172.9
−701.1
4481.8

Thursday May 18 1899

Reduction of Measures C.S.M. No 17 p. 50.

		(1) C.S.M. No 17 p. 50. α Crucis X8997	(2) Corrected values. C.S.M. No 17 p 57	(2) − (1)	Corrected values.			
	10	14602		(35~~410~~$\overset{395}{04}$)	49997			50002
D_3	9	14848	5024~~8~~6	35394		5024~~1~~6	3539~~4~~8	~~5024~~
	8	15172		(35394)	50566			
	7	35022		(35318)	70340			
	6	35338	706~~87~~96	35349		70696	35358 ✓	
	4	36369	716~~5~~65	35286		71665	36296 ✓	
	1	39522	74778	35256		74778	35256 ✓	
H_3		41658	769~~35~~28	35277		76928	35270	
H_4		94806						

Values in parenthesis derived from curve.



Thursday May 18 1899.

Reduction of X8936 β Columbae.

	x'	y'
H_δ	− 13559	+ 238.9
~~H~~ λ 4482.5	+ 6865	− 141.8
H_β	+ 21780	− 520.8

log y'	2.378216	2.151676 n	2.716671 n
log x'	4.132228 n	3.836641	4.338058
log $\frac{y'}{x'}$	$\bar{2}$.245988 n	$\bar{2}$.315035 n	$\bar{2}$.378613 n
$\frac{y'}{x'}$	−0.0176193	−0.0206555	−0.0239178

Form of Equation $y' + \frac{y'}{x'}c + d = 0$

Eqs
$+238.9 - 0.017619c + d = 0$
$-141.8 - 0.020655c + d = 0$
$-520.8 - 0.023912c + d = 0$

Sum $-423.7 - 0.062186c + 3d = 0$ = 0 (1)

Eqs multiplied Each by Coef. of c.
$-4.20924 + 0.000310c - 0.017619d$ = 0
$2.32653 + 0.00042\overset{7}{6}c - 0.020655d$ = 0
$12.453\overset{2}{3}9 + 0.000572c - 0.023912d$ = 0

Sum. $10.57058 + 0.001309c - 0.06\overset{2}{2}186d$ = 0 (2)

Find c & d from (1) & (2)

Eqs ~~mult~~ Each by :

$(1)\ -141.2 - 0.020729c + d = 0$

May 18, 1899.

Reduction of β Col. (cont.)

10.57058 + 0.001309c − 0.062186 d = 0

log 10.570~~58~~ = 1.024075

log 0.062186 = 8.793693

2.230382 = log 169.973

log 0.001309 = 7.116940

8.793693

8.323247 = log 0.0210400

(2) 169.973 + 0.0210400c − d = 0

(1) − 141.2 − 0.020729 c + d = 0

+ 28.773 + 0.000311 c ~~d~~ = 0

0.000311 c = − 28.773

log −28.773 = 1.458985 n

log 0.000311 = 6.492760

4.966225 n = log c

c = − 92517.6

Substituting in (2)

169.973 + ~~+~~(−92517.6) (0.02104) = d

log c = 4.966225 n

" 0.02104 = 8.323247

3.289472 n = log −1947.47

169.97

~~2117.44~~

log d = 3.249809 n

d = − 1777.50

Friday May 19 1899

Value of d for (1) on preceding page.

log c 4.966225 n
log −.020729 8.316578 n
~~1~~3.282803

+1917.8
− 141.2
+1776.6 + d = 0
d = −1776.6

Friday May 19 1899.

Constants for Reduction of wave lengths α Scorpii
X 8729. Measures C.S.M. 17 p 84.
Variation of work in Book No. 1 p 218.

		x' from $H\beta$	y'
H_{ϵ} 2	123578	$- \overset{4}{\cancel{5}}6650$	+ 891.3
H_{γ}	100000	− 23072	+ 520.8
H_{β}	76928		

log y'	2.950024	2.716671
log x'	4.668852 n	4.363085 n
	8.281172 n	8.353586 n

Eqs

$$+891.3 - 0.0191061\,c + d = 0$$
$$+520.8 - 0.0225728\,c + d = 0$$
$$+370.5 + 0.00\overset{3}{\cancel{2}}4667\,c = 0$$

~~2.568788 n~~
~~7.392116~~
~~5.176672 n~~
~~8.281172 n~~
~~3.457844~~

~~+2869.8~~
~~891.3~~
~~+3761.1~~

2.568788 n
7.539916 ~~n~~
~~.108704~~
5.028872 n
8.281172 n
3.310044

891.3
2041.9
+2933.2

~~5.176672 n~~
~~8.353586 n~~
~~3.530258~~

~~+3390.5~~
~~520.8~~
~~1113~~

5.028872 n
8.353586 n
3.382468

520.8
2412.5
+2933.3

log d 3.467342 n

$d = \overline{*}2933.2$
c = − 106874.

Friday May 19 1899

Computation (continued)

			x' for Hβ	y'
~~Hγ~~				
Hβ	76928			
λ 5172.9	66845	+	10083	− 311.4
λ 5896.0	49856	+	27072	− 1034.5

log y'	2.493319	n	~~2~~3.014730	n
log x'	4.003590		4.432520	
	8.489729	n	8.~~7~~582210	n

Eqs
$-311.4 - 0.0308837\,c + d = 0$
$-1034.5 - 0.0\,\cancel{038213}\,c + d = 0$ (382129)
$+723.1 + \cancel{0.0270624}\,c\ \cancel{+d} = 0$
0.0073~~8~~92 (2)

2.859198
~~8~~7.865057
~~3~~4.994141 n
8.489729 n
~~2~~3.483870 ~~7~~

~~2.859198~~
~~8.432366~~ ~~x~~
~~4.426832~~
8.489729 n
2.916561 n

~~c = +26719.7~~
c = −98660.

~~− 311.4~~
~~− 825.2~~
− 1136.6

~~d = + 1136.6~~

~~3~~4.994141 n
8.682210 n
~~2~~3.576351

~~4.426832~~
~~7.582210 n~~
~~2.009042 n~~

~~−1034.5~~
~~−102.1~~
~~−1136.6~~

~~log d = 3.055608 n~~

d = ~~+~~ 2735.6
log d = 3.437057~~8~~ n

~~+ 304.7~~
~~− 311.4~~
+ 3046.9
− 311.4
+ 2735.5

~~+ 377.0~~
~~−1034.5~~
+ 3770.1
− 1034.5
+ 2735.6

Monday May 22 1899

From preceding page.

Constants for X8729. reckoning for H_β

	C	d
Lines H_β H_γ H_2	−106874	−2933.2
Lines 5876. 5173. H_δ	−98660	−2735.6

This shows so great a variation in the constant that there seems little hope of going directly from one ~~to~~ the other.

Monday May 22 1899

Reduction of ε Scorpii X873₅ for Constants ~~of~~ of formula for wave length. C. S. M. No 17 & 92.

Hβ	76780		x	y
λ 5172.9	66609	+	10171	−311.4
λ 5896.0	49435	+	27345	−1034.5

log y	2.493319 n	3.014730 n
log x	4.007364	4.436878
	8.485955 n	8.577852 n

Eqs

− 311.4 − 0.0306165 c + d = 0

− 1034.5 − 0.0378314 c + d = 0

+ 723.1 + 0.0072149 c = 0

2.859198
7.858230
5.000968 n
8.485955 n
3.486923

c = − 100223

+ 3068.5
− 311.4
+ 2757.1

5.000968 n
8.577852 n
3.578820

+ 3791.6
− 1034.5
+ 2757.1

d = − 2757.1

log d = 3.44045 n

Monday May 22 1899.

Reduction of X 8735 2 Scorpii for Constants of wavelength. Using H_β H_γ & H_δ but calling H_δ = λ 4107.8 & H_γ = 4343.0

	x	y
H_δ	− 37746	+ 753.7
H_γ	− 23220	+ 518.5
H_β		

log y	2.877199	2.714749
log x	4.576871 n	4.365862 n
	8.300328 n	8.348887 n

Eqs

$+753.7 - 0.0199677\ c + d = 0$

$+518.5 - 0.0223299\ c + d = 0$

$+235.2 + 0.0023622\ c \quad = 0$

2.371437
7.373317
4.998120 n
8.300328 n
3.298448

c = − 99568.
d = − 2741.8

1988.1
753.7
2741.8

Computation wave length of λ 5896.0

x = Dist from H_β = + 27345
x + c = − 72223
log x = 4.43688
log d = 3,43804 n
7.87492 n
log (x+c) 4,85868 n
log y 3.01624
y = 1038.1
4861.5
5899.6

4.998120 n
8.348887 n
3.347007

2223.3
518.5
2741.8

Tuesday May 23 1899

Reduction for Constants of wavelength for X 8729 α Scorpii using Hβ Hγ & Hδ but Calling Hγ = λ 4343.0 & Hδ = λ 4107.8

	x	y
Hδ	− 37523 ~~14451~~	+ 753.7 ~~518.3~~
Hγ	− 23072	+ 518.5
Hβ		

log y 2.877199 2.714749
log x 4.~~75~~52 4298 n 4.363085 n
8.302901 n 8.351664 n

Eq^s
$+ 753.7 - 0.0200864\ c + d = 0$
$+ 518.5 - 0.0224732\ c + d = 0$
$+ 235.2 + 0.0023868\ c = 0$

2.371437
7.377816
4.993621 n
8.302901 n
3.296522

4.993621 n
8.351664 n
3.345285

c = − 98542.
d = − 2733.0

+1979.3
753.7
2733.0

+2214.5
518.5
2733.0

Computation wavelength of λ 5896.0

λ = diff. Hβ + 27072
~~log~~ x + c − 71470
log x = 4.43252
log d = 3.43664 n
7.86916 n
log (x+c) 4.85412 n
log y 3.01504
y = 1035.2
4861.5
λ = 5896.7

Wednesday May 24 1899

Test of Formula for 20 on λ 5173 in same spectrum.

Hβ 76780
Reading 66609
Diff = x = + 10171
C = − 99568
x + C = − 89397
log x 4.00736
log d = 3.43804n
7.44540n
log(x + C) 4.95133n
log y 2.49407
y = 311.9
4861.5
5173.4
λ = 5172.9
+ 0.5

Repetition for λ 5896.0 Hβ = 76780
Reading 49435
x = + 27345
C = − 99568
x + C = − 72223
log x 4.43688
log d = 3.43804n
7.87492n
log(x + C) 4.85868n
log y 3.01624
y = ~~+103.8~~ 1038.1
~~4861.8~~ 4861.5
5899.6
λ = 5896.0
+ 3.6

Wednesday May 24 1899

Test of same formula as on preceding day for λ 5785

Hβ 76780
Reading 57669
x = +.25111
c = −99568
x+C = −74457
log x 4.39987
log d ~~4.38~~3.43804 n
7.83791 n
log(x+c) 4.87190 n
log y 2.96601
y = + 924.7
4861.5
5786.2
λ = 5785.0
+ 1.2

Wednesday May 24 1899

Reduction for Constants of wave length for
X 8936 β Columbae. C. Sm. No. 17. p. 90.
Same method as on pages 20 & 21

			x	y
H_γ	113559	−	35339	+753.7
H_δ	100000	−	21780	+518.5
H_β	78220			

log y	2.877199	2.714749
log x	4.548254n	4.338058n
	8.328945n	8.376691n

Eq's

$+753.7 - 0.0213278\ c + d = 0$

$+518.5 - 0.0238063\ c + d = 0$

$+235.2 + 0.0024785\ c = 0$

2.371437
7.394189
4.977248n
8.328945n
3.306193

c = − 94896

+2023.9
753.7
+2777.6

4.977248n
8.376691n
3.353939

+2259.1
518.5
2777.6

d = −2777.6
log d = 3.44367n

	λ ~~5781.6~~ 5785.0	5410
H_β	78220	78220
Reading	54474	62615
x =	+ 23746	+ 15605
c =	− 94896	− 94896
x + c =	− 71150	− 79291
log x =	4.37561	4.19326
log d =	3.44367n	3.44367n
	7.81928n	7.63693n
log x + c	4.85217n	4.89922n
log y	2.96711	2.73771
y =	+ 927.1	+ 546.6
	4861.5	4861.5
	5788.6	5408.1
λ	5783.3	5410.0
	+ 5.3	− 1.9

Wednesday May 24 1899.

Test of formula — δ -24 for λ 5172.9

~~λ = 5041.6~~

Hβ	~~= 78220~~	= 78220
Reading	~~= 66609~~	68642
x =	~~+ 11611~~	x 9578
C =	~~− 94896~~	C = −94896
x + C	~~− 83285~~	x + C = − 85318
log x =	~~4.06487~~	3.98127
log d =	~~3.44367 n~~	3.44367 n
	~~7.50854 n~~	7.42494 n
log(x+C)	~~4.92056 n~~	4.93104 n
log y.	~~2.58798~~	2.49390
y =	~~+387.2~~	y = 311.8
	~~4861.5~~	4861.5
	~~5248.7~~	5173.3
		λ = 5172.9
		+ 0.4

Wednesday May 24 1899
Test of Formula for λ5735 See page 20 &
C.S.M. No 17 & 92

λ	5587.0	5183.8	5041.6	5408
Reading	55881	66299	70656	76780 60227
x	+20899	+10481	+ 6124	16553
x+c	−78669	−89087	−93444	−83015
log x	4.32013	4.02040	3.78704	3.43 5045 4.21 884 ~~4.91916~~
log x f	7.75817n	7.45844n	7.22508n	7.65692n ~~8.35720n~~
log x+c	4.89580n	4.94982n	4.97055n	4.91916n
log y	2.86337	2.50862	2.25453	2.73776
y	+730.1	+ 322.6	+179.7	+ 546.7
λ(Comp.)	4591.6	5184.1	5041.2	5408.2
	+ 4.6	+ 0.3	− 0.4	+ 0.2

1899phae.p10J..925K

Wednesday May 24 1899

List of formulae p 24 See C.S.M. No 17 page 90

λ	5587.0 88.3 5589.6	5183.8	5041.6
Reading	58486	68355	72446
x =	+ 19734	+ 9865	+ 5774
x + c =	− 80162 (5)	− 90031 (85)	− 94122 (89)
log x =	4.29522	3.99410	3.76148
log x d	7.73889 n	7.43777 n	7.20515 n
log(x+c)	4.87600 n ~~4.90397~~ n	4.92957 n ~~4.95439~~ n	4.94499 n ~~4.97369~~ n
~~log y~~	~~2.83492~~	~~2.48338~~	~~2.23146~~
~~y~~	~~+683.8~~	~~304.4~~	~~170.4~~
~~λ(Comp)~~	~~5453~~		
log y	2.86289	2.50820	2.25516
y	+729.3	+322.3	+180.0
λ(Comp)	5590.8	5183.8	5041.5
	+ 2.5	0	−0.1

Summary of preceding figures

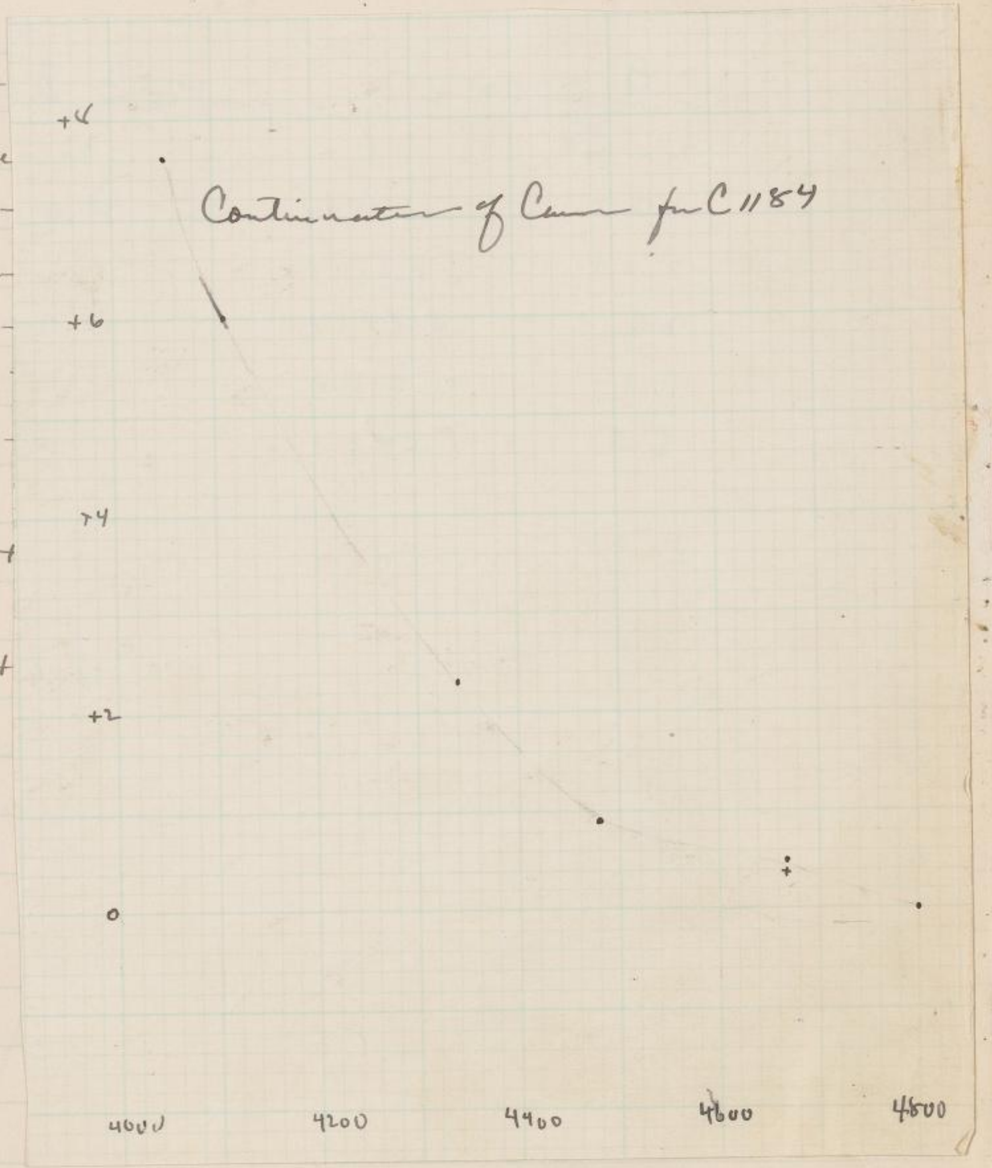
λ	Residuals for X 8735 ζ Gemini	X 8936 β Columbae
5041.6	−0.4	−0.1
5172.9	+0.5	+0.4
5183.8	+0.3	0
5410.0	~~−1.9~~	−1.9
5587.0		+4.6
5781.6 5785.0		+5.3
5896	+3.6	

Wednesday May 24 1899

Summary of preceding pages as to accuracy of plan of reduction proposed on page 20.

X 8735

λ	Re
5041.$\overset{6}{2}$	-
5172.9	-
5183.8	-
5408.0	
558$\overset{7.0}{\cancel{9.3}}$	-
5785.0	+
5896	+

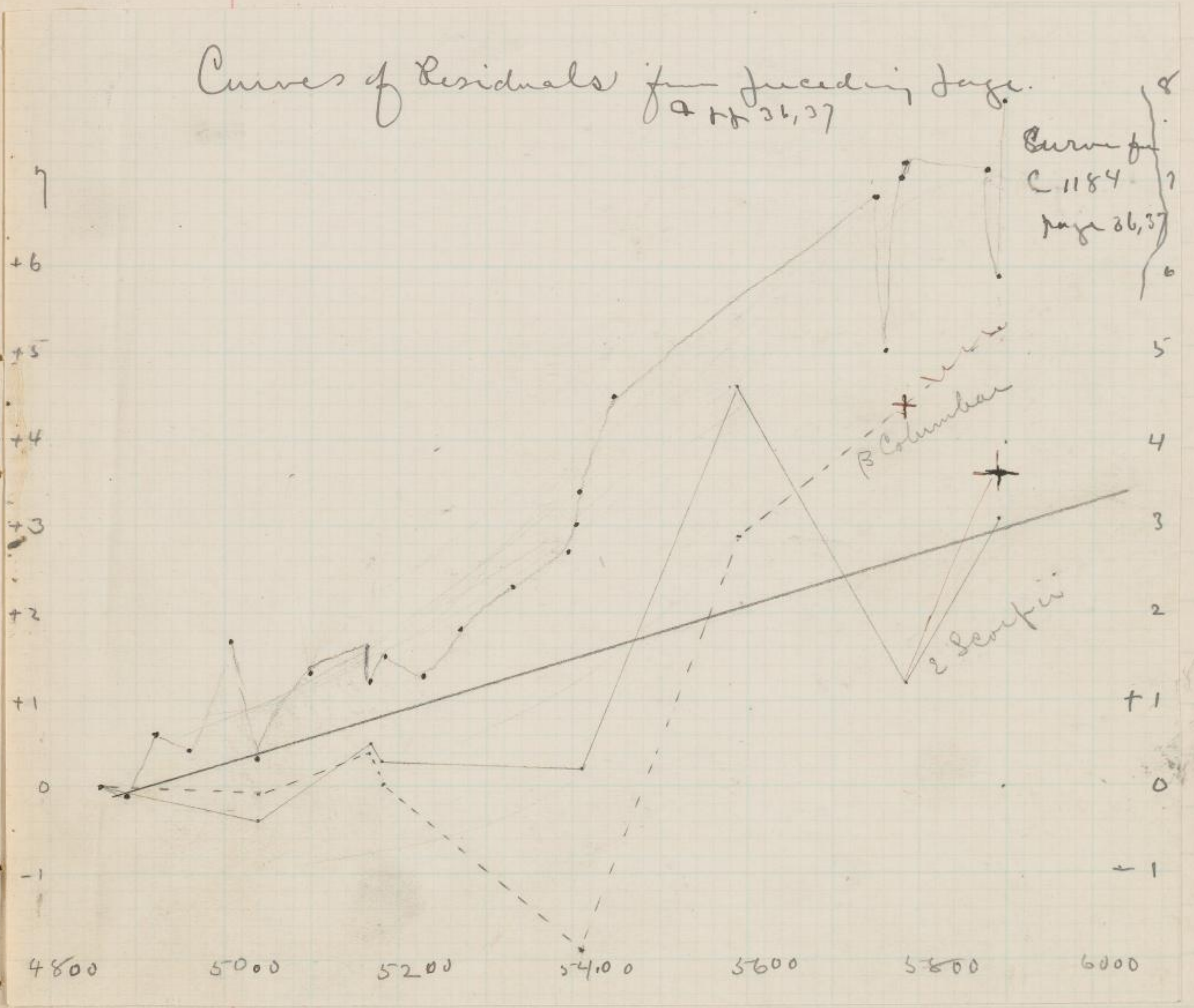


Wednesday May 24 1899

Summary of preceding pages as to accuracy of plan of reduction proposed on page 20.

X 8735 $\overset{2}{\omega}$ Scorpii. X 8936 β Columb

λ	Resid.	λ	Resid.
$5041.\overset{6}{2}$	−0.4	5041.6	−0.1
5172.9	+0.5	5172.9	+0.4
5783.8	+0.3	5783.8	0.0
5408.0	+0.2	5410.0	−1.9
$558\overset{7.0}{\cancel{9.3}}$	+4.6	5588.3	+2.9
5785.0	+1.2	5783.3	+5.3
5896	+3.6		



Curves of Residuals from preceding page. & pp 36, 37

The straight line in pencil is what I shall assume to be mean error of method

The straight line in pencil is what I shall assume to be mean error of method

Wednesday May 24 1899

Reduction of 2 Scorpii X 8735

Constants from page 19

Line.	~~49~~ 5796.0	5785	5587	5406&10	5183	5172
Reading	49435	51669	55881	60227	66299	66609
x =	+27345	+25111	+20899	+16553	+10481	+10171
x + C =	-72878	-75112	-79324	-83670	-89742	-90052
log x	4,43688	4.39987	4.32013	4.21888	4.02040	4.00736
log x d	7.87733 n	7.84032 n	7.76058 n	7.65933 n	7.46085 n	7.44781 n
log (x+c)	4.86260 n	4.87571 n	4.89940 n	4.92257 n	4.95300 n	4.95449 n
log y	3.01473	2.96461	2.86118	2.73676	2.50785	2.49332
y	+1034.5	+921.7	+726.4	+545.5	+322.0	+311.4
λ (Comp),	5896.0	5783.2	5587.9	5407.0	5183.5	5172.9
	5896.0	5785.0	5587.0	5408.0	5183.8	5172.9
Resid	0	-1.8	+0.9	-1.0	-0.3	0

Wednesday May 24 1899

Measured C. S. M. No 17 page 92

5167	5041	Hβ	4668	Hγ	Hδ	Hε
66770	70656	76780	64327	100000	114426	123908
+10010	+6124	0	−7547	−2$\overset{3}{\cancel{4}}$220	−37646	−47128
−90213	−94099		−107770	−12$\overset{3}{\cancel{4}}$443	−137869	−147351
4,00043	3,78704		3.87777 n	4,36586 n ~~4,38417~~ n	4,57572 n	4.67328 n
7.44088 n	7.22749 n		7.31822	7.80631 ~~7.82462~~	8.01617	8.11373
4,95527 n	4,97358 n		5,03250 n	5,09147. ~~5,09497~~ n	5,13946 n	5.16835 n
2.48561	2.25391		2.28572 n	2.71484 n ~~2.72965~~ n	2.87671 n	2,94538 n
+ 305.9	+ 179.4	0	− 193.1	− 519.6 ~~− 536.6~~	− 752.8	− 881.8
5167.4	5040.9	4861.5	4668.4	42.9 43~~24.9~~	4108.7	3979.7
5167.6	5041.6	4861.5	4668.0	4340.7	4101.8	3970.2
− 0.2	− 0.7	0	+ 0.4	+ 2.2	+ 6.9	+ 9.5

Thursday May 25, 1899.

Constants for Enlargement of C 2343 α Aurigae to normal scale. $1^{m} = 0.1^{\lambda}$ $H_\delta - H_\zeta$..

Measured with glass ~~mm~~ scale. Long 2'' divn divided to tenths

		Meas. div.	Dist fr H_ζ	Measured div	Dist fr H_ζ	Mean in mm
H_δ	H_δ	+4.49	+6.07	+4.70	+6.05	+12.12
H_ζ	λ	+2.05	+3.63	+2.26	+3.61	+7.24
K	λ	+0.17	+1.75	+0.38	+1.73	+3.48
λ 38~~8~~78.5	H_ζ	−1.58	0	−1.35	~~1.75~~ 0	0.00
	K	−3.32	−1.74	−3.10	−1.75	−3.49
	λ 3878.5	−6.17	−4.59	−5.96	−4.61	−9.20

Measures of above lines copied & repeated. Dist fr ~~H_δ~~ λ 38~~87~~78.5

							mean
H_δ	+4.4~~6~~9	+4.70	+5.09	10.6~~8~~6	10.66	10.67	10.66
λ	+2.05	+2.26	+2.65	8.22	8.22	8.23	8.22
λ 4005.3	+0.17	+0.38	+0.79	6.34	6.34	6.37	6.35
H_ζ	−1.58	−1.35	−0.92	4.59	4.61	4.66	4.62
K	−3.32	−3.10	−2.65	2.85	2.86	2.93? omit in mean	2.86
λ 3878.5	−6.17	−5.96	−5.58	0	0	0	0

~~H~~.	Measures mm	x mm			Dist fr λ 4005.3 mm		in
H_δ	21.32	+ 12.08	=	0''.479	+ 8.62	=	0.339
H_ζ	9.24						
λ 3878.5	0.00	− 9.24	=	0''.364	−12.70 mm	=	0.500
λ 4005.3	12.70						

Friday May 26 1899

Constants for wave length formula for
✱ C 2343 α Aurigae. See p. 32.
End ϖ $1^{\lambda} = 1^{mm}$

	x	y	
H 8	$+\ 0.''479$	$-\ 131.^{\lambda}6^{mm}$	$= -5.''181$
λ 3878.5 ~~H ζ~~	$-\ 0.''364$	$+\ 91.^{\lambda}7^{mm}$	$= +3.''610$

Friday May 26 1899

Reduction of C 1184 (See C.S.M. No 17 pp 98,99)
by method of page 20

		x	y
H_δ	123598	− 61119 ~~23598~~	+ 753.7
H_γ	100000	− 37521	+ 518.5
H_β	62479		

log y	2.877199	2.714749
log x	4.786176 n	4.574274 n
	8.091023 n	8.140475 n

Equations $+753.7 - 0.0123317\ c + d = 0$
$+518.5 - 0.0138189\ c + d = 0$
$+235.2 + 0.0014872\ c = 0$

2.371437
7.172369
~~8.091023n~~
5.199068n ~~[illegible]~~
8.091023n
3.290091

c = − 158150.

+ 1950.3
753.7
+ 2704.0

d = − 2704.0

5.199068n
8.140475n
3.339543

+ 2185.5
518.5
2704.0

log d = 3.43201n

Friday May 26 1899

Tuesday May 30, 1899.

Reduction of C 1184 (See C.Sm

	5896.0	5890.0	5857.8	5785.0	5781.6	5763.2	5753.6	5710.4
	18475	18690	19676	21983	22099	22740	23022	26179
x =	$4\overset{400}{\cancel{399}}4$	43789	42803	40496	40380	39739	39457	36300
x + C =	$-1\overset{1}{\cancel{8}}4146$	114361	115347	117654	117770	118411	118693	121850
log x	4.64349	4.64137	4.63147	4.60742	4.60617	4.59922	4.59613	4.55991
log λd	8.07550 n	8.07338 n	8.06348 n	8.03943 n	8.03818 n	8.03123 n	8.02814 n	$7.991\overset{9}{0}2$ n
log(x+C)	5.05746 n	5.05828 n	$5.06\overset{20}{\cancel{79}}1$ n	5.07061 n	$5.0710\overset{4}{\cancel{6}}$ n	5.07376 n	5.07442 n	5.08583 n
	3.01804	3.01510	3.00147	2.96882	2.96714	2.95747	2.95372	$2.90\overset{60}{\cancel{57}}9$ ✓
	1042.4	1034.4 ✓	1003.4	930.7	927.1	906.7	898.9	$80\overset{5.5}{\cancel{3.9}}$
	5903.9	$589\overset{5}{5}.9$	5864.9	$\overset{5}{\cancel{8}}792.2$	5788.6	5768.2	5760.4	$566\overset{7.0}{\cancel{5.4}}$ ✓
Resid.	+7.9	+5.9	+7.1	+7.2	+7.0	+5.0	+6.8	?
		?						

This is λ of ~~Mean~~ of Double line.

5227.1	5183.8	5172.9	5167.6	5098.8	5080.2	5041.6	5013.4
43584	45567	46091	46323	49655	50464	52587	53981
18895	16912	16388	16156	12824	12015	9892	8498
139255	$14\overset{1}{\cancel{8}}238$	141762	141994	145326	146135	148258	149652
4.27635	4.22819	4.21453	4.20833	4.10803	4.07972	3.99528	3.92932
7.70836 n	7.66020 n	7.64654 n	7.64034 n	7.54004 n	7.51173 n	7.42729 n	7.36133 n
5.14381	$5.\overset{14995}{\cancel{15302}}$ n	5.15156 n	5.15227 n	5.16234 n	5.16475 n	5.17103 n	5.17508 n
2.56455	2.51025	2.49498	2.48807	2.37770	2.34698	2.25626	2.18627
366.9	323.8	312.6	307.7 ✓	238.6	222.3	180.4	153.6
5228.4	5185.3	5174.1	5169.2	5100.1	5083.8 ✓	5041.9	5015.1
+1.3	+1.5	+1.2	$+\overset{1}{\cancel{2}}.6$	+1.3	+3.6	+0.3	+1.7
					?		

See note above.

Tuesday, May 30, 1899.

17 pp 98997) using constant from page 34.

5658.5	5615.8	5587.0	5446.1	5410.0	5406.0	5397.3	5328.5	5270.2
27790	28860	338$\overset{3}{8}$7	34188	35670	35848	36215	39089	41635
34689	33619	28642	28291	26809	26631	26264	23390	20844
123461	124531	129508	129859	131341	131519	131886	134760	137306
4.54019	4.52659	4.45700	4.45165	4.42828	4.42539	4.41936	4.36903	4.31898
7.9$\overset{7}{8}$220 n	7.95860 n	7.88901 n	7.88366 n	7.86029 n	7.85740 n	7.85137	7.80104 n	7.75099 n
5.09153 n	5.09528 n	5.11230 n	5.11347 n	5.11840 n	5.11899 n	5.12020 n	5.12956 n	5.13769 n
2.8$\overset{8}{8}$067	2.86332	2.7$\overset{7}{8}$6$\overset{7}{0}$1	2.77019	2.74189	2.73841	2.73117 ~~64937~~	2.67148	2.61330
59.8 7~~25.6~~	730.0	598.0 ~~583.5~~	589.1	551.9	547.5	538.5	469.3	410.5
5621.3 ✓	5591.5 ✓	5459.5 ✓	5450.6	5413.4	5409.0	5400.0	5330.8	5272.0
2 ~~5.5~~	2 ~~+4.5~~	2	+4.5	+3.4	+3.0	+2.7	+2.3	+1.8

			×			×	×	
4957.6	4920.0	4891.3	4861.5	4668.0	4482.5	4340.7	4101.8	4043.9
57029	59095	60761	62479	74638	88189	100000	123598	129878
5450	3384	+1718	0	−12159	−25710	−37521	−61119	−67399
152700	154766	156432	158150	-170309	183860	195671	219269	225549
3.73640	3.52943	3.23502	—	n 4.08489 n	4.41010 n	4.57427 n	4.78617 n	4.82865 n
7.16841 n	6.96144 n	6.66703 n	—	n 7.57690 n	7.84211 n	8.00628 n	8.21818 n	8.26066 n
5.18384 n	5.18968 n	5.19433 n	—	n 5.23124 n	5.26449 n	5.29153 n	5.34098 n	5.35324 n
1.98457	1.77176	1.47270		2.28566 n	2.57762 n	2.71475 n	2.87720 n	2.90742 n
96.5	59.1	29.7	0	−193.0 ~~+19.3~~	−378.1 ~~37.8~~	−518.5	−753.7	−808.0
4958.0	4920.6	4891.2	4861.5	46$\overset{6}{8}$8.5	4483.4	4343.0	4107.8	4053.5
+0.4	+0.6	−0.1	0	+0.5	+0.9	~~+~~ +2.3	+6.0	+7.6

Wednesday May 31 1899

Comparison of dist. of lines in θ Carinae & α Crucis

See Miss Cannon's book p 173

Designation.	θ Carinae	α Crucis	Mean
"6"	5046.8	5046.2	5046.5
"4"	5015.9	5016.0	5016.0
"1"	4921.9	4922.4	4922.2

For ε Canis majoris these lines will be assumed as known.

