KG
11366
182

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Ida E. Woods
Book No. 6
Cluster Variables.

Including
47 Tucanae

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KG 11366182

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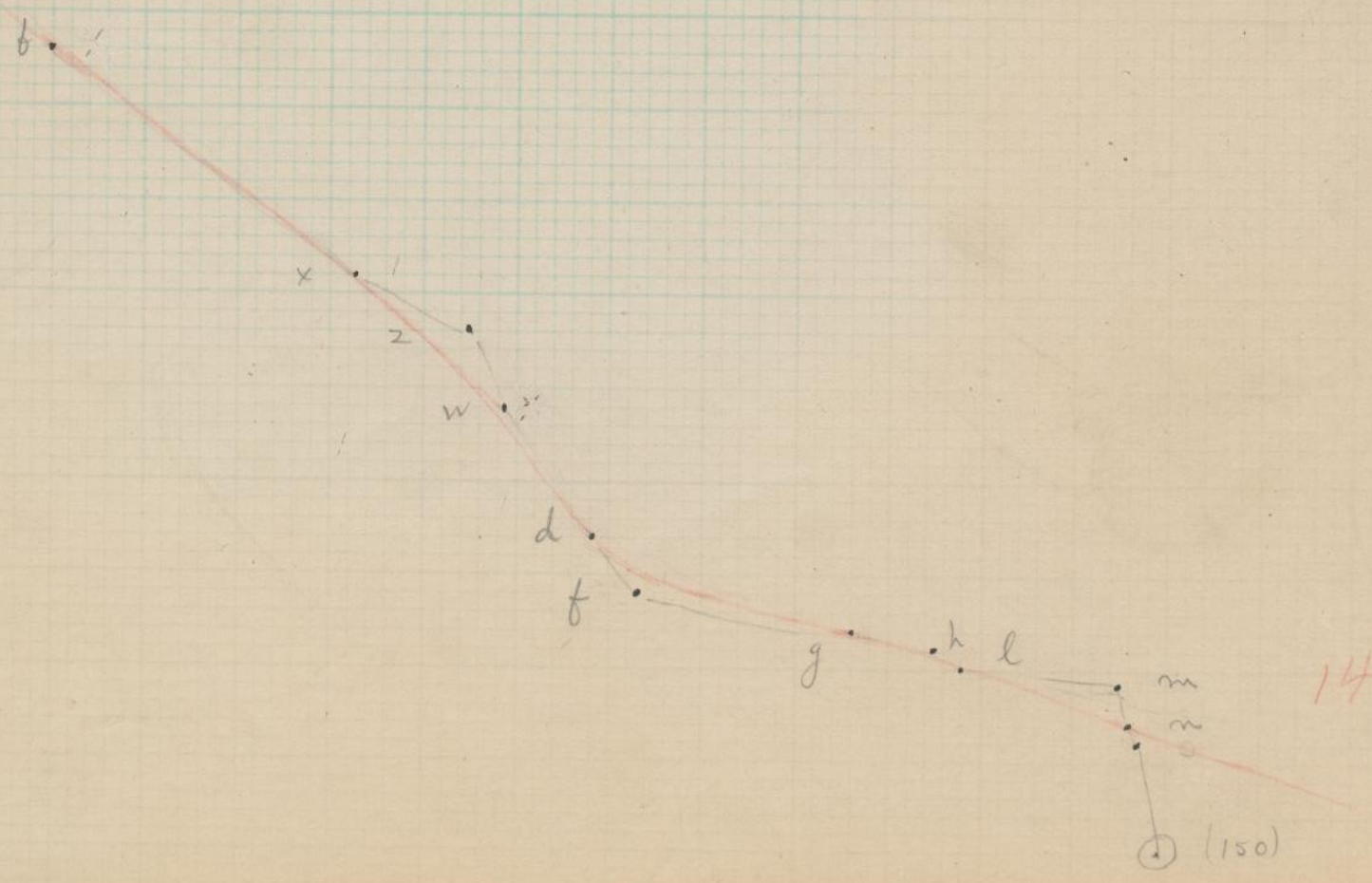
Scale N. 47 Tucanae Calibration of

Results = Corrected, Final Magns.

p. 123

Corr. Scale Readings Bk. 6, p. 200

Magn. 1 2 3 4 5 6 7




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# Index.


| Page | N.G.C. | |
|---|---|---|
| 4 to 74 and 84 | 2422 and 2437 | |
| 72 to | 2099 | |
| 56 to | 2808 | |
| 86 to 113 | " | |
| 28 to 47 | 6362 | |
| 80 | ~~6388~~ | |
| 14 to 27 | 6541 | |
| 50 to 55 | 6705 | = M11 |
| 76 to | 6715 | |
| 78 | ~~6981~~ 6779 | |
| 82 | 6981 | |
| 86 au abre | N.G.C. 2808 | |
| 120 | N.G.C. 104 = 47 Tucanae | |
| 114 | M 3 | |


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 See, also, pages. 74, 84

January 25, 1919.

Selected by Prof. Pickering for examination by I. E. W., Jan. (1 or 2)? 1919.

N.G.C. 2422 $7^h 32.^m0$ $-14^\circ 16'$ (1900)
2437 7 37.2 −14 35

H. A. 60, No. 6, page 210.

See Nos. on B 35334, marked by Miss Cannon?

Best plates, B 17705, 22422.

Conclusions: B Plates, see page 10. No objects suspected.

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~~March~~

Eff. 2

N.G.C. 2422 I 7446 60m 4

No C plates

Eff. 2.

