

KG

11366
v.864

Index.

Work for Equatorial. p. 210.

Very variable near γ Cephei. p. 202.

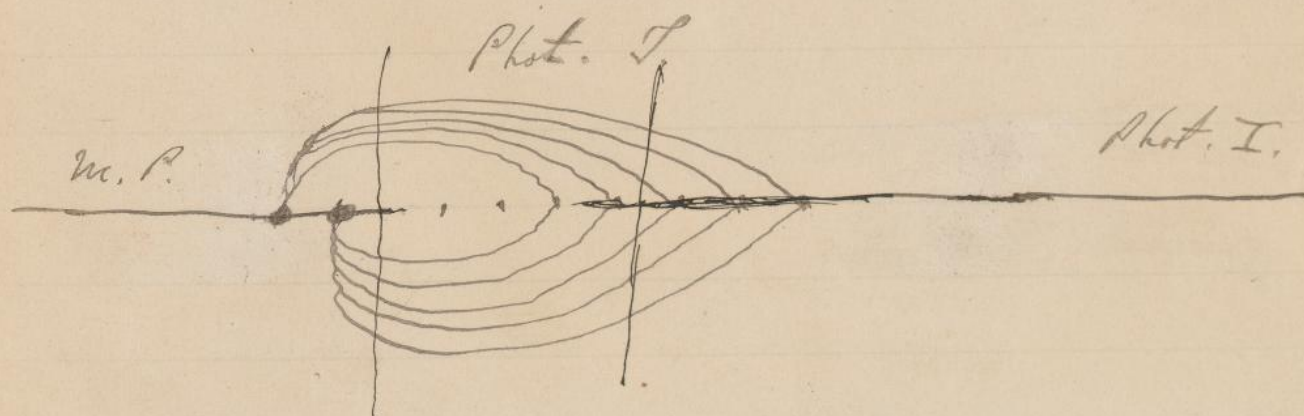
Value of division on Phot. T.

In using Phot. T. this summer on the comp.
star for circumpolar variables scheme.

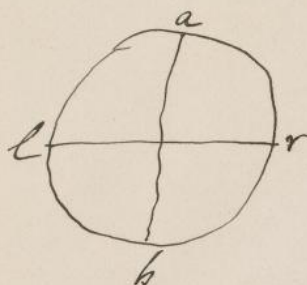
Take 2 stars measured with the Mer. Phot.,
(say 2 to 9 mag. stars) and ^{well} ^{1st} ₉₀ in one of these to
3 to 5 of the faintest stars, ^{in succession} which can be easily
measured with Phot. T. taking 2 sets of $\times$ each
~~with~~ on each.

Then take the other m. p. star and get 2 sets of
 $\times$ settings each between it and each of the 3 to 5
faintest ^{comp.} stars visible in Phot. T.

Repeat the above scheme on 3 nights.



Order of sides with Photometer.



$a - b$

$r - l$

$r.a. - l.b.$

$r.b. - a.l.$

Hedge Photometer Zone stars still needing observation. Oct. 23. 1894.

+9° 647. In Zones 54 and 57, no star was found in this place. (4th 32nd) A star was found and measured as 11.2, which follows place of 647 by 0.3^m and 1' north. See R. 54. p. 92 or thereabouts. (This star fol. 647. Dec. 7' south.)

+9° 2795. Observed in Zone 126 as 10.3 but missing (13th 34th) in Zones 125 and 124.

Zone 125 is in R. 66. p. 36.

" 126 " " " " " 56.

" 128 " " " " " 76.

There is some doubt about 2795 having been actually observed in Zone 126. It was possibly wrong. See record book.

+9° 2942 This star was missing in both zones 127 (1st & 3rd) and 129.

Zone 127 is in R. 66 p. 69.

" 129 " " " " " 121.

+9° 3099 This star needs 2 observations as it was (1st & 3rd) omitted in copying up the scheme of Hedge Zones and has not been, but should be observed.

+9° 5073 Omitted, but needs 2 observations. (22nd 31st) Same ^{conditions} ~~as~~ as on +9° 3099.

Wedge Photometer Zone stars still
needing observations. con.