Measures of β Crucis compared with those of α Scorpii C. S. M. No 17 pp 84 & 94

Line.	α Scorpii (2)	β Crucis (1)	(2)-(1)	Corrected for Resid.
5875.9	50240‡	50075	+ 165	+171
"6"	70679‡	70574	+ 105	
"4"	71$\overset{6}{\cancel{7}}$54*	7158$\overset{2}{\cancel{4}}$	~~+ 172~~ + 72	
"1"	74$\overset{86}{770}$*	74721	+ $\overset{65}{\cancel{49}}$	
Hβ	76928	76857	+ 71	
Hγ	100000	100090	0	
Hδ	114451	114379	+ 72	
Hε	123578	123747	− 169	

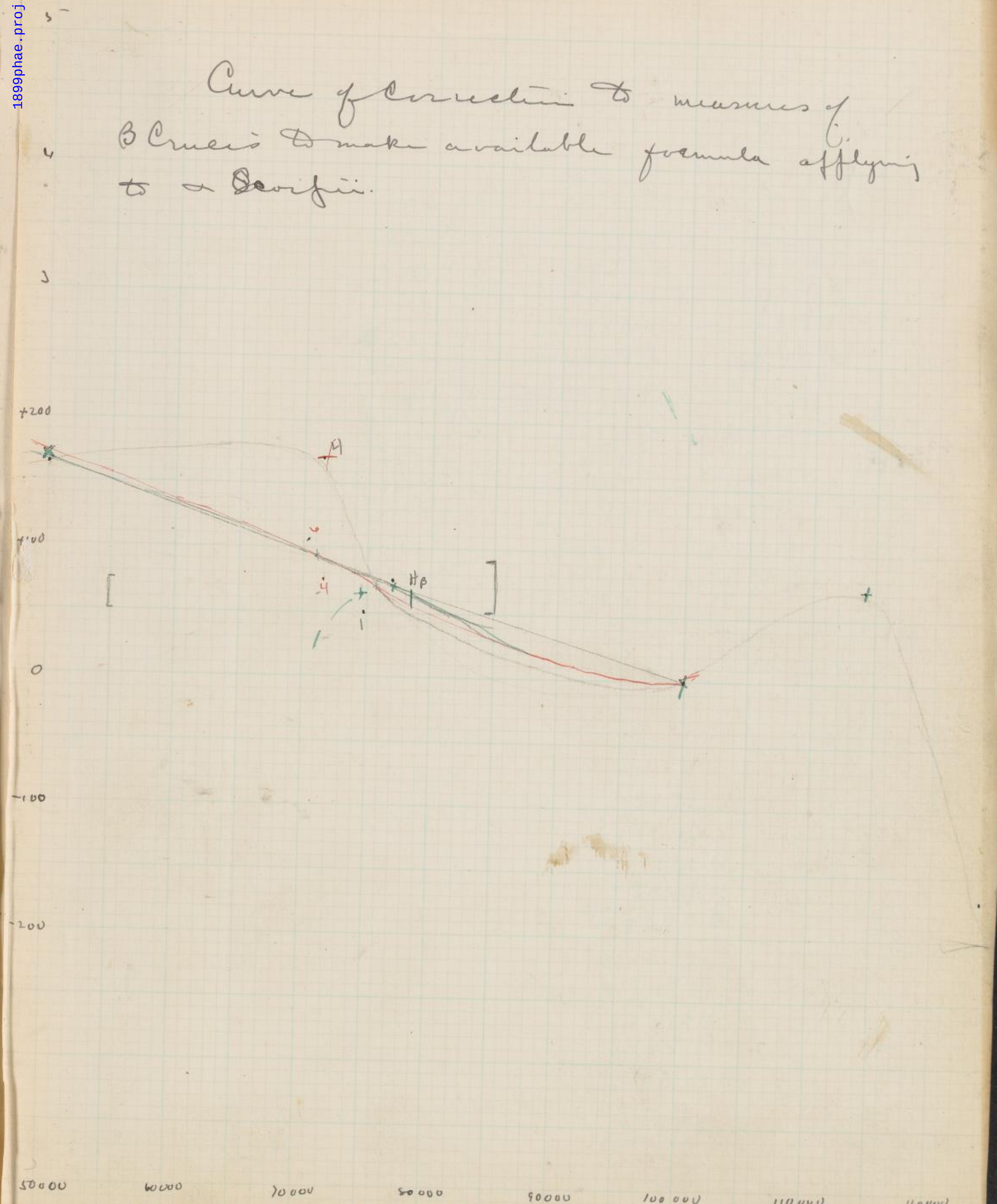
50246
50075
171

‡ Computed see pp 10 & 38 & 39

5172.9   5172.9
5016.0   4922.2
y = −156.9   − 250.7
d −3047.0   −3047.0
d-y = −2890.1   −2796.3
log y 2.19562n   2.39915n
log c 4.94733n   4.94733n
7.14295   7.34648
log(d-y) 3.46092n   3.44658n
log x 3.68203n   3.89990n
x = ~~7~~ 4809.78   − 7925 (4.1)
66645+   66845
~~62036~~ 71454   74770
74786

Miss Rudy

Curve of Correction to measures of β Crucis to make available formula applying to α Scorpii.



70679	71654	74770	
33330	33330	33330	
37349	38324	41440	
33515	33515	33515	
−3834	− 4809	− 7925	x
−88577	−88577	−88577	
−92411	−9338.6	−96502	x + c
3.48387 n	3.48387 n	3.48387 n	
3.58365 n	3.68205 n	3.89900 n	log x
7.06752	7.16592	7.38287	log x c
4.96572 n	4.97028 n	4.98454 n	
2.10180 n	2.19564 n	2.39833 n	log(x + c)
5172.9	5172.7	5172.9	
−126.4	−156.9	−250.2	
5046.5	5016.0	4922.7	

Error in other Comp
should be 74786

5172.9
5046.5
−126.4
−3047.0
−2920.6
2.10175 n
4.94733 n
7.04908
3.46547 n
3.58361 n

−3834
66845
70679

Thursday June 1, 1899.

Constants for X9186 β Crucis.
See C. Sm No. 17 pp 94-95

			x		y
Hβ	76857_{6283}	−	26782_{6283}	+	
"6"	70574	−	20499	+	
5875.9 ~~Hβ~~	50075				

			x		y
Hβ	76857				
"6"	70574_{11815}	+	6283_{11815}	−	184.7
5875.9	5875.9	+	18098	−	1014.4

log y	~~3~~. 2.266467	~~4~~. 3.006209n
log x	3.798167	4.257631
	8.468300n	8.748578n

Eqs
$-184.7 - 0.0293968\ c + d = 0$
$-1014.4 - 0.0560503\ c + d = 0$
$+829.7 + 0.0266535\ c = 0$

2.918921
8.

Thursday June 1 1899

From preceding page.

x y

76857
70574
6283

H_β 76857
"6" 70574 + 6283 − 185.0
20499 20499
5875.9 50075 + 26782 − 1014.4

76857
50075
26882

log y 2.267172 n 3.006209 n
log x 3.798167 4.427843
8.469005 n 8.578366 n

$-185.0 - 0.0294445\ c + d = 0$
$-1014.4 - 0.0378762\ c + d = 0$
$+829.4 + 0.0084317\ c = 0$

2.918764
7.925915
4.992849 n
8.469005 n
3.461854

c = −98367

+2896.4
185.0
+2711.4

d = −2711.4
log d = 3.43319 n

4.992849 n
8.578366 n
3.571215 n

+3725.8
1014.4
2711.4

~~76857~~ ~~70574~~ 50075
~~50075~~ 50075
26782 20499
+26882 + 6283 = x
− 98367 − 98367 = c
− 71485 − 92084 = x + c

log x ~~3.43319 n~~
~~3.85421 n~~ 3.96395 n
7.28740
log x + c 4. n

3.43319 n
4.42784
7.86103 n
4.85482 n
3.00621 +717 14
1014.4

log x
log x c
log(x + c)

3.43319 n
4.42946
7.86265 n
4.85421 n
3.00844

3.43319 n
3.79817
7.23136 n
4.96419 n
~~2.26797~~
2.26717

5875.9
+01.
5875.9
1014.4
4861.5

5875.9
185.0

4861.3
185.0

Friday June 2 1899

Constants for λ 4186 β Crucis (C Slit No 17 p 94)
by method of page 20

	x			y
Hδ	114379	−	37522 ~~14377~~	+753.7
Hγ	100000	−	23143	+518.5
Hβ	76857			

log y	2.877199	2.714749
log x	4.574286n	4.364420n
	8.302913n	8.350329n

Eqs.

$+753.7 - 0.0200869\ c + d = 0$

$+518.5 - 0.0224042\ c + d = 0$

$+235.2 + 0.0023173\ c = 0$

2.371437
7.364982
5.006455n
8.302913n
3.309368

c = − 101498

2038.8
753.7
2792.5

log d = 3.445993n

5.006455n
8.350329n
3.356784

2274.0
518.5
2792.5

When this formula is used, correct results by curve on page 29

Friday June 2 1899

Computation for D^3 ×9186 by preceding.

.76857
50075
+ 26782
− 101498
− 74716

log x = 4.42784
3.44599 n
7.87383 n
4.87342 n
3.00041

~~1.006~~ ~~1000~~

1001.0
4861.5
5962.5

33
8
264

" 8a "

~~+ 12968~~
~~− 101498~~
~~− 88530~~

log x = ~~4.11287~~
~~3.44599~~
~~7.55886~~
~~4.94709 n~~
~~2.61177~~

~~409.0~~
~~4861.5~~
~~5270.5~~

~~53877~~
53707
76857
+ 23150
−101498
− 78348

4.36455
4.894034

4.36455
3.44599
7.81054
4.89403
2.91651

825.1
4861.5
5686.6

Friday June 2 . 1899.

Constant for γ Velorum (CSm 17 & 26 et seq)
~~Method of page 20~~ . Hβ — Hζ

Hζ 128389 − 49984 + 972.4
28389
Hγ 100000 − 21595 + 520.8
Hβ 78405

log y	2.987845	2.716671
log x	4.698831 n	4.334353 n
	8.289014 n	8.382318 n

Eq's
$+972.4 - 0.0194542\ c + d = 0$
$+520.8 - 0.0241167\ c + d = 0$
$+451.6 + 0.0046625\ c = 0$

2.654754
7.668619
4.986135 n
8.289014 n
3.275149

c = − 96858.

+ 1884.3
972.4
+ 2856.7

4.986135 n
8.382318 n
3.368453

+ 2335.9
520.8
2856.7

log d = 3.45586 n

− 96858	− 96858	c
− 49984	− 21595	x
− 146842	− 118453	x + c
3.45586 n	3.45586	log d
5.13621 n	5.07355 n	log y
8.59207	8.52941	log x + c
3.45586 n	3.45586 n	log d
4.69883 n	4.33435 n	log x
8.15469	7.79021	
5.18627 n	5.07355 n	log (x + c)
3.01848 n	2.71666 n	
2.98784 n	4861.3	
4861.3	− 520.6	
− 972.4	4340.7	
3889.1		

Friday June 2 1899.

Constants for ε Canis Majoris (C.S.M. 17 p 52, 53)
Method of page 20 Hβ Toward red.

Hδ	113469	− 35031 113469	+753.7
Hγ	100000	− 21562	+578.5
Hβ	78438		

log y	2.877199 n	2.714749
log x	4.544453 n	4.333689 n
	8.332746 n	8.381060 n

+753.7 − 0.0215152 c + d = 0
+578.5 − 0.0240470 c + d = 0
+235.2 + 0.0025318 c = 0

2.371437
7.403429
4.968008 n
8.332746 n
3.300754

1998.7
~~2027.9~~
753.7
2752.4

c = − 92898.

log d = 3.43971 n

4.968008 n
8.381060 n
3.349068

2233.9
518.5
2752.4

Correct by curve on page 29

Friday June 2, 1899.

Constants for γ Velorum. Red end.
H_β toward red. C.S.M. 17 p 26
Method of page 20.

		x	y
H_δ	113469	− 35064	+ 753.7
H_γ	100000	− 21595	+ 518.5
H_β	78405		

log y	2.877199	2.714749
log x	4.544861 n	4.334353 n
	8.332338 n	8.380396 n

$+753.7 - 0.0214960\ c + d = 0$
$+518.5 - 0.0240102\ c + d = 0$
$+235.2 + 0.0025142\ c = 0$

$c = -93548.$

2.371437
7.400400
4.971037 n
8.332338 n
3.303375

2010.8
753.7
2764.5

$d = 276\overset{4}{\cancel{1}}.6$

4.971037 n
8.380396 n
3.351433

2246.2
518.5
2764.7

log d = 3.44163 n

Check

− 35064	− 21595
− 93548	− 93548
− 128612	− 115143
3.44163 n	3.44163 n
4.54486 n	4.33435 n
7.98649	7.77598
5.10928 n	5.06124 n
2.87721 n	2.71474 n
4861.5	4861.5
− 753.7	− 518.5
4107.8	4343.0

Correct by curve on page 29

Wednesday July 19 1899.

Constants for wave length formula for
C 2343 α Aurigae see page 32

Enl to $1^{\lambda} = 1^{mm}$ λ 4005.3 taken as central line.

	$\overset{x}{~~+8.~~}$ $+\overset{m}{0}.339$	$\overset{y}{-3.799}$
Hδ	+0.339	− 3.799
λ 3878.5	− 0.500	+ 4.992.

log y	0.579669 n	0.698275
log x	9.530200	9.698970 n
log $\frac{y}{x}$	1.049469 n	0.999305 n

Eqs.

$-3.799 - 11.2065\,c + d = 0$
$+4.992 - 9.9840\,c + d = 0$
$-8.791 - 1.2225\,c = 0$

0.944038 n		
0.087249 n		c = − $\overset{m}{7}$.1910
0.856789 n	+ 80.586	
1.049469 n	− 3.799	
1.906258 n	+ 76.787	d = − 76.787

0.856789 n	+ 71.795
0.999305 n	+ 4.992
1.856094 n	+ 76.787.

Thursday July 20 1899

Computation of Constants for Enl on Normal
Scale 1mm = 1r of ~~$~~ C 2343 α Aurigae

$c = 7.191$
$d = 76.787$

$\log c \; 0.85679$
$\underline{\qquad\qquad 2}$
$\log c^2 \; 1.71358$
$\log (d^2+F^2) \; \underline{3.78612}$
5.49970
$\log (c^2+F^2) \; \underline{2.42590}$
$2/\underline{3.07380}$
$\log b \; 1.53690$
$b = +34.427$
$\underline{c = 7.191}$
$b+c = 41.618$
$\log (b+c) = 1.61928$
$\underline{\qquad\qquad 2}$
$\log (b+c)^2 = 3.238556$
$\log F = \underline{1.16613}$
4.40469
$\log bc \; \underline{2.39369}$
$\log D = 2.01100$
$\log (b+c) \; 1.61928$
$\log F = \underline{1.16613}$
2.78541
$\log b = \underline{1.53690}$
$\log f. \; 1.24851$

$F = 14.66$
$F^2 = 214.916$
$c^2 = 51.711$
$c^2+F^2 = 266.627$
$d^2+F^2 = 6111.2$

$\log d = 1.88529$
$\underline{\qquad\qquad 2}$
$\log d^2 \; 3.77058$
$d^2 = 5896.3$

$\log b \; 1.53690$
$\log c = \underline{0.85679}$
$\log bc = 2.39369$

$\log 2 = \log \frac{b}{c} = 0.68011$

$\varepsilon =$

$D = 102.5\overset{6}{\cancel{7}}5$

$f = 17.722$

$D - f = 84.843$

Thursday July 20 1899

log F = 1.16613
log b = 1.53690
log Cos A 9.62923 A = 64° 47'.8

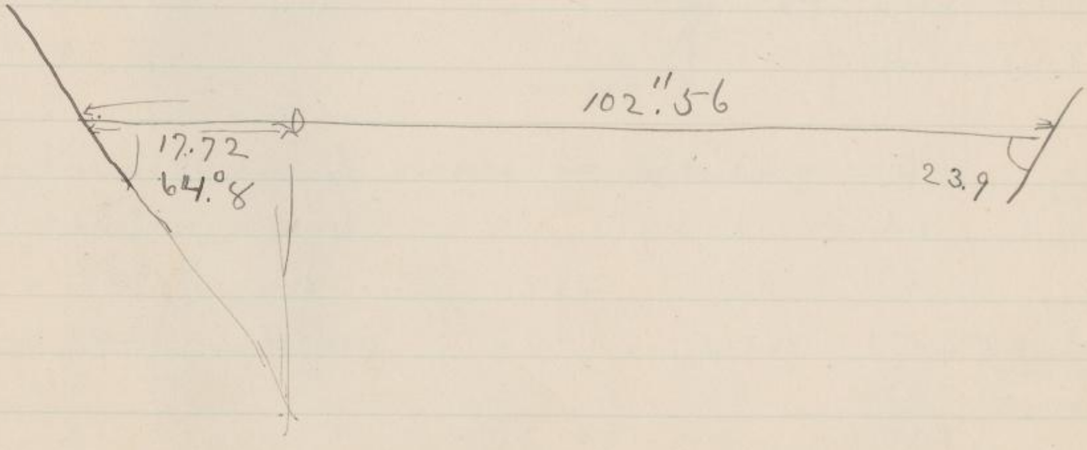
log c = 0.85679
log d = 1.88529
2.74208

log Fb. 2.70303
log cd 2.74208
log Cos B 9.96095
B = 23° 56'.0

Proof

log f = 1.24851
log tan A = 0.32731
1.57582

log (D − f) = 1.92862
log tan B 9.64722
1.57584



Thursday July 20 1899

A rough recomputation ~~of~~ of work on pp 48, 49 for lens of 8 inches.

$c = 7''$ ~~f~~ = 8

$d = 77$ $f^2 = 64$

$c^2 = 49$ $c^2+F^2 = 113$

$d^2 = 5929$ $d^2+F^2 = 5993$

1.6902

3.7774

5.4676

2.0531

2) 3.~~2~~4145

log b 1.~~6~~7072

b = ~~40.4~~ = 51.0

40) 8.00

0.02

A = 88.7

$e = \frac{b}{c} = \frac{40}{7} = 5.7$

$\frac{51}{7} = 7.$

~~fb = 324.0 log 2.5105~~

~~cd = 539. log 2.7316~~

~~log cos B 9.7789~~

~~B = ~~50~~ 53°~~

~~6.7~~

~~8~~

~~7~~

~~8~~

~~56~~

~~9~~

~~D = 65 approx.~~

fb = 51 × 8 = 408 log = 2.6107

cd = 539 log = 2.7316

9.8791

B = ~~49.~~ 40°

Thursday July 20 1899

Same as last but assuming F = 12

$F^2 = 144$ (5924)

$c^2 + F^2 = 193$

$d^2 + F$ 6073

1.6902
3.7832
5.4734
2.2856
2)3.1878
1.5939 b = 39"

fb 39 × 12 = 468 log 2.6702

(39 × 12: 78, 39, 468)

cd 539. log 2.7316
9.9386 B = 29°

So that focus of the a Lens. which is commonly used in meteor Cameras.

Image formed of (½ c.m. squares ruled in tin foil.

Enl.	Dist bet. plates	f.	Conjugate foci of f'	f
10	98 in	8.10 in	99.5	9.05
6.6	72	8.22	62.3	9.45
4.6	57	8.36	46.1	10.00

Interval between shutter focal distance = ½"

98	11	72	7.6	57	5.6
1.9912	1.0414	1.8573	0.8808	1.7559	0.7482
1.0000		0.8195		0.6628	
2.9912		2.6768		2.4187	
2.0828		1.7616		1.4964	
0.9084		0.9152		0.9223	
8.10		8.22		8.36	

~~Ct~~ Call f = 8.2 in

Friday July 21 1899

Computation of Constants for Enl. on Normal Scale of $1^{mm} \equiv 1''$ of C 2343 & Aurigae

$c = 7.191$
$d = 76.787$
$\log c = 0.85679$
$\underline{\quad 2}$

$\log c^2 \quad 1.71358$
$\log(d^2+F^2) = \underline{3.77550}$
5.48908
$\log(c^2+F^2) = \underline{2.07536}$
$2)\,3.41372$
$\log b \quad 1.70686$
$b = 50.917$
$c = \underline{7.191}$
$b+c = 58.108$
$\log(b+c) = 1.76424$
$\underline{\quad 2}$
3.52848
$\log F. \ \underline{0.91381}$
4.44229
$\log bc \ \underline{2.56365}$
$\log D \ 1.87864$
$\log(b+c) = 1.76424$
$\log F. = \underline{0.91381}$
2.67805
$\log b = \underline{1.70686}$
$\log f = 0.97119$

$F = 8.2$
$F^2 = 67.24$

$\log F = 0.91381$
$\underline{\quad 2}$
$\log F^2 = 1.82762$

$c^2 = 51.71$
$c^2+F^2 = 118.95$
$\log d = 1.88529$
$\underline{\quad 2}$
$\log d^2 = 3.77058$
$d^2 = 5896.3$
$d^2+F^2 = 5963.5$

$\log b = 1.70686$
$\log c = \underline{0.85679}$
$\log bc \quad 2.56365$

$\log \varepsilon = \log \frac{b}{c} = 0.85007$

$\varepsilon = \underline{7.08}$
$D = 75.62$

$f = \underline{9.36}$

$D - f = 66.26$

Friday July 21 1899

log F = 0.91381
log t = 1.70686
log cos A 9.20695

A = 80° 43.~~35~~ 195

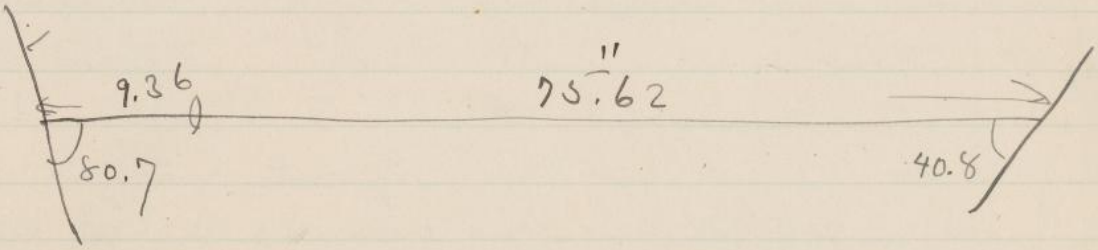
log Fb = 2.62067
log cd = 2.74208
log cos B 9.87859

log c 0.85679
log d 1.88529
log cd 2.74208

B = 40° 52'6

735
tan A 0.78~~687~~
19
0.971~~28~~
log f ~~1.82125~~
~~2.60812~~
~~1.75715~~
~~1.75868~~
1.75854

tan B 9.93728
log D - f 1.82125
~~0.11603~~
1.75853



Tuesday July 25 1899

Measures of C 1269 Solar Spectrum.

Measures.

							mm
H_δ		+4.72		+4.53	5.87	5.88	11.75
λ 4005.3	+3.95	−1.15	+5.08	−1.35	8.65	8.66	17.31
λ 3878.5	−4.70		−3.58				

Thursday Dec 28 1899

Experimented to find best light for standards to be used with new photometer designed to be used with large telescopes.

An aperture of 2mm was placed back of enlarging lens (Ross) & an out of focus image thrown on the door across the room. This image was about 50 mm in diameter. The aperture was first illuminated by a Welsbach burner & later by a 16 c.p. electric light. A comparison was made by noting the disappearance of the shadow of a lighted candle interposed in the beam. For Welsbach distance = about 10 to 11" For Electric light distance = 16 to 20" However the filament of the electric light did not fill the aperture.

By a combination of lenses images of the two lights were thrown upon the screen separately. Later they were projected together. The electric light appeared intrinsically brighter though not as much as at first as Welsbach was adjusted to burn brighter.

By means of a shade glass electric filament appeared bright against Welsbach. It could also be seen through it. The experiment was repeated with same result using a 1 c.p. lamp in circuit ordinarily employed to run shutter on Crooke Lens.

Monday Jan 29 1900.

Work for Photographic wedge for Photometers for faint stars.

Wedge App. used with slit instead of screen. Distances measured are about 169^{mm} & 835^{mm}

Length of wedge as shown by ground glass = 58^{mm}.
Length of aperture = 264^{mm}

835 : 264 :: 169 : (53^{mm}.4)

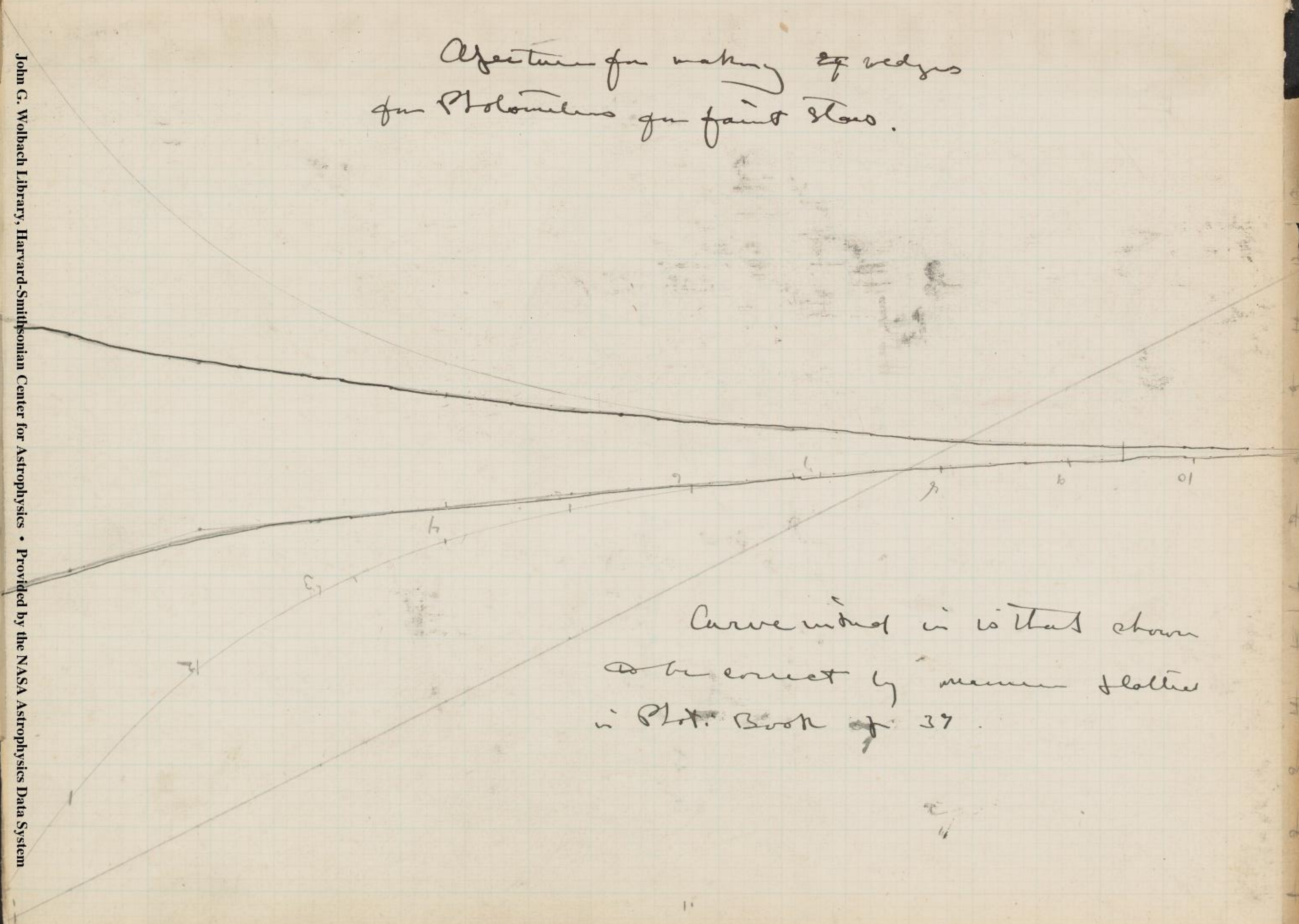
2.2279
2.4216
4.6495
2.9217
1.7278

As slit is 4^{mm} wide, we have the length 58^{mm} accounted for.

Have plotted curve graphically to make wedge with S 23 with exposure of 60 min & standard development. Kept at known distance from porcelain. See E & Phot. of about this date E. Phot. Book No 1 p 39 Curve of E 5706.

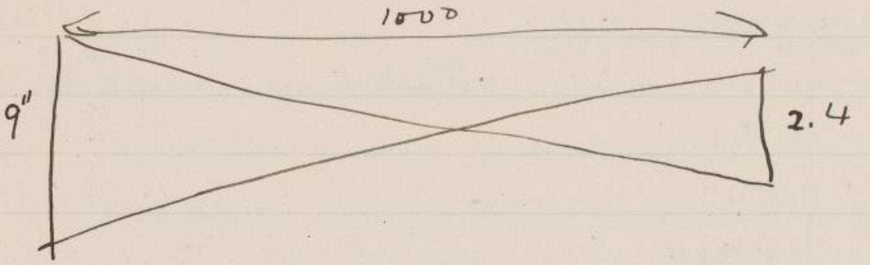
The desired wedge should have a range of 3 mag. as shown by line.

Apertures for making of wedges for Photometers for faint stars.



Curve inked in is that shown to be correct by manner plotted in Phot. Book p. 37.

Monday Jan 29 1900



9" : 2.4 :: 1000 − x : x

11.4 : 2.4 :: 1000 : x

11.4 / 2400. (210.5
228
120
114
600

211^m Dist to set slit from plate.

Friday Feb 9 1900

Comparison of Measures of ζ Puppis in λ8230 & β Columbae in λ8936 for means of reduction of lines toward red. See C.S.M. No 16 H 172-204 & No. 17 p 90

	λ8230	λ8936	Diff	
5410.	63012	62615	− 397	These lines assumed to be identical.
5589.6		62925		
5197.		68355		
5173		68642		
5168		68821		
5042		72446		
		75573		
		76186		
~~Hβ~~		77806		
Hβ	78$\overset{514}{\cancel{681}}$	78220	− 294	
4668		85264		
4482		93135		
~~43 H~~γ	100000	100000	0	
4338		100712		
4227		106069		
Hδ	11344$\overset{6}{x}$	113559	+ 113	

This makes such an irregular curve of correction or transition that it does not appear safe to use it.

Friday March 9, 1900.

Light Experiments. Law of Cosines and distances.

$10^{m}.000$ ~~Cos~~ 60

$2/100^{m}.$

50^{m} $2/1.6990$ 0.8495 $2/1.69897$ 0.84948

7.07 7.071

1.69895
0.30103
$2/1.39792$
0.69896

Normal Exp at $10^{m}.000$
60° " at 7.071

Normal Exp at 7.071
60° " at 5.000

Mag. of Stand unit when dist = 1 meter,

Friday
~~Thursday~~ March 23 ~~22~~ 1900

Standard apertures for Argand lamp in Portable box enlarged as follows tested by use of enlarging apparatus.

Mag. of Stand unit (1'	Aperture	Intended aperture. mm	Measured on C.S.M. No 17 pp 114-117	Log	Diff.	Mag	
3.0	1	1.16	1.12	0.0492	.5855	2.93	+.07
3.5	2	1.46	1.45	0.1614	.6977	3.49	+.01
4.0	3	1.84	1.83	0.2625	.7988	3.99	+.01
4.5	4	2.31	2.29	0.3598	.8961	4.48	+.02
5.0	5	2.91	2.93	0.4669	1.0032	5.0$\overset{2}{8}$	-.02
5.5	6	3.66	3.66	0.5635	1.0998	5.50	00
6.0	7	4.61	4.60	0.6628	1.1991	6.00	00
6.5	8	5.80	5.87	0.7686	1.3049	6.52	-.02
7.0	9	7.31	7.31	0.8639	1.4002	7.00	00
	~~10~~						

log sin 0° 1' + log 1.000 = 9.4637

Aperture.	Diff from 1 mag.	log of ratio
1	0.00	
2	0.56	
3	1.06	
4	1.55	
5	2.09	
6	2.57	
7	3.07	
8	3.59	
9	4.07	

~~Friday~~ Saturday March 24, 1900.

Examined C 12577 occultation of Saturn. Images numbered arbitrarily. Last image called 217. On that basis. Contacts with outer edge of ring, inner ring. both limbs of planet, ~~(6 in all~~ (6 contacts in all) were read off.

K 1 103 20 08 2 115 20 20 3 130 20 35
#6 180 21 26 5 175 21 21 4 160 21 06
41 41 41 41
290 20 50

~~R 1627 Sat — (53.8) f — x2822~~
R 1938 Jupiter — 1.6 R 1593 x
R 1415 Neptune — 21 f — x2562
D 2145 Venus -1.0 — f — x3827

C 1 20 37
6 21 13
41 50
20 55

Me

3) 147 3) 156

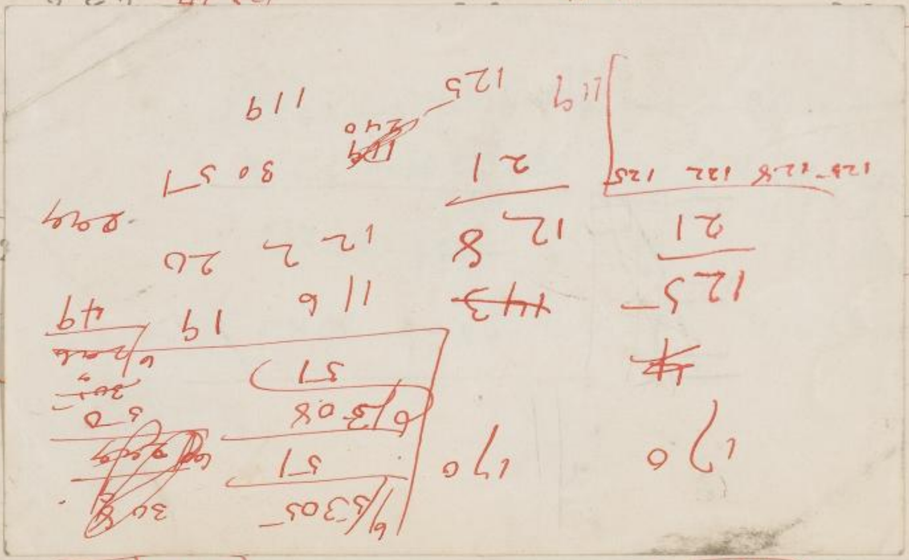
mean 15 20 49 15 20 52

Images reduced to seconds on Saturday Nov 26 1904

~~Friday~~ Saturday March 24, 1900.

Examined C 12577 occultation of Saturn. Images numbered arbitrarily. Last image called 217. On that basis. Contacts with outer edge of ring, inner ring, both limbs of planet, ~~6 in all~~ (6 contacts in all) were read off:

K 1 103 20 08 2 115 20 20 3 130 20 35
#6 180 21 26 5 175 21 21 4 160 21 06
41 34 41 41 41 41
20 50



C 1 20 37
6 21 13
41 50
20 55

Mea

3) 147 3) 156

mean 15 20 49 15 20 52

Images reduced to seconds on Saturday [illegible] 26 1904

~~Friday~~ Saturday March 24, 1900.

Examined C 12577 occultation of Saturn. Images numbered arbitrarily. Last image called 217. On that basis. Contacts with outer edge of ring, inner ring. both limbs of planet, ~~(6 in all~~ (6 contacts in all) were read off.

K 1 103 20 08 2 115 20 20 3 130 20 35
#6 180 21 26 5 175 21 21 4 160 21 06
283 41 34 290 41 41 290 41 41
15 20 47 15 20 50 15 20 50

Rejected 118
C 1 103 20 08 2 117 ~~118~~ 118 20 22 3 132 20 37
6 184 21 30 5 176 21 22 4 167 21 13
287 41 38 293 41 44 299 41 50
15 20 49 15 20 52 15 20 55

Mean K C
15 20 47 15 20 49
50 52
50 55
3) 147 3) 156
mean 15 20 49 15 20 52

Images reduced to seconds on Saturday Nov 26 1904

Monday March 26 1900.

Double Interpolation.