7.5 A 5065 11m 3

7237 60 3i

7.8 3493 10 4 Does not cover region.

| | 2 Eff. | | 2. Eff. | |
|---|---|---|---|---|
| B 14968 | | 24926 | Too poor except to confirm. | |
| ✓ 17705 | Good pl. | 26647 | | |
| ✓ 29491 | 4 10 | ✓ 28948 | | |
| ✓ 30822 | | ✓ ~~31554~~ | | |
| ✓ 32873 | | ✓ 33374 | 3 10 | (out of focus) |
| ✓ 41212 | 3 17 | ✓ 35867 | | |
| ✓ 20847 | 4 5 Broken | ✓ 39953 | 3 10 el. on edge | |
| ✓ 22422 | 5 11 | ✓ ~~15569~~ | ~~3 15~~ | Does not cover reg |
| ✓ 24522 | 4 10 | ✓ 17522 | | |
| ✓ 35334 | | 18600 | broken | |
| ✓ 39846 | | ✓ 18742 | Does not cover reg. | |
| ✓ 8924 | 3 13 | ✓ ~~18853~~ | 3i 13 | Does not cover reg. |
| ✓ 10918 | 3 Too poor | | | |
| ✓ 15079 | | | | |
| ✓ 18252 | Too poor. | | | |
| ✓ 18309 | | | | |
| ✓ 18542 | 3 11 few stars. | | | |
| 24219 | | | | |

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January 25, 1919.

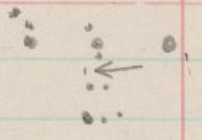
Comparing B 17705 and 14968.

Many images suspected. Marked on B. 17705. Probably all of them are prismatic companions. Examined bright stars of both plates and decided the direction of the images in relation to the bright stars fixed them all to be p.c.

A few other objects suspected but none are noted. Diff. in images of two plates made comparison a little difficult.

One object marked on 14968

N.G.C. 2437



Moving object? or defect?
not on B 17705 nor B 35334
Not prismatic comp? Probably is p.c.
See, superposing B 32873 & 14968)
Compared with bright star, South, (pos.) marked, red circle, on 14968

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Note.
Clusters in
23948
17522

March 7, 1919.

Comparing B 41212 & 39846

B 41212 elongated images, poor for comparison.
No objects that cannot be explained by
prismatic companions.

Comparing B 22422 & B 39846
No objects suspected

Comparing B 39846 & B 10918
B 10918 Too poor.

Comparing B 39846 & B 33374
No objects suspected.

Comparing B 39846 & B 39953
No objects suspected

Comparing B 39846 & B 8924
8924 Cl. too much dye

Comparing B 39846 & B 24522
No objects suspected

Comparing B 39846 & B 28978
No objects suspected.

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March 7, 1919.

Comparing B 39846 & B 18309
No objects suspected

Comparing B 39846 & B 18252
No objects suspected.

Comparing B 39846 & B 15079
See object mkd on B 15079

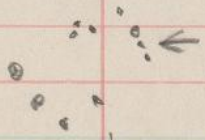
Watch!



| | upper br. | upper ft. |
|---|---|---|
| B 15079 | 29491 | |
| 14968 | 30822 | |
| | 17705 | |

Nothing proved. Probably due to peculiar images on B 15079.

Comparing B 39846 & B 20847
Ft following cluster



or star below?

st. 2 br. B 18309
B 8924
B 20847
B 17705
about equal B 39846

upper star br.?
B 39953

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March 7, 1919.

Comparing B 39846 & B 29491
No objects suspected

Open Cluster at
marked on B 17522.
Exam. on B 17522 & B 18853

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March 8, 1919

Comparing B 17705 & B 31554
B 31554 poor image, cluster near edge.

Comparing B 17705 & B 32873
No objects suspected.

Comparing B 32873 & B 35334
No objects suspected.

Comparing B 30822 & B 35334.
No objects suspected.

Conclusion: About 20 B plates examined. No objects proved to be variable. Suspected objects numerous, but probably wholly due to prismatic companions.

" If cluster variables are all faint, B plates would not show them. Can X plates be taken ?

× (Only one var. in M 3 and M 5 was brighter than 14.00)

Try MC plates

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H.G.C. 6541, Var. No. 1.

List of B Plates examined.

These plates do not show Max. of Var. unless otherwise stated. The individuals stars of the cluster are difficult to separate on many of these plates. A max. may be shown on some of the plates not so designated but hazy images or poor plate make it impossible to see this star. Comparison is made with star a.

At max. the variable is nearly equal to star a.

*B13575 shows splendid separation.

| | | | | | |
|---|---|---|---|---|---|
| B 3534 | | 19324 | June 1, 1897 | | |
| 3535 | | 19547 | " 18, " | | |
| | | 20356 | Sept. 15, " | Br. | 14183 |
| 3812 | | 21224 | April 13, 1898 | Br. | 14393 |
| 3861 | | 22028 | Oct. 12, " | | |
| 3876 | | 22479 | April 5, 1899 | | |
| 3959 | | 23413 | July 11, " | Br.? | |
| 4096 | | 23969 | Aug. 24, " | Br. | 14891 |
| 5964 | | 25206 | May 2, 1900 | Br. | 15142 |
| 5966 | | 25343 | " 18, " | | |
| 6131 | May 30, 1891 | 27437 | " 27, 1901 | Faint | |
| 7878 | | 27595 | June 6, " | Too poor | |
| 9282 | May 1, 1893 | 27920 | July 19, " | Br. | 15585 ~~15220~~ |
| 9691 | June 24, " | 27930 | " 20, " | Br. | 15586 ~~15221~~ |
| 13534 | June 3, 1895 | 29451 | April 26, 1902 | Br. | 15866 |
| 13575 | " 4, " | 30360 | July 14, " | | |
| 13716 Br. | 16157 June 5, 1896 Br | 31404 | April 3, 1903 | | |
| | 16364 " 15, " Too poor | 31469 | " 17, " | | |
| | 17445 Sept 23, " | 35780 | April 7, 1905 | | |
| | | 32658 | June 24, 1903 | Br. | 16293 |

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* 47326 Too doubtful to determine ft. or br. This plate was wanted to confirm the ft. appearance between two Mar. 47269 48014. Miss Leavitt examined this and found it too poor