+19° 1405 Observed in Zone 173 as 10.3 (R 70. p. 16)
 (6^h 22^m) No apparent trouble with star but
 needs 1 more observation simply.

+19° 2777 This star does not disappear in wedge.
 (18^h 6^m) 1.0 magnitude.

+19° 2240 There is no star in this position. A star
 (9^h 46^m) was observed, not very far away, in zones
 43. (R. 51. p. 25) and 119 (R 65. p. 123)
 but no star was seen in the ~~correct~~ place
 as given in D.M.

for Cambridge

Computation of Gr. M. T. of Places of
Transit of Mercury for Nov. 10. 1898.

$$\begin{aligned}
 \varphi' &= 42^\circ 12' \checkmark \\
 \text{Log sin } \varphi' &= 9.42719 \checkmark \\
 \text{" cos } \varphi' &= 9.46970 \checkmark \\
 \lambda &= 71^\circ 2' \checkmark \\
 (329^\circ 59') - \lambda &= 258 \ 51 \checkmark \\
 (330^\circ 26') - \lambda &= 259 \ 12 \checkmark \\
 (4^\circ 45') - \lambda &= 293 \ 36 \checkmark \\
 (217^\circ 45') - \lambda &= 146 \ 37 \checkmark \\
 (212^\circ 16') - \lambda &= 147 \ 2 \checkmark \\
 \text{Log cos } 258^\circ 51' &= \sim 9.24641 \checkmark \\
 \text{" " } 259 \ 12 &= \sim 9.26273 \checkmark \\
 \text{" " } 293 \ 36 &= +9.60244 \checkmark \\
 \text{" " } 146 \ 37 &= \sim 9.92169 \checkmark \\
 \text{" " } 147 \ 2 &= \sim 9.92425 \checkmark
 \end{aligned}$$

$$\begin{array}{rcl}
 +0.7952 \checkmark & 1.6351 \checkmark & 3 \ 55 \ 42.1 \checkmark \\
 +9.4272 \checkmark & 9.4697 \checkmark & +10.4 \checkmark \\
 +K.19 = 0.6224 \checkmark & \sim 9.2464 \checkmark & \hline
 & 10.7912 = +6.12 \checkmark & 3 \ 55 \ 52.5 \checkmark \\
 & +K.19 \checkmark & 5 \quad \quad \quad 02 \checkmark \\
 & +10.37 \checkmark & \hline
 & & 22 \ 55 \ 52.5 \checkmark
 \end{array}$$

$$\begin{array}{rcl}
 +0.7273 \checkmark & +1.6356 \checkmark & 3 \ 57 \ 26.2 \checkmark \\
 +9.4272 \checkmark & +9.4697 \checkmark & +10.1 \checkmark \\
 +K.12 = +0.6145 \checkmark & \sim 9.2627 \checkmark & \hline
 & 10.7740 \checkmark & 3 \ 57 \ 36.3 \checkmark \\
 & +5.94 \checkmark & \hline
 & +K.12 \checkmark & 22 \ 57 \ 36.3 \checkmark \\
 & +10.06 \checkmark &
 \end{array}$$

$$\begin{array}{r}
 +1.217K^{\checkmark} \\
 +9.2272^{\checkmark} \\
 \hline
 +1.0886^{\checkmark} \\
 +11.02^{\checkmark}
 \end{array}$$

$$\begin{array}{r}
 +1.5255^{\checkmark} \\
 +9.2697^{\checkmark} \\
 \hline
 +9.6024^{\checkmark} \\
 +1.0576^{\checkmark} \\
 \hline
 -11.82^{\checkmark} \\
 +11.02 \\
 \hline
 -0.3K^{\checkmark}
 \end{array}$$

$$\begin{array}{r}
 6 \quad 3K \quad 22.7^{\checkmark} \\
 \hline
 -0.3^{\checkmark} \\
 \hline
 6 \quad 3K \quad 22.8^{\checkmark} \\
 \hline
 \checkmark \\
 1 \quad 3K \quad 22.8^{\checkmark}
 \end{array}$$

$$\begin{array}{r}
 +1.8292^{\checkmark} \\
 +9.2272^{\checkmark} \\
 \hline
 +1.2564^{\checkmark} \\
 +12.05^{\checkmark}
 \end{array}$$