~~Go~~ Formula to be used for 2nd Diff.

$$F_{(n)} = F_{(0)} + n d_1 + \frac{n(n-1)}{2} d_2$$

I	II	III	
$F_{aa'}$	$F_{ba'}$	$F_{ca'}$	F_{da}
F_{ab}	F_{b0}	F_{cb}	F_{db}
F_{af_1}	F_{bc+1}	F_{cf_1}	F_{dc}
F_{ad}	F_{bd}	F_{cd}	F_{dd}

~~a_1~~ a_1 a_2 a_3 a_4

~~a_2~~ b_1 b_2 b_3

a. c_1 c_2

d. d_2

I

$$A_1 = b_1 + n(c_1 - b_1) + n(n-1)\frac{(a_1 + d_1 - b_1 - c_1)}{4}$$

~~b_1~~

b_1 ~~$+ n c_1 - n b_1 + n^2(a_1 + d_1 - b_1 - c_1) + n a_1 + n d_1$~~

~~$+ n c_1 + n b_1$~~

~~$b_1 + 2 n c_1$~~

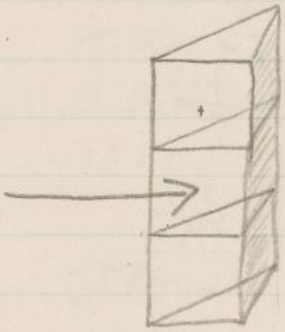
$b_1 +$ ~~$n(2c_1 - a_1 - d_1) + n^2(a + d$~~ $- b - c)$

$$4A_1 = 4b_1 + 4nc_1 - 4nb_1 + n^2(a_1 + d_1 - b_1 - c_1)$$
$$+ \; nc_1 \; + nb_1$$

Monday Apr. 2 1900.

Set up lab. spectrometer to measure index of refraction of small triple glass prism; middle section of the three only measured others covered up!

Sodium flame used: focal length coll. lens too short to focus for parallel, so used it with slit as close to lens as possible



min dev

"a" microscope
180°.7 estimated
+ 18.9
0
− 19.7
60.2

60.0
19.7
40.3
60.2 =

"B" microscope
1°.6 estimated
+ 22.8
0
− 22.3
60.5

60.0
22.3
37.7
60.5 =

Coll. & tel. in line

"a"
141.3 ~~estimated~~ -
+ 44.9
0
− 43.~~8~~7
61.2

oK ~~44.9~~
~~0~~
16.3
~~+44.9~~ oK =
61.2

"B"
322.3 estimated
+ 46.2
0
− 45.4
60.8

oK
~~46.0~~
13.8
oK ~~+46.2~~ =
60.8

"a"	"B"
180°.669	1.623
141.266	322.240
39°.403	39°.383
min. dev	min. dev

angle min dev. = mean 39°.393

Monday Apr 2 1900
Same again

min dev.

a

$274^{\circ}.\cancel{5}$ – ~~estimated~~
$+\overset{4.6}{\cancel{3.4.9}}$

$-\overset{3.7}{\cancel{34.1}}^{\circ}$
60.89.

$\frac{60.0 - 3.7}{56.3}$

$\frac{56.3 + \cancel{34.9}}{60.8} =$

B

$9\overset{4.8}{\cancel{5.4}}+$ ~~estimated~~
+ 8.8

-9.0°
59.8

$\frac{60.0 - 9.0}{51.0}$

$\frac{51.0}{59.8} =$

In line

~~a~~ B

$55^{\circ}.4$ + estimated
+ 33.7

-32.4°
61.3

$\frac{33.7}{61.3} =$

~~B~~ a

224.5 +
+ 27.7

-27.0°
60.7

$\frac{60.0 - 27.0}{33.0}$

$\frac{33.0}{60.7} =$

"a"	"B"
$27\overset{30}{\cancel{4}}.926$	$94^{\circ}.853$
234.544	~~234.544~~ 55.450
39.382	39.403

diff

mean

angle min. dev. = 39°.392

39.392
39.392

39°.392 angle min. dev. ~~[illegible]~~

Tuesday. Apr 3 1900

Same app as yesterday
Measures of angle of prism

"a"
168.2 estimated
+10.0
0
−9.0
61.0

$\frac{51.0}{61.0} =$

"β"
348.8 estimated
+11.5
0
−11.0
60.5

$\frac{49.0}{60.5} =$

slit from one face of angle

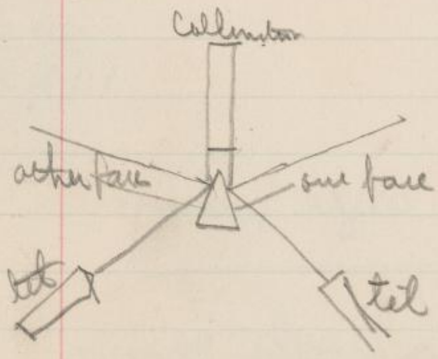
Slit from other face

"a"
288.+ estimated
$- \frac{57.2}{60.} =$

measured in terms of prism drum

"β"
109− estimated
+2.8
0.
−2.0
60.8

$\frac{58.0}{60.8} =$



"a"	"β"
168°.164	348°.810
288°.047	108.954
119.883	120.144

mean
120°.014

Tuesday Apr 3. 1900

Same again:

"a"
10~~4.8~~ 5.2 – ~~estimated~~
+13.0
a.0
–12.0
61.0

$\frac{48.0}{61.0} =$

"B"
285.8 estimated
+ ~~11.4~~ 12.3
a.
– ~~10.0~~ 11.2
61.~~4~~1

$\frac{48.8}{61.41} =$ ~~50.0~~

"a"	"B"
~~104°.787~~ 105°.213	285.799
225.017	45.931
119.804	120.132

mean
119°.968

---

other faces.

"a"
225+ estimated
–1.0
59.0
in terms of previous drum

$\frac{58.0}{59.0} =$

"B"
45.9+ estimated
+4.2
a.
–3.5
60.7

$\frac{56.5}{60.7} =$

119°.968
120.014
119°.991 | 2 mean angle prism

59°.996 mean angle prism

Tuesday Apr 3, 1900

Physical Manip; vol I; p 153

$$n = \frac{\sin\frac{1}{2}(a+D)}{\sin\frac{1}{2}a}$$ where a = angle of prism = $59^\circ.996$

D = deviation total = $39^\circ.392$

$a = 59^\circ.996$ $\quad \frac{1}{2}a = 29^\circ.998$

$D = 39.392$

$a+D = 99^\circ.388$

$\frac{1}{2}(a+D) = 49^\circ.694$

log sin $49^\circ.694 = 9.88229$

$29.998 = 9.69894$

log n $\quad 0.18335$

$n = 1.525$~~3~~

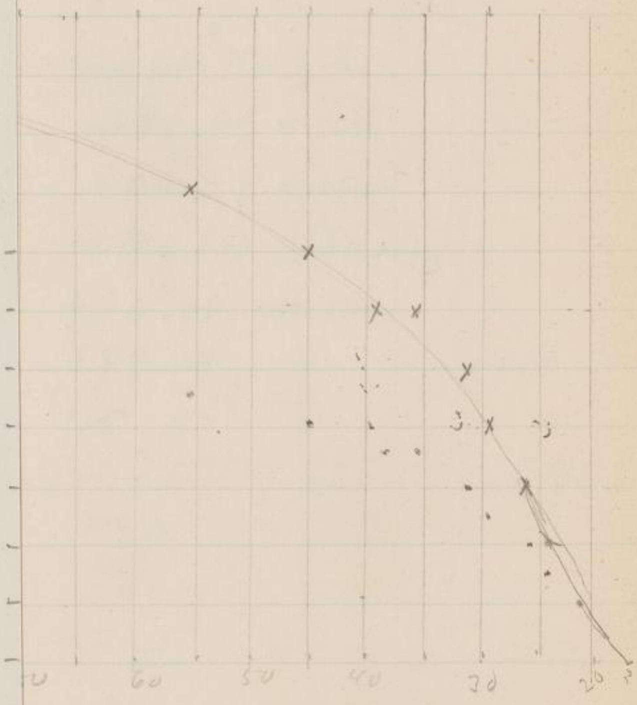
M = index refraction = 1.525

Wednesday June 13 1900

Experimenting with a galvanometer for purpose of measuring current in small electric lights used for photometers. Galvanometer apparently not very good

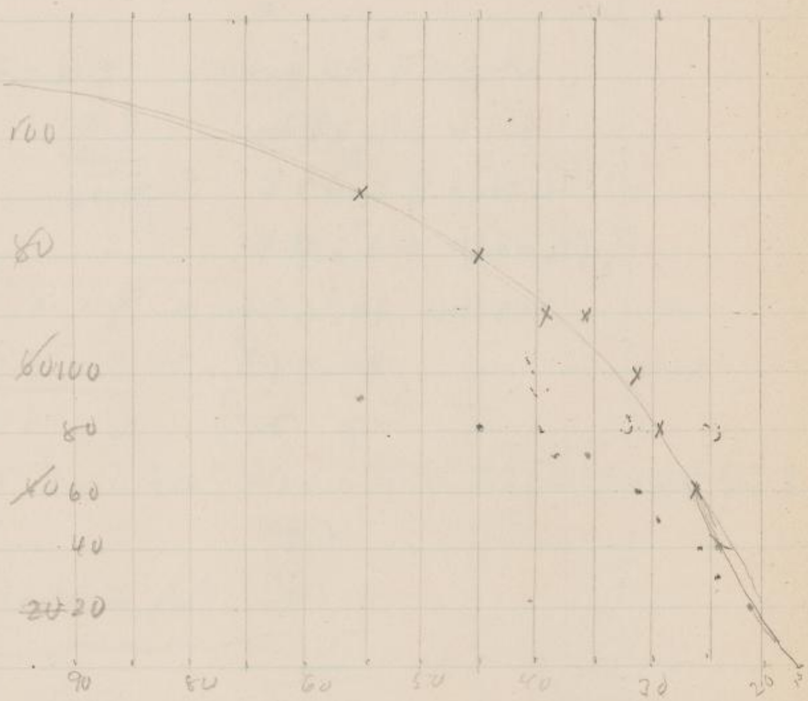
~~20 21~~
~~$\overset{21}{30}$ 22~~
22

Ohms	Deflection
20	21°
~~21~~	~~24~~
30	24°
40	26°
50	29°
60	32
70	36
70	38
80	45
90	$\overset{90-}{34}$ = 56



Wednesday June 13 1900

Experimenting with a galvanometer for purpose of measuring current in small electric lights used for photometers. Galvanometer apparently not very good



Tuesday July 10 1900

Berlin Longitude ~~to~~ − 0^h 53^m 35^s

July 6th 14^h 30 G T.
5 54

+9h
20^h 24 Berlin Time.

Position of Eros

July 6	0	55	47^s	+ 14	31	57
7	0	57	28	14	50	34
		1	41		18	37

~~1001~~
101
34

0 55 47
34
0 56 21

$^s 70^s$
$1^m 10^s$

24 | ~~141~~ (~~459~~ ^{s}
120
~~210~~ $8\frac{1}{2}$
216 168
30
20^s.

0^h 57^m 8^s

60
1080 6′ 12 ^{6} 12
27
24 | 1107 (~~46″~~ 14^{38} 09
96 ~~8½~~
147
144 138
3 23
161 = 2′ 41
14 31 57

14^0 ~~49′ 48″~~
47 53

For computation 0^h 57^m + 14^0 ~~50~~ 148

$m = 46''.0623 + 0''.0002849\,t$

$n = 20''.0607 - 0.0000863\,t$

1200
1855
~~245~~
$22\frac{1}{2}$
$1877\frac{1}{2}$

$\frac{d\alpha}{dt} = m + n \sin\alpha \tan\delta$

$\frac{d\delta}{dt} = n \cos\alpha$

2849
$22\frac{1}{2}$
5698
5698
1424
.0063102
4

46.0623
.0064
46.0687

log 2849 6.45469
1.88930
8.34399

15 | ~~202.3.8 | 138.3~~
~~15~~
57
41
~~123~~
120
38

$m = $ 46.0623
.02312
$46''.0854 = m$
~~48~~
2304270
1843416
20.736430

863
$77\frac{1}{2}$
6031
6031
432
.0066773

$n = $ $20''.0604$
0067
20.0537

~~0 57~~^{m}

Tuesday July 10 1900

$\frac{d\alpha}{dt} = m + n \sin\alpha \tan\delta$ $m = 46.0854$

$n = 20.0537$

$\alpha = 0\ 57^m = 14° 15'$

$\delta = 14\ 50$

log n = 1.302194
9.391206
9.422974
0.116374

46.0854
1.3073
47.3927
45
2369635
1895708
68 | 2132.67715
15 | ~~35.32.7~~
60 | 14.2.2
$2^h\ 22^s.2$

0 56 21
2 22
0 58 59

0 57
2 22
0 54 38 Red for 1855
+0 ~~Corr for 12~~
0 53 28

Precession for ~~100~~ 1^h 0 +15° from table in A P

given ^{m} .0525 × 45 = $2^h\ 22^s$

.32 × 45 = 14'.4

~~14 49.8~~ 14
~~14.4~~
~~14~~ 35.4

14 47.9
14.4
14 33.5

Cos α = 9.985280
1.302194
1.287474
1.653213
2.960687
1.778151
1.182536 15'.2

14 48.8
15.4
+ 14 34.4

14 38.2
14.4
14 23.8

14 47.9
14.4
14 33.5

Wednesday July 11 1900

Examination of wedge-to list. what density affords the greatest contrast to eye ~~to~~

Examined following wedges by light from half sheet. lighting from window

	Dw.	
E 5730	7	0.65
5742	9	0.24
5753	Could not discern	—
5683	5½	—
5720	10	0.34
5765	7 from dark	1.88
5721	6	

Thursday July 12 1900

Position of Eros July 10 14 30 E.T.
5 54
20 24 Berlin time.
20.4

July 10 12h 1 02.5 +15°.8
11 12h 1 04.1 +16.1
1m.6 .3
8.4
64
128
24 | 13.44 | .56
120
144
144

20.4
12
8.4

Ra 1 03.1 +15°.9
2.4 .2
15.7

Precession for H.P. 1h 00.7

0.525
4½
2100
262
2.362

36
60
2160

.32
45
160
128
4 | 14.40
90
131
1440

Examination of I 25542 shows object at
1 02.4 (1855) +15.5 (1855)

Place for night of July 9
1 00.7 +15.~~4~~ 7
1.6 3
0 59.1 ~~+15.8~~
8
+16.0

Examination of I 25539 shows object at about
1. 00.5 (1855) +15.7 which is elongated east & west as
I showed expect Eros to be, as the ~~trail~~ clock rate was not
correct

Tuesday July 24 1900

Examination of I 25580 Chart for Eros. with axis displaced.

Taken Saturday July 21 at Sid Time 21 50 − 23 29

50   21 50

22 40   1 39

1 30

16

16

~~Call this at~~ 14 30 E.T.

5 54

20 24 Call this ~~⅔~~ 1/3 of a day

~~before~~ after Ephem Times given in Nach. for midnight July 21

July 21	1	20	32.62		19°	15'	57"
		1	37.02			19'	19"
22	1	22	9.64	3/107 38	19	35	16
		1	36 72				
23	1	23	46.36		19	54	38

19/20

1940

17

~~1 20.5~~

1 20 33.

36

1 21 09

1 21.2

2.4

1 18.8

19. 16'

7

+19°.4

2

+19°.2

45

.054

180

225

2.430

.31'

45

155

134

1 3.95

s 241

11 / 107 | 9.7

99

80

~~.6~~

.4

19

60

1140 27

17

160 | 1157 | 7.2

1120

390   .3

Monday Aug 20 1900

For focus of Cooke Lens.
Formed images of ½ cm ruling in tinfoil.

	Lens Readings	Enent Reading	Enl.		f
(1)	13.9	183.5	2/23.3 =	11.66	13.35
(2)	14.0	170.0	2/21.3 =	10.65	13.34
(3)	14.1	159.3	2/19.6 =	9.80	
(4)	14.3	143.3	2/17.2 =	8.60	13.37
(5)	14.5	128.0	2/14.8 =	7.40	
(6)	14.7	120.0	2/13.6 =	6.80	13.41
(7)	15.0	108.1	2/11.8 =	5.90	
(8)	15.5	93.8	2/9.6 =	4.80	
(9)	16.0	84.5	2/8.1 =	4.05	
(10)	17.0	73.5	2/6.2 =	3.10	
(11)	18.0	66.4	— =	2.50	13.55

Setting for C 12114

(12)	14.0 +	168.4		10.52	

+ having been found on loose sheets to be approx = 2.″0

Formula for Cooke Lens $D = 13.''2\,\frac{(\varepsilon+1)^2}{\varepsilon} + \frac{1.''8}{2.''0}$

See p 75–76

For other measures see p 77

Monday Aug. 20 1900

Formula $F = D\frac{\mathcal{E}}{(\mathcal{E}+1)^2}$

F = focus

D = Scale Reading or Dist between Plates

$\mathcal{E}$ = enlargement.

	(1)	(2)	(11)	(6)	(4)
log($\mathcal{E}$ + 1)	1.10243 2 2.20486	1.06633 2 2.13266	0.54407 2 1.08814	0.89209 ~~0.83257~~ 2 ~~1.66502~~ 1.78418	0.98227 2 1.96454
log $\mathcal{E}$	1.06670	1.02735	0.39794	0.83257 ~~0.89209~~	0.93450
log D	2.26364 3.33034 2.20486 1.12548	2.23045 3.25780 2.13266 1.12514	1.82217 2.22011 1.08814 1.13197	2.07918 ~~2.91169~~ ~~2.97127~~ 1.78418 ~~1.66502~~ ~~30625~~ 1.12751	2.15625 3.09075 1.96454 1.12621
F =	13.35	13.34	13.55	13.41	13.37

~~(a)~~ Call formula ~~F~~ $D = F\frac{(\mathcal{E}+1)^2}{\mathcal{E}} + X$

(1) $183.5 = F\frac{(12.66)^2}{11.66} + x$

(11) $66.4 = F\frac{(3.50)^2}{2.50} + x$

$117.1 = F\left(\frac{(12.66)^2}{11.66} - \frac{(3.50)^2}{2.50}\right)$

2.20486
1.06670
1.13816

1.08814
0.39794
0.69020

13.745
4.900
8.845

$\overset{2}{\cancel{8}}$.06856
0.94670
1.12186

F = 13.24

on ~~F~~ (2) $170.0 = F\frac{(11.65)^2}{10.65} + x$

(10) $73.5 = F\frac{(4.10)^2}{3.10} + x$

$96.5 = F\left\{\frac{(11.65)^2}{10.65} - \frac{(4.10)^2}{3.10}\right\}$

2.13266
1.02735
1.10531

0.61278
2
1.22556
0.49136
0.73420

12.745
5.423
7.322

1.98453
0.86463
1.11990

F = 13.18

Monday Aug 20 1900

	(1)	(2)	(3)	(4)	(5)	(6)
E + 1	12.66	$\overset{1}{10}$.65	$\overset{10}{9}$.80	$\overset{9}{8}$.60	$\overset{8}{7}$.40	$\overset{7}{6}$.80
	1.10243	1.06633	1.03342	0.98227	0.92428	0.89209
log $(E+1)^2$	2.20486	2.13266	2.06684	1.96454	1.84856	1.78418
log E	1.06670	1.02735	0.99123	0.93450	0.86923	0.83251
	1.13816	1.10531	1.07561	1.03004	0.97933	0.95167
log D	2.25873	2.22588	2.19618	2.15061	2.09990	2.07224
	1.10243	1.06633	1.03342	0.98227	0.92428	0.89209
	1.15630	1.15955	1.16276	1.16734	1.17562	1.18015
	14.33 13.90 .43	14.44 14 0.44	14.55 14.10 .45	14.70 14.30 .40	14.98 14.50 .48	15.14 14.7 .44
	183.5	170.0	159.3	143.3	128.0	120.0
D =	181.4	168.2	157.1	141.5	125.9	118.1
x =	2.1	1.8	2.2	1.8	2.1	1.9

	(7)	(8)	(9)	(10)	(11)	(12)
E + 1	6.90	5.80	5.05	4.10	3.50	11.52
	0.83885	0.76343	0.70329	0.61278	0.54407	1.06145
log $(E+1)^2$	1.67770	1.52686	1.40658	1.22556	1.08814	2.12290
log E	0.77085	0.68124	0.60746	0.49136	0.39794	1.02202
	0.90685	0.84562	0.$\overset{7}{\cancel{6}}$9912	0.73420	0.69020	1.10088
log D	2.02752	1.96619	1.91969	1.85477	1.81077	2.22145
	0.83885	0.76343	0.70329	0.61278	0.54407	1.06145
	~~106.6~~	~~92.5~~	~~83.1~~			
	1.18867	1.20276	1.21640	1.24199	1.26670	1.16000
	15.44 15.00 .44	15.95 15.5 .45	16.46 16.00 .46	17.46 17.00 .46	18.48 18 .48	14.45
	108.1	93.8	84.5	73.5	66.4	168.7
D	106.6	92.5	83.1	71.6	64.7	166.5
x =	1.5	1.3	1.4	1.9	1.7	1.9

Means x = 1.8

Correction to short focus = − 0″.45

Thursday Aug. 23 1900

Further measures made in same manner as those of p 74

18.0	66.5	2.50
20.0	59.5	1.80
22.0	56.4	1.40
26.0	54.6	.98
25.0	54.7	1.07

~~Measured~~

Compared measured distance between plates & easel reading

Easel Reading 52 5/8
Dist. measured 50 9/16

This shows that x found on p 76 is mostly if not entirely due to error of easel reading.

Tuesday Aug 28 1900

Measured dist on enl. Apparatus from plate to front face of flange for lens when lens setting = 20".0
Found to be 19 3/16" = 19.19 19".2 − Corr. = −.81

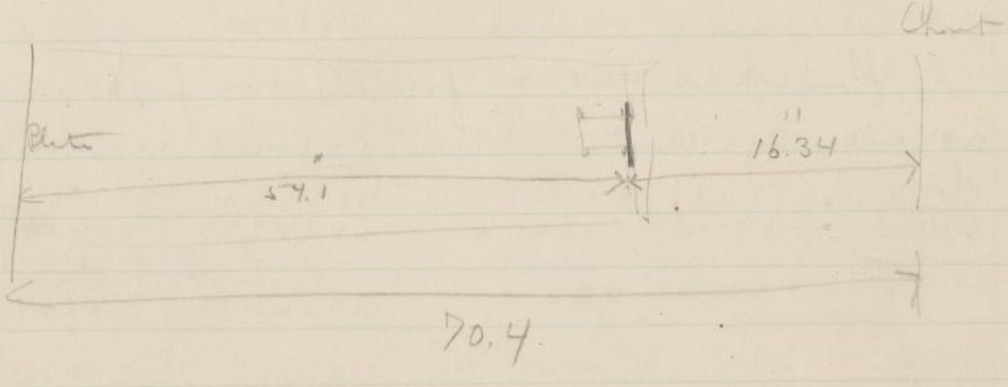
For 3 times enl, to use for enlarging D M Charts.

13.2
4
3) 52.8
17.6
70.4 Dist between plates.

✓
no corr. x. see p 77.

17.60 Dist from Lens to ~~plate~~ Chart
.45 Corr for p 76
17.15
.81 Corr from measures above
16.34

70.4
16.3
54.1 -



Aug 28 1900

al. Apparatus from plate to
for lens when lens setting = 20″.0
6 = ~~19.19~~ 19″.2 – Corr. = –.81

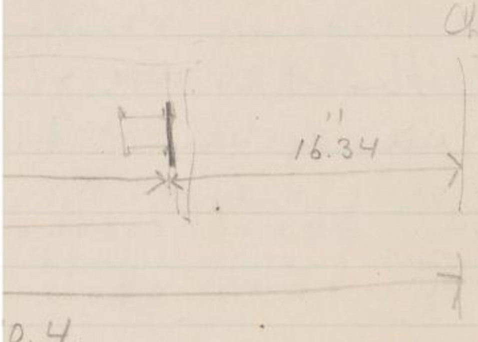
Division for enlarging D M Chart.

✓

No corr. x. See p. 77.

Dist between plates.

17.60 Dist from Lens to ~~plate~~ chart
.45 Corr for +76
17.15
.81 Corr from measures above
16.34



0.4.

No	Name & Type	Pos.	Neg.	
-655	α Cygni 1	? 6901, 2, ③,	—	✓
-655	— Aquilae ,	6904 -	—	✓
X8083	α Aquilae ,	6905, 6, 7, ⑧, ✓	~~1~~ 7450 ✓	✓
C5929	α Cygni 1	6909, 10, ✓	7448 ✓	✓
B11938				
B14895				
B19017				
B21258				
C5789	γ Cassiopeiae 1	6951, 2, 3, 4, 5, ⑥, ✓	? 7437 ✓	✓

No.	Name or type			Pos.	Neg.
B10105	—	O_b	½	6636, 38, 39, (40), 41	(6673), 74,
B13761	R Carinae	Md^6	½	(6646), 47,	6672, 6685, 6715, 41, (56), 94, 95
B20454	π Gruis. Pec.		½	6648, 9, (50)	6675, 6720, 39, (52), 97,
B20867		Md	½	6651, (2)	6670, (1).
B13149	R Hydrae		½	6676, (7), 8,	6716, 37, (53), 96, (7449)
C11496	o Ceti		1	6679, (80), 81 / 6827, 8, 9, 30, (31)	6682, 3, 4, 6686, 7, 6714, 40, (57), ~~58~~ 98,
B17699	R Dorado.	Mc	½	6690, 1, 2, (3),	6717, 36, (55), 85,
I21925	—	Na	½	6694, 5, 6, 7, 8, 9, (6700)	6721, 38, (54), 86,
C11575	o Ceti		½	(6701), ~~2~~	6718, 34, 35, ~~58~~, (59), 84,
C1274	α Herculis		½	6702, (03), 69, 70,	6719, 31, 32, 33, 60, (61), ~~69, 70~~ 91, 92, 93,
X8119	ζ Orionis		~~½~~ 1?	6704, 5, 9, 10, (11),	6775, 76, 99, 6800
I1051	R Lyncis		½	(6712), 13	6779, 80,
B9767	Nova Normae		½	(6722)	6764, (65), 66, 71, 72, 73
B8416		O^{III}	½	(6723)	6774.
X4512	HP 1311		½	6724, (25)	6777, 8,
C11856	α Orionis		½	6726, 7, (8), 9, 30	6762, (63), 81, 82, 83, (7443)?
	μ Centauri			D5 ~~X~~ 1 87 (6950)	½(6751, (67), 681
X8362	μ Centauri ·		~~½~~ 1	6787, 88, 89, 90, 6940, 1, 2, 3, 45, 6789,	6803, 4, (7446), 47,
B13761		Md4	½	6805, 6, 7, 8, 9, (10)	6822, 23
I7640	Pl. Neb		½	6811, (12),	6821
B19215	—			6813, 14, (15),	6820
	No				

Name	Scale	Original Plate	Positive	Negative	
ξ Puppis	cm. 6.0	X6257		D6749	
γ Velorum	6.0	X4474		D6742-50	
η Carinae	6.0	X6480	D ~~5~~5726 5830	D5734,5	
" "	6.0	X6592	D5729	D5736,7	
" "	6.0	X4709	D 5739 5813 5814	D $5\overset{8}{7}40$	
Nova Aurigae	6.0	C4413	D5827	D5835	
o Ceti	6.0	C1480	D6075	D6081	
" "	6.0	C11460	D6089	D6095	
— Ob	6.0	B10105	D6640	D6673	
R Carinae	6.0	B13761	D6646	D$\overset{?}{6}$656	Repeat Contrast.
π Gruis	6.0	B20454	D6650	D$\overset{?}{6}$652	Repeat Contrast?
— Nd	6.0	B20867	D6652	D6671	
R Hydrae	6.0	B13149	D6677	D6753	Repeat Contrast?
R Doradus	6.0	B17699	D6693	D6755	" " ?
— N_a	6.0	I21925	D6700	D6754	Needs better enl.
o Ceti	6.0	C11575	D6701	D6759	Repeat Contrast.
α Herculis	6.0	C1274	D6703	D6761	Better enl. & contrast.
R Lyncis	6.0	I1051	D6712	D6779	
Nova Normae	6.0	B9767	D6722	D6765	Better Contrast needed.
— O^{III}	6.0	B8416	D6723	D6774	
HP 1311	6.0	X4512	D6725	D6777	
α Orionis	6.0	C11856	D6728	~~D6763~~ D7443	Better Contrast needed
μ Centauri	6.0	X5633	—	D6767	

Name	Scale	Original Plate	Positive	Negative	
—— M d4	cm. 6.0	B13761	D6810 ✓	6822,3 ✓✓	Reprint contact
Plan. Neb.	6.0	I7640	D6812 ✓	D6821 ✓	Reprint only if 6811 is poor.
—— –	6.0	B19215	D6815 ✓	D6820 ✓	" " " 68~~B~~15 is poor.

No.	Name	Pos.		Neg.	
X6257	✓ ζ Puppis ✓	✓✓ 5672, 3. 4, 5, 80, 81, 5710	(5674) (5675)	~~½(6746, ⑨,~~ 3678, 5702, 5760, 62, (80)	✓
"	~~"~~ 2½			6746, ㊾	
X6155	ζ Puppis Scale to X7966	6134, 5, 6144, 5, ⑥, 7		Included plates 6210, 11, 12, 13, 14, 47, 48, 50, 51 6172, 3, 4, 5, 6, 79, 80, 1, 2, 3, 4, ⑤ 98, 99, 53 ✓	
~~X8188~~	~~ζ Puppis~~	~~6170, 1,~~			
X8478 ✓ ~~X Vel~~	γ Velorum	✓✓ 5705, 6	(5705)	~~½(6742, 3, 4, 5, 7, 8, 50,~~ 5751, 2, 3, 5759, 61, 76, 7, 8, 9, (81)	✓
"	" ½			6742, 3, 4, 5, 7, 8, 50	(4x5?)
X7505	✓ γ Velorum	5712, 13, 14, 15, 16,		✓✓ 5730, 1, ②, 3,	(5732)
X1480	✓ η Carinae ½?	5725, ㉖ 5815, 29, ㉚ ✓		5734, 35	
X6592	✓ η Carinae ½?	5727, 8, ⑨		5736, 7	
X4709	✓ η Carinae ½?	5738, ㊴ 5807, 8, 9, 10, 11, 12, 13, ⑭ ✓✓		✓c 5743, 5839, ㊵	Refract
C4413 ~~X64~~	✓ Nova Aurigae ~~η Carinae~~ ½?	✓✓ 5826, ㉗ 28	(5827)	✓ (5833)	
C1480	✓ O Ceti ½	6073, 4, 5, 6,		✓ 6080, 1, (84) (85)	
C11460	✓ o Ceti E ½	✓ 6087, 8, 9, 90,		✓ 6091, 2, 3, 4, 5, 6,	

Type.	Name	Scale	Original Plate	Positive	Negative	
	α Cygni	12^cm.	C5929	D6909	D7448 ✓	Compare D6903 for −653
	α Aquilae	"	X8083	D6908	D7450 ✓	" D6904 " "
	γ Cassiopeiai	"	C5189	D6956	D7451 ✓	
	o Ceti	"	C11496	D68$\overset{3}{4}$1	D7449 ✓	
	~~o Ceti~~	~~"~~	~~C11460~~	—	—	
	μ Centauri	12^cm.	X8362	D6950	D7446 ✓	
	ζ Puppis	"	X6257	D5674	D5780 ✓	
	γ Velorum	"	X8478	D5706	D5781 ✓	
	" "	"	X7505	D5716	D5732 ✓	

Vol XXVIII

Typical Spectra.
Peculiar Spectra.
Direct Enlargement. Enlarge. Mult. or Cyl. Lens
Wave lengths greater than $H\beta$.

Vol XLI.

Part VII. Mu 13.

Part VIII. Related to Normal. β Orionis
" " α Aurigae

Autumn Study

Saturday Oct 13 1900

Collection of Enl. from Spectrum Plate.

Type.		Name	Orig. Plate.	Positives		Negatives.		Scale
B	✓	β Orionis	X8096	D5742		D6053 ✓		12 cm ✓
F		α Carinae	X8114	D5821		D5832 ✓		12 cm ✓
K		α Bootis	C6563 ~~X80~~	D6060		D6068 ✓ ✓		12 cm ✓
		γ Velorum	X8478	D5706		D5781		12 cm ✓
		ζ Puppis	X6257	D681 ✓ D5674	D5675	D5780 D5702 ✓		12 ✓
		"	X6155					
		"	X8188					
G.		α Aurigae	X7984	D6062		D6086 ✓		12 ✓
		o Ceti	C1480	D6076 D6075		D6085 D6084?		~~12~~ 6 cm
		"	C11460	D6089		D6071-6	D6095 ✓	
A	✓	α Canis Majoris	X8094	D5825		D5833 ✓		
G	✓	——	C429	(D6054) D6056		D6072 ✓		
Ma	✓	α Orionis	C1043	D6049		D6051 ✓		
		η Argus	X4709	D5814 ✓		D5840 ✓		
		"	X6480	D5830		D5834		
		Nova Aurigae	C4413	D5827 ✓		D5835 ✓		
		~~[illegible]~~	~~C1274~~					
	✓	ε Orionis	X8119	D6710 ✓		D6800 ✓		
		μ ~~ω~~ Centauri	X6480	D5830				
	✓	Sun	C1269	D7155 ✓		D7445 ✓		12 cm
		o Ceti	C11496	D6831 ✓ ~~6856~~		D7449 ✓		
		α Orionis	C639~~4~~5					
		α Orionis	C11856	D6728 ✓		7443 ✓ D6763		6 cm
		α Herculis	C1274					
		γ Cass	C5189	D6956 ✓		D7451 ~~6956~~ ✓		
		μ Centauri	X8362	D6950 ~~46~~ ✓		D7446 ✓ ✓		
		α Aquilae	X8083	D6908 ✓		D7450		

Type	Name	Original Plate	Positive	Negative	Scale
	α Cygni	C5929	D6909	D7448	
	α Cygni	} 655	D6903		
	α Aquilae		D6904		

Normal

7169 7166 E4380

7170 7161 — E5492

Spectrum work with moving plate.

rig. Plate	Name	Type	Scale	Pos. plate (Bear.)	Neg. plate (Bef.)
B10105	—	O_b	6 c.m	6640	667~~4~~3
B13761	R Carinae	Md^6	"	664~~7~~6 x	6685 6715 6741 6794 95 6672? 6756
I1051	R Lyncis	Md^1	"	6712 x	6779,80, 6716 37 6796
B13149	R Hydrae	Md^{10}	"	6677 x	6753
B20867	—	N^d	"	6652	6671
B20454	π Geminorum	Peculiar	"	6650 x	6720,39,6797 6675? 6752
11496	o Ceti	Md	12 c.m	6680 x	6714,40,6798 6757 6686,7 6784 6735 6718
11575	o Ceti	Md	6 c.m	6701 x 6769,70	6759 6784 ~~6771~~ 6791-3
1274	α Herculis	Mb	6 c.m	~~6703~~ 6703	~~6761~~ 6719,31-33 6717 6785
B17691	R Draconis	Mc	6 c.m	6693 x	6755 6736
X8119	ε Orionis	B	12 c.m	6710 x	6775,76 6799,6800 6721,38
I21925	—	Na	6 c.m	6700 x	6754 6786
N1856	α Orionis	Ma	6 c.m	6728 x	6763 6781-83
X4572	HP 1311	O	6 c.m	6725 x	6777,78
X6257	ζ Puppis Red		6 c.m	12 c.m (D5674)	6749
X8478	γ Velorum Red		6 c.m	12 cm (D5706)	6750
9767	Nova Normae	~~6722~~	6. c.m	6722 x	6765 6771-73
	μ Centauri Red			12 cm (D5787)	6767
B8416		O^{III}		6723 x	6774
B13761		Md^4		6810	6822, 23
I7640	Plan. Neb.	1		D6812	6821
B19215	—			D6815	D6820

Thursday Nov 22 1900

Comparison of measures of Spectra from C.S.M No. 17

λ	p 84 α Scorpii	p 126 δ Can Maj	
5455.8	59523	59373	+ 150
5397.3	60767	60819	− 5~~8~~2
5167.6	67000	67042 ~~66912~~	− 42
5172.9	66845	66912	− 67
5041.6	70849	71616	+ 233
4861.5	76928	77067	− 139
4668.0	84400	84384 84539	− 62
4482.5	92733	92828	− 95
4340.7	10000	10000	00

		p 124 γ Velorum	
5410.0	60443	60407	+ 36
4861.5	76928	76993	− 65
4340.7	10000	10000	00

Thursday Nov 22 1900

Study of Hartmann's Interpolation Formula.