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | B 35817 | April 12, 1905 | 47189 | June 8, 1916 | | |
| | | 36431 | July 12, " | 47265 | " 10, " | Too poor | |
| 17727 | Br.? | 37539 | May 31, 1907 | 47266 | " 10, " | Br.? | |
| | | 38822 | May 3, 1906 | 47267 | " 10, " | Br. | 21025 |
| | | 40062 | Apr. 9, 1909 | 47268 | " 10, " | Br.? | |
| | | 41379 | May 29, 1910 | 47269 | " 10, " | Br.? | 21025 |
| | | 42440 | July 7, 1911 | 47323 | June 11, " | Too poor | |
| | | 42738 | Oct. 2, " | 47326 | " 11, " | Too poor? * | |
| 19605 | Br. | 43355 | July 21, 1912 | 48014 | July 22, " | Br.? | 21067 |
| | | 43745 | June 7, 1913 | 48171 | Aug. 18, " | | 21094 |
| | | 43770 | " 10, " | 48182 | " 23, " | | 21099 |
| | | 44109 | Aug. 19, " | | | | |
| | | 44725 | July 2, 1914 | 49907 | Apr. 12, 1917 | | |
| 20316 | Br. | 44734 | " 2, " | 50005 | Apr. 14, " | | |
| 20332 | Defective Br. | 44794 | " 18, " | 50007 | " 14, " | | |
| 20335 | Br. | 44834 | " 21, " | 50074 | " 16, " | | |
| 20338 | Br. | 44857 | " 24, " | 50122 | " 17, " | | |
| 20338 | Br. | 44858 | " 24, " | 50395 | May 12, " | | |
| 20339 | Br. | 44872 | " 25, " | 50472 | " 15, " | | |
| | | 44873 | " 25, " | 50964 | June 11, " | | |
| | | 44884 | " 27, " | 51106 | | Cracked Not found | |
| | | 44902 | " 31, " | 51208 | June 23, " | | |
| | | 44947 | Aug. 12, " | | | | |
| | | 44961 | " 13, " | | | | |
| | | 44971 | " 14, " | | | | |
| 21048 | | 46899 | May 27, 1916 | | | | |
| 21017 | | 47047 | June 2, " | Too poor | | | |
| 21019 | | 47077 | " 4, " | | | | |
| 21019 | | 47080 | " 4, " | | | | |

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Continued from Bk. 5, page 159.

April 3, 1919.

N.G.C. 6541 Measures of positions of Variables and Comparison Stars for Sequence.

Measures of D 18330 from I 12124

| | vert | hor. | vert. | hor. | Mean vert. Reads. | M |
|---|---|---|---|---|---|---|
| A | 2477 | 1377 | 2477 | 1377 | 247.70 00 00 | 13 |
| B | 418 | 991 | 418 | 990 | 41.80 00 00 | |
| C | 1459 | 1360 | 1459 | 1360 | 145.90 00 00 | 13 |
| D | 2096 | 667 | 2095 | 667 | 209.55 05 05 | |
| E | 1005 | 1168 | 1006 | 1168 | 100.55 05 05 | 1 |
| F | 1168 | 888 | 1168 | 887 | 116.80 00 00 | |
| G | 443 | 1389 | 442 | 1390 | 44.25 05 05 | 1 |
| H | 1840 | 1463 | 1840 | 1463 | 184.00 00 00 | 1 |
| a | 1074 | 1268 | 1074 | 1268 | 107.40 00 00 | 12 |
| b | 1119 | 1318 | 1119 | 1318 | 111.90 00 00 | 1 |
| c | 1062 | 1303 | 1063 | 1302 | 106.25 05 05 | 1 |
| d | 1337 | 852 | 1337 | 852 | 133.70 00 00 | |
| e | 1280 | 888 | 1280 | 889 | 128.00 00 00 | |
| f | 1320 | 991 | 1320 | 991 | 132.00 00 00 | |
| g | 1239 | 1160 | 1238 | 1160 | 123.85 05 05 | 1 |
| h | 1130 | 1173 | 1130 | 1173 | 113.00 00 00 | 1 |
| k | 1223 | 1211 | 1223 | 1211 | 122.30 00 00 | 1 |
| l | 1210 | 1008 | 1210 | 1009 | 121.00 00 00 | 1 |
| m | 1182 | 1148 | 1183 | 1146 | 118.25 05 05 | |
| n | 1101 | 1126 | 1100 | 1125 | 110.05 05 05 | |

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144.00 mm. 116.80 m.m.

Star - Center. = Dec. = R.A.

| Mean hor. | Resids. vert m.m. | hor m.m. | vert. x5" | hor. x5" | |
|---|---|---|---|---|---|
| 137.70 00 00 | +103.70 | +20.90 | +518.50 | +104.50 | A |
| 99.05 05 05 | -102.20 | -17.75 | -511.00 | -88.75 | B |
| 136.00 00 00 | + 1.90 | +19.20 | + 9.50 | +96.00 | C |
| 66.70 00 00 | +65.55 | -50.10 | +327.75 | -250.50 | D |
| 116.80 00 00 | -43.45 | 0.00 | -217.25 | 0.00 | E |
| 88.75 05 05 | -27.20 | -28.05 | -136.00 | -140.25 | F |
| 138.95 05 05 | -99.75 | +22.15 | -498.75 | +110.75 | G |
| 146.30 00 00 | +40.00 | +29.50 | +200.00 | +147.50 | H |
| | | | | | |
| 126.80 00 00 | -36.60 | +10.00 | -183.00 | +50.00 | a |
| 131.80 00 00 | -32.10 | +15.00 | -160.50 | +75.00 | b |
| 130.25 05 05 | -37.75 | +13.45 | -188.75 | +67.25 | c |
| 85.20 00 00 | -10.30 | -31.60 | -51.50 | -158.00 | d |
| 88.85 05 05 | -16.00 | -27.95 | -80.00 | -139.75 | e |
| 99.10 00 00 | -12.00 | -17.70 | -60.00 | -88.50 | f |
| 116.00 00 00 | -20.15 | -0.80 | -100.75 | -4.00 | g |
| 117.30 00 00 | -31.00 | +0.50 | -155.00 | +2.50 | h |
| 121.10 00 00 | -21.70 | +4.30 | -108.50 | +21.50 | k |
| 100.85 05 05 | -23.00 | -15.95 | -115.00 | -79.75 | l |
| 114.70 10 10 | -25.75 | -2.10 | -128.75 | -10.50 | m |
| 112.55 05 05 | -33.95 | -4.25 | -169.75 | -21.25 | n |

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April 3, 1919.