$$\begin{array}{r}
 +1.5382^{\checkmark} \\
 +9.2697^{\checkmark} \\
 \hline
 +9.9217^{\checkmark} \\
 +1.3256^{\checkmark} \\
 \hline
 -21.16^{\checkmark} \\
 +12.05^{\checkmark} \\
 \hline
 -3.11^{\checkmark}
 \end{array}$$

$$\begin{array}{r}
 9 \quad 11 \quad 28.5^{\checkmark} \\
 \hline
 -3.1^{\checkmark} \\
 \hline
 9 \quad 11 \quad 25.0^{\checkmark} \\
 \hline
 \checkmark \\
 4 \quad 11 \quad 25.0^{\checkmark}
 \end{array}$$

$$\begin{array}{r}
 +1.427K^{\checkmark} \\
 +9.2272^{\checkmark} \\
 \hline
 +1.2586^{\checkmark} \\
 +17.97^{\checkmark}
 \end{array}$$

$$\begin{array}{r}
 +1.5387^{\checkmark} \\
 +9.2697^{\checkmark} \\
 \hline
 +9.9282^{\checkmark} \\
 +1.3226^{\checkmark} \\
 \hline
 -21.31^{\checkmark} \\
 +17.97^{\checkmark} \\
 \hline
 -3.3K^{\checkmark}
 \end{array}$$

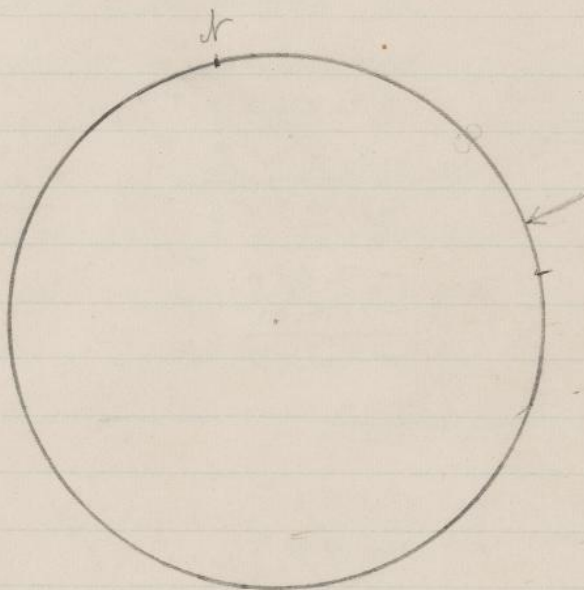
$$\begin{array}{r}
 9 \quad 13 \quad 2.3^{\checkmark} \\
 \hline
 -3.3^{\checkmark} \\
 \hline
 9 \quad 13 \quad 5.0^{\checkmark} \\
 \hline
 \checkmark \\
 4 \quad 13 \quad 5.0^{\checkmark}
 \end{array}$$

First contact. = Nov. 9. ^d 22 ^h 55 ^m 41.5^r ~~22.8~~ ^{25.3} Eastern Time.
 Second " = " " 22 57 ~~36.3~~ " "
 Least dist. of cen. = Nov. 10. 1 34 22.8^r " "
 Third contact = " " 4 ¹⁰ ~~11~~ ^{23.0} ~~21.0~~ " "
 Fourth " = " " 4 ¹² ~~13~~ ^{7.0} ~~1.0~~ " "

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Transit of Mercury continued.

First Contact (corrected)	=	Nov. 9 ^d	22 ^h	55 ^m	41. ⁿ	East. Line.
Second	"	"	22	57	25.3	"
		Nov. 10.				"
Third	"	"	4	10	23.0	"
Fourth	"	"	4	12	7.0	"



my check mark is ✓
Mr. Fraits " " " ^
Mr. Clemen " " " >
Mr. Fauson " " " <

Expts. with Plot. I. in order to determine the value of one division on wheel which moves achromatic prisms.