$xy - cy - d = 0$

This may be written $y = \frac{d}{x - c}$ or ~~$xy - cy - d = 0$~~

or $d = xy - cy$

Reductions for Constants for α Scorpii X 8729 See previous Book page 219.

	x'	y'
H_β	−10083	+311.4
−5896.0	+16989	−723.1

~~$d = xy - cy$~~ ~~log x'y' 6.4969094n~~

$x' = -10083.$
$y' = +311.4$

40332
10083
10083
30249
3139846.2

$d = -3139846.2 - 311.4\,c$

$d = -12284745.9 + 723.1\,c$

$-9144899.7 + 1034.5\,c = 0$

1034.5) 9144899.7 (+8839.9224
~~802860~~
82760
86889
82760 9
41299
31035
102642 7
93105
95420
93105
2315

231.50
206.90
24600
20690
39100

5
4
2
4
6

$x'' = +16989$
$y'' = -723.1$

1698.9
50967
33978
118923
1228474 5.9

311.4
.0004
.12456

8839.9224
311.4
3535968.86
8839922
8839922
26519766
2752751.7108
3139846.2
5892597.9

8839.922
723.1
8839922
26519766
17679844
61879454
6392147.5982
1228474 5.9
− 5892598.3
.3

723.1
.0004
.28928

log d = 6.7703074n

d = − 5892598.

Thursday Nov 22 1900

$x = -10083$

$c = +8840$

$x - c = -1\overset{9}{\cancel{8}}23$

log d = 6.770307 n

log (x−c) = 4.276990 n

2.493317

y = + 311.4

$x = +16989$

$c = +8840$

$x - c = 8149$

log d = 6.77031 n

log x−c 3.91110

2.85921 n

y = − 723.1

$x = +47945$

$c = +8840$

$x - c = 39105$

log d = 6.77031 n

4.59224

2.17807 n

− 150.7

$x = 14790$

$c = 8840$

$x - c$ 5950

6.77031 n

3.77452

2.99579 n

990.3

Thursday Nov 22 1900

Second Method with Hartmann's Formula

Saturday Nov 24 1900.

Derivation of Formula for wave-length for α Scorpii Plate X 8722 C.S.M. No. 17 page 84 using λ5410.0 as extreme toward red

	λ		x	~~x_1~~	y_1
	5410.0	λ'	x' 60443	+	− 548.5
Hβ	4861.5	λ''	x'' 76928		1069.3
Hγ	4340.7	λ'''	x''' 100000		+ 520.8

Use formula [illegible] $\lambda = \lambda_0 + \frac{b}{x+c}$

then $$c = \frac{(\lambda'''-\lambda')(x'-x'')\,x''' - (\lambda''-\lambda')(x'-x''')\,x''}{(\lambda''-\lambda')(x'-x''') - (\lambda'''-\lambda')(x'-x'')}$$

$\lambda''' - \lambda' = \overset{-1069.3}{\cancel{-520.8}}$ log

$x' - x'' = +39557$ log

or $$c = \frac{+\dfrac{x'''(\lambda'''-\lambda')}{(x'-x''')} \overset{-}{\cancel{+}} \dfrac{x''(\lambda''-\lambda')}{(x'-x'')}}{+\dfrac{(\lambda''-\lambda')}{(x'-x''')} \overset{-}{\cancel{+}} \dfrac{(\lambda'''-\lambda')}{(x'-x''')}}$$

$$c = \frac{\dfrac{x''(\lambda''-\lambda')}{x''-x'} - \dfrac{x'''(\lambda'''-\lambda')}{x'''-x'}}{\dfrac{\lambda'''-\lambda'}{x'''-x'} - \dfrac{\lambda''-\lambda'}{x''-x'}} = \frac{A x'' - B x'''}{\cancel{A} - \cancel{B} \quad B - A}$$

$$\lambda' = \lambda_0 + \frac{b}{x'+c}$$

$$\lambda' x' + \lambda' c = \lambda_0 (x' + \cdot$$

$$\lambda'' = \lambda_0 + \frac{b}{x''+c}$$

$$\lambda''' = \lambda_0 + \frac{b}{x'''+c}$$

a derivation of formula on page 86
May 28 1901

~~$\lambda' - \lambda'' = \frac{b}{x'+c} - \frac{b}{x''+c}$~~

~~$\lambda'' - \lambda''' = \frac{b}{x''+c} - \frac{b}{x'''+c}$~~

~~$(\lambda' - \lambda'') x' + (\lambda' - \lambda'') c -$~~

$$x'x'' + (x' + x'')c + c^2$$

$$(\lambda' - \lambda'') x' x'' + (\lambda' - \lambda'')(x' + x'')c + (\lambda' - \lambda'')c^2 = b x'' + \cancel{bc} - b x' - \cancel{bc}$$

$$(\lambda' - \lambda'')(x'+c)(x''+c)(x''' - x'') = b(x'' - x')(x''' - x'')$$

$$(\lambda'' - \lambda''')(x''+c)(x'''+c)(x'' - x') = b(x''' - x'')(x'' - x')$$

$$(\lambda' - \lambda'')(x'+c)\cancel{(x''+c)}(x''' - x'') = (\lambda'' - \lambda''')\cancel{(x''+c)}(x'''+c)(x'' - x')$$

$$\lambda = \lambda_0 - {}^{x+c}\!/ \frac{dx}{abcd} (d$$

$$\text{or } \lambda = \lambda_0 \mp \frac{mx}{x + n}$$

$$\lambda = \lambda_0 - d + \frac{cd}{x + c}$$

$$\lambda = \lambda_0 \mp m + \frac{mn}{x + n}$$

$$\lambda' = \lambda_0 + \frac{b}{x'+c} \qquad \lambda' x' + \lambda' c = \lambda_0 (x' + \cdot$$

$$\lambda'' = \lambda_0 + \frac{b}{x''+c}$$

$$\lambda''' = \lambda_0 + \frac{b}{x'''+c}$$

a derivation of formula on page 86

May 28 1901

$$\lambda' - \lambda'' = \frac{b}{x'+c} - \frac{b}{x''+c}$$

$$\lambda'' - \lambda''' = \frac{b}{x''+c} - \frac{b}{x'''+c}$$

$$(\lambda' - \lambda'')x' + (\lambda' - \lambda'')c -$$

$$x'x'' + (x'+x'')c + c^2$$

$$(\lambda'-\lambda'')x'x'' + (\lambda'-\lambda'')(x'+x'')c + (\lambda'-\lambda'')c^2 = bx'' + \cancel{bc} - bx' - \cancel{bc}$$

$$(\lambda'-\lambda'')(x'+c)(x''+c)(x'''-x'') = b(x''-x')(x'''-x'')$$

$$(\lambda''-\lambda''')(x''+c)(x'''+c)(x''-x') = b(x'''-x'')(x''-x')$$

$$(\lambda'-\lambda'')(x'+c)\cancel{(x''+c)}(x'''-x'') = (\lambda''-\lambda''')\cancel{(x''+c)}(x'''+c)(x''-x')$$

$$= \frac{(\lambda'-\lambda''')(x''-x')x''' - (\lambda'-\lambda'')(x'''-x'')x'}{(\lambda'-\lambda'')(x'''-x') \qquad - (\lambda''-\lambda''')\cancel{(x'''+c)}(x''-x')}$$

Monday
~~Saturday~~ Nov $\overset{26}{24}$ 1900

$\lambda''' - \lambda'$ $-\ 1069.3$ log $3.029100n$
$x''' - x'''$ $+\ 39557$ log $\underline{4.597223}$
log B $8.431877n$ $B = -0.0270320$
log x''' $\underline{5.000000}$
$Bx''' = -2703.2$ $3.431877n$

$-\lambda'$ $-\ 548.5$ log $2.739177n$
$-x'$ $+\ 16485$ log $\underline{4.217089}$
log A $8.522088n$ $A = -0.0332727$
log x'' $\underline{4.881084}$ +
$Ax'' = -\ 2559.6$ $3.408172n$
$Bx''' = -\ 2703.2$

$B - A = +0.0062407$

$Ax'' - Bx''' = +\ 143.6$ log 2.157154
log $(B-A)$ $\underline{7.795233}$
log c 4.361921 $c = +23010.2$

$$b = \frac{(\lambda'' - \lambda')}{(x'' - x')} \cdot (x''+c)(x'+c) \quad = -\frac{(\lambda''' - \lambda')}{(x''' - x')} (x''+c)(x'+c)$$

$x'' + c$ 83453.2 log 4.921444 4.921444
$x' + c$ 99938.2 log 4.999732
$x''' + c$ 123010.2 log 5.089941
$\underline{8.522088n}$ $\underline{8.431877n}$
$b = +\ 0.0277500$ $8.443264n$ $8.443262n$

$$\lambda_0 = \lambda - \frac{b}{x + c}$$

log $b = 8.443263$
log $x'' + c = \underline{4.999732}$
3.443531

4861.5
$\underline{2776.7}$
2084.8

Formula $\lambda = 2084.8 + \dfrac{[8.443264]}{x + 23010}$

Monday Nov 26 1900

Check of Comp. on p 87

λ	5410.0	4861.5	4340.7
$X =$	60443	76928	100000
$C =$	23010	23010	23010
$x + C$	83453	99938	123010
$-$ log b	8.44326	8.44326	8.44326
log x+C	4.92145	4.99974	5.08995
	3.52181	3.44352	3.35331
	3325.2	2776.6	2255.8
	2084.8	2084.8	2084.8
	5410.0	4861.4	4340.6

Derivation of Formula for wave-length for δ Canis Majoris. C.S.M. No 17 p 126

λ'	5406.0	x'	60641
λ''	4861.5	x'	77067
λ'''	4340.7	x'''	100000

$\lambda''' - \lambda' = -1065.3$ log 3.027472 n

$x''' - x' = 39359$ log 4.595044

log B $\overset{8}{5}$.432428 n $B = -0.0270662$

log x''' 5.

log $Bx''' =$ 13.432428 n

$Bx''' = -2706.62$

Monday Nov 26 1900

$\lambda'' - \lambda'$ − 544.5 log 2.735998n
$x'' - x'$ +16426 log 4.215532
log A 8.520466n
log x'' 4.886868
log Ax'' 3.407334n

~~B =~~

A = − 0.0331487
B = − 0.0270662
B−A = + 0.0060825

$Ax'' = -2554.66$
$Bx''' = -2706.62$
$Ax'' - Bx''' =$ + 351.96

log = 2.181729
log B−A = 7.784082
log C 4.397647 C = +24983.1

$x' + C$	85624.1	log	4.932597	4.932597
$x'' + C$	102050.1	log	5.008813	
$x''' + C$	124983.1	log		5.096851
		log A	8.520466	log B 8.432428
		log b	8.461876	8.461876

~~b = + 0.0~~

log b = 8.461876
$x'' + C$ 102050.1 log = 5.008813
3.453063
2838.3

4861.5
2838.3
$\overset{20}{\cancel{19}}$23.2

Formula $\lambda = \overset{20}{\cancel{19}}23.2 + \dfrac{[8.461876]}{x + 24983.}$

Friday Nov 30 1900

Formula for wave length for δ Canis Majoris C.S.M. No 17 p 126. Change in measures of standard lines used.

$\lambda' = 5406.0$ $x' = 60641$
$\lambda'' = 4861.5$ $x'' = 76885$
$\lambda''' = 4340.7$ $x''' = 100000$

$\lambda''' - \lambda' = -1065.3$ $B = -0.0270662$
$x''' - x' = +39359$
$\therefore Bx''' = -2706.62$

$\lambda'' - \lambda' = -544.5$ log $2.735998n$
$x'' - x' = 16244$ log $\underline{4.210693}$
$8.525305n$ $A = -0.0335201$
log $x'' =$ $\underline{4.885842}$ $B-A = +0.0064539$
$3.411147n$

$Ax'' = -2577.20$ 2.112001 $C = 20053.$
$\underline{+2706.62}$ $\underline{7.809822}$
$+129.42$ 4.302179

$x' + C$ 80694 4.906841 4.906841
$x'' + C$ 96938 4.986494
$x''' + C$ 120053 5.079373

log A $\underline{8.525305}$ log B $\underline{8.432428n}$
$8.418640n$ 8.418642

log b = 8.418641

Friday Nov 30 1900

log h	8.418641		8.418641
log $x'' + C =$	4.986494	$\log(x' + C)$	4.906841
$\sim$	3.432147	$\sim$	3.511800
	2704.9		3249.4
	4861.5		5406.0
	2156.6		2156.6

Wednesday Dec 5 1900

~~Co Errors~~ of Residuals of Computation according to formulae of previous pages.. ~~Comp~~ Comp. for Miss Cannon's B 1 × 50°C

α Scorpii formula p 87		
5896.0	−2.8	
5890.0	−3.1	
5785.0	−3.4	5455.8 −0.1
5410.0	0.0	5446.1 ~~+0~~ +1.0
5397.3	−0.1	
5172.9	+0.2	
5167.6	+0.2	
5041.6	−0.2	
4924.6	+0.8	
4920.8	−0.7	
4861.5	0.0	
4668.0	+0.4	
4482.5	−0.2	
4340.7	0.0	
41.01.8	+1.8	
3970.2	+7.9	

	δ Canis majoris Form. p 90 & 91	δ Canis min formula p 89
5711.8		−3.1
5658.5	+4.7	−1.2
5588.3	+4.1	0.0
5455.8	+2.0	+1.1
5446.1	+2.3	+1.6
5406.0	0.0	0.0
5397.3	+1.5	+1.7
5328.5	+1.1	
5316.9	+0.7	−9.3
5227.1	−0.3	+2.6
5172.9	−0.4	−2.2
5167.6	−1.2	+7.6
4861.5	—	
4670.0	−2.7	
4668.0	−4.5	
4482.5	−3.1	
4340.7	0.0	
4101.8	+7.8	
3970.2	+11.0	

Wednesday Dec 19 1900

Constants for α Scorpii X − (C.S. m 17 p.84)

X	λ
$X' =$ 16526	$\lambda' =$ 5896.0
$x'' =$ 33515	$\lambda'' =$ 5172.9
$x''' =$ 43598	$\lambda''' =$ 4861.5

$\lambda'' - \lambda'$ − 1034.5 log 3.014730 n

$x''' - x'$ + 27072. log 4.432520

log B = 8.582210 n B = −0.0382129

$Bx''' =$ −1666.01 log $x''' =$ 4.639467

log $Bx''' =$ 3.221677 n

$\lambda'' - \lambda'$ − 723.1 log 2.859198 n

$x'' - x'$ + $16\overset{989}{\cancel{011}}$ log 4.230168 A = $-0.04256\overset{2}{\cancel{4}}8$

log A 8.629030 n

log x'' 4.525239 ~~B − A = $\overset{439}{0439}$~~

$Ax'' =$ − 1426.49 log $Ax'' =$ 3.154269 n B − A = +0.0043499

$Bx''' =$ −1666.01

$Ax'' - Bx''' =$ + 239.52 log 2.379342

log B−A 7.638479

log C 4.740863 C = + 55063.4

Thursday Dec 20 1900

Computations (continued)

$x' + c = 71589.4$ log = 4.854848   4.854848

$x'' + c = 88578.4$ log = 4.947328 .

$x''' + c = 98661.4$ log =   4.994148

log A   8.629030n   8.582210n

log b =   8.431206n   8.431206n

---

log b = 8.431206n

log$(x''+c)$ 4.947328   3.576358n x'

3.483878n

+3047.0   +3770.1

5172.9   5896.0

2125.9   2125.9

Formula $\lambda = 2125.9 + \frac{[8.43121]}{x + 55063.}$

H_ε

x = 90248

c = 55063

x+c 145311   log 5.162299

3.268907

2125.9

1857.4

3983.3

~~Friday~~ Dec 21 1900 ✓

Wave lengths Constants C 118-04 α Orionis.

		Micron.	x	λ	y
D3	(mean of [illegible])	62977		5875.9	
5167.6 9 5172.9	mean of two	75564	+ 12587	5170.2	− 705.7
Hβ		82967	+ 19990	4861.5	−1014.4

log y 2.848620 n 3.006209 n

log x 4, ~~300813~~ 09922 4.300813

8.7~~8~~4 8698 n 8.705396 n

$-1014.4 - 0.0507453\,c + d = 0$

$-705.7 - 0.0.5\cancel{47896}\,c + d = 0$ (60658)

$+308.7 - 0.00\cancel{40443}\,c = 0$

0 0 0 5 3 2 0 5

c = + ~~763297~~ 8

+ 58021

2.489537

72.59 5 2

7. ~~606843~~

.763585

4. ~~882694~~

4

8.788698 n

3.~~621392~~ n 4

3.5~~6~~22283 n

~~1014.4~~

~~4182.1~~

~~705.7~~

d = + ~~4887.8~~

~~3178.9~~

~~705.7~~

~~4.6~~

3253.0

705.7

3958.7

763585

4. ~~882694~~

8.705396 n

3.~~588090~~ n

3.468981 n

~~3873.4~~

~~1014.4~~

4887.8

2944.3

1014.4

3958.7

log d = 3.597553

log d = ~~3.689113~~

Check

75564	~~[illegible]~~ 6 82967
62977	62977
12587	19990
775885	783288
3.68911	3.68911
4.09992	4.30081
7.78903	7.98992
5.88980	5.89392
1.89923	2.09600

−62977

+58021

−4956

Reduction a GC & 68

Friday Dec 21 1900

Check of comp. on preceding page.

	75564	82967	82967
	629~~8~~77	$629\overset{7}{8}7$	62977
x	$125\overset{8}{6}7$	$199\overset{9}{7}0$	19990
	~~80540~~	~~77991~~	82967
			4956
x + c	$70\overset{6}{5}\overset{0}{\cancel{8}}8$	$7\overset{8}{7}\overset{0}{9}\overset{1}{9}1$	78011
log d	3.59755	3.59755	
log x	4.09992	4.30081	
	7.69747	7.89836	
log(x + c	~~4.84873~~	~~4.89204~~	
	2.84874	3.00632	
	7.69747	7.89836	
	4.84885	4.89216	
	2.84862	3.00620	
	$587\overset{5}{7}.9$	5875.9	
	705.7	1014.4	
	5170.2	4861.5	

Saturday Dec 22 1900

mean of two measures as this was wrong

Constants for wave lengths of C ~~11809~~ 11808 & V Orionis.
C.S.M. No 17 & 130 &c.

~~$B\ D_3$ 63126~~

	x		λ	
D_3	x' 63222		λ' 5875.9	
4922.1	x'' 81533	(x''−x') 18311	λ'' 4922.1	λ''−λ' = −953.8
4471.6	x''' 95069	x'''−x' = 31847	λ''' 4471.6	λ'''−λ' = −1404.3

log (λ'''−λ')	3.147460 n	log (λ'''−λ')	2.979457 n
log (x'''−x')	4.503069	log (x'''−x')	4.262712
log B	8644391 n	log A	8.716745 n
log x'''	4.978039	log x''	4.911333
log B x'''	3.622430 n	log A x''	3.628078 n.
B =	− 0.0440952	A x'' =	− 4240.96
A =	− 0.0520889	B x''' =	− 4192.08
B − A =	+ 0.0079937	A x'' − B x''' =	− 48.88
		log — =	1.689131 n
C =	− 6114.8	log B−A =	7.902748
		log C.	3.~~8~~7 86383 n

x' + C	57107.2	log (x'+C) =	4.756691	log (x'+C) =	4.756691.
x'' + C	75418.2	log (x''+C) =	4.877476	log (x'''+C) =	4. ~~954021~~ 949166
x''' + C	8~~7~~6954.2	log A =	8.716745	log B =	8.644391
			~~7.650912~~		~~8.355103~~
			8.350912		8.350248

Saturday Dec 22 1900

Constants for C 11808 by old method. similar to p 95.

x' = + 18311 y' = − 953.8

x'' = + 31847 y'' = − 1404.3

log y = 2.979457 3.147460

log x = [illegible] [illegible]

Eq's − 953.8 − 0.052 [illegible] c + d = 0

− 1404.3 − 0.044 [illegible] c ~~d~~ + d = 0

+ 450.5 − 0.0079937 c = 0

2.653695 c = 56357.

7.902748

4.750947 4.750947

8.644391 8.716247

3.395338 3.467692

2485.1 2935.6

1404.3 953.8

d = 3889.4 3889.4

log d = 3.589883

(check)

(1)	M	81533	95069
(2)	M − 63222	18311 ~~81533~~	31847 ~~95469~~
(3)	M − 6865	74668	88204
(4)	log (2)	3.58988 4.26271	3.58985 4.50307
5	= ~~log (3)~~ (4) + 3.58988	7.85259	8.09295
(6)	log (3)	4.87314	4.94549
(7)	(5) − (6)	2.97945	3.14746
(8)	Nat No (7)	5875.9 953.8	5875.9 1404.3
(9)	λ = 5875.9 − (8)	4922.1	4471.6

~~57~~ log c = 4.750947

5875.9 log d = 3.589883

3889.4 8.340830

1986.5

8.340830

log (3) = 4.873135 4,945488

3.467695

2935.5

Reduce again to 70

~~log m~~ 8.340830 8.340830

log M. 4.911353 4.978039

3.429497 3.362791

~~2688.4~~

Saturday Dec 22 1900 √

Constants of wave lengths for X10203 λ Velorum {C.S. m no 1) r 129

	M		λ	
~~5890 & 96~~				
5890 & 96	49993	x	5893.0	y
5172.9	66905	+ 16912	5172.9	− 720.1
H β	76966	+ 26973	4861.5	− 1031.5
log y	2.857393 n		3.013469 n	
log x	4.228195		4.430929	
$\frac{y}{x}$	8.629198 n		8.582540 n	

Eqs

$-720.1 - 0.0425\overset{9}{7}83\,c + d = 0$

$-1031.5 - 0.0382419\,c + d = 0$

$-311.4 + 0.0043374\,C = 0$

log 311.4 = 2.493319 C = + 71794.

7.637229

log C 4.856090 4.856090

8.6291$\overset{9}{8}\overset{8}{9}$ ~~n~~ 8.582540 ~~n~~

3.4852$\overset{}{7}$9 3.438630

88

$\overset{8}{3056.95}$ $\overset{56}{2745.6}$

720.1 1031.5

3777.05 3777.1 06

log d = 3.57715

49993
71794
21801

Check

(1) = $\overset{x}{M}$	21801 66905 49993	21801 6 76969 49993 3
(2) = $\overset{x}{M}$ − 49993 =	16912	26976
(3) = $\overset{x}{M}$ + 21801 =	88706	98767
(4) = log (2)	3.57715 4.22820	3.57715 4.43093
(5) = (4) + log d	7.80535	8.00808
(6) = log (3)	4.94795	4.99461
(7) = (5) − (6)	2.85740	3.01347
8 = number (7)	5893.0 720.1	5893.0 1031.5
9 = λ = 5893.0 − (8)	5172.9	4861.5

4

Reduction A. J. C. r 72

Saturday Dec 22 1900 ✓

Constants for X10203 ζ Puppis

	M.		λ	
Hβ	76948	x	λ 4861.5	y
Hγ	100000	+ 23052	4340.7	− 520.8
Hε	123413	+ 46465	3970.2	− 891.3

log y = 2.716671 n   2.950024 n

log x = 4.362709   4.667126

8.353962 n   8.282898 n

Eqs

− 520.8 − 0.0225924 c + d = 0

− 891.3 − 0.0191822 c + d = 0

− 370.5 + 0.0034102 c = 0

log 370.5 − 2.568788   c = 108644

7.532780

5.036008   5.036008

8.353962   8.282898

3.389970   3.318906

2454.5+   2084.0

520.8   891.3

2975.3   2975.3

log d = 3.47353 ✗

108644

76948

e = 31696

		31696
(1) = M = x = a	100000 76948	123413 76948
(2) = M −76948 ~~+c~~	23052	46465
(3) = M + c = b	131696	155109
	3.47353	3.47353
(4) = log (2)	4.36276	4.66713
(5) = ~~log~~ (4) + log d = c	7.83624	8.14066
(6) = log (3)	5.11957	5.19064
(7) = (5) − (6)	2.71667	2.95062
	4861.5	4861.5
(8) = No./(7)	520.8	891.3
(9) = λ = 4861.5 − (8) = To	4340.7	3970.2

Monday Dec 24 1900 ✓

Constants for $\overset{C}{\cancel{*}}$ 11809 δ Orionis (C.S.M No. 7 p. 138)

	M	x	λ	y
~~BD~~3	63126		5875.9	
—	81291	+ 18165	4922.1	− 953.8
—	95004	+ 31878	4471.6	− 1404.3

log y	2.979457 n	3.147460 n
log x	4.259235	4.503491
	8.720222 n	8.643969 n

Eq. $-953.8 - 0.0525075\,c + d = 0$

$-1404.3 - 0.0440523\,c + d = 0$

$450.\overset{5}{\cancel{8}} - 0.0084552\,c = 0$

log ~~450.8~~ 450.5 2.653~~984~~695 c = 53281.

7.927124

4.726~~8~~~~6~~~~0~~571   4.726~~860~~571

8.720222   8.643969

3.44~~7~~6~~082~~793   3.370~~829~~540

279~~7.5~~7.6   234~~8.7~~7.1

953.8   ~~E~~1404.3

~~3753.3~~   ~~375~~~~2~~~~.0~~

3751.4   3751.4

log 3751.4 = 3.57419

c = ~~53881.~~   63126 c = 53281

b = — ~~9245~~   9845

check.

(1) x =	9845 81291 ~~63126~~	9845 95004 63126
(2) x + a	18165	31878
(3) x + b	78~~0~~46	85~~2~~59
(4) log (x + a)	4.2592~~6~~4 3.57419	4.50349 3.57419
(5) (4) + c	7 ~~8~~.83343	8.07768
(6) = log (3)	4.85~~761~~398	4.93~~328~~023
(7) (5) − (6)	~~3.97582~~ 7.82945	~~3.14440~~ 3.14745
(8) Nat No (7)	5875.9 953.8	5875.9 1404.3
9 = λ = λ₀ − (8)	4922.1	447~~8~~1.6

Reduction AJC p 82

Monday Dec 24 1900 √

(C.S.m no. 7 p. 132)

Constants for wave lengths for C 11803 α Orionis

		x		y
D_3	mean of 2 62904		5875.9	
—	mean of 2 75536	+ 12632	5170.2	− 705.7
H_β	mean of 3 82785	+ 19881	4861.5	− 1014.4

log y	2.848620 n	3.006209 n
log x	4.101472	4.298438
	8.747148 n	8.707771

Eqs

$-705.7 - 0.0558660\ c + d = 0$

$-1\overset{0}{4}14.4 - 0.0510236\ c + d = 0$

$-\overset{3}{\cancel{7}}08.7 + 0.0048424\ c = 0$

log 308.7 2.489537 c = 63749.

7.685061

4.804476	4.804476
8.747148	8.707771
3.651624	3.512247

3561.4	3252.7
705.7	1014.4
4267.1	4267.1

log = $3.63013\cancel{3}$ = (c)

+ 63749
− 62904 = (a)
+ 845 = (b)

Reduction a ge p 80

Check =

(1) = M	845 75536 62904	845 82785 62904
(2) = M + a	12632	19881
(3) = m + b	76381	83630
(4) = log (2)	3.63013 4.10147	3.63013 4.29844
(5) = (4) + c	7.73160	7.92857
(6) = log (3)	4.88298	4.92236
(7) = (5) − (6)	2.84862	$3,00\overset{6}{8}21$
(8) = Nat No (7)	5875.9 705.7	5875.9 1014.4
(9) = λ = 5875.9 − (8)	5170.2	4861.6

Monday Dec 24 1900 √

Constants for wave lengths for X10153
γ below Hβ towards violet (C. S. M. No. 17 p. 124)

mean of 3

Hβ	~~4~~ 77009		4861.5
Hγ	100000	22991	4340.7 − 520.8
Hδ	123563	46554	3970.2 − 891.3

log y = 2.716671 n   2.950024 n
log x = 4.361558   4.667~~023~~ 957
8.355113 n   ~~8.283001~~ n
8.28~~3~~²067

Eqs.
$-520.8 - 0.0226523\,c + d = 0$
$-891.3 - 0.0191\cancel{867}^{455}\,c + d = 0$
$-370.5 + 0.00346\cancel{56}\,c = 0$
0.0035068

log 370.5 2.568788
44911
7.53~~9778~~

c = ~~106908~~
105652

5.023877
~~5.029010~~
8.282067
~~8.283001~~

9010
8978
32

~~5.029010~~
5.023877
8.355113

~~3.384123~~
3.378990
~~2421.7~~
~~520.8~~
~~2942.5~~

~~3.312011~~
3.305944
~~2051.2~~
~~891.3~~
~~2942.5~~

log 3.468776²

2393.3
520.8
2914.1

2021.8
891.3
2913.1 4

log = 3.46450

~~106906~~
~~−77009~~
~~+ 29899~~

105652
77009
+ 28643

Check
3.46450   3.46450
4.36156   4.66796
7.82606   8.13246
5.10939   5.18243
2.71667   2.95003
4861.5   4861.5
520.8   891.3
4340.7   3970.2

Check 28643
~~29897~~   ~~29899~~
100000   123563
77009   77009
22991   45554
129899   153462
3.46872   3.46872
4.34156   4.66796
7.83028   8.13668
5.11368   5.18600
~~4.47566~~   2.95068
~~3.35462~~
2.71668
22991   46554
128643   152206
7.83028   8.13668
5.10939
.72089

Reduction a 9 c p 76

Tuesday Jan 15 1901
~~Thursday Jan 10 1901~~
~~Monday Jan 7 1901~~

~~Compilation of wave lengths.~~
~~β Crucis α Crucis θ Carinae~~

~~measures of~~
~~Comparison & Orionis of~~ δ Orionis
λ

Constant of wave length δ Orionis C11808. CSM 17-130

D_3	63222 (mean)	x	5875.9	y
Hβ	83033	19811	4861.5	− 1014.4
Hγ	100000 ~~16967~~	36778 ~~16967~~	4340.7 ~~520.8~~	1535.2 ~~520.8~~

log y	3.006209 n	3.186165 n
log x	4.296906	4.565588
	8.709303 n	8.620577 n

Eqns
−1014.4 − 0.0512039 c + d = 0
−1535.2 − 0.0417424 c + d = 0
+520.8 − 0.0094615 C = 0

2.716671
7.975960
4.740711 4.740711
8.709303 8.620577
3.450014 3.361288

C = 55044.

83033 63222	70771 63222	100000 63222
19811	7549	36778
55044	55044	55044
74855	62593	91822
3.58353	3.58353	3.58353
4.29691 4.87422	4.87788	4.56559
7.88044	7.46142	8.14912
4.87422	4.79653	4.96295
3.00622	2.66489	3.18617
5875.9 1014.4	5875.9 462.3	5875.9 1535.2
4861.5	5413.6	4340.7

1014.4 1535.2
2818.5 2297.7
3832.9 3832.9

log = 3.58353

Reduction of Jan 20

Tuesday Jan 15 1901

Constants of Wave Length & Orionis C11809 ES.M 17—138

D3	63126		—	
Hβ	82935	19809	—	−1014.4
Hγ	100000 ~~17065~~	36874 ~~17065~~	—	−1535.2

3.006209 n	3.186165 n
4.296863	4.566720
8.$\overset{7}{3}$09346 n	8.619445 n

—— −0.0512090 c + 1

—— −0.046337 ——

+520.8 − 0.0095753 c

C = 54390.

2.716671	
7.981152	
4.735519	4.735519
8.709346	8.619445
3,444865	3,354964
1014.4	1535.2
2785.3	2264.5
3799.7	3799.7

log = 3.57975

	82935	70662	100000
	63126	63126	63126
✓	19809	7536	36874
	54390	54390	54390
✓	74199	61926	91264
	3.57975	3.57975	3.57975
	4.29686	3.87714	4.56622
	7.87661	7.45689	8.14647
	4.87039	4.79187	4.96030
	3.00622	2.66502	3.18617
		5875.9	
		462.4	
		5413.5	

Reduction a GC 91

Tuesday Jan 15 1901

Constants for wave lengths ε Orionis C11 804 C. Ser 17–137

5893.0	62977 (mean)		5893.0	
H β	82967	+ 19990	4861.5	− 1031.5
H γ	100000	+ 37023	4340.7	− 1552.3
	~~17033~~ 3	17033	~~520.8~~	~~520.8~~

3 ~~4~~.013469 n
4.300813
8.712656 n

3.190976
4.568472
8.622 5 ~~4~~ 04

−1031.5 − 0.0516007 c + d
−1552.3 − 0.041 9 ~~183~~ 280 c + d

+ 520.8 − 0.00968 ~~24~~ 727 c = 0

λ 5397.3

2.716671
7.985 ~~983~~ 548
4.73 ~~0688~~ 1123
8.71 ~~2656~~ 2656
~~3.443344~~
3.443779

c = ~~53788~~
53842

4.73 ~~0688~~ 1123
8.622 5 ~~4~~ 04
3.35 ~~3092~~
3 6 ~~5~~ 27

1031.5
277 ~~5.3~~ 8.3 −
380 ~~7.0~~ 9.8

1552.3
225 7 ~~4~~.7
380 ~~7.0~~ 9.8

log ~~3.58058~~
3.58090

82967	71034	100000
62977	62977	62977
19990	8057	37023
53 842 ~~788~~	53 842 ~~788~~	53 842 ~~788~~
73832	61899	90865
~~73778~~	~~61845~~	~~90811~~
3.580 90 ~~58~~	3.580 90 ~~58~~	3.580 90 ~~58~~
4.30081	3.90617	4.56847
7.881 71 ~~39~~	7.48 707 ~~675~~	8.149 37 ~~05~~
4.86 824 ~~799~~	4.791 68 ~~30~~	4.958 40 ~~17~~
3.0134 7 ~~6~~	2.695 39 ~~45~~	~~3.19097~~
		3.19097

5893.0
496.0
5397.0

λ 1552.2

Reduction a ζ & q²

93.0
~~5875.9~~
1031.5
4861.5 4

5893.0
495.9
5397.1

5893.0
1552.3 ~~1~~
4340.7

Wednesday Jan 15 1901

Constants for wave length α Orionis C 11803' CSM 17 – 132

5893.0	62904 (mean)		5893.0	
Hβ	82785 (Mean)	19881	4861.5	−1031.5
Hγ	100000 ~~17215~~	37096 ~~17215~~	4340.7	−1552.3

3,013469 n	3,190976 n
4,298438	4,569327
8.715031 n	8.621649 n

$-1031.5 - 0.0518\overset{3}{\cancel{4}}8\ c + d = 0$

$-1552.3 - 0.0418455\ c + d = 0$

+ 520.8 ~~−0~~0.0100383 c

2.716671	c = 51881.
8.001660	
4.715011	4.715011
8.715031	8.621649
$3.\overset{4}{3}30042$	$3.33\overset{6}{8}660$

1031.5	1552.3
2691.8	2171.0
3723.3	3723.3

lg = 3.57093

5

3.580583
4.568472
8.149055
4.958138
3.190917

λ5397.3
~~Hβ~~'

	82785	71008	100000
	62904	62904	62904
7	19881	8104	37096
	51881	51881	51881
	71762	59985	$8\overset{8}{8}977$
	3.57093	3.57093	3.57093
	4.29844	3.90870	4.56933
	7.86937	7.47963	8.14026 4,94928
	4.85590	4,77804	~~495413~~
	3.01347	2,70159	~~3.18613~~ 3.19098

5893.0
503.0
5390.0

Reduction agc ~~[illegible]~~

Wednesday Jan 16 1901

Change in reading for Hβ

Constants of wave length α Orionis C 11803 C3 m 17 - 132

5893	62904		
Hβ	82954	20050	-1031.5
Hγ	100000	37096	-1552,3

3,013469 n
4.30 ~~11 39~~ 21 14
8.71 ~~2330~~ n 1355

3.190976 n

n

— -0.051 ~~5620~~ 4464
— -0.0418455
0.009 ~~7165~~ 6009

λ 5397.3

2.716671
7.98 ~~7510~~ 2312
~~4.729161~~
4.734359
8.71 ~~2330~~
~~3.441491~~
3,445714

1031,5
2763.7
3795.2

Hγ = ~~3.579235~~

~~2269.9~~
1031,5
2790.7
3822,2

Hγ = 3.58231

C = ~~53600~~ 54245

~~4.729161~~
4.734359
8.621649
~~3.350810~~
3.356008

1552,3
2242.9
3795.2

15523
2269.9
3822.2

82954	71008	100000
62904	62904	62904
20050	8104	37096
54245	54245	54245
~~53600~~	~~53600~~	~~53600~~
~~73650~~	~~61704~~	~~90696~~
~~3.57924~~	~~3.57924~~	~~3.57924~~
74295	62349	91341
3.58231	3.58231	3.58231
4.30211	3.90870	4.56933
7.88442	7.49101	8.15164
4.87096	4.79483	4.96066
3.01346	2.69618	3.19098

5893.0
496.8
5397.2
6

Reduction [illegible] γ 97

~~Friday~~ Jan 18 1901

Comp. for wave length C 1180~~8~~3

~~35742~~
~~620~~
70334
62904
√ 7430
54245
√ 61675
3.58231
3.87099
7.45330
4.79011
2.66319

3~~5~~4758
35188
~~70946~~ 69946
62904
7042
54245
61287
3.58231
~~2~~3.84720
~~6~~7.43001
4.78787
~~3~~2.64264

63071	63583	63992	64476
62904	62904	62904	62904
167	679	1088	1572
54245	54245	54245	54245
54412	54924	55333	55817
3.58231	3.58231	3.58231	3.58231
2.22271	2.83187	3.03663	3.19645
5.80502	6.41418	6.61894	6.77876
4.73570	4.73976 ~~4.73436~~	4.74298	4.74677
1.06932	1.67442	1.87596	2.03199
11.7 ~~1.7~~	47.3	75.2	107.6
5881.3	5845.7	5817.8	5785.4

~~5893.0~~
~~729.8~~
~~163.2~~

5893.0
460.5
5432.5

5893.0
439.2
5453.8
~~5~~
5463.8

Assumed
5429.9
33.0
34.8
317.7
5432.6

5432.6

−0.1

− 2.0

Reduced

Saturday Jan 20 1901

Diff of λ 4922.1 from H_β .