N.G.C. 6541

| | vert. | hor. | vert. | hor. | Mean vert. | Resids. | |
|---|---|---|---|---|---|---|---|
| a | 1182 | 1048 | 1181 | 1049 | 118.15 | 05 05 | 1 |
| f | 1123 | 1028 | 1122 | 1030 | 112.25 | 05 05 | 1 |
| Var. | 1187 | 1213 | 1187 | 1212 | 118.70 | 00 00 | 1 |
| Center | 1442 | 1168 | 1439 | 1168 | 1439 1168 144.00 | 20 10 10 | 11 |

Images of A, B, C, D, E, F, G, H, a are larger than space between images 1 and 2 of scale but an attempt has been made in all cases to measure center of star.

D. E. W.

D 18330, enlargement 8.5 times from ~~X~~ 12124
Scale of X plates = 42".4 to mm.

See B 47268, 47326, 50074

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| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | 144.00 m.m. | 116.80 m.m. | = Dec. | = R.A. | |
| | Mean hor. Star-Center. | | | | vert. x5" | hor. x5" | |
| ds. | Resids. | vert. | hor. | | | | |
| 05 | 104.85 05 05 | | −25.85 m.m. | −12.05 m.m. 1195 | −129.25" | −59.75" −60.25 | o |
| 05 | 102.90 10 10 | | −31.75 | −13.90 | −158.75 | −69.50 | f |
| 00 | 121.25 05 05 | | −25.30 | + 4.55 | −126.50 | +22.25 | Var. I |
| 0 | 116.80 00 00 00 | | | | | | |

4

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N.G.C. 6541. Identification of Catalogue Stars.

See B 44 109.

| | | | | R.A. (1875) | | Dec. | | Magn. |
|---|---|---|---|---|---|---|---|---|
| Checked by Miss Mackie | A | C.P.D. | -43° 8452 | 17 | 59 | 8.9 | -43 34.9 | 9.6 |
| | B | | -43 8446 | 17 | 58 | 49.9 | -43 52.1 | 9.5 |
| | C | | -43 8450 | 17 | 59 | 7.4 | -43 43.3 | 9.5 |
| | D | | -43 8443 | 17 | 58 | 35.4 | -43 38.0 | 9.8 |
| | E | | -43 8448 | 17 | 58 | 58.9 | -43 47.1 | 9.6 |
| | F | | -43 8445 | 17 | 58 | 44.9 | -43 45.8 | 9.8 |
| | G | | -43 8451 | 17 | 59 | 8.4 | -43 51.9 | 9.6 |
| | H | | -43 8454 | 17 | 59 | 11.9 | -43 40.2 | 10.0 |

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(August 5 1921)

N.G.C. 6541

B 46947
Slide
4552

Comparison sequence Carte 18h-40°, B 46947.
This seq. is far from Var. region on A Plates.
On M F 6649 Comp. Seq. is near center, Cluster, Southern part.

Magn. 18h-40°
Bk. 35,
page 145.

Star a to between 12 & 13 of Seq.
12 = 11.70 13 = 12.39
Star a = about 12.1
Faintest star of Sequence = 16 = 13.3
Limit of A plates is probably at least the 16th magn.; possibly the 17th.

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N.G.C. 6541. Reduction of Centers from
Coordinates from D Plate. 8 Catalogue Stars.

Reverse signs of both X & Y

| | | | | X | Y |
|---|---|---|---|---|---|
| A | $17^h\ 59^m\ 8^s.9$ | $-43°\ 34'.9$ | (1875) | $+104''.50$ | $60)\overline{+118''.50}$ |
| | $+9^s.6$ | $+8''.6$ | | $1.381$ (sec d) | $+8'.6$ |
| | $17\ 58\ 59^s.3$ | $-43\ 43''.5$ | | $15)\overline{144.31}$ | |
| | | | | $+9^s.621$ | |
| B | $17\ 58\ 49^s.9$ | $-43\ 52''.1$ | | $-88''.75$ | $60)\overline{-511''.00}$ |
| | $-8^s.2$ | $-8''.5$ | | $1.387$ (sec d) | $-8'.5$ |
| | $17\ 58\ 58^s.1$ | $-43\ 43''.6$ | | $15)\overline{123.096}$ | |
| | | | | $-8^s.206$ | |
| C | $17\ 59\ 7^s.4$ | $-43\ 43''.3$ | | $+96''.00$ | $60)\overline{+9''.50}$ |
| | $+8^s.9$ | $+0''.2$ | | $1.384$ (sec d) | $+0'.2$ |
| | $17\ 58\ 58^s.5$ | $-43\ 43''.5$ | | $15)\overline{132.864}$ | |
| | | | | $+8^s.851$ | |
| D | $17\ 58\ 35^s.4$ | $-43\ 38''.0$ | | $-250''.50$ | $60)\overline{+327''.75}$ |
| | $-23^s.1$ | $+5''.5$ | | $1.382$ (sec d) | $+5'.5$ |
| | $17\ 58\ 58^s.5$ | $-43\ 43''.5$ | | $15)\overline{346.191}$ | |
| | | | | $-23^s.079$ | |
| E | $17\ 58\ 58^s.9$ | $-43\ 47''.1$ | | $0''.00$ | $60)\overline{-217''.25}$ |
| | $0^s.0$ | $-3''.6$ | | $1.385$ (sec d) | $-3'.6$ |
| | $17\ 58\ 58^s.9$ | $-43\ 43''.5$ | | | |
| F | $17\ 58\ 44^s.9$ | $-43\ 45''.8$ | | $-140''.25$ | $60)\overline{-136''.00}$ |
| | $-12^s.9$ | $-2''.3$ | | $1.385$ (sec d) | $-2'.3$ |
| | $17\ 58\ 57^s.8$ | $-43\ 43''.5$ | | $15)\overline{194.246}$ | |
| | | | | $-12^s.950$ | |
| G | $17\ 59\ 8^s.4$ | $-43\ 51''.9$ | | $+110''.75$ | $60)\overline{-498''.85}$ |
| | $+10^s.2$ | $-8''.3$ | | $1.387$ (sec d) | $-8'.3$ |
| | $17\ 58\ 58^s.2$ | $-43\ 43''.6$ | | $15)\overline{153.610}$ | |
| | | | | $+10^s.241$ | |
| H | $17\ 59\ 11^s.9$ | $-43\ 40''.2$ | | $+147''.50$ | $60)\overline{+200''.00}$ |
| | $+13^s.6$ | $+3''.3$ | | $1.383$ (sec d) | $+3'.3$ |
| | $17\ 58\ 58^s.3$ | $-43\ 43''.5$ | | $15)\overline{203.992}$ | |
| | | | | $+13^s.599$ | |

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No plotting made; compare directly with print. No check reduction from coordinates is necessary, as no correction is applied.