$$\begin{array}{rcll}
 3.0 & = & 4.21 \text{ per unit} & 12.62 \\
 5.0 & = & 3.21 \text{ " " } & 19.03 \quad 6.41 \\
 10.0 & = & 3.42 \text{ " " } & 38.22 \quad 15.19 \\
 12.0 & = & 3.11 \text{ " " } & 37.33 \quad 3.11
 \end{array}$$

$$\begin{array}{r}
 60/707.2 \\
 \hline
 12.62
 \end{array}
 \quad
 \begin{array}{r}
 3/12.62 \\
 \hline
 4.21
 \end{array}
 \quad
 \begin{array}{r}
 5/19.03 \\
 \hline
 3.21
 \end{array}
 \quad
 \begin{array}{r}
 10/38.22 \\
 \hline
 3.42
 \end{array}$$

$$\begin{array}{r}
 12/37.33 \\
 \hline
 3.11
 \end{array}
 \quad
 \begin{array}{r}
 3.20 \\
 3.04 \\
 \hline
 3.11
 \end{array}$$

When achromatic prisms are close to eye piece, the angular separation of images is 2.1

The value of one division on head, as above, is approx. 3', ~~so that~~

The index was therefore set at 1.0 for the ~~zero~~ prisms close home, so that the angular separation of images and stars can be found approximately by reading the head, multiplying by 3, and calling the results minutes of arc

meats. of Polas

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Messier 13. (Cluster in Hercules).Location of stars g, k and l (on Photographic Chart)Star gStar f

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Messier 13.

Star L

Equivalent focus for Eye Pieces.

Positive Eye Piece.

Divide the product of the focal lengths of the component lenses, by their sum minus the distance between them.

Let 1.5 = the focal length of each lens.

" 1. = " distance between them.

" 3 = " sum of the two focal lengths.

$$\therefore \frac{1.5 \times 1.5}{3 - 1} = \frac{2.25}{2} = 1.125 \text{ inch.}$$

This may be condensed by saying that the equivalent focus is equal to three fourths of the focal length of either lens for the positive eye piece, or

Let a (as before) equal the focal length of either lens of the positive eye piece. Then

$$\text{Equivalent focus} = \frac{3a}{4} \quad \text{or, again.}$$

$$\#3 \quad " \quad " \quad = \frac{f \cdot D}{f} \quad (D \text{ being distance between lenses})$$

For development of above, see below. viz:

$$\frac{a^2}{2a - \frac{2a}{3}} = \frac{a^2}{\frac{6a}{3} - \frac{2a}{3}} = \frac{a^2}{\frac{4a}{3}} = \frac{3a^2}{4a} = \frac{3a}{4}$$

$$\text{But } a = \frac{3D}{2} \quad \therefore \text{ we have}$$

$$\frac{3 \cdot \frac{3D}{2}}{4} = \frac{9D}{8} \quad \text{q. e. d.}$$

(See also p. 52)

Equivalent focus for eye Pieces.

Negative Eye Pieces.

Divide twice the product of the focal lengths of the component lenses by their sum.

Let the focal length of the field-lens be 3, and of the eye-lens be 1. the length of the equivalent lens will be

$$\frac{3 \times 1 \times 2}{4} = \frac{6}{4} = 1\frac{1}{2}$$

This may be condensed by saying that the equivalent focus for the negative eye piece is as follows.

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$$\text{Equivalent focus} = \frac{3D}{4} \quad (D \text{ being distance between lenses})$$

For development of above, see below, viz.:

Let D = distance between lenses.

" $\frac{D}{2}$ = focal length of eye lens.

" $\frac{3D}{2}$ = " " " field "

$$\therefore \frac{2 \times \frac{D}{2} \times \frac{3D}{2}}{\frac{D}{2} + \frac{3D}{2}} = \frac{2 \times \frac{D}{2} + \frac{3D}{2}}{2D} = \frac{\frac{2D}{2} \times \frac{3D}{2}}{2D} =$$

$$\frac{6D^2}{4} = \frac{6D^2}{4} = \frac{3D}{4} \quad \text{q.e.d.}$$

(See also next page.)

Equivalent Focus of Eye Pieces, con.

Positive Eye Piece.