C 11808		C 11809		
1st	2nd	1st		
40849	40822	37848	37862	37861
39362	39309	36213	36178	36248
1487	1513	1635	1684	1613
	1487		1613	
	26		71	
	1^λ +		3^λ +	

Diff λ 5397.3 & 5406 & 10

C 11804			C 11803	
32144	32142	32162	35813	35828
31900	31904	31914	35602	35604
244	$2\overset{3}{\cancel{4}}4$	248	211	214

7815
37023

7887 − 7815 = 72
37096
37023
73) 37023 (507
365
523

7815
15
7830

8057
8104
47

8057
16
8073

71034
62977
8057

Saturday June 20 1901

Comparison of lines in α Orionis
as measured in C. 8 in 17 — H 137 & 132

	C 11804	C 11803	
5893	62977	62904	+ 73
5406 & 10	70792	70791	0
5397.3	71034	71008	+ 26
~~5172.9~~ } ~~5167.6~~ }	75		
	74389	74360	+ 29
5172.9	75503	75477	+ 26
5167.6	75626	75594	+ 22
	75684	75652	+ 32
	75893	75892	+ 01
	78482	78485	− 03
	78590	78734	
Hβ	82967	82954	+ 13

4668.0 88485 — 8847, — +10

Comparison of lines in δ Orionis C. 8 in 138 & 130

	C 11807	C. 1108	
D3	63126	63222	− 96
Hβ	70662	70771	− 109
λ 4922.1	81291	81533	− 242
Hβ	82935	83033	− 98
4471.6	95004	95069	− 65
Hγ	100000	100000	00

Friday Jan 25 1901

Constants for wave length. δ Canis Majoris

5406 60641 5406.0
4861.5 76885 16244 4861.5 −544.5
53581
Hγ 114222 ~~37337~~ 4101.8 ~~−04.2~~
759.7 −1304.2
759.7

2.735998n 3.115344n
4.210693 4.729011
8.525305n 8.386333n

$-544.5 - 0.0335201\,C + d = 0$
$-1304.2 - 0.0243407\,C + d = 0$
$759.7 - 0.0091794\,C = 0$

2.880642 82761
~~20~~. ~~82760~~.
7.962814
4.917828 4.917828
8.525305 8.386333
3.443133 3.304161

~~2774.8~~ 2014.5
~~544.5~~ 1304.2
~~3319.3~~ 3318.7

2774.2
544.5
3318.7 log = 3.520968

5711.8 4861.5
~~7~~

53610 76885 114222
60641 60641 60641
−7031 16244 53581
+82761 ~~80~~ 82761 ~~80~~ 82761 ~~80~~
+75749 ~~49~~ 30 +99024 ~~4~~ 05 136367 42

3.52097 3.52097 3.52097
3.84702n 4.21069 4.72901
7.36799n 7.73166 8.24998
4.87937 ~~6~~ 4.99576 ~~74~~ 5.13463 ~~4~~
2.48867n 72 2.73592 600 3.11535

~~5406.0~~
~~−308.0~~
~~5714.0~~
~~5711.8~~
~~2.2~~

5406.0
−308.2
~~7.8~~
5714.2

Saturday Jan 26 1901

$\times R'$ λ'

R'' $R''-R' = x'$ λ'' $\lambda''-\lambda' = y'$

R''' $R'''-R' = x''$ λ''' $\lambda'''-\lambda' = y''$

$$y' + \frac{y'}{x'}c + d = 0$$

$$y'' + \frac{y''}{x''}c + d = 0$$

$$(y'-y') + \left(\frac{y''}{x''} - \frac{y'}{x'}\right)c = 0$$

$$c = \frac{y'-y''}{\frac{y''}{x''} - \frac{y'}{x'}}$$

$$d = \frac{x''' - x''}{\frac{x''}{y''} - \frac{x'}{y'}}$$

Saturday Jan 26 1901

Constants for wavelength δ Canis Majoris 17-126

60641
76885   126244
123652   63011   63111
~~46767~~   ~~46767~~

5406.0
4861.5   − 544.5
3970.2   − 1435.8
~~891.3~~   ~~891.3~~

2.735998
4.210693
8.525305

3.157094   3.157094
4.799416   4.800105
8.357678   8.356989

−544.5 − 0.0335201 c + d = 0
−1435.8 − 0.0227865 c + d = 0
+ 891.3 − 0.0107336 c = 0

335201
227504
107697

2.950024
8.032203
4.917821
8.525305
3.443126

4.917821
8.356989
3.274810

2774.1
544.5
2318.6

1882.8
1435.8
2318.6

83038
60641
22397
5306.0
76067

2.950024
8.030746
4.919278
8.525305
3.444583

c = 83038
c = 82760
4.919278
8.357678
3.276956

2783.48
544.5
2327.9

1892.1
1435.8
2327.9

log = 3.52217

log = 3.52096

5711.8

53610   76885   123652
60641   60641   60641
− 7031 (−7031   16244   63011
+83038   82760   83038   83038
~~90069~~   75729   99282   146049
+76007   ~~279~~ ~~[illegible]~~

3.52217   3.52096   3.52217   3.52217
3.84702   3.84702   4.21069   4.79942
7.36919   7.36798   7.73286   8.32159
4.88085   4.87926   4.99687   5.16450
2.48834   ~~17536~~   2.73599   3.15709
2.48872

✓   ✓

5406.0
307.8   308.1
5713.8
5711.8
2.0

Red. shows diff for use of 100 mean of Hε = 7.4 ±

Monday Jan 28 1901

Constant for wavelength δ Canis Majoris 17-126

60641
100000
123652

39359
63011
~~23652~~

5406.0
4340.7
3970.2
370.5

$-1\overset{0}{8}65.3$
1435.8
$\overset{3}{2}70.5$

~~3.066438~~
~~4.595044~~
~~8.471394~~

3.027472
4.595044
8.432428

$-1\overset{0}{8}65.3 - 0.0\,2706625\,c + a = 0$

$-1435.8 - 0.0\,227865\,c + a = 0$

$+370.5 - 0.0042797\,c = 0$

2.568788
7.631413
4.937375
8.432428
3.369803

c = 86572

4.937375
8.357678
$3.\overset{2}{3}95053$

86572
60641
25931
53610
79541

2343.2
1065.3
3408.5

~~2483.4~~
~~1435.8~~
1972.7
1435.8
3408.5

by = 3.532563

5711.8
+53610
60641
−7031
+86572
+79541

100000
60641
39359
86572
125931

~~1000~~
123652
60641
63011
86572
149583

$3.53257\overset{6}{\cancel{1}}$
$3.84703\overset{4}{3}$
$7.379\overset{58}{\cancel{61}}$ 4
4.90059
$2.4798\cancel{8}\cancel{2}$ 4
$2.478\overset{\cancel{49}}{99}$
~~5406.0~~
~~301.7~~
~~5107.7~~
5406.0
301.3
5707.3
11.8
4.5

$3.53257\overset{6}{\cancel{1}}$
4.59504
$8.12760\cancel{8}$
5.10013
$3.0275\cancel{0}$
47
~~1065.4~~

$3.5325\overset{6}{\cancel{83}}$
$4.7994\overset{16}{\cancel{2}}$
$8.33\overset{18}{20}\overset{0}{8}9$
5.174883
$3.1571\cancel{3}$
26
10
~~1435.9~~

Tuesday Jan 29 1901

Constants for wavelength for γ Velorum Hβ to red. CSM 17 - p 124

Hβ′	60407		5413.6	
Hβ	76993	16586	4861.5	- 552.1
Hε	123563	63156	3970.2	- 1443.4
	~~46570~~	~~46570~~	~~D891.3~~	~~891.3~~

2.742018 n
4.219742
8.522276 n

3.159387
4.800415
8.358972

-552.1 - 0.0332871 c + d = 0
-1443.4 - 0.0228545 c + d = 0.
+ 891.3 - 0.0104326 c = 0

2.950024
8.018393
4.931631
8.522276
3.453907

c = 85434.
4.931631
8.358972
3.290603

Hβ
25027
76993
60407
16586
102020
3.53096
4.21974
7.75070
5.00868
2.74202
✓
5413.6
552.1
4861.5
✓

Hε
25027
123563
60407
631~~8~~6 (5)
148590
3.53096
3.80042
7.33138
5.17199
2.15939
✓
5413.6
1443.4
3970.2
✓

25027
53881
60407
-6526
8~~0~~434 (5)
7~~3~~908 (8)
3.53096
3.87465
7.34561
4.89712
2.44849
5413.6
280.9
5694.5
Λ

85434
60407
25027

2843.9 -
552.1
3396.0 -

1952.6
1443.4
3396.0 -

q = 3.53096

Tuesday Jan 29 1901

Constants for wave length for ~~Scorpii~~ γ Velorum Hβ & Ref. C.S. m 17 – 85 26d 27m 92s 84

~~54 10. Hβ Hε #8~~

~~60443~~	Hβ,	62~~6~~57 7		5413.6	
~~76928~~	Hβ	78405	15648	4861.5	−552.1
114451	Hε	12231~~5~~ 9	595~~58~~ 62	3970.2	−1443.4
		~~43910~~.	~~43910~~		891.3

2.742018 n
4,194459
8.547559 n

3.159387 n
4.7749~~40~~ 69
8.38444~~7~~ n 18

$$-552.1 - 0.0352825c + d = 0$$
$$-1443.4 - 0.024423\overset{36}{\cancel{52}}c + d = 0$$
$$+891.3 - 0.01104\overset{89}{\cancel{73}}c = 0$$

2.950024
~~8.0020 49~~ 4 3 ~~2 6 6~~ 3 19
~~4.906768~~
~~4.947975~~
4.906705
8.547559

c = 806~~80~~. 69

4.947975
4.9067~~68~~ 05
8.38444~~7~~ 18

~~3.495534~~
3.454~~327~~ 264
~~552.1~~
3~~129.9~~

~~3.332422~~
3.291~~218~~ ~~152~~ 123
~~2149.9~~

806~~80~~ 69
-62757
179~~23~~ 12

2846.~~6~~ 2
552.1
3398.~~7~~ 3

195~~6~~.~~3~~ 4 ~~0~~ 9
1443.4
3398.~~7~~ 3

b = 3.531~~31~~ 26

Hβ 179,2		Hε 17912
78405	56708	122319
62757	62757	62757
15648	−6049	59562
	80669	
96317	74620	140231
3.53126	3.53126	3.53126
4.19446	3.78168	4.77497
7.72572	7.31294	8.30623
4.98370	4.87286	5.14684
2.74202	2.44008	3.15939
5413.6	5689.1	5413.6
552.1		1443.4
4861.5		3970.2

Tuesday Jan 29 1908

Constants for wave length of δ Columbae C. Sm 17 – 90

H 5410.	62615		5413.6	
Hβ	78220	15605	4861.5	552.1 ~~47.9~~
Hγ	113559	50944	4101.8	1311.8
	35339	35339	~~759.7~~	~~759.7~~

2.7420184n
4.193264
8.548754 n

3.117868
4.707127
8.410741

$-552.1 - 0.0353797\,c + d = 0$

$-1311.8 - 0.0257478\,c + d = 0$

$+759.7 - 0.0096319\,c = 0$

2.880642
7.983712
4.896930
8.548754
3.445684

c = 78873.

4.896930
8.410741
3.307671

78873
62615
16258

2790.5
552.1
3342.6

2030.8
1311.8
3342.6

b_γ = 3.52408

5783.3
16258
54474
62615
– 8141

70732
3.52408
3.91068n
7.43476
4.84962
2.58514

5413.6
384.7
5798.3
5783.3
15.0

16258
78220
62615
15605

94478
3.52408
4.19326
7.71734
4.97533
2.74201

8.3
558~~2~~.4
16258
58486
62615
– 4129
78873
7~~8~~744
3.52408
3.61584
7.13992
4.87358
2.26634

5413.6
184.6
5598.2
5588.3
9.9

Wednesday Jan 30 1901

Constants for wave length of γ Velorum C8m 17 – 26

H β₁	62757		5413.6	
H β	7~~7~~8405	15648	4861.5	552.1
H ~~β~~δ	113469	50712	4101.8	1311.8
	~~35064~~	~~35064~~	~~759.7~~	~~759.7~~

2.7420188 n
4.194459
8.547559 n

3.117858 n
4.705711
8.412747 n

−552.1 − 0.0352825 c + d = 0
−1311.8 − 0.0258678 c + d = 0
+759.7 − 0.0094854 c = 0

2.880642
~~8~~7.97~~4300~~3839
4.90~~6342~~6803
8.547559
~~3.453901~~
3.454362

c = 80687.

~~4.906342~~
4.906803
8.412747
~~3.319089~~
3.319550

80687
62757
17930

~~2843.8~~
~~757.7~~
~~3603.6~~

~~2084.9~~
~~1311.78~~
~~3395.5~~

2846.8
552.1
3398.9

2087.1
1311.8
3398.9

ly = ~~3.531338~~
3.53134

λ —	~~N~~0
	~~17930~~
56708	78405
62757	62757
−6049	15648
80687	80687
+74638	96335

3.53134
3.78168 n
7.31302 n
4.87296
2.44006

3.53134
4.19~~557~~446
7.72~~691~~580
4.98378
~~2.7431 3~~
2.74202

275.5
5413.6
5689.1
15.0 Cr
5674.1

Friday
~~Saturday~~ Feb 1
~~Friday Jan 31~~ 1901

~~Constants of wave length in α Scorpii 17 - p 92~~

By comparing means of velocity C.Sm 17 - 127
with α Scorpii " " - 87

Find correction to ~~56708~~ mean 53881 = -44

	53881
	.40
	53841
Formula of p 2	66843
	+13004
	-88577
	-75573

3.48387
4.11408
7.59795
4.87837
2.71958

524.3
5172.9
5697.2

~~From page~~

From page 116	5694.5
	2.0
	5692.5

Friday Feb 1, 1901

Constant of wave length α Scorpii C. Sm 17–84

5410 60443 5410.0

H_β 76928 16 ~~16~~485 4861.5 −548.5

H_γ 114451 54008 4101.8 −1308.2

~~37523~~ ~~37523~~ ~~9659.7~~ ~~759.7~~

2.739177

4.217089

8.522088

3.116674

4.732458

8.384216

−548.5 − 0.0332727 c + d = 0

−1308.2 − 0.0242223 c + d = 0

+759.7 0.0090504 c = 0

2.880642 83941.

7.956668

4.923974 4,923974

8.522088 8.384216

3.486062 3.308198

~~2858.0~~ ~~2033.2~~

~~548.2~~ ~~1308.2~~

~~3406.2~~ ~~3341.4~~

3341.4

~~2793~~

2792.9

548.2

3341.4

log = 3,5239.3

~~5891~~

5783.3 H_β H_γ

52055 76928 114451

60443 60443 60443

−8388 16485 54008

83941 83941 83941

+75553 100426 137949

3.52393 3.52393 3.52393

3.92366 4.21709 4.73246

7.44759 7.74102 8.25639

4.87825 5.00185 5.13972

2.56934 2.73917 3.11667

5410.0 5410.0 5410.0

371.0 548.5 1308.2

5781.0 4861.5 4101.8

5783.3

± 2.3

Saturday Feb 2 1901

Constants for wave length 2 Scorpii CSm 17 – 792

5408	60227		54080	
Hβ	76780	16553	4861.5	– 546.5
Hγ	123908	63681	3970.2	–1437.8
	~~47128~~	47128	~~891.3~~	~~891.3~~

2.737590 n
4.218877
8.518713 n

3.157698 n
4.804010
8.353688 n

$-546.5 - 0.0330152\ c + d = 0$

$-1437.\overset{8}{7} - 0.0225782\ c + d = 0$

$+891.\overset{3}{0} - 0.0104370\ c = 0$

2.950024
8.018576
4.931448
8.518713
3.450161

c = 85398.

4.931448
8.353688
3.285136

$\underline{5785^2}$
51669
60227
– 8558
85398
76840

3.52710
3.93207
7.45947
4.88559
2.57388

2819.4
546.5
3365.9

1928.1
1437.8
3365.9

log = 3.52710

5408.0
374.9
5782.9
Assm 5783.3
– 0.4

Monday Feb 4 1901

Theoretical λ of Hβ' according to Runge & Kayser's formula. See Astro-Phys. Journal Vol V p 96

Assume λ = 5413.6 ∴ then $1/\lambda = 0.00184805$

2.733486
7.266514

$1/\lambda = 27559 - 134054\, n^{-2}$

```
  27559      25) 134054 (5362
   5362          125
  -----          ---
  22197            90
                   75
                   ---
                   155
                   150
                   ---
                     54
                     50
```

$n = 5$

$n^{-2} = \frac{1}{25}$

log 4342 = 3.637690
6.362310

~~20~~
2303

$1/\lambda = 27430 - 109721$

```
  27430      25) 109721 (4389
   4389          100
  -----          ---
  23041            97
                   75
                   ---
                   222
                   200
                   ---
                   221
```

```
16) 134054 (8378        27559
    128                  8378
    ---                 -----
     60                 19181
     48
     ---
     125
     112
     ---
     134
```

| 134054

~~10 9~~

27559

16) 134054 [8378 4.282871

128

19181 5.717129 5213.5

60

48

125

112 5

134

128

27559 4.346294 4505

25) 134054 [5362 5.653706

125

22197

90

75

155

150

54

5

.102871

27559

9) 134054 [14895 .897429 7838.4

9

12664

44

36

80

72

85

81

44

---

m = 2

4) 109721

27430

27430

0

m = 3

9) 109721 .182956

27430 .817044 65621

12191

15239

m = 4

16) 109721 [27430 96 8.00000

6858 4.313279 85

96

20572 24 5.686723 15

137

128 3

92

80

121

112

90

m = 6

36) 109721 (3047 — 27430 8 — 24382 — 8. 4.387069 — 3.612931 — 4101.4

108
172
144
281
252
29

II

~~1848~~

m = 6

36) 134054 (83724 — 27559 — 24835 — .395064 — .604936 — 4026.6

108
260
252
85
72
134

---

m = 4

16) 134054 (8378 — 27559 — 19181 — .282871 — .717129 — 5213.5

128
60
48
125
112
134
128

---

m = 8

64) 134054 (2095 4 — 27559 — 25465 — .405944 — .594056 — 3927.0

128
605
576
294
320
34

Wednesday Feb 6 1901

~~Tuesday Feb 5 1901~~

$1/\lambda = A - Bm^{-2} - Cm^{-4}$ K & R's formula

~~$a = A =$~~ n & m

~~$a = X\ f$~~. n' & $m+4$

$m = x - ay$

$n' = x$

$\overset{!}{n} = x - \frac{1}{m^2} B$

$n'' = x - \frac{1}{m^2+8m+1} B$

$n'' - n' = B\left(\frac{1}{m^2+8m+1} - \frac{1}{m^2}\right)$

~~$B =$~~

~~$n'' - n' = B\ m^2 - m^2$~~

$n' - n'' = B \frac{8m+1}{m^2(m^2+8m+1)}$

6563.0	4861.5	4340.7	4101.8	3970.2	3889.1	3835.5	3798.1
.817102	.686770	8 3637560	.612974	.598812	.589849	.583822	.579566
4.182898	84 1.313230	~~864~~ 0.362440	.387026	.401188	.410151	.416178	.420434
15237	20570	23038	24380	25188	25713	26072	26329
	5333	2468	1342	808	525	359	257 ~~186~~
3	4	5					

$\frac{1}{m^2}$

n=1 $\frac{1}{\lambda} = A - 1\,B$

n=2 $-.2500$

~~.1111~~

n=3 .1111

~~4~~

n=4

2	3	4	5	6	7	8	9
~~4~~	9	16	25	36	49	64	81
~~0.60206~~	0.95424	1.20412	1.39794	1.55630	1.69020	1.80618	1.90849
250000	111111	62500	40000	27778	20408	15625	12346
	148889	48611	22500				

10	11	12	13
100	121	144	169
10000	8264	6944	5917

Wednesday. Feb. 6, 1901

m = 5 ~~4544~~ 4543.6

m = 10 ~~3815.~~ 3815.2

$\frac{657400}{.342600}$ $\frac{.581517}{0.418483}$

m 5 $1/\lambda$ 22009 m 10 $1/\lambda$ 26211

$$26211 = A - B\,\frac{1}{100} = A - .01\,B$$

$$\underline{22009 = A - B\,\frac{1}{25} \quad A - .04\,B}$$

$$.03 \,\big|\, \underline{4202{,}00 = .03\,B}$$

$$140067 = B$$

1

$$A = \begin{array}{r} \cancel{26211} \\ \cancel{1401} \end{array} \quad \begin{array}{r} 26211 \\ \underline{1401} \\ 27612 \end{array}$$

5

$$1/\lambda = 27612 - 140067\,m^{-4}$$

$$16 \,\big)\, \begin{array}{r} 140067 \\ \underline{128} \\ 120 \\ \underline{112} \\ 86 \\ \underline{80} \\ 67 \end{array} \quad \begin{array}{r} 27612 \\ \underline{8754} \\ 18858 \end{array} \quad \begin{array}{r} \underline{.275496} \\ .724504 \end{array}$$

5302.8

Approx value for H_β'

from K&R Formula used

for Circ. No 16

Wednesday Feb 6 1901

$1/\lambda = A - .01 B - .0001 C$

$1/\lambda = A - .04 B - .0016 C$

5

Thursday Feb 7 1895

For least Sq. solution of wave length.

~~tg~~ $\lambda = \lambda_0 + \frac{a}{b+m} = \frac{\lambda_0(b+m)+a}{b+m}$

~~log λ =~~

~~sin tan λ = tan~~ $y = a + \frac{b}{x+c}$

~~$xy + ax + b/c = 0$~~ $xy + cy = ax + ac + b$

~~$\log x + \log y +$~~ x

$$xy + ax + cy + b + ac = 0$$

x ~~y + a~~ $\frac{b + ac = d}{b +}$

$$\lambda' = \lambda_0 + \frac{\cancel{d}\,a}{x' + b}$$

$$\lambda' x + \lambda' b = \lambda_0 x + \lambda_0 b + a$$

~~λx~~ $\underline{\lambda'} b - \underline{x'}\lambda_0 - b\lambda_0 - a + \underline{\lambda' x'} = 0$

Put $(b\lambda_0 + a) = \cancel{d}\,w$ $b = u$ & $\lambda_0 = v$

~~then x~~ then $\lambda u - x' v - w = 0$

having form $uv + w$ $a = w - uv$.

Thursday Feb 7 1901

Copied fr p. 130 $a = w - uv$ or $a = w - b\lambda_0$

$$\lambda' = \lambda_0 + \frac{\overset{\sigma}{w - b\lambda_0}}{x' + b}.$$

$$\overset{\lambda x}{\cancel{\lambda' x'}} + \lambda' b = \lambda_0 x' \cancel{+ \lambda_0 b} + w - \cancel{b\lambda_0}$$

Hence we have a linear form adapted to the method of least squares.

To revert to original form

$$\lambda' x' + \lambda' b = \lambda_0 x' + w$$

$$x' \lambda_0 - \lambda' b + w - \lambda' x' = 0$$

$$\frac{x'}{\lambda'} \lambda_0 - b + \frac{1}{\lambda'} w - x' = 0$$

Friday Feb 8 1901

Theoretical λ of Hβ' by ~~[illegible]~~ K & R's Formula

Values for det in 1899

n = 5 4542.4 657285 342715

22015

n = 10 3815.7 581574 .418426.

26208

.03) 4193.00

~~1398~~

~~n = X 4026.0~~ 593729 406271 25484

n = 8 3924.0

B = 1.39767

26208
1398
A = 27606
8735
18871

16) 139767 (8735
128
117
112
56
48
(7

16) 1.00 (.625
96
40
32
80
80

.125

25) 1.00 (.04
100

64) 1.000 (.015625
64
360
320
400
384
160
320

275735
724205

5299.1

10 26208 = A − .01 B − .0001 C

8 25484 = A − ~~.0625~~ .015625 −

5 22015 = A − .04 B − .0016 C

93
37
56
7.6

Saturday
~~Friday~~ Feb ~~8~~ 9 1901

~~H_β' γ' δ'~~

m =	4	5	6	7	8	9	10
	H_β'	γ'	δ'	ε'	ζ'	η'	θ'
λ =	5413.6	4542.4	4200.7	4026.0	3924.0	3860.8	3815.7
$1/\lambda$ =	18472	22013	23805	24839	25484	$2590\overset{1}{\cancel{4}}$	26207
log λ	733486	657285	623322	604874	593729	586677	581574
	266514	342715	376678	395126	406271	413323	418426
$1/\lambda$	18472	22015	23806	24839	25485	25901	26208
m^2	16	25	36	49	64	81	100
	18472	21839	$236\overset{6}{\cancel{7}}2$	24770	25485	25976	26327
	0	+ 176	+ 144	+ 69	0	− 75	119
	18472	21787	23588	24674	25378	25862	26208
	0	+ 228	+ 218	+ 165	+ 107	+ 39	0
	18871 ~~+8~~	22015 ~~21787~~	23724	24754	25422	25881	$2620\overset{5}{8}$
	− 399	0	+ 72	+ 75	+ 63	+ 20	0

Saturday Feb 2 1901

$\frac{1}{7}$

m = 4 18472 ~~.0625~~ = A − .0625 B

m = 8 25485 = A − .015625 B

7013 .046875

3.845904
8.670941
5.174963

16 / B = ~~149610~~
149611

29) 2.00 ~~68~~
174
260
232
28

18472
9351
27823

25485
2338
27823

5.174963
1.204120
3.970843

5.174963
1.806180
3.368783

m = 10 27823
149611
12862

27823
1496
26327

m = 5 25 / 149611
4
~~616444~~
598

27823
5984
21839

m = 6
36) 149611
144
56
36
201
176
50

27823
4161
23662

49) 149611
147
261
245
161
147
14

3053
27823
3053
24770

81) 149611
81
686
648
381
324
571

27823
1847
25976

278

16) 149611
144
56
48
81
80
11

9351
27823
9351
18472

n = 4 $18472 = A - \frac{1}{16} B - \frac{1}{256} C$

n = 7 $24839 = A - \frac{1}{49} B - \frac{1}{(49)^2} C$

n = 10 $26208 = A - \frac{1}{100} B - \frac{1}{(100)^2} C$

$18472 = A - .0625 \quad B - .$

n = 4 $18472 = A - .0625 B$

n = 10 $26208 = A - .0100 B$

.0525) 7736,000 (147352
5 25
2486
2100
3860
3675
1850
1575
2750
2625
1250
1050
200

26208
1473
27681 27181
9209
18472

16) 147352 (9209
144
33
32
152

36) 147352 (4093
144
335
324
112
108

27681
4093
23588

49) 147352 (3007
147
352

27681
3007
24674

27681
3894
23787

25) 147352
125
223
200
235
225
102

64) 147352 (2303
128
193
192
152

27681
2303
25378

81) 147352 (1819
81
663
648
153
81
742

27681
1819
25862

81) 1.00 (.0123456789

81

190

162

280

243

370

324

460

405

550

486

640

567

730

648

820

81

Saturday ~~Feb~~ 9 1901

m = 5 18472 = A − .04

~~.0123456789~~

m = 9 25485 = A .0123456789

7013 .027654321 1

3.845904

8.441763

5.404141

1.2397940

4.3.006201

5.404141

1.3.908483

3.4.495656

256

625

101448

18

176

16

1056

176

2816

25

2.245373

2.408240

2.795880

7.449633

2.567026

4.882607

2.408240

2.474367

6. 2.474367

3.112606

.361761

4.882607

3.112600

1.770007

59

625

256

369

256) 76315 (298

512

2511

2304

2075

2048

298.

625) 76315 (

16
16
256

256
200
51200

5200 – 0

25)51200(2048
50
120
100
207

176
25
950
352
4470
25
2350
894

176
625
950
342
1056
~~10947 0~~
110070

176
625

4

~~6875~~
+430 — 430
43

110000

256)111750

176
625
880
352
1056

16)1100000
96
140
128
120
112
80
80

16)6875(429
64
47
32
153

4 298 – 298
5 298 – 176
298 – 59

Saturday Feb 9 1901

16 ~~256~~

~~256~~

16	49	100
1.204120	1.690196	
8.795880	8.309804	
2	2	
7.591760	6.619608	

~~0.903090~~
1
0.602060
4
06
2.410240

~~7.58960~~
7.591760

m =

4 18472 = A − ~~0.06250~~ 0.0625000 B − 0.00390625 C

7 24839 = A − 0.0204082 B − 0.00041649 C

10 26208 = A − 0.01 B − 0.00010000 C

Tuesday Feb 12 1901

Constants for wave length β Columbae. C8M 17 - $\frac{90}{50}$

5410.0	62615		5410.0	
H_β	78220	15605	4861.5	− 548.5
H_δ	113559	$5094\overset{4}{8}$	4101.8	− 13~~4~~08.2
	35339	35339	759.7	759.7

2.739177 n
4.193264
8.545913 n

3.116674 n
4.707093
8.409581 n

$-548.5 - 0.0351\overset{4}{8}90\ c + d = 0$

$-1308.2 - 0.0256792\ c + d = 0$

$+759.7 - 0.0094698\ c = 0$

2.880642
7.976341
4,904301
8.545913
3,450214

c = 80223

4.904301
8.409581
3.313882

2819.8
548.5
2368.3

2060.1
1308.2
2368.3

l_γ = 3.52741

5783.3

54474
62615
− 8141
(80223)
+72082

78220
62615
15605
80223
95828

113559
62615
50944
80223
131167

3.52741
3.91068
7.43809
4.85783
2.58026

3.52741
4.19326
7.72067
4.98149
2.73918

3.52741
4.70709
8.23450
5.11782
3.11668

5410.0
380.4
5790.4
83.3
7.1 suggest

5410.0
548.5
4861.6

5410.0
1308.2
4101.8

Tuesday Feb 12 1901

5410.0 62615
5397.3 62925
2|10807.3 2|115540
5403.6 62770

~~62615~~

62770 5403.6
78220 15450 4861.5 542.1
113559 50789 4101.8 1301.8
~~35334~~ ~~35339~~ ~~759.7~~ ~~759.7~~

2.734079 n
4,1889$\overset{2}{\cancel{4}}$8
8.545151 n

3.114544 n
4.705770
8.408774 n

$-542.1 - 0.0350874\ c + d = 0$
$-1301.8 - 0.0256315\ c + d = 0$
$+759.7 - 0.0094559\ c = 0$

2.880642
7.975703
4.904939
8.545152
3,450090
~~8.545151~~
1.995241

c = 80341

4.904939
8.408774
3,313713
8.408774
1.722487

~~9891~~

2819.0
542.1
3361.1

2059.3
1301.8
3361.1

b_y = 3.52648

5783.3
54474
62770
−8296
80341
+ 720$\overset{5}{\underset{4}{\cancel{4}}}$5

78220
62770
15450
80341
95791

113559
62770
50789
80341
131130

3.52648
3,91887
7.44535
4.85760
2.58775

3.52648
4.18893
7.71541
4.98132
2.73409

3.52648
4.70577
8.23225
5.11770
3.11455

5403.6
387.0
5790.6
5883.3
7.3

Reductions for wavelengths of Nova Persei
C 13151 C.S.M. 17 — p 149 et seq.