N.G.C. 6541.

| | | | | R.A. Resids. | Dec. |
|---|---|---|---|---|---|
| from | A | $17^h\ 58^m\ 59^s.3$ | $-43^\circ\ 43'.5$ | +.85 | +.02 |
| " | B | 17 58 58.1 | -43 43.6 | -.35 | -.08 |
| " | C | 17 58 58.5 | -43 43.5 | +.05 | +.02 |
| " | D | 17 58 58.5 | -43 43.5 | +.05 | +.02 |
| " | E | 17 58 58.9 | -43 43.5 | +.45 | +.02 |
| " | F | 17 58 57.8 | -43 43.5 | -.65 | +.02 |
| " | G | 17 58 58.2 | -43 43.6 | -.25 | -.08 |
| " | H | 17 58 58.3 | -43 43.5 | -.15 | +.02 |
| | | 36 | 42 | +1.40 | +.12 |
| (1875) | | $17^h\ 58^m\ 58^s.45$ | $-43^\circ\ 43'.52$ | -1.40 | -.16 |

$17^h\ 59^m.0$ $-43^\circ\ 43'.5$ (1875 by measures)
1.8 0.0

18 0.8 -43 43.5 (1900)

H.A. 76, No. 4. 18 $0^m\ 45^s$ -43 43.5 (1900)

Position of Var. No. 1.

Center = $17^h\ 58^m\ 58^s.45$ $-43^\circ\ 43'.52$ (1875)
2.03 2.1

17 59 00.48 -43 45.6 (1875)

Prec. 1.8 0.0

18 0.8 -43 45.6 (1900)

Sec. $\delta$ = 1.3822
.0006
Sec. $\delta$ = 1.3838
22
15) 30.44
2.03 = 5

126" = 2.1

Announced H.B. 764

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1919phae.proj.1184W



N.G.C. 6541.

To correct orientation

Star-Center ( $17^h 58^m 58^s.4$ $-43° 43'.5$

(1875)

All Conf. stars are on D Plate

| | | | | |
|---|---|---|---|---|
| A | $17^h 59^m 8^s.9$ | $-43° 34'.9$ | $+0^m 10^s.5$ (cos δ) | $+0° 8'.6$ |
| | | | $10^s.5 \times 0.724 \times 15 = +114''.030$ | |
| | | | $8'.6 = 516''.0$ | |
| B | 17 58 49.9 | −43 52.1 | $-0\ 8^s.5$ (cos δ) | $-0\ 8'.6$ |
| | | | $8^s.5 \times 0.721 \times 15 = -91.928$ | |
| | | | $8'.6 = 516''.0$ | |
| C | 17 59 7.4 | −43 43.3 | $+0\ 9^s.0$ (cos δ) | $+0\ 0'.2$ |
| | | | $9^s.0 \times 0.723 \times 15 = +97.605$ | |
| | | | $0'.2 = 12''.0$ | |
| D | 17 58 35.4 | −43 38.0 | $-0\ 23^s.0$ (cos δ) | $+0\ 5'.5$ |
| | | | $23^s.0 \times 0.724 \times 15 = -249.780$ | |
| | | | $5'.5 = 330''.0$ | |
| E | 17 58 58.9 | −43 47.1 | $+0\ 0^s.5$ (cos δ) | $-0\ 3'.6$ |
| | | | $0^s.5 \times 0.722 \times 15 = +5.415$ | |
| | | | $3'.6 = 216''.0$ | |
| F | 17 58 44.9 | −43 45.8 | $-0\ 13^s.5$ (cos δ) | $-0\ 2'.3$ |
| | | | $13^s.5 \times 0.722 \times 15 = -146.205$ | |
| | | | $2'.3 = 138''.0$ | |
| G | 17 59 8.4 | −43 51.9 | $+0\ 10^s.0$ (cos δ) | $-0\ 8'.4$ |
| | | | $10^s.0 \times 0.721 \times 15 = +108.150$ | |
| | | | $8'.4 = 504''.0$ | |
| H | 17 59 11.9 | −43 40.2 | $+0\ 13^s.5$ (cos δ) | $+0\ 3'.3$ |
| | | | $13^s.5 \times 0.723 \times 15 = +146.408$ | |
| | | | $3'.3 = 198''.0$ | |

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| | Measures | | Diff. fr. Cat. (Meas.-Cat.) | |
|---|---|---|---|---|
| | x | y | | |
| +516".0 | +104".50 | +518." | −10" | +2" |
| −516.0 | −89 | −511 | +3 | +5 |
| +12.0 | +96 | +10 | −2 | −2 |
| +330.0 | −250 | +328 | 0 | −2 |
| −216.0 | 0 | −217 | −5 | −1 |
| −138.0 | −140 | −136 | +6 | +2 |
| −504.0 | +111 | −499 | +3 | +5 |
| +198.0 | +148 | +200 | +2 | +2 |
| | | | +14 −19 | +16 −5 |

No correction needed for scale.
" " " orientation

*

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N.G.C. 6541 Var. No. 1.