If we take the formula on p. 50. viz:
 Equivalent Focus = $\frac{3a}{4}$ (a being focal length
 of either lens) we have

$$\frac{3}{4} \text{ of Focal Length} = \text{Equiv Focus.} \quad (a)$$

$$\text{But } D = \frac{2}{3} \text{ of Focal Length, or } F. L. = \frac{3}{2} D$$

Sub. $\frac{3}{2} D$ for $F. L.$ in 1st ^{above} eqn. we have.

$$\frac{3}{4} \cdot \frac{3}{2} D = \text{Equiv. Focus. or}$$

$$\text{Equivalent Focus} = \frac{9}{8} D, \text{ as before.}$$

Negative Eye Piece.

We see by the general example on p. 51. expres-
 sing definite and unalterable ratios, that
 the resulting equiv. focus was $1\frac{1}{2}$ units.

But the distance (D) apart of the two lenses
 being always 2.0 units, we see that the

$$\text{Equivalent Focus} = \frac{3}{2} D, \text{ as before.}$$

To check any number of residuals.

Example.

4.5	+1
4.6	+2
4.5	+1
4.3	-1
4.0	-4
mean 4.32	
Assumed 4.4	$\frac{-1}{5} = -0.2$
-0.2	
4.32	

4.2	-1
4.6	+3
4.5	+2
4.3	0
4.1	-2
4.34	+5-3
mean 4.3	
Assumed 4.3	$\frac{+2}{5} = +0.4$
+0.4	
4.34	

∴ we have the following rule. viz:

Take the sum of the positive and negative residuals, and then divide their difference (putting on the sign) by the number.

Add this result algebraically to the assumed mean and if every thing is right, it should reproduce completely the true mean.

Susp. Var.

New fol. Sur. +19° K257.

+19° 754. Star decidedly fr. than 9.0

+19 237. Star fol. 235, 13 secs. instead of 23 secs. and is abt. 9' south of it instead of 6' as by Sur.

+19 900. This star pre. 901 by 5 secs., 12' north instead of 1 sec., 5' north, as by Sur.

+19 1081. No star in exact position. Look up.

+19 2260. No star " " " " " " Star meas. follows 2274 by 2nd 12th 3' south of it.

23/419 K106. No star found in position in either series. Region identified.

+19 K257. A star follows K257, 3 secs. 1' north (9.1 mag) which is reddish and not in Sur. Var. 2.

+19 K240. Star checks in position with adjacent stars, but is decidedly br. than 9.3. It measured 4.3, 4.7 in two zones.

+19 K796. This star estimated as rather faint for a 9.0 Sur. It measured 9.4, 9.7.

+19 K971 (9.7) In Series 24, measured as 9.6
" " 90 " " 12.1+19 K914 follows K917 (according to note) 54 secs. 4' north, whereas by Sur. it follows 12 secs. 7' north, This^{1st} star measured. Look up region.

+

- +9° 647. In both series, no star seen in position indicated by D.M.
- +9 2316. No star in position indicated by D.M. Star observed follows 2313, 21 sec. 7' south, whereas by D.M. it should follow by 1^m 34^m and be 6.5' south.
- +9 2795 This star missing in Series 125 and 126.
In Series 126, star observed as 10.3.
- +9 2902. Star missing in both series. Region identified.

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Either ~~at~~ comp. star K or L (for δ Cephei) are variable.

When selected K was better than L.

The following observations have been made on them,

1895. Mar. 9. K 4.5 V, V 2.5 in

K. . L

" Mar. 14. K 5.5 V, V 1 in

" Apr. 20. K 3 L

. X

" Apr. 23. X 3 K

" " " X 4.5 L } in lar. tel.

" " " K 2 L

" " " K 1 L

" " " X 2 K } in field.

" " " X 3 L

" May 13. K 2.5 X

" " " X 2 L } lar. tel.

" " " K 4.5 L

Work for Equatorial.
Phot. T. X Cygni.

measure star 2 on two nights with comp. star R = δ U.
 $+ 32^{\circ} 35' 49'' (2.0)$ - At same times measure $35' 49''$
 with X itself. - Also, on two moonlight nights,
 compare $+ 32^{\circ} 35' 49'' (2.0)$ with comp. star ρ , which is
 δ U. $+ 32^{\circ} 35' 7'' (2.2)$ - Star 2 is the star which
 has been used as comparison star for X Cygni
 with Phot. R.

1904phae, proj. 1869.