H β 80768 4861.5
H γ 100000 19232 4340.7 520.8
H ζ 125098 $\overset{4}{8}4330$ 3889.1 972.4
~~15098~~ ~~451.6~~ ~~451.6~~

2.716671 "
4.284024
8.432647 "

2.987845 "
4.646698
8.341147 "

520.8 − 0.0270799
972.4 − 0.0219355
451.6 0.0051444

2.654754 87785
7.711335
4.943419 4.943419
8.432647 8.341147
3.376066 3.284566

2377.2 1925.6
520.8 972.4
2898.0 2898.0

lg = 3.46210

100000 125098
80768 80765
19232 44330
87785 87785
107017 132115

3.46210 3.46210
4.28402 4.64670
7.74612 8.10880
5.02945 5.12098
2.71667 2.98785

4861.5 4861.5
520.8 972.4
~~486~~
4340.7 3889.1

60199	60934	61365	61692	66465	67154	68764	78978
− 20569	19834	19403	19076	14303	13614	12004	1790
67216	67951	68382	68709	73482	74171	75781	85995
+ ~~60199~~	~~60934~~	~~61365~~	~~61692~~	~~66465~~	~~67154~~	~~68764~~	~~78978~~
~~9~~9							
4.31321	4.29741	7 4.2878~~69~~	4.28049	4.15543	4.13399	4.07933	3.25285
7.77531	7.75951	7.74997 ~~24079~~	7 8.74259	7.61753	7.59609	7.54143	6.71495
4.82747	4.83220	4.83494	4.83701	4.86618	4.87023	4.87956	4.93447
2.94784	2.92731	2.91503	2.90558	2.76135	2.72586	2.66187	1.78048
∓ 886.8	845.9	822.3	804.6	564.1	531.9	459.1	60.3
5748.3	5607.4	5683.8	5666.1	5425.6	5393.4	5320.6	4921.8

80060	—	85467	87132	87915	88891	90489	91225
− 708		+ 4699 ~~01~~	6364	7147	8123	9721	10457
87077	—	92484	94149	94932	95908	97506	98242
~~80060~~		~~85467~~	~~87132~~	~~87915~~	~~88891~~	~~90489~~	~~91225~~
2.85003		3.67200	3.80373	3.85412	3.90972	3.98771	4.01941
6.31243		7.13410	7.26583	7.31622	7.37182	7.44981	7.48151
4.93990		4.96607	4.97382	4.97741	4.98186	4.98903	4.99230
1.37253		2.16803	2.29201	2.33881	2.38996	2.46078	2.48921
− 23.6		+ 147.2	195.9	218.2	245.4	288.9	308.5
4885.1		4714.3	4665.6	4643.3	4616.1	4572.6	4553.0
	0						

92102	92867	94027	94456	95915	96730	97885
11334	12099	13259	13688	15147	15962	17117
99119	99884	101044	101473	102932	103747	104902
4.05438	4.08275	4.12251	4.13634	4.18033	4.20309	4.23343
7.51648	7.54485	7.58461 ~~8721~~	7.59844	7.64243	7.66519	7.69553
4.99616	4.99950	5.00451	5.00635	5.01255	5.01597	5.02079
2.52032	2.54535	2.58010	2.59209	2.62988	2.64922	2.67474
331.4	351.0	380.3	390.9	426.5	445.9	472.9
4530.1	4510.5	4481.2	4470.6	4435.0	44156	4388.6
		44814				
		− 0.2				

98890	—	103477	109349	110695	112067	113481
18122		22709	28581	29927	31299	32713
105907		110494	116366	117712	119084	120498
4.25821		4.35620	4.45608	4.47606	4.49553	4.51472
7.72031		7.81830	7.91818	7.93816	7.95763	7.97682
5.024935		5.04335	5.06582	5.07079	5.07586	5.08098
2.69538		2.77495	2.85236	2.86737	288177	2.89584
495.9		595.6	711.8	736.8	761.7	786.8
4365.6		4265.9	4149.7	4124.7	4099.8	4074.7
					4101.8	
					− 2.0	

119974	125098
39206	44330
12699.1	132115
4.59335	—
8.05545	
5.10377	
2.951$\overset{6}{\cancel{8}}$8	
894.7	
3966.8	
3970.2	
− 3.4	0

Repeated
Reduction of for wave lengths β Persei (1315)
C. Sun 17 H 149 —

H β	80768		4861.5	
H γ	100000	19232	4340.7	520.8
H ε	119974	39.206	3970.2	891.3
		~~19974~~	~~370.5~~	~~370.5~~

2.716671 n
4.284024
8.432647 n

2.950024
4.593353
8.356671 n

520.8 − 0.0270799
891.3 − 0.0227337
370.5 0.0043462

2.568788 85247.
7.638110
4.930678 4.930678
8.432647 8.356671
3.363325 3.287349

520.8 891.3
2308.5 1938.0
2829.3 2829.3

lg = ~~3.451679~~
3.45168

H_β	4481.4	4340.7	4101.8	3970.2	3889.1
80768	94027	100000	112067	119974	125098
—	13259	19232	31299	39206	44330
	98506	104479	116546	124453	129577
	4.12251X	4.28402	4.49553	4.5933$\overset{6}{5}$	4.64670
	7.$\overset{5}{6}$7419	7.73570	7.94721	8.0450$\overset{4}{3}$	8.09838
	4.99346	5.01903	5.06650	5.09$\overset{501}{\cancel{449}}$	5.1125$\overset{3}{4}$
	2.$\overset{5}{6}$8073	2.71667	2.88071	2.950$\overset{03}{\cancel{06}}$	2.9858$\overset{5}{4}$
	380.8 ~~479.4~~ ~~8.21~~	520.8	759.8	891.3	967.9
	4480.7	4340.7	4101.7	3970.2	3893.6
	4481.4	4340.7	4101.8	3970.2	3889.1
0	− 0.7	0	− 0.1	0	+ 4.5

60199	60934	61365	61692	66465	67154	68764
− 20569	19834	19403	19076	14303	13614	12004
64678	65413	65844	66171	70944	71633	73243
4.31321	4.29741	4.28787	4.28049	4.15543	4.13399	4.07933
7.76489	7.74909	7.73955	7.73217	7.60711	7.58567	7.53101
4.81076	4.81566	4.81852	4.82067	4.85092	4.85571	4.86467
2.95413	2.93343	2.92103	2.91150	2.75619	2.73056	2.66634
899.8	857.9	833.7	815.6	570.4	537.7	463.8
5761.3	5719.4	5695.2	5677.1	5431.9	5399.2	5325.3
5748.3	5707.4	5683.8	5666.1	$542\overset{5}{4}.6$	5393.4	20.6
13.0	12.0	11.4	11.0	6.3	5.8	4.7

78978	80060	85467	87132	87915	88891	90489
1790	− 708	+ 4699	6364	7147	8123	9721
83457	84539	89946	91611	92394	93370	94968
3.25285	2.85003	3.67200	3.80373	3.85412	3.90972	3.98771
6.70453	6.30171	7.12368	7.25541	7.30580	7.36140	7.43939
4.92146	4.92706	4.95398	4.96195	4.96564	4.97021	4.97758
1.78307	1.37465	2.16970	2.29346	2.34016	2.39119	2.46181
− 60.7 ~~606.8~~	− 23.7 ~~236.9~~	+ 147.8	196.5	218.9	246.1	289.6
4922.2	4885.2	4713.7	4665.0	4642.6	$461\overset{5}{4}.6$	4571.9
21.8	85.1	14.3	65.6	43.3	16.1	72.6
04	0.1	− 0.6	− 0.6	− 0.7	~~1.3~~ − 0.5	− 0.7

o

91225	92102	92867	94456	95915	96730	97885	98890
10457	11334	12099	13688	15147	15962	17117	18122
95704	96581	97346	98935	100394	101209	102364	103369
4.01941	4.05438	4.08275	4.13634	4.18033	4.20309	4.23343	4.25821
7.47109	7.50606	7.53443	7.58802	7.63201	7.65477	7.68511	7.70989
4.98093	4.98489	4.98832	4.99535	5.00071	5.00522	5.01015	5.01439
2.49016	2.52117	2.54611	2.59267	2.63030	2.64955	2.67496	2.69550
309.1	332.0	351.6	391.4	426.9	446.2	473.1	496.0
4552.4	4529.5	4509.9	4470.1	4434.6	4415.3	4388.4	4365.5

〃	25140	6491	Telescopium	ζ	4.5	4.00
〃	25383	6557	Pavo	ζ	4.2	4.04
〃	26162	6716	Corona Aust.	δ	5.0	4.41
〃	27239	6952	Sagittarius	ι	4.3	4.08
〃	27273	6966	Pavo	μ'	5.9	5.70
〃	27298	6969	Pavo	μ²	5.6	5.20
〃	27354	6981	Sagittarius	—	6.2	5.98

2.77464	2.85152	2.86638	2.89466
595.2	710.4	735.1	784.6
4266.3	4151.1	4126.4	4076.9
65.9	49.7	24.7	74.7
+0.4	+ 1.4	+1.7	+2.2

o

91225	92102	92867	94456	95915	96730	97885	98890
10457	11334	12099	13688	15147	15962	17117	18122
95704	96581	97346	98935	100394	101209	102364	103369
4.01941	4.05438	4.08275	4.13634	4.18033	4.20309	4.23343	4.25821
7.47109	7.50606	7.53443	7.58802	7.63201	7.65477	7.68511	7.70989
4.98093	4.98489	4.98832	4.99535	5.00$\overset{1}{8}$71	5.00522	5.01015	$\overset{5}{4}$.01439
2.49016	2.52117	2.54611	2.59267	2.63030	2.64955	2.67496	2.69550
309.1	332.0	351.6	391.4	426.9	446.2	473.1	496.0
4552.4	4529.5	4509.9	4470.1	4434.6	4415.3	4	

C 13151 Nova Persei

[illegible]	[illegible]	[illegible]	[illegible]
2.77464	2.85152	2.86638	2.89466
595.2	710.4	735.1	784.6
4266.3	4151.1	4126.4	4076.9
6519	49.7	24.7	74.7
+0.4	+ 1.4	+1.7	+2 2

o

91225	92102	92867	94456	95915	96730	97885	98890
10457	11334	12099	13688	15147	15962	17117	18122
95704	96581	97346	98935	100394	101209	102364	103369
4.01941	4.05438	4.08275	4.13634	4.18033	4.20309	4.23343	4.25821
7.47109	7.50606	7.53443	7.58802	7.63201	7.65477	7.68511	7.70989
4.98093	4.98489	4.98832	4.99535	$5.00\overset{1}{8}71$	5.00522	5.01015	$\overset{5}{4}.01439$
2.49016	2.52117	2.54611	2.59267	2.63030	2.64955	2.67496	2.69550
309.1	332.0	351.6	391.4	426.9	446.2	473.1	496.0
4552.4	4529.5	4509.9	4470.1	4434.6	4415.3	4388.4	4365.5
53.0	30.1	10.5	70.6	35.0	15.6	88.6	65.6
−0.6	−0.6	−0.6	−0.5	−0.4	−0.3	−0.2	−0.1

103477	109349	110695	113481
22709	28581	$\overset{2}{3}9927$	32713
107956	113828	115174	117960
4.35620	4.45608	4.47606	4.51472
7.80788	7.90776	7.92774	7.96640
5.03324	$\overset{5}{4}.05624$	5.06136	5.07174
2.77464	2.85152	2.86638	2.89466
595.2	710.4	735.1	784.6
4266.3	4151.1	4126.4	4076.9
65.9	49.7	24.7	74.7
+0.4	+1.4	+1.7	+2.2

Thursday March 7 1901

Wavelengths Nova C 13152. C8m 17 – 157, 152

H β	80776		4861.5	
H γ	100000	19224	4340.7	– 520.8
H ε	119906	39130	3970.2	– 891.3
		19906	~~370.5~~	~~370.5~~

2.716671 n
4.283844
8.432827 n

2.950024 n
4.592510
8.357514 n

– 520.8 – 0.0270911
– 891.3 – 0.0227779
370.5 0.0043132

(1)	5723 100000 80776	5723 119906 80776	*
(2)	19224	39130	x
(3)	105723	125029	x + c
*	3.45452	3.45452	log a
(4)	4.28384	4.59251	log x
(5)	7.73836	8.04703	log ax
(6)	5.02160	5.09701	log (c+x)
(7)	2.71666	2.95002	

2.568788
7.634800
4.933988
8.432827
3.366815

c = 85899
80776
5123

4.933988
8.357514
3.291502

520.8
2327.1
2847.9

891.3
1956.6
2847.9

log = 3.45452.

4861.5
(8) = 520.8

(9) = 4340.7

Friday March 15 1901

Diff. Coef of wavelengths.

$$\lambda = \lambda_0 - \frac{\overset{b}{d}x}{c+x}$$

$$d\lambda = - \frac{\overset{b}{d}c}{(c+x)^2}$$

---

or, $$d\lambda = - \cancel{bd}\ \frac{ac}{(a+x)^2}$$

New notation.

See B 1 p 133

Friday March 15 1901

Wave lengths of C13158 C.Sm 17 p143-148

H β	82945		4861.5	
H γ	100000	17055	4340.7	520.8
H ε	117707	34762 ~~17707~~	3970.2 ~~370.5~~	891.3 ~~370.5~~

2.716671 n
4.231852
8.484819 n

2.950024 n
4.541105
8.408919 n

520.8 − 0.0305365
891.3 − 0.0256401
0.0048964

2.568788

C = 75668.

7.689877
4.878911
8.484819
3.363730

4.878911
8.408919
3.287830

100000
82945
17055
75668
92723

117707 (1)
82945
34762 (2)
75668
110430 (3)

520.8
2310.6
2831.4

891.3
1940.1
2831.4

3.45200
4.23185
7.68385
4.96719
2.71666

3.45200
4.54110 (4)
7.59310 d+(4)
5304309 log 6
2.95001

d = log $\overset{b}{\cancel{x}}$ 3.45200
log c 4.87891
log $\overset{b}{\cancel{x}}c$ 8.33091

Tuesday March 19, 1901

Foci for out of focus images with 11" Draper.

By measure, ~~focus~~ scale the face of plateholder is displaced 3.9 cm. by apparatus ∴ when in focus ~~the~~ reading should be 6.1 — 3.9 = 2.2 cm.

Foci used

	10.0	12.0	14.5	18.0	22.0	27.0	34.0
	2.2	2.2	2.2	2.2	2.2	2.2	2.2
	7.8	9.8	12.3	15.8	19.8	24.8	31.8
log	0.8921	0.9912	1.0899	1.1987	1.2967	1.3945	1.5024
		0.8921	0.8921	0.8921	0.8921	0.8921	0.8921
	0.2 /	0.0991	0.1978	0.3066	0.4046	0.5024	0.6103
		mag 0.50	0.99	1.53	2.02	2,51	3.05
		.49	.54	.49	.49	.54	(2.54)

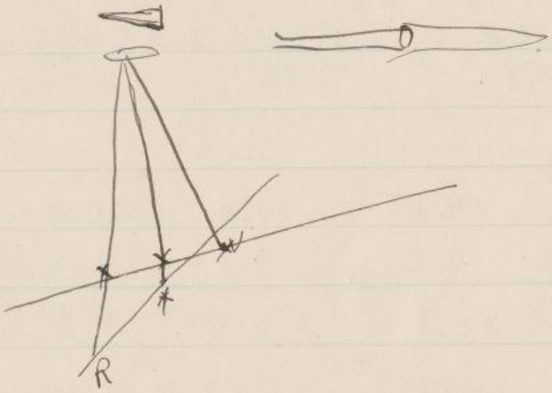
8.0	10.0	12.5	16.0	20.0	25.0	32.0
0.9031	1.0000	1.0969	1.2041	1.3010	1.3979	1.5051
	9031	9031	9031	9031	9031	9031
.2 /	.0969	.1938	.3010	.3979	.4948	6020
	0.48	0.96	1.50	1.99	2.47	3.01
	.48	.54	.49	.48	.54	(2.53)

.50	.50	50
.99	.98	100
1.53	1.52	1.54
2.02	2.01	2.03
2.51	2.49	2.52
3.05	3.03	3.06

Thursday April 25 1901

Spectroscope giving Normal Spectra.

~~Assume only one refracting surface with index μ~~



Monday May 6 1901

α Carinae. A8114 Spectrum Measures for C.S.M.17 pf 10 May.

Hβ	Hγ	Hδ	Hε	H K	Hζ
20745					
~~54014~~	54353	75313	89184	93159	98392
20743					
~~54111~~	54351	75288	89195	93125	98364
88	108704	601	179	84	156
20744	54352	75300	89190	93142	98378

		x		y
Hγ	54352	x	4340.7	y
Hδ	75300	20948	4101.8	− 238.9
Hζ	98378	44026	3889.1	− 451.6
	~~23078~~	~~23078~~	~~212.7~~	~~212.7~~

log y. ~~8~~2.378216 n   ~~3~~2.654754 n

4.321143   4.643709

~~1~~9.057073 n (8)   ~~1~~9.011045 n (8)

− 238.9 − 0.114044 c + d = 0

− 451.6 − 0.102576 c + d = 0

+ 212.7 − 0.011468 c = 0

~~3~~ 2.327767   c = 185472.

~~8~~7.059488

5~~7~~4.268279   5~~4~~8.268279

8~~9~~.057073   9.011045

~~4~~3.325352   3.279324

M = 75300   98378

54352   54352

x = 20948   44026

~~185472~~   ~~185472~~

~~185472~~   ~~185472~~

~~39495~~   ~~62873~~

206420   229498

3.37182   3.37182

4.32114   4.64371

7.69296   8.01553

~~4.59654~~   4.79639

3.09642   3.21914

7.69296   8.01553

5.31475   5.36078

2.37821   2.65475

21152.0
238.9
21390.9

21152
238.9
2354.1

19025
451.6
2354.1

19025.0
451.6
476.6

log 3.371825

c = 7.728″   d = ~~91.8″~~ 92.68″

Monday May 6 1901

Constants for α Carinae X 8114 for Normal Enlargement.
with Cooke Lens: Focus 13.2"

$c = 7.728$
$d = 92.68$

$\log c = 0.88807$
$\underline{\,2}$
$\log c^2 \quad 1.77614$
$\log(d^2+F^2) \quad \underline{3.01418}$
4.79032
$\log(c^2+F^2) \quad \underline{2.36914}$
$2)\,\underline{2.42118}$
$\log b. \quad 1.21059$
$b = +16.24$
$c = \underline{7.73}$
$b+c = 23.97$
$\log(b+c) \quad 1.37967$
$\underline{\,2}$
$\log(b+c)^2 \quad 2.75934$
$\log F. = \underline{1.12057}$
3.87991
$\log bc \quad \underline{2.09866}$
$\log D \quad 1.78125$

$\log(b+c) \quad 1.37967$
$\log F \quad \underline{1.12057}$
2.50024
$\log b \quad \underline{1.21059}$
$\log f \quad 1.28965$

F
$F = 13.2$
$F^2 = 174.24$
$d^2 = 859.0$

$\underline{c^2 = +59.72}$
$c^2+F^2 = 233.96$
$\underline{d^2+F^2 = 1033.2}$
$\log d = 1.96699$
$\underline{\,2}$
$\log d^2 = 3.93398$

$\log b \quad 1.21059$
$\log c \quad \underline{0.88807}$
$\log bc \quad 2.09866$

0.88807
$\underline{1.96699}$
2.85506

$\log \varepsilon = \log \frac{b}{c} =$

$D = +60.43$

$f = +\underline{19.48}$

$D-f = 40.95$

Monday May 6 1901

log f = 1.12057
log b = 1.21059
log cos A 9.90998 $A = 35\overset{\circ\,6}{.\cancel{7}}$

log f b 2.33116
log c d 2.85506 $B = 72^{\circ}.6$
log cos B 9.47610

tan A $9.854\overset{9}{\cancel{87}}$
log f = 1.2896
1.1445

tan B 0.5039
log D − f 1.6122
2.1161

Tuesday May 7 1901

Constants for Enlargement (Angstrom's Scale) of α Canum X 8714 Sept 153.

x	y
+ 0.873	− 9.40~~5~~6
+ 1.873	− 17.780

0.973405 n　　　1.249932 n

9.941014　　　0.2~~8~~42538

1.032391 n　　　0.977394 n

−9.406 − 10.7744　c + d = 0

−17.780 − 9.4928　c + d = 0

+ 6.374 − 1.2816　c = 0

0.922933　　　6.534

0.107752

0.815181

$xy + cy + dx = 0$

~~xy − ax~~　$y + \frac{y}{x}c + d = 0$

Tuesday May 7 1901

	x	y
H_γ	− 0.″873	+ 9.406
~~H_ζ~~	~~+ 1.873~~	~~− 17.78$\overset{0}{4}$~~
HG	+ 1.000	− 8.374$\overset{8}{}$

0. 973405
9. 941014 n
1.032391 n

0. 922933 n
0. 0000
0. 922933 n

+ 9.406 − 10.7746 c + d = 0
− 8.374 ~~+~~ − 8.3740 c + d = 0
+ 17.780 ~~− 19.1486~~ − 2.4606 c = 0

1.249932
0.380302
0.869630
1.032391
1.902021

c = 7.407

0.869630
0.922933
1.792563

−0.873
+ 7.407
+ 6.534 ~~280~~
1.8475$\overset{6}{\cancel{8}}$
9.94101
1.7885$\overset{7}{\cancel{6}}$
0. 81578
0.9733$\overset{9}{\cancel{8}}$

+1.000
7.407
8.407
1.8475$\overset{6}{\cancel{8}}$
0. 0000
1.8475$\overset{6}{\cancel{8}}$
0.92464
0.92292

79.803
9.406
d = 70.397

62.024
8.374
70398

log d = 1.8475$\overset{6}{\cancel{5}}$

Tuesday May 7, 1901.

$c = 7''.407$
$d = 70.398$

log c = 0.869636
2

log c^2 1.739260
log d^2+F^2 3.71013
~~2.36003~~

~~4.09929~~
5.44939

log c^2+F^2 2.36003

2/ 3.08936

log b = 1.54468

b = + 35.049
c = 7.407

$b+c$ = 42.456

log $(b+c)$ 1.62794
2

log $(b+c)^2$ 3.25588
log F 1.12057

4.37645

log bc 2.41431

log D 1.96214

---

log $(b+c)$ 1.62794
log F 1.12057

2.74851

log b 1.54468

1.20383

F = 13.20
F^2 = 174.240
c^2 = 54.861
c^2+F^2 = 229.101

log d = 1.847756
2

log d^2 3.69512
d^2 = 4955.9
d^2+F^2 5130.1

log b = 1.54468
log c 0.86963

log bc = 2.41431

log ε = log $\frac{b}{c}$ = 0.67505

D = 91.65

f = 15.99

$D-f$ = 75.66

Tuesday May 8 1901

log F = 1,12057
log b 1.54468
log cos A 9.57589

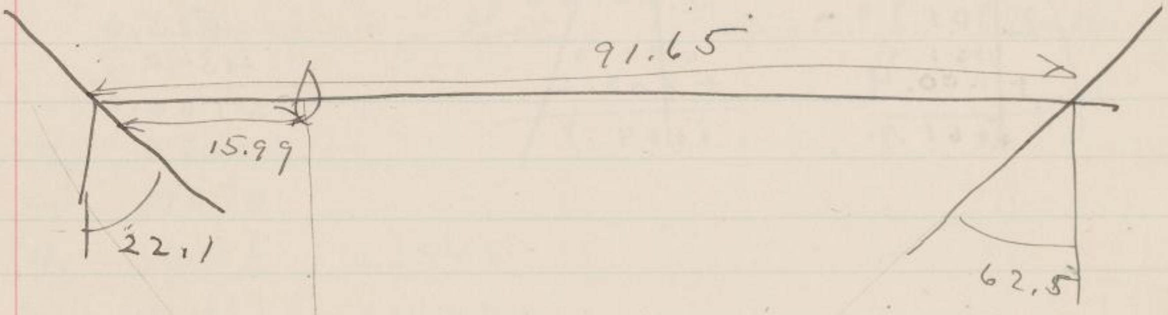
67° 5~~2~~3' = A = 67°.9
(22° 7') (22.1)

log Fb = 2,66525 · log c = 0.86963
log cd 2.71719 log d = 1.84756
log cos B 9.94806 2.71719

B = 27°.28'
= 27°.5
(62.5)

tan A = 0,39087
log f 1.20383
1.59470

tan B = 9.71586
log(D-f) 1.87887
1.59473



Schema for Enlargement of η Carinae from X 8114 to Angström scale from Hγ toward blue.

Monday May 13 1901

Lines in Spectrum of Carinae X8714 reduced to wave length by formula of p. 155 for purpose of identification.

~~54111~~
~~39564~~
~~− 14547~~
~~+ 185472~~
~~+ 170925~~

~~3.37182~~
~~4.16277 n~~
~~7.53459 n~~
~~5.23280~~
~~2.30179 n~~
~~4861.5~~
~~+ 200.4~~
~~5061.9~~

~~54111~~
~~39374~~
~~− 14737~~
~~+ 185472~~
~~170735~~

~~3.37182~~
~~4.16835 n~~
~~7.54017 n~~
~~5.23233~~
~~2.30785 n~~
~~4861.5~~
~~+ 203.2~~
~~5064.7~~

54353
20745
33608
14547
− 48155
185472
+ 137317

4.68264
3.37182
8.05446
5.18772
2.91674

825.5
4340.7
5166.2

Tuesday May 14 1901

Lines for Identification in α Carinae X 8114

Measures = 43868

H_γ = 54353 Formula p 155

$-104\overset{8}{\cancel{3}}5$

+18547.2

+174987

3.37182

4.02057 n

7.39239 n

$5.24\overset{3}{8}00$

2.14939

4340.7

141.1

4481.8

Measures of Spectrum α Carinae from C SM N 17 p 173

	H_γ	89532	
	—	79070	
	H_β	56036	33496
λ 5167.6	λ	41492	14544
~~5167.6~~ λ 5893.0	D	16468	

Tuesday May 14 1901

Constant for α Carinae [illegible] 8114 Second Red for Enl. & Normal

16468 5893.0

41492 + 25024 516,7.6 − 725.4

56036 + 39568 4861.5 − 1031.5

1 ~~4544~~ ~~14544~~ ~~306.1~~ ~~306.1~~

x y

1.043 − 28.559

1.649 − 40.610

log y 1.455743 n 1.608633 n

log x 0.018284 0.217221

1.437459 n 1.391412 n

− 28.559

−40.610

+12.051

~~−725.4~~ − 27.3816 c + d = 0

~~−1031.5~~ − 24.6270 c + d = 0

~~+306.1~~ − 2.7546 c = 0

1.081023
0.440059
0.640964
1.437459

2.078423

119.79
28.56
148.35

2.485863
0.440059
2.045804
1.437459
3.483263

3042.7
725.4
3768.1

c = ~~+ 111.12~~
c = 4.375

2.045804
1.391412
3.437216

2736.6
1031.5
3768.1

0.640964
1.391412
2.032376

107.74
40.06
~~147.80~~
148.35

+ 1.043
+ 4.375
~~+ 3.332~~
5.418

2.17129
0.01828
2.18957
0.73354
~~0.52270~~
1.66687
1.45573

+ 1.649
+ 4.375
~~+ 2.726~~
+ 6.024

2.17129
0.21722
2.38851
0.77988
1.60863

log d = 2.17129

Wednesday May 15 1901

Constants for enlargement to normal scale of spectrum of α Carinae X8114 ~~H~~ λ5893 5168 & Hβ using Cooke Lens.

$c = 4.375$ $\qquad$ $f = 13.20$

$d = 148.35$ $\qquad$ $f^2 = 174.24$ ~~17.240~~

$c^2 = 19.140$

$c^2+F^2 =$ 193.38 ~~36.380~~

log c	0.640964	
×2	2	
log c^2	1.28193 ~~28~~	1.28193
log(d^2+F^2)	4.34290	4.34800 4.3454
	5.62483	5.62793 ~~.647~~
log(c^2+F^2)	1.56086	2.28642 ~~2.241~~
2)	4.06397	3.34151
log b	2.03198	1.67076
log c	0.640964	0.64096
log bc	2.67294	2.31172

log Σ = log $\frac{b}{c}$ = 1.39102

Σ =

log d	2.17129	
×2	2	
log d^2	4.34258	
f^2 =	~~17.24~~	174
d^2 =	2200.7	22008.
	~~.242~~ ~~.624.~~	
d^2+F^2 =	~~2217.9~~ ~~2374.9~~	22182.
b =	~~107.64~~	46.855
c =	~~4.38~~	4.375
b+c =	~~112.02~~	51.230
log(b+c)	2.04891	1.70952
×2	2	2
log$(b+c)^2$	4.09782	3.41904
log f.	1.12057	1.12057
~~log bc~~	5.21839	4.53961
log bc	2.67294	2.31172
log D =	2.54545	2.22789

D = ~~351.12~~ 169.00

---

f = ~~13.72~~ 14.43

1.70952
1.12057
2.83009
1.67076
1.15933

log b+c	2.04891
log f.	1.12057
	3.16948
	~~0.92834~~
log b	2.03198
log f	1.13750

D − f. = ~~337.40~~ 154.57

Wednesday May 15 1901
~~Constants det~~ Det. of Constants (Continued)

log f = ~~1.12057~~ 1.12057
log b = ~~2.03198~~ 1.67076
log Cos A ~~9.08859~~ 9.44981

A = 73° 38'

73.6
16.4

~~log fb. 3.15255~~ 2.79133
~~log cd 2.81225~~ 2.81225
log Cos B 9.97908

log c 0.64096
log d 2.17129
log cd = 2.81225.
B = 17° 39'

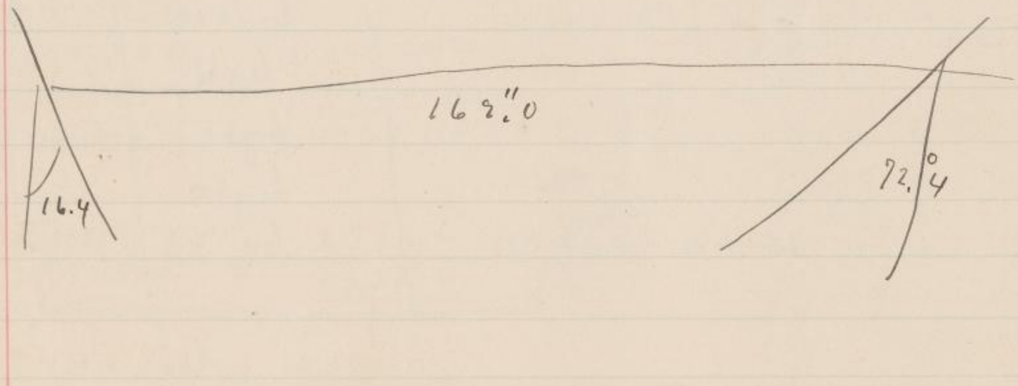
17.6
72.4

tan A 0.53223
log f 1.15933
1.69156

tan B 9.50245
log(D-f) 2.18912
1.69157

49.15

Sch



Wednesday May 15 1901

Det. of Constants for Scale with Shorter focus.

$c = +4.375$
$d \equiv 148.35$
$\log c$ 0.64098
× 2 2
$\log c^2$ 1.28196
$\log(d^2+F^2)$ 4.34327
5.62523
$\log(c^2+F^2)$ 1.74147
2) 3.88376
$\log b$. 1.94188
$\log c$ 0.64098
$\log bc$ 2.58286
$\log \varepsilon = \frac{b}{c} = 1.30090$
$\varepsilon =$ 19.99
$\log(b+c)$ ~~1.91960~~ 1.96308
× 2 ~~2~~ 2
$\log(b+c)^2$ ~~3.83920~~ 3.92616
$\log F$ ~~0.77815~~ 0.77815
~~4.61735~~ 4.70431 ~~3.14601~~
$\log bc$ ~~2.58286~~ 2.58286
$\log D$ 2.03449 ~~1.56515~~ ~~2.12245~~ 2.12145

$D =$ ~~201.60~~ $= 132.27$

$\log(b+c)$ ~~1.91960~~ 1.96308
$\log F$. ~~0.77815~~ 0.77815
~~2.69775~~ 2.74123
$\log b$ ~~1.94188~~ 1.94188
$\log f$ ~~0.78587~~ 0.79935

$f = 6.30$
$D - f = 125.97$

$F = 6.00$
$F^2 = 36.00$
$c^2 = 19.14$
$c^2+F^2 = 55.14$
~~$c^2 = 19.14$~~
$\log d = 2.17128$
× 2 2
$\log d^2$ 4.34256
$d^2 = 220\overset{3}{0}\overset{6}{7}.$
d^2+F^2 22043.
$b =$ 87.474
$c =$ 4.375
~~83.099~~
$b+c =$ 91.849

$\log c$ 0.64098
$\log d$ 2.17128
$\log cd$ 2.81226

$\log b$ 1.94188
$\log F$ 0.77815
$\log \cos A$ $8\,\overset{8}{\cancel{7}}\,36\,\overset{73}{27}$ $A =$ ~~86° 53~~ 86° 4′

$\log F b = 2.72003$
$\log cd$ 2.81226
$\log \cos B$ 9.90777 $B = 36° 2′$

$\tan A$ ~~1.26313~~ 1.16271
$\log f$ ~~0.77815~~ 0.79935
~~2.04128~~
~~1.94086~~
1.96206
$\tan B$ 9.86179
$\log(D-f)$ 2.10027
1.96206

Wednesday May 15 1901

Constants for Red. to Normal Scale for a Comparison.

~~Hγ~~ = λ 5167.~~2~~6	41492		51.67.6	
Hβ	56036	−14544 = −.606	4861.5	* + 306.1 = +1.2,05
Hγ	89532	+33496 = +1.396	4340.7	− 520.8 = −2.0,50
			~~826.9~~	~~826.9~~

log y (in m.m)	2.485863	2.716671 n
log 25.4	1.404834	1.404834
log y (in inches)	1.081029 (+12.051)	1.311837 n (−20.504)
log x (in inches)	9.782473 n	0.144885
	1.298556 n	1.166952 n

+12.051 − 19.8864 c + d = 0

+20.504 − 14.6876 c + d = 0

32.555 − 5.1988 c = 0

c = 6.262

1.512618

0.715903

0.796715

1.298556

2.095271

124.5$\overset{2}{3}$9

12.051

d = 112.478

0.796715 = log c

1.166952

1.963667

91.974

20.504

112.478

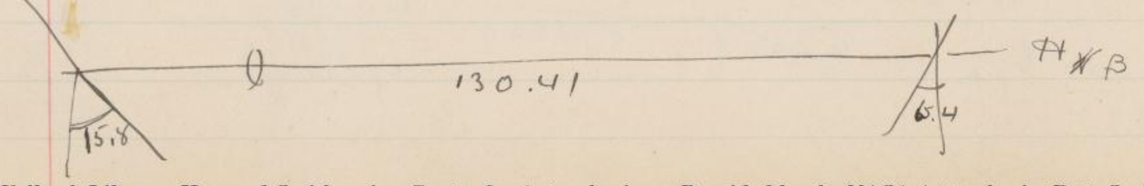
log d = 2.05107

log c = 0.79672

Proof.

−.606	+1.396
6.262	+6.262
5.656	+7.658
2.05107	2.05707
9.78247 n	0.14488
1.83354 n	2.19595
0.75251	0.88412
1.081034 n	1.31183

Scheme from p 169



Wednesday May 15 1901

Constants for Cult to normal scale for α Carinae Hγ – λ 5167.

c = –

d = –

log c 0.79671

2

log c^2 1.59342

log (d^2+f^2) 4.10808

5.70150

log (c^2+f^2) 2.32930

2) 3.37220

log b 1.68610

log c 0.79672

log bc. 2.48282

log 2 = log $\frac{b}{c}$

log c = 0.79671

log d 2.05107

~~3.44778~~

2.84778

$f.$ = 13.20

f^2 174.24

c^2 = 39.212

$c^2 + f^2$ 213.452

log d 2.05107

2

log d^2 4.10214

d^2 = 12651.5

174.2

$d^2 + f^2$ 12825.7

b = 48.540

c = 6.262

b+c 54.802

log (b + c) 1.73880

2

log $(b+c)^2$ 3.47760

log f. 1.12057

4.59817

log bc 2.48282

log D 2.11535

D = 130.42

log (b+c) 1.73880

log f 1.12057

2.85937

log b 1.68610

log f 1.17327

f = 14.90

D – f. = 115.52

log f. 1.12057

log b 1.68610

log cos A 9.43447

A = 74° 13′ 74.2 15.8

log f b. 2.80667

log c d. 2.84779

log cos B 9.95889

B = 24° 38′ 24.5 65.4

log tan A 0.54884

log f 1.17327

1.72212

log tan B 9.65948

log D-f 2.06262

1.72210

Perpendicular = 52.74

Friday May 17 1901

1 Focus of Ross Zeiss Lens.

~~Dist~~ Length 271^mm from 30.3^mm Dist 70.″0

1.8

68.2

30.3) 271.0 (8.94

~~264~~

2424

2860

2727

1330

$$f = D\frac{\varepsilon}{(\varepsilon+1)^2}$$

log 271. 2.43297

1.48144

0.95153 $\varepsilon =$ 8.944

1

log 68.2 1.83315 $\varepsilon+1$ 9.944

2.78468

1.99512 $\log(\varepsilon+1)$ 0.99756

0.78956 2

$f =$ 6.16 $\log(\varepsilon+1)^2$ 1.99512

---

2 Again. 104.5 from 30.3 Dist 36.1

log 104.5 2.01912

log 30.3 1.48144

0.53768 3.45

log 36.1 1.55751 1.00

$2.\overset{0}{\cancel{8}}9519$ 4.45

1.29672 0.64836

0.89847 2

7 1.29672

$f =$ 6.29

Use $f =$ 6.2.