Superseded by page 12. Examined. B Plates do not show object. Single stars in Cluster cannot be separated.

| | | | | |
|---|---|---|---|---|
| B | 3861. | | | |
| | 3876 | | | |
| | 4096 | | | |
| | 4990 | 1890 | Apr. 25 | |
| | 5420 | " | June 14 | |
| | 23786 | 1899 | Aug. 8 | |
| | 30298 | 1902 | July 7 | |
| | 32058 | 1903 | June 27 | |
| | 44878 | 1914 | July 26 | |

All Plates do not show object.

| | | | | |
|---|---|---|---|---|
| Examind | Am 1854 | 1903 | April 3, | |
| | 1895 | " | Apr. 21 | |
| | 4169 | 1906 | " 23 | |
| | 5673 | 1908 | July 22 | |
| | 5688 | " | July 26 | |
| | 5708 | " | Aug. 1 | |
| | 5718 | " | " 3 | |
| | 5750 | " | " 14 | |
| | 5751 | " | " 15 | |
| | 5986 | 1909 | Mar. 22. | |
| MF | 4481 | Am 14267 1918, Aug. 6 1919 | Aug. 20. | Blurred. No est. of mag. n. |
| | 6334 | 1920, | July 18 | Blurred. No estimate of m |
| Exc. Pl. | 6649 | " | August 9 | Var. N.S. Star 16 is at bac |
| | 4925 | | July 13, 1893 | N.S. |
| 18157 | 12124 | | Aug. 3, 1908 | Br. |
| 18187 | 12169 | | Sept. 2, " | Br. |

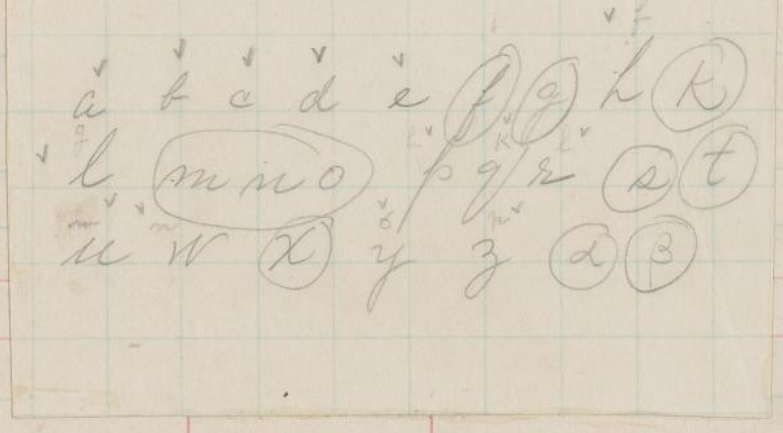
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N.G.C. 6541.

Will Miss Leavitt please correct or approve sequence as marked on print, (see ~~V~~ 12124 ?



magn.
of magn.
at least .2.

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N.G.C. 6541. Var. 1.

| | | | | |
|---|---|---|---|---|
| | Best* | 1927 | 1896, July 18, Not Seen. | |
| 13776 | a | 1975 | 1896, Aug. 4 Not Seen | |
| | * | 1982 | " Aug 6 Not Seen | |
| 14162 | | 2667 | 1897 Aug. 25 Bright. | |
| | | 2465 | 1897 June 9 Too poor. | |
| 15529 | | 5209 | 1901 May 24. Blurred images. Var. probably N.S. | |
| 15618 | | 5559 | " Aug. 21 Poor. | |
| " | | 5560 | " " 21 Too poor | |
| " | | 5561 | " " 21 " " Probably N.S. | |
| " | | 5562 | " " 21 " " Short Exp. Defect in region | |
| " | | 5563 | " " 21 Probably N.S. Blurred. | |
| " | | 5564 | " " 21 " " Too poor. | |
| " | | 5565 | " " 21 " " Short Exp. | |
| 15632 | * | 5626 | " Sept. 4 N.S. | |
| 15634 | | 5633 | " " 6 Probably N.S. Too poor. | |
| 15634 | | 5634 | " " 6 " " Blurred. | |
| 15635 | | 5636 | " " 7 N.S. | |
| 15667 | | 5709 | " Oct. 9 N.S. | |
| 16184 | | 6313 | 1903 Mar. 10 N.S. | |
| 16225 | | 6340 | " April 20 N.S. | |
| | | 6375 | " May 15 Too poor | |
| | | 8405 | 1907 Aug. 3 N.S. | |
| | | 8975 | 1908 July 29 | |
| | | 8853 | " June 16 Too poor. | |
| | | ~~8878~~ 9339 | 1909 June 8 Too poor | |

For list of B Plates, see page 12.

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1919phae.proj.1184w



Var. nearly = a = 12.3? (See page 19)

Fainter than Star 16, which = at least, 3

" "

Star 16 is quite bright.

This plate does not show Comp. sequence but shows as faint stars as a 5626. Fainter than Star 16?
(Blurred. Cannot separate. Var. is about = to star near P (:o = to var., :o - var.
This star is fainter than 16 of Seq. about 14th Magn. ?

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1919phae.proj.1184w



Continued from Book 5, p. 172.

May 3, 1919.

N.G.C. 6362. Measures of positions of Variables and Comparison Stars

Measures of D 18331 from X 12161

| | rect | hor. | rect. | hor. | Mean rect. | Resids | |
|---|---|---|---|---|---|---|---|
| E | 1798 | 1906. | 1798 | 1906 | 17980 | 00 | 00 |
| a | 1045 | 921 | 1045 | 920 | 10450 | 00 | 00 |
| b | 1695 | 1238 | 1695 | 1238 | 16950 | 00 | 00 |
| c | 1930 | 1482 | 1930 | 1482 | 19300 | 00 | 00 |
| d | 1458 | 1013 | 1458 | 1013 | 14580 | 00 | 00 |
| e | 1230 | 1249 | ~~1798~~ 1230 | 1249 | 12300 | 00 | 00 |
| f | 1287 | 1013 | 1287 | 1012 | 12870 | 00 | 00 |
| g | 1392 | 1001 | 1392 | 1001 | 13920 | 00 | 00 |
| h | 1327 | 1022 | 1320 | 1021 | 13205 | 05 | 05 |
| k | 1433 | 923 | 1433 | 923 | 14330 | 00 | 00 |
| l | 1650 | 1032 | 1650 | 1032 | 16500 | 00 | 00 |
| m | 1597 | 1103 | 1597 | 1102. | 15970 | 00 | 00 |
| n' | 1611 | 10.32 | 1612 | 1032 | 16115 | 05 | 05 |
| o' | 1732 | 1074 | 1732 | 1075 | 17320 | 00 | 00 |
| p' | 1668 | 1008 | 1668 | 1008 | 16680 | 00 | 00 |
| q' | 1698 | 1000 | 1698 | 1000 | 16980 | 00 | 00 |
| r' | 1639 | 1156 | 1638 | 1155 | 16385 | 05 | 05 |
| n² | 1247 | 1346 | 1247 | 1347 | 12470 | 00 | 00 |
| o² | 1264 | 1326 | 1264 | 1327 | 12640 | 00 | 00 |
| p² | 1301 | 1263 | 1300 | 1263 | 13005 | 05 | 05 |
| q² | 12.22 | 1312 | 1222 | 1312 | 12220 | 00 | 00 |
| r² | 1235 | 1351 | 1236 | 1352 | 12355 | 05 | 05 |