Friday May 17 1901

3 1 Focus of Ross lens (continued) 1

Again

22.7 22.3
11.4 11.4
34.1 33.6

Small 3 times

Mean 33.8
3
16) 101.4 (634
96
54
48
60

33.6
3
16) 100.8 (6.30
96
48

For No 1 the distance was taken from scale on floor & corrected by previous work. The dist for the other cases were measured directly.

---

4 Again

102.0
30.3

~~6.16~~
~~6.29~~
~~6.30~~
~~6.30~~
~~4) 105~~
~~6.26~~

(1) 6.16
(2) 6.29
(3) 6.30
(4) 6.28
(5) 6.30
5) 133
6.27
Mean

2.00860
1.48144
0.52716
1.55141
2.07861
1.28096
0.79765

f = 628

24.1
11.1
35.6

ε = 3.37
ε+1 4.37
log 4.37 = 0.64048
2
1.28096

5

0.79937
1.99572
2.79449
0.95153
1.84296

69.7

236.
30.3

2.37291
1.48144
0.89147
~~1.8~~
1.79588
2.68735
1.88728
0.79937
6.30

Dist 52.5
10
62.5

7.79
1
8.79

0.94399
2
1.88798

Friday May 17 1901

Constants for Calc. to Normal Scale for α Canum 1mm = 1Å

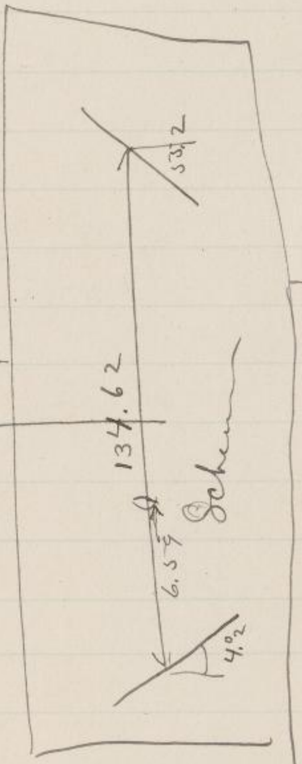
λ 4114 ~~Hγ — λ 5767~~ H δ turned Red See page 165

	c = 4.375	d = 148.35	f = 6.27
log.	c = 0.64098	log d 2.~~05707~~ 17129	log f. = 0.79727
×2	2	2	2
log()²	1.28196	4.34258	1.59454
	39.314 c² = 19.141	39 d² = 22008.	f² = 39.314
	c²+f² = 58.455	d²+f² = 22047.	

log C² 1.28196
log (d²+f²) 4.34335
5.62531
log(c²+f²) 1.76682
3.85849
2)
log b 1.92924
log c 0.64098
2,57022
log bc

log(b+c) 1.95104
×2 2
3,90208
log f. 0.79727
b 4.69935
log bc 2.57022
log D. 2,12913

log(b+C) 1,95104
log f 0.79727
2.74831
log b 1.92924
log f 0.81907



D = 13462

f = 6.59

D − f = 128.03

b = 84.963 log c 0.64098
c = 4.375 log d 2.17129
b+c = 89.338

log f 0.79727
log b 1.92924
log Co A 8.86803 A = 85°.8
4.2

log f b 2.72651
log cd 2.81227
log Co B 9.91424 B = 34.8
55.2

log tan A 1,130~~678~~ 78
log f 0.81907
1,94985

log tan B 9.84257
log (D−f) 2.10731
12.94988

Perpendicular = 89.10

Friday May 17 1901

Same width as on previous page except scale is 1 mm = 2

c = 4.375
log c
log² c²
c²
c² + f² 58.455

d = 74.18
log d 1.87029
log d² 3.74058
d² 5502.~~8~~ 39.3
d² + f² = 5541~~X~~

f = 6.27
log f.
log f²
f² 39.314

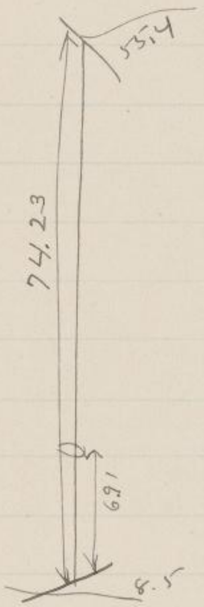
log c² 1.28196
log(d²+f²) 3.74359
5.02555
log(c²+f²) 1.76682
2) 3.25873
log b 1.62936
log c 0.64098
log bc 2.27034

log(b+c) 1.67182
log (b+c)² 3.34364
log f. 0.79727
4.14091
log bc 2.27034
log D 1.87057

D = 74.2~~30~~ 28

log(b+c) 1.67182
log f 0.79727
2.46909
log b 1.62936
log f 0.83973

f = 6.914
D−f 6~~8~~7.3~~2~~ 14



b = 42.595 log c 0.64098
c = 4.375 log d 1.87029
b+c = 46.970 2.51127

log f 0.79727
log b 1.62936
log Cos A 9.16791 A = 81.5
8.5

log fb 2.42663
log cd 2.51127
log Cos B 9.91536 B = 34.6
55.4

log tan A 0.82733
log f 0.83973
1.66706

log tan B 9.83910 ✓
1.82810
log (D−f) ~~1.82162~~
~~1.66072~~
1.66720

Perpendicular 46.48

Friday May 17 1901

Same as on preceding Page

From Cooke lens & scale 1mm = 2λ

c 4.375 d 74.18 f = 13.20

log c 0. log d log f

log c² log d² log f²

c² 174.240 19.14x d² 1742 5502.7 f² 174.24

c² + f² ~~226.565~~ ~~213.4~~ 65 193.381 d² + f² 5676.9

log c² 1.28 19 ~~68~~ 6 ~~1.281~~ ~~1.59344~~ 11

log (d² + f²) 3.75404

~~5.34748~~ 5.03 60a7

log (c² + f²) 2.~~32729~~ 28641

2) ~~3.01879~~ ~~4~~.749 5696

log b. ~~1.50910~~ 1.3747~~8~~3

log c 0.64098

log bc 2.01578

log (b + c) 1.44837

log (b + c)² 2.89674

log f 1.12057

~~1.77617~~ 401731

2.01578

log bc

log D ~~1.98~~ 2.00153

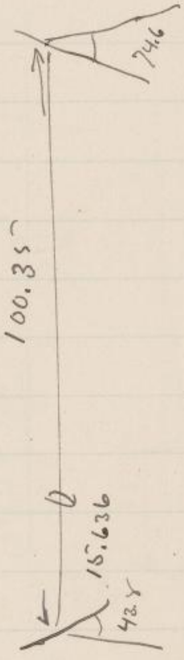
log (b + c) 1.44837

log f 1.12057

2.56894

log b 1.37480

log f 1.19414



D = 100.353 ~~98.068~~

f = 15.636

~~82.432~~ 84.717

b = 23.703

c = 4.375

b + c = 28.078

log c ~~0.79677~~ 0.64098

log d 1.87029

251127

log f 1.12057

log b 1.~~50910~~ 37483

log Cos A ~~9.61147~~ 9.7457~~7~~4

A = 56.2

43.8

log f b. ~~2.62967~~ 2.49537

log cd 28.5112~~7~~3

log Cos B 9.9841~~0~~4

B 15.4

74.6

log tan A 0.1736~~0~~6

log f 1.19414

1.367~~74~~80

log tan B 9.4~~4036~~3970

log (D − f) 1.92797 ~~1.91610~~

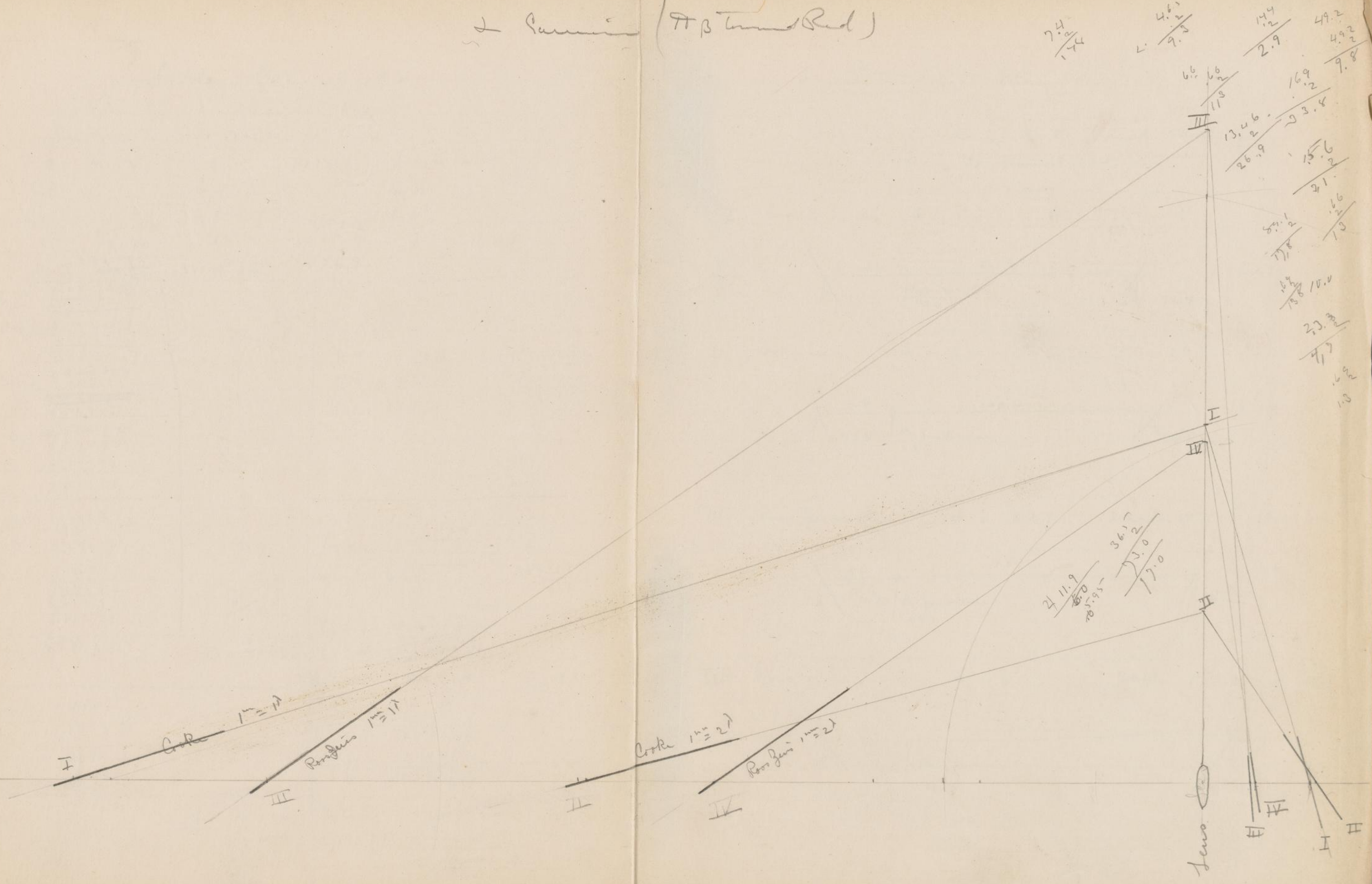
~~1.35646~~

~~136833~~

1.36767

23.32 Perpendicular

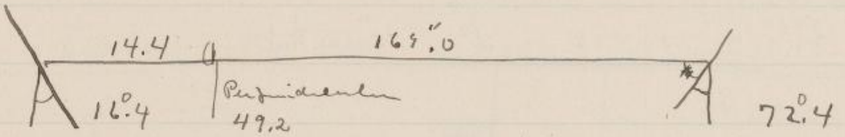
l Carinae (H β turned Red)



Saturday May 18 1901

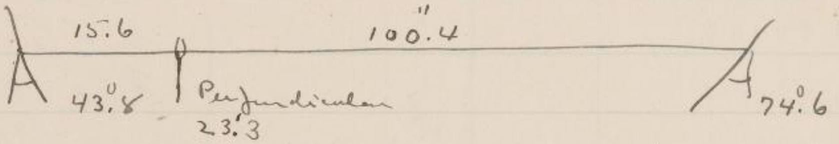
Scheme of Enlargement to Normal scale for α Carinae λ8114 H_β toward Red.

I Cooke Lens $f = 13''.20$ Scale $1^{mm} = 1^{\lambda}$



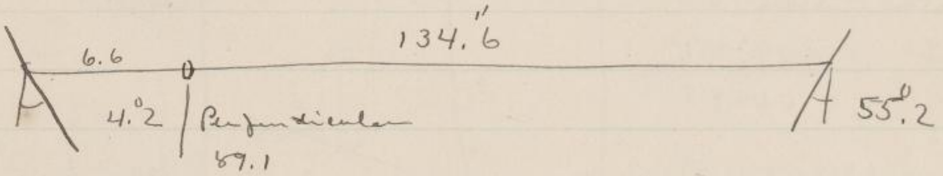
(See p. 166 [illegible])

II Cooke Lens $f = 13.20$ Scale $1^{mm} = 2^{\lambda}$

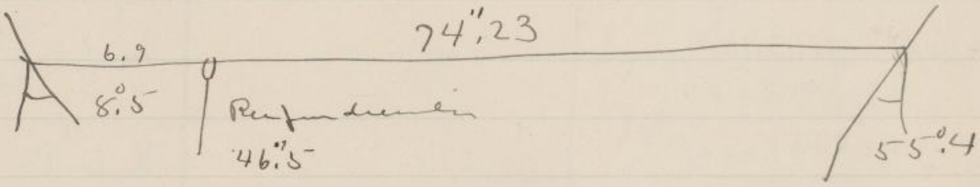


(See p. 174)

III Ross Zeiss Lens $f = 6''.27$ Scale $1^{mm} = 1^{\lambda}$ (See p. 172)



IV Ross Zeiss Lens $f = 6''.27$ Scale. $1^{mm} = 2^{\lambda}$ (See p. ~~[illegible]~~ 173)



Monday May 20 1901

Constants for Ext. & Normal scale. Same plate & position of objective as on page 169. , but using Ross. Goerz lens.

c = 6.262 d 112.478 F 6.27

~~log~~ c $\overset{0}{\cancel{1}}$.79671 log d 2.05$\overset{1}{\cancel{0}}$07 log F 0.79727

log c² $\overset{1}{\cancel{0}}$.59342 " d² 4.10214 " F² 1.59454

$c^2 =$ $\overset{39314}{39.212}$ 78.526 d² = 1265$\overset{1}{\cancel{2}}$. (147²) = 12690 F² = 39.314

c^2+F^2

log c² 1.59345

log(d²+F²) 4.10346

5.69691

log(c²+F²) 1.89502

2) 3.80189

log b 1.90094

~~log~~ c 0.79671

2.69765

log bc

log(b+c) 1.93382

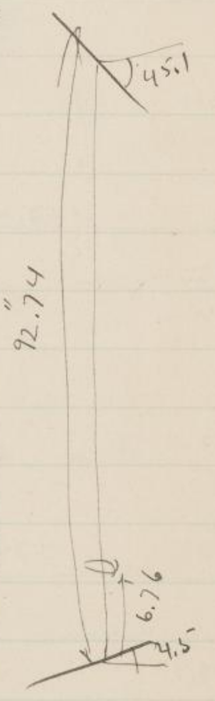
log(b+c)² 3.86764

log F 0.79727

4.66491

log bc 2.69765

log D 1.96726



D = 92.738

log(b+c) 1.93382

log F. 0.79727

2.73109

log b 1.90094

log f 0.83015

f = 6.763

D−f. 85.975

b = 79.605

c = 6.262

b+c 85.867

log c 0.79671

log d 2.05107

2.84778

log F 0.79727

log b 1.90094

log cos A 8.89633 A = 85.5 / 4.5

log Fb 2.69821

log cd 2.84778

log cos B 9.85043 B = 44.9 / 45.1

log tan A 1.10232

log f 0.83015

1.93247

log tan B 9.99810

log(D−f) 1.93438

1.93248

Perpendicular = 85.60

Tuesday May 21 1901

Constants for Cal. Same as on page 176 ~~[illegible]~~
Scale # $1^{mm} = 2''$ Ross Zeiss. Lens
d = 56.239

$c^2 =$ ~~39.212~~ 39.314
$d^2 =$ ~~3.162.9~~ 39.3
$f^2 = 39.314$

c^2+f^2 78.526
$d^2+f^2 =$ 3202.2

log c^2 1.59345
log (d^2+f^2) 3.50545
5.09890

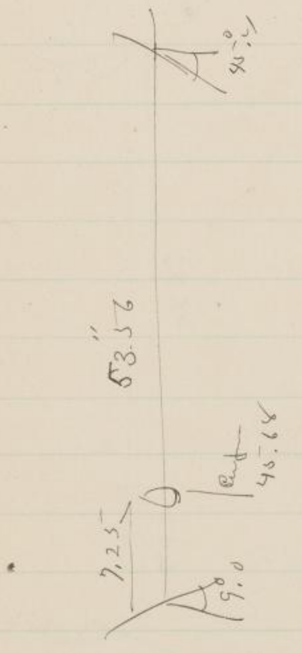
log (c^2+f^2) 1.89402 (5)
2) 3.20388

log b 1.60194
log c 0.79671
.87866 (~~5~~)
log bc 2.39

log(b+c) 1.66512
log$(b+c)^2$ 3.33024 (~~2~~)
log f 0.79727
4.12751 (~~3~~)

log bc 2.39865
log D 1.72886 (~~0~~)

log(b+c) 1.66512
log f. 0.79727
2.46239
log b 1.60194
log f. 0.86045



D = 53.562

f = 7.252
D − f = 46.310

b = 39.989 log c 0.79671
c = 6.262 log d 1.75004
b+c = 46.251 log cd. 2.54675

log f. 0.79727
log b 1.60194
log Cos A 9.19533 A = 81°.0
9°.0

log fb. 2.39921
log cd 2.54675
log Cos B 9.85246 B = 44°.6
45.4

log tan A 0.79927
log f 0.86045
1.65972

log tan B 9.99404
log(D−f) 1.66567
1.65971

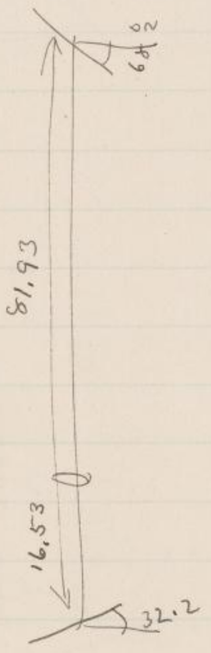
Perpendicular ~~46~~ 45.68

Tuesday May 21 1901

Constants for Eul. Same as p 176.
1mm = 2λ Cooke Lens

c = 6.262   d = 56.239   f = 13.20
log 0.79671   1.7~~4~~5004
1.59342   3.50008
c² = 39.212 (174.24)   d² = 3162.9 (174.2)   f² = 174.24
c² + f² = 213.45   3337.1

log c² 1.5934~~8~~2
log (d²+f²) 3.52337
5.116~~8~~7~~2~~9
log (c²+f²) 2.32929
2) 2.7875~~3~~0
log b. 1.393~~8~~7~~6~~5
log c 0.79671
log bc 2.190~~8~~4~~7~~6
log (b+c) 1.491~~75~~67
log (b+c)² 2.983~~50~~34
log f 1.12057
4.10~~40~~7
39 4 1 6
log bc 2.190~~8~~4~~7~~6
log D 1.913~~8~~4~~0~~5
log (b+c) 1.491~~75~~67
log F 1.12057
2.612~~3~~~~2~~
log b 1.393~~86~~7 4 5
log f 1.218~~40~~49



D = 81.9~~40~~32

f = 16.53~~7~~8
D − f = 65.~~403~~394

b = 24.76~~1~~0
c = 6.262
b+c = 31.02~~4~~2

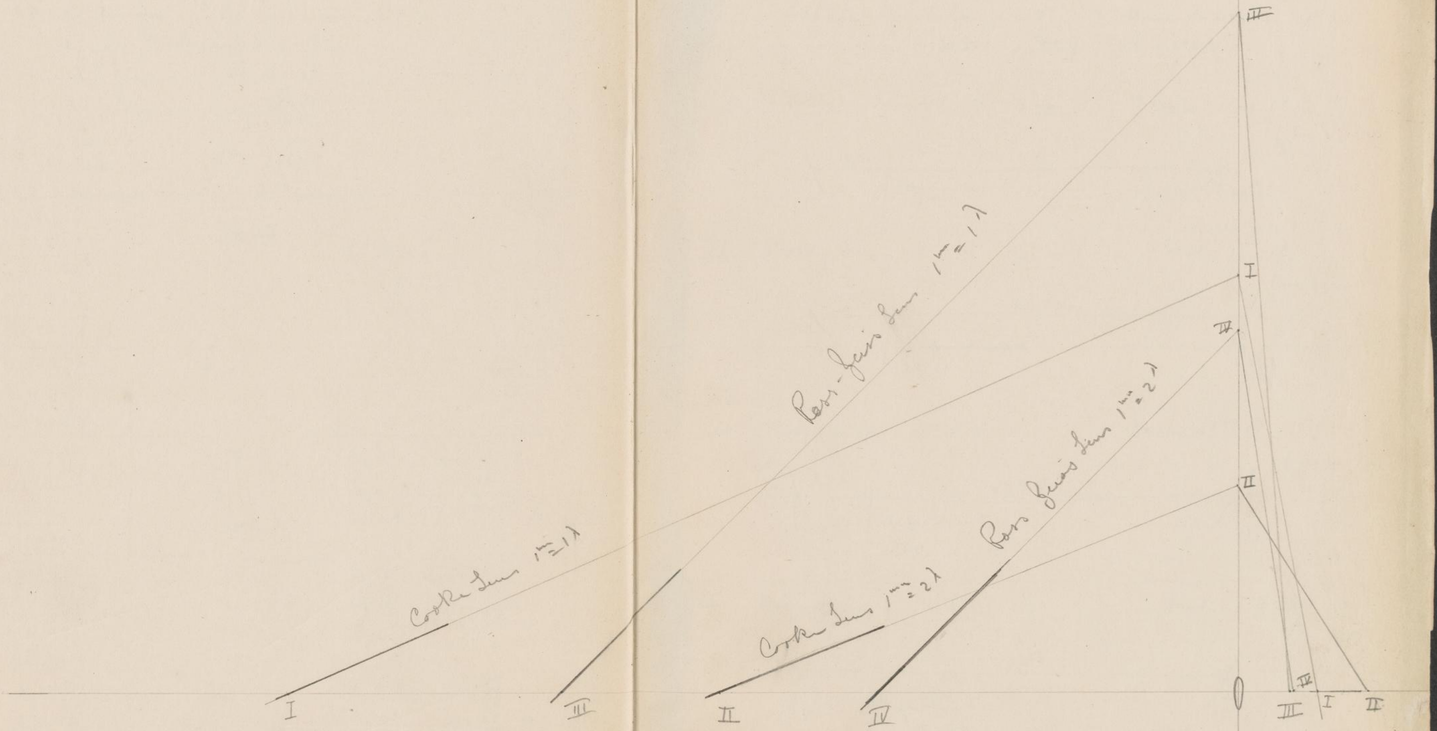
log c
log d
log cd

log f 1.12057 ~~1.24115~~
log b 1.393~~86~~75
log Co A 9.726~~7X~~82   A = 57.8
32.2

log fb 2.514~~48~~32
log cd 2.54675
log Co B 9.967~~68~~57   B = 21.8
68.2

log tan A 0.200~~78~~57
log f 1.2184~~6~~9   Bezuding
1.419 ~~8~~4 06
349
log Tan B 9.60~~2~~ ~~83~~ 69
log (D−f) 1.815~~60~~53
1.41~~8~~ ~~48~~ ~~29~~ 9
= 26.25

α Carinae (Hγ — λ5167)

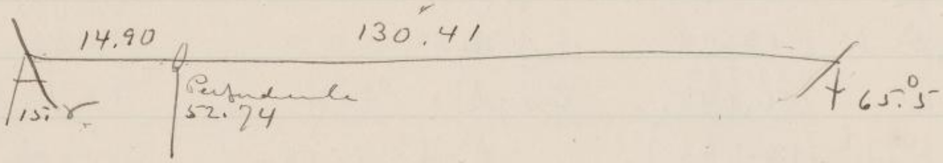


Tuesday May 21 1901

Schemes of Enlargement & Normal scale for α Carinae λ4214 Hγ & λ5167.

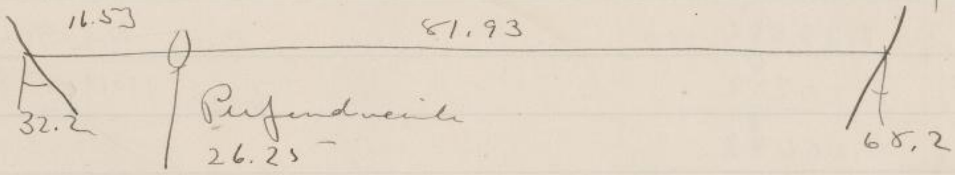
I Cooke Lens f 13″20 Scale 1mm = 1λ

(See p 169)



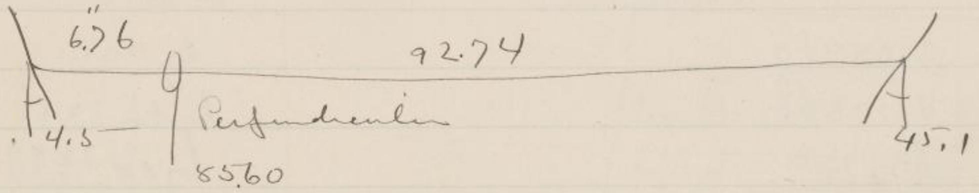
II Cooke Lens f = 13″20 Scale 1mm = 2λ

(See page 178)



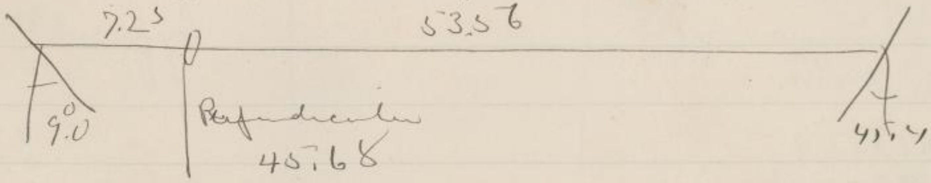
~~III~~
III Ross-Zeiss f = 6″27 Scale = 1mm = 1λ

(See p 176)



IV Ross Zeiss f = 6″27 Scale 1mm = 2λ

(See p 177)



Thursday May 23 1901

Constants for Enl. ~~D~~ Normal Scale (α Canum #V −λ5167 ×8114)
Using Ross Zeiss D, twice enlargement from original Scale 1mm = 1/11

c = 12.524   d = 112.478   f = 6.27
log c = 1.09774
log c² 2.19548   log d²
c² $\overset{39.314}{156.848}$ d²
c²+f² 196.162   d²+f² 12690   f² = 39.314

log c² 2.19548
log(d²+f²) 4.10346
6.29894
log(c²+f²) $2.29\overset{6}{2}52$
2) $4.006\overset{3}{4}2$
log b $2.003\overset{16}{\cancel{21}}$
log c 1.09774
log bc 3.10095
log(b+c) $2.054\overset{05}{\cancel{10}}$
log(b+c)² $4.108\overset{10}{\cancel{20}}$
log f. 0.79727
$4.905\overset{3}{4}7$
log bc 3.10095
log D $1.804\overset{4}{5}2$ D = $63.7\overset{41}{\cancel{55}}$

log (b+c) $2.054\overset{05}{\cancel{10}}$
log f. 0.79727
$2.8513\overset{2}{\cancel{7}}$
log b $2.003\overset{16}{\cancel{21}}$
log f 0.84816   f = $\overset{50}{7.04\cancel{0}}$ / $\underset{691}{56{,}708}$

b = $100.7\overset{30}{\cancel{42}}$ log c 1.09774
c = 12.524   log d $\overset{2.05107}{\cancel{1.75004}}$
b+c = $113.2\underset{54}{\cancel{66}}$ log cd ~~2.84778~~ 3.14881

log f 0.79727
log b $2.003\overset{16}{\cancel{21}}$
log Cos A $8.794\underset{11}{\cancel{06}}$ A = 86.4 / 3.6
~~log~~
log fb $2.8004\overset{3}{\cancel{8}}$
log cd ~~2.84778~~ 3.14881
log Cos B ~~9.95270~~ 9.65162   B ~~63.4~~ ~~26.3~~ ~~63.7~~ 26.6
log tan ~~A~~ $1.20\overset{505}{\cancel{310}}$
log f. 0.84816
2.0532~~6~~ 1
log tan B ~~9.69313~~ 0.29967
log(D−f) $1.753\overset{5}{\cancel{8}}2$
~~1.44675~~
2.05319

Saturday May 25 1901

Constants for enlargement & Carinae (H_γ – λ5167.)
Using Cooke Lens. Normal Scale 1mm = 1Å from Erlangen (2 times) from original.

c = 12.524 d = 112.478 F = 13.20

c^2 = 156.848 (174.24) d^2 = 12651.5 (174 2) F^2 = 174.24

c^2+F^2 = 331.09 d^2+F^2 12825.7

log c^2 2.19546
log(d^2+F^2) 4.10808
6.30356
log(c^2+F^2) 2.51995
2) 3.78361
log b. 1.89180
log c 1.09774
log bc. 2.98954
log (b+c) 1.95650
log $(b+c)^2$ 3.91300
log F 1.12057
5.03357
log bc 2.98954
log D 2.04403 D = 110.669

log (b+c) 1.95650
log F 1.12057
3.07707

log b 1.89180
log f. 1.18527 f = 15.320
95.349

b = 77.947
c = 12.524
b+c = 90.471

log F 1.12057
log b 1.89180
log Cos A 9.22877 A = 80.3
9.7

log Fb 3.01237
log cd 3.14881
log Cos B 9.86356 B = 43.1
46.9

log tan A 0.76491
log f 1.18527
1.95018

log tan B 9.97088
log (D–f) 1.97932
1.95020

Monday May 27 1901

Constants for enl. & Normal Scale (α Carinae Hγ – λ5167)
Cooke Lens. Twice enlargement from original & Scale $1^{m} = 2$tt

Monday May 27 1901

Constant for Ext. to Normal Scale of 1mm = 1d from ~~two~~ Three incl. of α Carinae (Hβ toward Red)

c = 8.750
log c 0.94201
log c² 1.88402
174 240
c² 76.563
c² + f² 250.803

d = 148.35
log d 2.17128
log d² 4.34256
174.2 174
d² ~~2200.7~~ 22007
d² + f² ~~2374.9~~ 22181

f = 13.20
log f. 1.12057
log f² 2.24114
f² 174.24

log c² 1.88402 1.88402
log (d² + f²) 3.37564 4.34598
5.25966 6.23000
log (c² + f²) 2.39933 2.39933
2) 2.86033 2) 3.83067

log b 1.83016 1.91534
log c 0.94201 0.94201
2.37217 2.85735

log (b + c) 1.55236 ~~1.62989~~ 1.95922
log (b + c)² 3.10472 ~~3.25978~~ 3.91844
log f 1.12057 1.12057
~~4.38035~~ 4.22529 5.03901
log bc 2.37217 2.85735
log D ~~1.90818~~ 1.85312 2.18166

151.936
D = ~~80.943~~
~~71.305~~

log (b + c) ~~1.62989~~ 1.55236 1.95922
log f 1.12057 1.12057
~~2.75046~~ 2.67293 3.07979
log b 1.83016 1.91534
log f ~~1.22030~~ 1.24277 1.16445

14.603
f = ~~17.489~~
~~16.607~~
~~64.336~~
~~53.816~~
~~72333~~

b = 26.125 ~~33.897~~ ~~82.29~~ 82.288
c = 8.750 8.75
b + c = ~~42.647~~ ~~35.675~~ 91.038

log c 0.94201
log d 2.17128
log cd 3.11329

log f = 1.12057 1.12057
log b = 1.53016 1.91534
log Cos A 9.59041 9.20523
A = ~~60.6~~ ~~67.1~~ 80.8

log f b 2.65073 3.03591
log cd 3.11329 3.11329
log Cos B 9.53744 9.92262
B = ~~74.1~~ ~~69.8~~ = 33.2

log tan A ~~0.37389~~ 0.24986 ~~0.78829~~ 9.08858
log f ~~1.22030~~ 1.24277 1.16445
log θ ~~1.59419~~ 1.49263 ~~1.95274~~ 1.95353

to
log tan D ~~0.43509~~ 0.54564 ~~9.81589~~ 9.81577
log (D − f) ~~1.30845~~ 1.23391 2.13778
~~2.24354~~ 2.27655 ~~1.94367~~ 1.95355

89.8

Friday May 31 1901

Examination of Principles involved in Transforming Normal Scale of Spectra to a Reciprocal One.

log 3900 3.59106
log 4900 3.69020
7.28126

X

3900 to ~~$~~4900

by m =

$y = \frac{m}{X}$

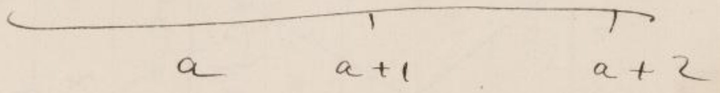
~~log~~

X = 3900	4000	4100	4200	4300	4400	4500	4600
	7.28126	7.28126	7.28126	7.28126	7.28126	7.28126	7.2812
	3.60206	3.61278	3.62325	.63347	3.64345	.65321	3.6627
	3.67920	3.66848	3.65801	3.64779	3.63781	.62805	3.6185
y = 4900	4778		4550		4343		4154

4700	4800
7.28126	7.2812
67210	3.681
3.60916	3.600

398

X	y	
3900	4900	
4000	4778	
4100	4661	
4200	4550	
4300	4444	
4400	4343	
4500	4247	96
4600	4154	93
4700	4066	88
4800	3981	85
4900	3900	81



$$\frac{1}{a} - \frac{1}{a+2} = \frac{2}{a(a+2)} =$$

$$m - a(a+2)$$

$$\frac{m}{a}(a+2) - (a) = 2$$

$$a+1 \overline{\big) a^2+2a} \big(a+1 - \frac{1}{a+1}$$

$$a^2 + a$$

$$a$$

$$a+1$$

Friday May 31 1901

Examination of Principles involved in Transforming Normal Scale of Spectra to a Reciprocal One.

log 3900 3.59106
log 4900 3.69020
7.28126

X

3900 to 4900

by m =

$y = \frac{m}{X}$

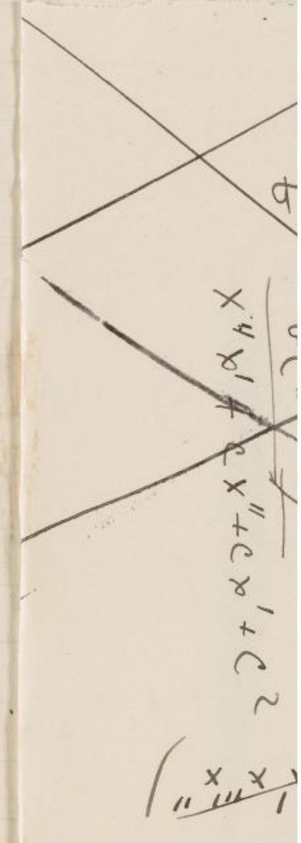
~~log~~

X = 3900	4000	4100	4200	4300	4400	4500	4600
	7.28126	7.28126	7.28126	7.28126	7.28126	7.28126	7.2812
	3.60206	3.61278	3.62325	.63347	3.64345	65321	3.6627
	3.67920	3.66848	3.65801	3.64779	3.63781	.62805	3.6185
y = 4900	4778		4550		4343		4154

4700	4800
7.28126	7.28126
.67210	3.68124
3.60916	3.60002

3981

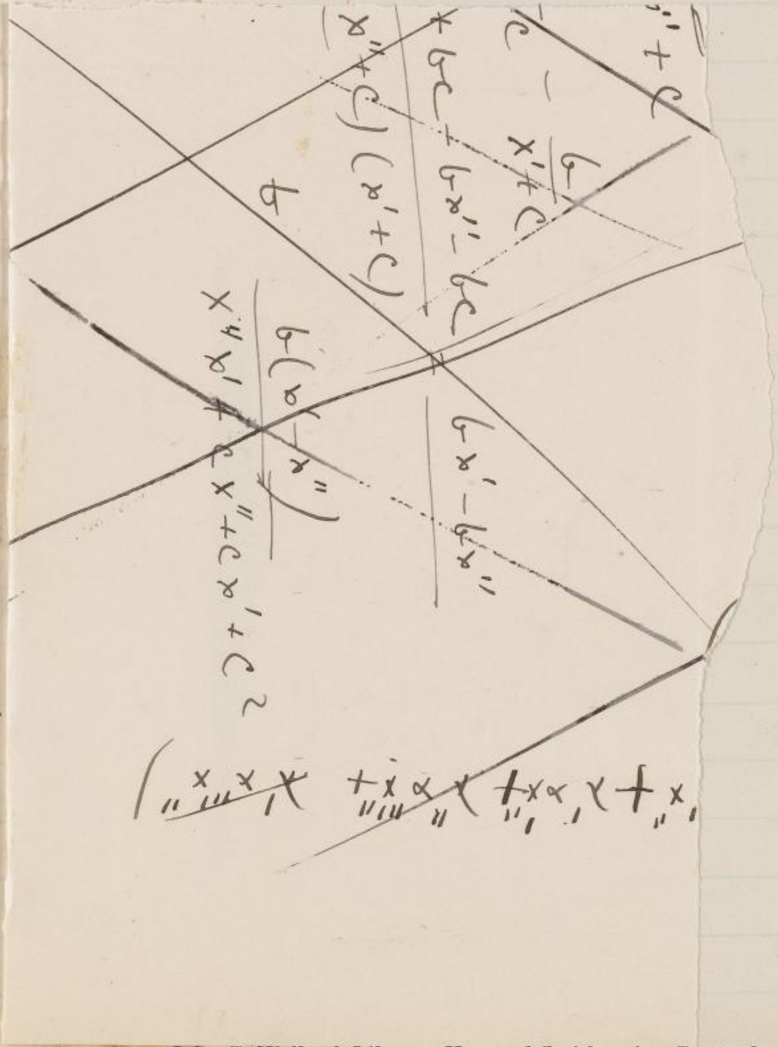
x	y		
3900	4900		
4000	4778	122	
4100	4661	117	5
4200	4550	111 ~~106~~	6
4300	4444	106 ~~101~~	5
4400	4343	101 ~~96~~	5
4500	4247	96	5
4600	4154	93	3
4700	4066	88	5
4800	3981	85	3
4900	3900	81	4



ransforming
al one.

4500 46
7.28126 9.2812
65321 3.6627
62805 3.61850

4154



Thursday June 20 1901

Discussion of Measures of Shade Glass. See Ph. Book II p 43-127

		1 ~~4~~ I	2 ~~42~~ II	3 ~~2~~ III	4 Mean	5 ~~IV~~ Red Glass. ~~Residuals~~	6	7 V Blue Glass
*	1	—	0.86	0.87	0.86	0.82	+0.04	0.87
*	1..	0.90	0.89	0.88	0.89	0.86	0.03	0.87
*	.....	0.86	0.88	0.85	0.86	0.80	.06	0.87
	1....	0.92	0.88	0.94	$0.9\overset{(1)}{\cancel{2}}$ [2]	0.86	$.0\overset{5}{6}$	0.92
*	...	0.89	0.90	0.84	0.88	0.85	.03	0.87
*	1...	0.85	0.84	0.84	0.84	0.81	.03	0.82
	1.	0.89	0.91	0.89	$0.\overset{9}{\cancel{8}}0$	0.84	.06	0.88
	..	0.89	0.88	0.90	0.89	0.86	.03	0.87
	....	$0.\overset{92}{\cancel{88}}$	0.91	0.90	0.91	0.84	.07	0.88
	1.....	0.88	$\overset{0.88}{\cancel{44}}$	0.92	0.89	0.84	.05	0.90
*	......	0.90	0.89	0.88	0.89	0.80	.09	0.86
*	—.—	0.82	0.85	0.84	$0.8\overset{4}{\cancel{3}}$ [3]	0.82	$.0\overset{2}{\wedge}$	0.84
		92	97	95	96	40	12/56	65 75
		~~0.89~~						
		~~0.88~~	~~0.88~~	~~0.88~~		~~0.~~	$0.04\overset{7}{\cancel{8}}$	
Means.		0.884	0.881	0.879	0.881	0.833		0.862
					Diff	0.048		0.019

I Measures (p 43-57) means of ~~20~~ 16 settings each direct
II " (p 64-68) " " 8 Settings "
III " (p 67-73) " " 8 " "
IV " (p 99-111) " " 16 " Red Glass interposed
V " (117-127) " " 16 " Blue " "
VI " (74-85) " " 16 " Measures 2 at a time.

* accepted ~~as~~ for use. "1" is used in Ast. Telescope.

Thursday June 20 1901

8	9	10	11
	VI	Derived from 4th column	(9)-(10)
| + |··	1.76	1.75	+.01
|·· + ·····	1.76	1.75	+.01
····· + |····	1.80	1.77 [8]	+.03 [+2]
|···· + ···	1.79	1.79 [180]	00 [-1]
··· + |···	1.73	1.72	+01
|··· + |·	1.71	1.74	-03
|· + ··	1.77	1.79	-02
·· + ····	1.79	1.80	-01
···· + |·····	1.81	1.80	+01
|····· + ······	1.79	1.78	+01
······ + —·—	1.72	1.73 [2]	-01 [0]
—·— + |	1.68	1.70 [169]	-$\overset{0}{\cancel{2}}$2 [-1]
12)	71		+08 [+07] -09 [-09]
2/	1.759		
	0,880		
	~~0.880~~		

Results.			
I	176	Settings	0.884
II	96	"	0.881
III	96	"	0.879
~~IV~~ VI	192	"	0.880
	560		

~~From~~ On sheet entered at page 174 of Pol. Phot. Book II as the result of 488 settings: on Shade Glass 1, a value of 0.880 is found.

Mean of 560 Settings. = 0.881

Mean of 488 Settings on "1". = 0.880

Interposition of red glass affects result by 0.048

" blue " " " 0.019

Thursday July 18 1901

A.H.A. of Objects at altitude of $42\frac{4}{5}$

Dec	H.A
−5	0^h 50^m
0	1 34
+5	2 12
+10	2 38
+15	3 02
20	3 20
25	3 38
30	3 52
35	4 06
40	4 19
45	4 30
50	4 42
55	8
60	5 02
65	
70	5 22
75	
80	5 40
85	
−02	1 16
−03	1 03
−04	0 44
+02	1 52

Saturday July 20 1901

Meaning of C 13389
Special Clock Rate.

Dec +2.5 Sel. 2. ~~HA~~

~~HA~~ ~~2~~ 1h — 2h W

0.7 1.54
2.04 .50 ~~3~~ 4.00
2.53 .49 3.92
3.03 .50 4.00
4/6 3.52 .49 3.92 } 139 —
1.98 1.98
2
~~2.76~~
3.96
22.2
798
798
798
88.578
50
139.

196
2
392

22.2
.04
.888

48
49
97

47
46
93

48
46
94

42
8

336
222

876
222

360
222

672
672
692

24592
50
125.

388
22
776
776
776
86.136
50
136

76
76
76
8436
50
134.

9072
7552
7552
7552
63472
50
133

~~HA~~ 2 → 0 W

0.28
0.70 0.42
1.17 0.47
1.65 0.48
2.14 0.49
~~4~~
1.86

3.70
222
74
74
74
82.14
50
132

0.76
1.24 .48
1.72 .48
2.18 .46
2.60 .42 2nd
1.84

Thursday July 25 1901

Measured lines of Spectrum of Meteor on D5164 using scale D6053
Lines rather faint. Therefore I dotted position with ink.

~~2.3~~	2.15		0.68		1.25	
~~3.1~~	3.06	.91	1.50	.92	2.14	.89
~~4.9~~	4.40	2.25	2.98	2.30	3.52	2.27
~~5.4~~	5.40	3.25	4.10	3.42	4.69	3.44
	6.25	4.10	4.76	4.08	5.50	4.25

Mean	0.00	0.00
	0.91	1.82
	2.27	4.54
	3.37	6.74
	4.14	8.28

Distances in m.m on D 8426 Spectrum of Lightning

0.0
13.6
28.5
39.2
49.5
57.8
67.8
73.8
78.0
96.0
99.0

Friday Sept 6 1901

Measured Contacts of Yerkes wedge

E 6624

no	in	in
9	0.6	0.6
5	1.7	1.8
3	2.5	2.5
7	1.1	1.2

3	2.0
5	1.2
1	2.4 ~~1.2~~
7	0.5 —

	2.0		3.0	4.0
9	0.6	0.6		
7	1.1	1.2	0.5	
5	1.7	1.8	1.2	0.5
3	2.5	2.5	2.0	1.4
1	—	—	2.4	1.8

5	0.5	0.4
1	1.8	2.0
3	1.4	1.5

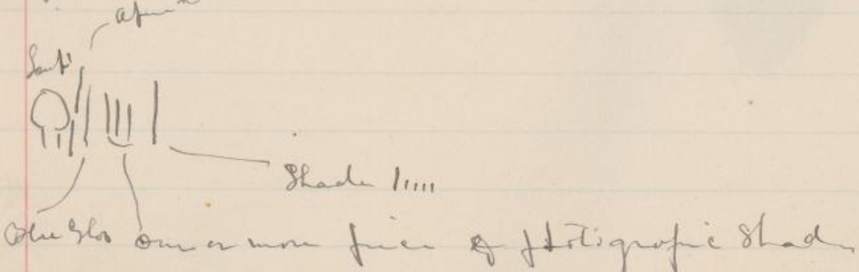
Tuesday Sept 10 1901

Measures of Yerkes wedge in Rumford Photometer

An artificial star was placed on enlarging pier of ~~the~~ Enl. Room, formed by a small electric lamp (such as are used in the photometers) behind a small aperture. The light was modified by interposing a piece of blue glass, & strips of photographic plate darked by exposure to light & development.

The Photometer was set up on the bench near the door going into the darkroom. The Cooke Lens (old) was used to project the light from the artificial star. The lens was held in place by ~~wrapping~~ winding it with paper & inserting it in end of photometer tube.

The two light were now compared with & without interposing Shade Glass 1.... just in front of aperture admitting the light.



Tuesday Sept 10. 1901.

Colson Rec.

5 09 25.0
25.2
25.7 Mean 24.4
22.4
23.7
22.0

Shade glass in.

33.0
26.0
30.0 Mean 28.7
28.4
26.1
43.5

Diff = 4.3 = 0.9 (2.1
86
40

Colson Redd. King recorded.

25.4
26.1
21.4
22.5 Mean 2.35
22.3
17.7

34.8
29.8
28.0 Mean 2.94
27.3 Diff 0.59
27.1
470

Tuesday Sept, 10 1901.

26.4
~~16.3~~
25.8
26.1
28.2
27.9
34 4

Mean = 2.79

21.3
27.4
25.8
24.1
24.2
22.8

Mean = 2.46
Diff 0.33

No good.

Wednesday Sept 11 1901

Same apparatus used as yesterday.

Cooke Lens = F/32

Ground Glass & Blue glass removed from Photometer.

Eye Stop provided for eye piece.

A piece of blue glass & also a photographic shade in front of artificial Star

	Measures	McCullar Rec.
3h 32.8	47.2	
	47.7	32.2
	44.0	Mean = 46.4
	46.7	
3h 36.8	47.6	

Shade Glass in

39.5	58.2	
	58.0	
	59.7	46.7
	60.3	Mean = 59.3
42.8	60.5	46.4
		Diff = 12.9

Wednesday Sept 11 1907

E.T.

~~Time 3.25.5~~

~~45.1~~

~~46.2~~

~~Photographic~~
Refractor.
Shade 1'''' in.

3h 48.6 61.0 +2.9
54.2 −3.9
55.1 −3.0 Mean 58.1
56.8 −1.3
52.2 63.2 +5.1
40.3
80 82 5)16.2
±3.2

54.4 Shade Glass 1'''' Out

50.0 +2.1
51.0 +3.1
44.3 −3.6 Mean 47.9
47.0 −0.9
59.4 47.2 −0.7 Diff 10.2
39.5 +5.2 52
5)10.4
±2.1

	Av. Dev.
58.1	± 3.2
47.9	± 2.1
10.2	

1899phae.pmoj..925K

Wednesday Sept 11 1901

Change of Photographic Shade.

4^h 4.9 33.3 +1.1
31.3 −0.8
29.3 −2.8 ~~+0.4~~
33.9 +1.8 Mean = 32.1
7.7 32.6 +0.5
10 4 3.4 −3.6
5)7.0
±1.4

9.0 39.1 −1.5
42.0 +1.4
39.9 −0.7 Mean = 40.6
40.8 +0.2 8.5
11.5 41.5 +0.9 Diff =
3.3 2.5 2.2
5)4.7
0.9

Av. Dev.
32.1 ± 1.4
40.6 ± 0.9
8.5

Wednesday Sept 11 1901

Same as preceding page

4h. 15.5 41.6 +1.6 Av. Dev.
38.9 −1.1
43.1 +3.1 Mean 40.0 ± 1.8
37.5 −2.5
19.5 39.1 −0.9
50 2 4.7 4.5
5)9.2
±1.8

20.7 33.9 +1.6
34.7 +2.4
31.0 −1.3 Mean 32.3. ± 1.9
33.0 +0.9 ~~−0.7~~ 7.7.
23.3 28.9 −3.4
11.5 +4.7. 4.7
5)9.4
±1.9

Wednesday Sept 11 1901

Change of photographic shade.

39.7	39.0	+1.3		
	36.3	−1.3		
	36.5	−1.1		Av. Dev.
	40.0	+2.4	Mean 37.6	± 1.5
43.0	36.3	−1.3		
	38.1	3.7 37		
		5/74		
		±1.5		
44.0	48.4	+0.1		
	47.8	−0.5		
	49.0	+0.7		
	49.6	+1.3	Mean 48.3	± 0.8
47.8	46.8	−1.5	10.7	
	41.6	2.1 20		
		5/41		
		±0.8		

Wednesday Sept 11 1901

Refraction

h.
4.52.0 45.2 + −1.3 Av. dev
47.3 +0.8
45.5 −1.0 Mean 46.5 ±1.0
47.0 +0.5
56.1 47.7 +1.2
32.7 25 23
5|48
±1.0

57.3 37.9 −0.5
37.5 −0.9
39.7 +1.3 Mean 38.4 ±0.7
38.1 −0.3 Diff 8.1
59.8 39.0 +0.6
42.2 +1.9 −17
5|36
±0.7

Wednesday Sept 11 1901

Repealist

5^h 4.5 39.1 0
42.4 +3.3 Av. Dev.
38.5 −0.6
38.5 −0.6 Mean 39.1 ± 1.3
7.5 36.9 −2.2

45 4 3.3 3 4
5)6.7
±1.3

9.1 47.9 +0.7
48.3 +1.1
43.3 ~~−4.~~ 3.9 Mean 47.2
47.8 +0.6 ± 1.6
11.7 48.8 +1.6 Diff 8.1

36.1 4.0 3.9
5)7.9
±1.6

Wednesday Sept 11 1901

Refractor

5^h 16.4 44.1 ~~-~~ -1.5
47.9 ~~+2.3~~ +1.3
46.2 +0.6 Av. Dev.
45.1 -0.5 Mean = 45.6 ± 0.8
22.4 44.7 -0.9
280 ~~2~~ 1.9 19
5)38
±0.8

22.7 38.0 -0.2
37.1 -1.1
37.1 -1.1 Mean = 38.2 ± 1.0
38.9 +0.7 Diff 7.4
26.4 39.9 1.7
41 0 2.4 24
5)48
~~0.~~ ±1.0

Wednesday Sept 11 1901

Repeated with shade glass set further from aperture.

32.4 47.6 +1.5 Av. Dev.
45.2 −0.9
45.2 −0.9 Mean = 46.1 ± 1.0
47.3 +1.2
37.2 46.4 −07
30.7 27 25
5|52
±1.0

37.5 39.3 +2.5
35.4 −1.4
35.6 −1.2 Mean = 36.8 ± 1.4
37.9 +1.1 Diff = 9.3
40.6 35.9 −0.9
34.1 36 35
5|71
±1.4

Thursday Sept 12 1901

Same apparatus as used on preceding pages. Adjusted more carefully.

A single piece of blue glass used over artificial star.

Shades. 1...., 1..... & ..
Measures.

McCullum Recorded.

4h 9.3	42.1	0			
	40.6		−1.5		
	42.1	0			
	43.8	+1.7			
11.6	41.9		−0.2		av. dev.
	10 5	1.7	1.7	Mean 42.1	± 0.7
		5|34 ± 0.7			

Shade 1..... Removed

16.4	36.4	+0.1			
	35.9	+0.6			
	36.1	+0.8			
	35.0		−0.3		
19.2	34.2		−1.1		
	26.6	+1.5	−1.4	Mean 35.3	± 0.6
		14 5|29 ± 0.6			

Thursday Sept 12 1901

Shade " Removed.

21.1 23.5 −1.1
23.1 −1.5
24.0 ~~+0.6~~ −0.6
~~22.1~~ ~~+2.0~~
26.6 ±2.6 2.0
25.0 26.0 ~~+2.0~~ 1.4
23 2 ~~3~~ 2 26
34 32
40 5)6.6
±1.3

Mean 24.6

av dev ± 1.3

Shade 1'''' Removed

26.2 17.3 ~~+2.2~~ +1.2
15.2 ~~+0.1~~ −0.9
16.3 ~~+1.2~~ +0.2
15.5 −0.6
30.2 16.3 +0.2
30.6 1.6
5)3.1
±0.5

Mean 15.1 ±0.5

Thursday Sept 12 1901

Shade Glasses in

$4^{h}\,50^{m}.8$ 43.9 +0.3
44.0 +0.4
43.9 +0.2
41.9 −1.7
53.7 44.1 +0.5
17.8 +15 −17
17
5)32
±0.6

Mean 43.6

Shade " Removed

56.5

33.0 −0.1
36.4 +3.3
30.8 −2.3
33.9 +0.9 −1.9
59.7 31.2
15 3 42 4.3
43
5)85
±1.7

Mean 33.1

Thursday Sept 12 1901

Shade 1'''' removed

5h. 1.8 23.0 -0.1
25.3 +2.2
24.9 +1.8
21.4 -1.7
5.0 21.1 $-\overset{2}{1}.0$
15.7 4.0 38
38
5)78
±1.6

Mean 23.1

Shade 1'''' Removed

6.2 17.2 -0.5
17.0 -0.7
18.0 +0.3
18.1 +0.4
8.3 18.3 +0.6
386 +13 -1.2
12
5)25
±0.5

Mean 17.7

Thursday Sept 12 1901

all shades in.

5h 29.8 40.1 −0.9
41.8 +0.8
41.9 +0.9 av dev. ± 0.7
~~40.9~~
40.3 −0.7
35.0 41.0 0
5.1 17 16 Mean 41.0
5)33

Shade " Removed

36.6 37.1 +0.4
35.2 −1.5
36.0 −0.7 av dev ± 0.9
37.0 +0.3
38.3 38.3 1.6 ~~+0.5~~
33.6 ~~+1.2~~ −2.2 Mean 36.7
−2.3
5)4.5

Thursday Sept 12 1901

Shade 1'''' removed

39.2 21.6 -0.~~7~~9
21.6 -0.~~7~~9
23.9 +1.~~6~~4
22.5 +0.~~2~~0
41.4 22.7 +0.~~4~~2
11.~~7~~ +~~2.2~~ -18
+16
5)34

Av. Dev. ± 0.7

Mean 22.~~3~~5

Shade 1''''' removed

42.5 ~~14.2~~
~~18.0~~
~~13.1~~
~~16.2~~ repeated
~~14.8~~
26.3

~~Mean 15.3~~

45.6 14.3 -1.9
16.5 +0.1
19.1 +2.7
18.8 +2.4
47.6 13.3 -3.1
32.0 52 .50
+102

av. Dev ± 2.0

Mean 16.4

Thursday Sept 12 1901

Shade glasses all in

48.0 43.7 −1.0
45.3 +0.6
42.3 ~~−2.4~~ −2.4 Av Dev. ± 1.4
46.9 +2.2
51.3 45.3 +0.6
223.5 3.4 3.4 Mean 44.7
5|68

Shade glasses all removed

51.5 17.9 +0.$\overset{2}{4}$
15.9 −1.$\overset{8}{6}$
19.2 +1.$\overset{5}{7}$ Av Dev ± .0.8
17.6 +0.1 −0.1
53.5 18.0 +0.3
88.6 20 −1.9 Mean 17.$\overset{7}{8}$
5|39

Friday Sept 13 1901

Table of means pp 204-210.

Shades removed	Mean I	av. Dev.	Diff.
	42.1	± 0.7	
1	35.3	± 06	6.8
"	24.6	±1.3	10.7
1	16.1	± 0.5	8.5
1st & last	26.0		

	II			III		Diff
	43.6	±0.6		41.0	± 0.7	
"	33.1	± 1.7	10.5	36.7	± 0.9	4.3
1....	23.1	±1.6	10.0	22.5	± 0.7	14.2
1.....	17.7	±0.5	5.4	16.5	± 2.0	6.0
1st & last	25.9			24.5		

	IV	
	44.7	±1.4
	—	
	—	
", 1...., 1.....	177	± 0.8
1st & last	27.0	

26.0
25.9
24.5
27.0
4) 23 4
3) 25.8 =
8.6 = $0.^{m}9$

1 dw. = 1/25" = 0.105 mag.

Friday Sept 13 1901

Same Apparatus as in previous pages.

arrangement
~~Adjustment~~ the same as for yesterday

Shades:: 1,,, & 1,,,,, in

2 58

45.0
42.9
43.0
42.0
3 02 41.7
146 Mean 42.9

Shades out
3 04 14.9
15.3
16.4
18.5
18.2
3 09 33.3

Mean 16.7

Diff 26.2

Friday Sept 13 1901

Shades out.

3 11 14.9
17.8
15.5
17.1
17.2
3 15 32.5 Mean 16.5

Shades in

3 16 45.9
45.0
42.1
46.0
45.1
3 21 241 Mean 44.8

Diff 28.3

Friday Sept 13 1901

Set Shade glass very near to lens.

3 40 47.1 +0.5
46.2 −0.4
45.5 −1.1
47.7 +1.1
3 45 46.3 −0.3
328 +1.6 −1.8

Mean 46.6

3 47 46.3
43.8
46.5
45.9
3 53 46.4
289

Mean 45.8

2/ 92.4
46.2
220
24.2 = 2.^{m}7

Shades removed

3 54 19.9

22.1

22.8

23.3

3 58 20.1

18 2 Mean 21.6

3 58 24.5

21.2

20.4

21.3

4 02 24.0

114 Mean 22.3

2/ 43 9

2.20

46.6
21.6
25.0

45.8
22.3
23.5

Friday Sept 1~~2~~3 1901

Wave Lengths of Lightning Spectrum. I —
C. Sm no

		x
Hβ*	75223	
Hγ	77799	+ 257
Hδ	79554	+ 433
	~~1755~~	~~175~~

log y
2.716671 n
1 0 9 4 6
3.4~~27486~~
9.~~289185~~ n
.305725

−520.8 — 0.~~+~~ 20
−759.7 — 0.17
+238.9 — ~~0.0+~~ 0.02

2.378216
427551
~~8.283505~~
3 950665
4.~~094711~~
305725
9.~~289185~~

c =
~~4.094~~
3.9501
9.2440

~~−75223~~
~~+12437~~
~~−62786~~

~~3.383896~~
3.256390

~~4.3387~~
3.1947

−75223
+8926
−66297
- ---- -

~~2420.4~~ +
1804.6
520.8

~~2181.~~
1565.
759.

d = ~~2941 2~~
2325.4

~~2941~~
2325

log ~~g~~d = ~~3. 468532~~
log c = ~~4.094911~~
log cd ~~7.563243~~
3.366498
3.950665
7.317163

λ0 =
2536.1

Hβ	Hγ	Hδ
75223	77799	79554
66297	66297	66297
89~~3~~26	11502	1325.7
7.31716	7.31716	7.31716
3.95066	4.06077	4.12244
3.36650	3.25639	3.19472
~~2326~~ ~~235~~ 2325.4	1804.6	1565.7
2536.1	2536.1	2536.1
4861.5	4340.7	4101.8

Prof.

28) ~~21~~ ~~206~~ (8
2~~8~~) 21 (75
~~196~~
140

Friday Sept 1~~7~~ 3 1901

Wave Lengths of Lightning Spectrum. I —
C. Sm no 17 + 174

		x	λ	y
Hβ*	75223		4861.5	
Hγ	77799	+ 2576	4340.7	− 520.8
Hδ	79554	+ 4331	4101.8	− 759.7
	1755	~~1755~~	~~238.9~~	~~238.9~~

log y

2.716671 n	2.880642 n
1 09 46	
3.4~~7~~7486	3.636588
9.~~289185~~ n	9.244054 n
.305725	

−520.8 — 0.~~194619~~ 202174

−759.7 — 0.175410

+238.9 — ~~0.019209~~ C = 0
0.026764

~~−75223~~
~~+12437~~
~~−62786~~

−75223
+8926
−66297
- ----

2.378216
427551
~~8.283505~~
3.950665
4.~~094711~~
305725
9.~~289185~~

~~3.383896~~
3.256390

~~2420.4~~ +
1804.6
520.8

d = ~~2941.2~~
2325.4

C = ~~12437~~ 8926

4.094711
3.950665
9.244054

~~4.338765~~
3.194719

~~2181.6~~ −
1565.7
759.7

~~2941.3~~
2325.4

log gd = ~~3.468532~~
log c = ~~4.094711~~
log cd ~~7.563243~~
3.366498
3.950665
7.317163

λβ = 4861.5
− ~~2941.2~~ 2325.4
λ0 = ~~1920.3~~
2536.1

~~Hβ Hγ H~~
~~75223 77799 7~~
~~−62786 62786 6~~
~~+12437 15013 1~~
~~7.56924 7.56324~~
~~4.09472 4.17647~~
~~3.46852 3.38677~~
~~41.2~~
~~2920.9 2436.5~~
~~1920.3 1920.3~~
~~4861.5 4356.8~~

Friday Sept 13 1901

Reduction of Lightning Wavelengths
C. Sm No 17 ~~Pl~~ page 175

	x		λ	y
Hβ	73323		—	
Hγ	75898	+ 2575	—	−520.8
Hδ	77550	+ 4227	—	−759.7
	~~1652~~	~~1652~~		

2.716671 n
3.410777
9.305894 n

2.880642 n
3.626032
9.254610 n

−0.202252
−0.179726
0.022526

2.378216
8.352684
4.025532
9.305894
3.331426

73323
10606
62717

C = 10606

4.025532
9.254610
3.280142

73323	75898	77550
62717	62717	62717
10606	13181	14833
7.451360	7.451360	7.451360
4.02555	4.11994 / 5	4.17122 / 3
3.42581	3.33412	3.28013
2665.7	2149.9	1906.0
~~2665.8~~	2195.7	2195.7
4861.5	~~4245.6~~ ~~4335.6~~ 4345.6	4101.7

21.4
2144.9
2195.7
4340.6

2145.0
520.8
d = 2665.8

1906.1
759.7
2665.8

log d = 3.425828
log c = 4.025532
log cd 7.451360

4861.5
2665.8
2195.7

Friday Sept 13 1901

21h + Lightning Spectrum Wave Lengths C. Sm No 17 & 176

x

Hβ	59452	
Hγ	61974	2522
Hδ	63553	4101
	~~1579~~	~~1579~~

2.716671 n
3,401745
9.314926 n

2.880642 n
3.612890
9.267752 n

− 0. 206533 (0 above the 3)
− 0. 185248
+ 0.0212555

59452
11240
−48212

2.378216
8.327461
4.050755
9.314926
3.365681

c = 11240

4.050755
9.267752
3.318507

2321.0
520.8
d = 2841.8

2082.1
759.7
2841.8

log. d 3.453594
log c 4.050755
log cd. 7.504349

4861.5
2841.8
2019.7

59452	61974	63553
48212	48212	48212
11240	13762	15338 41
7.504349	7.504349	7.504349
4.050766	4.138682	4.185769 854
3.453583	3,365667	3,318580 ~~595~~ 495
2841.7	2321.0	2082.5
2019.7	2019.7	2019.7
4861.4	4340.7	~~4102.2~~ 4101.8

Saturday Sept 14 1901

Apparatus for testing Yerkes wedge.
Arrangement about the same as when used
last. (See p. 214) . Blue glass not used.

Shades placed near to Crooke lens. i.e.
a paper aperture is fitted over lens & this is
covered by shade glass. . Aperture of lens 7/32
Shade glasses in '' , /'''' , /'''''

5 34 41.7
40.5
42.1
40.8
41.2
63 Mean 41.3

Shades removed
15.0
18.0
17.2
13.6
19.0
328 Mean 16.6

again
16.9
15.7
15.2
15.7
5 48 16.0
295 Mean 15.9

16.2
Dif 25.1

Saturday Sept 14 1901

7 44 Shade Glasses in

~~41.4~~
~~42.6~~
~~41.8~~
~~42.5~~
44.8 Interruption
Light turned off between.

7 54 44.8
46.1
44.1
42.4
45.9
23.3 Mean 44.6

'' Removed.

36.3
36.9
36.0
35.1
35.9 36.0
302

1'''' Removed

23.2
25.6
26.4
25.4
26.4

270

25.2

1''''' Removed

8.0

18.6
19.3
22.3
18.6
17.0

358

Mean 17.2

Repeated.

44.6
18.2

26.4

20.3
19.3
18.3
20.0
18.3

462

Mean 19.2

873

1899phae.proj..92SK

C. S. m. no. 17. page 174

M	72154	72917	73769	74094	74608	74930	75223	75691	76160
	5957	6620	7472	7797	8311	8633	8926	9394	9863
	3.767675	3.820858	3.873437	3.891928	3.919653	3.936162	3.950657	3.972851	3.994009
	3.549488	3.496305	3.443726	3.425235	3.397510	3.381001	3.366506	3.344312	3.323154
	354~~3.9~~ 4.0	3135.5 ✓	2778.0 ✓	2662.2 ✓	2497.5 ✓	2404.~~3~~ 4	232~~0.4~~ 5.4	2209.6 ✓	2104.5 ✓
	6080.~~0~~ 1	5671.6	5314.1	5198.3	5033.6	4940.~~4~~ 5	48~~56.5~~ 61.5	4745.7	4640.6

M	76746	77264	77799	78332	78680	79202	79554	79997	80381
	10449	10967	11502	12035	12383	12905	13257	13700	14084
	4.019075	4.040088	4.060773	4.080446	4.092826	4.110758	4.122445	4.136721	4.148726
	3.298088	3.277075	3.256390	3.236717	3.224337	3.206405	3.194718	3.180442	3.168437
	1986.5 ✓	1892.7 ✓	1804.6 ✓	1724.7 ✓	1676.2 ✓	1608.4 ✓	1565.7 ✓	1515.1 ✓	1473.8 ✓
	4522.6	4428.8	4340.7	4260.8	4212.3	4144.5	4101.8	4051.2	4009.9

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1	80823	81093	81579	82040
	14526	14796	15282	15743
	~~18037~~	~~18307~~	~~18793~~	~~19254~~
	4.162146	4.170144	4.184180	4.197087
	3.155017	3.147019	3.132983	3.120076
	✓	✓	✓	✓
	1429.0	1402.9	1358.3	1318.5
	3965.1	3939.0	3894.4	3854.6

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1	70250	71032	71790	72184	72710	73323	73817	74235	76187
	7533	8315	9073	9467	9993	10606	11100	11518	12470
	✓	✓	✓	✓	✓	✓	✓	✓	✓
	3.876968	3.919862	3.957751	3.976212	3.999696	4.025552	4.045323	4.061377	4.095866
	3.574392	3.531498	3.493609	3.475148	3.451664	2 3.4~~7~~5808	3.406037	3.389983	5 3.3~~6~~5494
	✓	✓	✓	✓	✓	✓	✓	✓	✓
	3753.1	3400.2	3116.1	2986.4	2829.2	2665.7 ~~2727.8~~	2547.0	2454.6	2320.0
	5948.8	5595.9	5311.8	5182.1	5024.9	61.4 49~~23.5~~	4742.7	4650.3	4515.7
	5								
	3948.8	5595.9	5311.8	5182.1	5024.9	4861.4	4742.7	4650.3	4515.7

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75898	76379	76678	76916	77200	77550	78051	78471	78801
13181	13662	13961	14199	14483	14833	15334	15754	16084
4.119948 ✓	4.135614 ✓	4.144917 ✓	4.152258 ✓	4.160859 ✓	4.171229 ✓	4.185655 ✓	4.197391 ✓	4.206394 ✓
3.331412	3.315846	3.306443	3.299102	3.290501	3.280131	3.265705	3.253969	3.244966
2144.9 ✓	2069.4 ✓	2025.1 ✓	1991.1 ✓	1952.1 ✓	1906.~~1~~0	1843.8 ✓	1794.6 ✓	1757.~~7~~8
4340.6	4265.1	4220.8	4186.8	4147.8	4101.~~8~~7	4039.5	3990.3	3953.4
4340.6	4265.1	4220.8	4186.8	4147.8	4101.7	4039.5	3990.3	3953.5

79068	79520	80053	
16351	16803	17336	✓
4.213544 ✓	4.225387 ✓	4.239949 ✓	
3.237816	3.225973	3.212411	✓
1729.1 ✓	1682.6 ✓	1630.8 ✓	
3924.8	3878.3	3826.5	
3924.8	3878.3	3826.5	✓

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56566	57342	58022	58456	58900	59452	59806	60416	61334
8354	9130	9810	10244	10688	11240	11594	12204	13122
3.921894 ✓	3.960471 ✓	3.991669 ✓	4.010470 ✓	4.028896 ✓	4.050766 ✓	4.064233 ✓	4.086502 ✓	4.118000 ✓
3.582455	3.543878	3.512680	3.493879	3.475453	3.453583 ✓	3.440116	3.417847	3.386349
3823.4 ✓	3498.5 ✓	3256.0 ✓	3118.0 ✓	2988.5 ✓	2841.7 ✓	2755.0 ✓	2617.3 ✓	2434.2 ✓
5843.1	5518.2	5275.7	5137.7	5008.2	4861.4	4774.7	4637.0	4453.9
5843.1	5518.2	5275.7	5137.7	5008.2	4861.4	4774.7	4637.0	4453.9

61974	62636	63221	63553	63956	64387	64752	65034	65474
13762	14424	15009	15341	15744	16175	16540	16822	17262 ✓
4.138682 ✓	4.159086 ✓	4.176352 ✓	4.185854 ✓	4.197115 ✓	4.208844 ✓	4.218536 ✓	4.225878 ✓	4.237091 ✓
3.365667	3.345263	3.327997	3.318495	3.307234	3.295505	3.285813	3.278471	3.267258 ✓
2321.0 ✓	2214.4 ✓	2128.1 ✓	2082.1 ✓	202~~4.2~~ 8.8	1974.7 ✓	1931.1 ✓	1898.8 ✓	1850.4 ✓
4340.7	4234.1	4147.8	4101.8	4048.9 5	3994.4	3950.8	3918.5	3870.1
4340.7	4234.1	4147.8	4101.8	4048.5	3994.4 3809.8 3809.8 1790.1	3950.8 3.252888 4.251468	3918.5 17843	3870.1 66055 M.

For measures of stand. aperture see p 60
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Trei. out of focus "