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1919phae.proj.11daw



Means hor, Resids. Star-Center (14260, 11683) ver. hor. = Decl. = R.A. vert. x5" hor. x5"

| | | | | | |
|---|---|---|---|---|---|
| 19060 00 00 | +3720 | +8377 | +186.00 | +418.85 | E |
| 9205 05 05 | −3810 | −2478 | −190.50 | −123.90 | a |
| 12380 00 00 | +2690 | +697 | +134.50 | +34.85 | b |
| 14820 00 00 | +5040 | +3137 | +252.00 | +156.85 | c |
| 10130 00 00 | +320 | −1553 | +16.00 | −77.65 | d |
| 12490 00 00 | −1960 | +807 | −98.00 | +40.35 | e |
| 10125 05 05 | −1390 | −1558 | −69.50 | −77.90 | f |
| 10010 00 00 | −340 | −1673 | −17.00 | −83.65 | g |
| 10215 05 05 | −1055 | −1468 | −52.75 | −73.40 | h |
| 9230 00 00 | +70 | −2453 | +3.50 | −122.65 | k |
| 10320 00 00 | +2240 | −1363 | +112.00 | −68.15 | l |
| 11025 05 05 | +1710 | −658 | +85.50 | −32.90 | m |
| 10320 00 00 | +1855 | −1363 | +92.75 | −68.15 | n' |
| 10745 05 05 | +3060 | −938 | +153.00 | −46.90 | o' |
| 10080 00 00 | +2420 | −1603 | +121.00 | −80.15 | p' |
| 10000 00 00 | +2720 | −1683 | +136.00 | −84.15 | q' |
| 11555 05 05 | +2125 | −128 | +106.25 | −6.40 | r' |
| 13465 05 05 | −1790 | +1782 | −89.50 | +89.10 | $n^2$ |
| 13265 05 05 | −1620 | +1582 | −81.00 | +79.10 | $o^2$ |
| 12630 00 00 | −1255 | +947 | −62.75 | +47.35 | $p^2$ |
| 13120 00 00 | −2040 | +1437 | −102.00 | +71.85 | $q^2$ |
| 13515 05 05 | −1905 | +1832 | −95.25 | +91.60 | $r^2$ |

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1919phae.proj.1184W



N.G.C. 6362 Measures of positions

D 18331, continued.

| see page 40 Old nos. | rev. | | hor. | | Mean vert. Res. |
|---|---|---|---|---|---|
| 1 | 1426 | 1169 | 1426 | 1168 | 1426 1168 |
| 2 | 1228 | 1111 | 1226 | 1111 | 1227.0 10 10 |
| 3 | 1248 | 1003 | 1247 | 1002 | 12475 05 05 |
| 4 | 1251 | 1010 | 1250 | 1010 | 12505 05 05 |
| 5 | 1397 | 1331 | 1397 | 1331 | 13970 00 00 |
| not confirmed 6 | ~~1417~~ | ~~1325~~ | ~~1418~~ | ~~1326~~ | ~~14175 05 05~~ |
| 7 | 1635 | 1214 | 1634 | 1212 | 16345 05 05 |
| 8 | 1641 | 643 | 1641 | 643 | 16410 00 00 |
| 9 | 1702 | 754 | 1701 | 753 | 17015 05 05 |
| not confirmed 10 | ~~1482~~ | ~~1151~~ | ~~1482~~ | ~~1151~~ | ~~14820 00 00~~ |
| 11 | 1523 | 1112 | 1522 | 1111 | 15225 05 05 |
| 12 | 1219 | 678 | 1219 | 678 | 12190 00 00 |
| 13 | 1186 | 700 | 1185 | 700 | 11855 05 05 |
| 14 | 1483 | 1908 | 1482 | 1909 | 14825 05 05 |
| new no. 10 = ~~15~~ | 2130 | 1541 | 2130 | 1541 | 21300 00 00 |
| not confirmed ~~16~~ | ~~1357~~ 1776 | ~~1149~~ ~~1276~~ | ~~1358~~ | ~~1140~~ | ~~13575 05 05~~ |
| new no. 6 = ~~17~~ | 1776 | 1276 | 1775 | 1277 | 17755 05 05 |
| ~~no. 18~~ = new no. 15 = ~~18~~ found by Prof. S.I. Bailey. | 1429 | 1271 | 1430 | 1271 | 14295 05 05 |

Star 1 is used as Center. Confirmed by Miss Leavitt.

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Mean hor. Res. Star – Center, (rev. 14260, hor. 11683) = Decl. = R.A.

| 14260 rev. 00 00 00 | 11683 hor. 07 03 03 00 | 00 | rev. ×5″ 000 | hor. ×5″ 000 | | |
|---|---|---|---|---|---|---|
| 11110 hor. 00 00 | −1990 | −573 | −99.50 | −28.65 | | 2 |
| 10025 05 05 | −1785 | −1658 | −89.25 | −82.90 | | 3 |
| 10100 00 00 | −1755 | −1583 | −87.75 | −79.15 | | 4 |
| 13310 00 00 | −290 | +1627 | −14.50 | +81.35 | | 5 |
| 13255 05 05 | −85 | +1572 | −4.25 | +78.60 | omit | X |
| 12130 10 10 | +2085 | +447 | +104.25 | +22.35 | | 7 |
| 6430 00 00 | +2150 | −5253 | +107.50 | −262.65 | | 8 |
| 7535 05 05 | +2755 | −4148 | +137.75 | −207.40 | | 9 |
| 11510 00 00 | +560 | −173 | +28.00 | −8.65 | omit | X |
| 11115 05 05 | +965 | −568 | +48.25 | −28.40 | | 11 |
| 6780 00 00 | −2070 | −4903 | −103.50 | −245.15 | | 12 |
| 7000 00 00 | −2405 | −4683 | −120.25 | −234.15 | | 13 |
| 19085 05 05 | +565 | +7402 | +28.25 | +370.10 | | 14 |
| 15410 00 00 | +7040 | +3727 | +352.00 | +186.35 | Changed to 10 | = |
| 11400 00 00 | −685 | −283 | −34.25 | −14.15 | omit | X |
| 12765 05 05 | +3495 | +1082 | +174.75 | +54.10 | Changed to 6 | 17 |
| 12711 00 00 | +35 | +1028 | +1.75 | +51.40 | Changed to 15 | 18 |

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N.G.C. 6362 Identification of Catalogue Stars.

See B 33534

| | | | R.A. (1875) h m s | Dec. ° ′ | Magn. | |
|---|---|---|---|---|---|---|
| Checked by Miss Mackie | √A | C.P.D. -66° 3116 | 17 17 35.0 | -66 45.6 | 7.2 | |
| | √B | -67 3328 | 17 16 27.0 | -67 10.0 | 8.8 | |
| | √C | -67 3333 | 17 18 55.5 | -67 8.7 | 9.2 | |
| | √D | -66 3121 | 17 21 8.0 | -66 58.2 | 8.9 | 17 23.7 — 6 |
| | √E | -66 3118 | 17 20 5.0 | -66 53.4 | 9.6 | |
| | √F | -67 3329 | 17 17 13.5 | -67 9.0 | 9.6 | |

20.1
16

23.7
21.1
2.6

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1919pnae.proj.1184w



QC

6659 138367
--

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N.G.C. 6362.

Reduction of Center. on D Plate. Unly

| | | | | | | |
|---|---|---|---|---|---|---|
| E | $17^h$ | $20^m$ | $5^s.0$ | $-66°\ 53'.4$ | $+36^{mm}\ 8.85$ | $+186.00$ |
| | 1 | 2.6 | - | 3.1 | | |
| | $17^h\ 19^m$ | $2^s.4$ | $-66°\ 56'.5$ | | | |

By measure on print, $x = 73.0$ mm $y = 37.1$

| | |
|---|---|
| 5 | 5 |
| $365''.0$ | $185.5$ |

See page 46 for reduction of center on X Plate.

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one Catalogue star.

from D Plate. 368.″85
2.5476 (decant δ)
15)938.682
62.ˢ579

60)186.″00
3.′1

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May 10, 1919. J

N.G.C. 6362

Measures of Cat. Stars on X 12167. Cat. Stars A, B, C, D, E, F, a, b, c, d, measured, not on enlargement. These stars also, a few stars, duplicated. Meas. on D 8831

| | Meas. hor. | Meas. rev. | Mean hor. | Mean rev. | Residuals hor. | Residuals rev. |
|---|---|---|---|---|---|---|
| A | -15.80 | +12.45 | -15.80 | +12.40 | -15.80 | +12.42 |
| B | -26.20 | -21.92 | -26.18 | -21.90 | -26.19 | -21.91 |
| C | -5.75 | -20.40 | -5.80 | -20.40 | -5.78 | -20.40 |
| D | +13.00 | -6.30 | +13.00 | -6.30 | +13.00 | -6.30 |
| E | +4.55 | +0.75 | +4.60 | +0.70 | +4.58 | +0.72 |
| F | -19.70 | -20.60 | -19.70 | -20.60 | -19.70 | -20.60 |
| a | -7.45 | -7.55 | -7.48 | -7.60 | -7.46 | -7.58 |
| b | -3.40 | -0.12 | -3.35 | -0.10 | -3.38 | -0.11 |
| c | -0.30 | +2.48 | -0.30 | +2.45 | -0.30 | +2.46 |
| d | -6.08 | -2.80 | -6.08 | -2.80 | -6.08 | -2.80 |
| Var. 1 = Centre | -4.30 | -3.30 | -4.30 | -3.25 | -4.30 | -3.28 |

| | | | | | | |
|---|---|---|---|---|---|---|
| A | 00 | 00 | 03 | 02 | | |
| B | 01 | 01 | 02 | 01 | | |
| C | 03 | 02 | 00 | 00 | | |
| D | 00 | 00 | 00 | 00 | | |
| E | 03 | 02 | 03 | 02 | | |
| F | 00 | 00 | 00 | 00 | | |
| a | 01 | 02 | 03 | 02 | | |
| b | 02 | 03 | 01 | 01 | | |
| c | 00 | 00 | 02 | 01 | | |
| d | 00 | 00 | 00 | 00 | | |
| Var. 1 = Centre | 00 | 00 | 02 | 03 | | |

These measures made on glass table with plate ruled in millimeters. Setting of plate was made by Miss A. D. Walker.

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B, C, D, F, were

use these coordinates in final table, [illegible] Plate

to reduce I plate to scale of D Plate. R.A. Dec.

| Star-Center (-4.30 -3.28) | | | | 0.05 X | 0.05 Y | x-0.05 Y | y+0.05 X |
|---|---|---|---|---|---|---|---|
| -11.56 mm hor. | +15.70 rev. mm | −487.600 mm hor. ×42".4 | +665.680 rev. ×42".4 mm | -24.380 | +33.284 | -520.884 | +641.300 |
| -21.89 | -18.63 | -928.136 | -789.912 | -46.407 | -39.496 | -888.640 | -836.319 |
| -1.48 | -17.12 | -62.752 | -725.888 | -3.138 | -36.294 | -26.458 | -757.264 |
| +17.30 | -3.02 | +733.520 | -128.048 | +36.676 | -6.402 | +739.922 | -91.372 |
| +8.88 | +4.00 | +376.512 | +169.600 | +18.826 | +8.480 | +368.032 | +188.426 |
| -15.40 | -17.32 | -652.960 | -734.368 | -32.648 | -36.718 | -616.242 | -767.016 |
| | | | | | | | |
| -3.16 | -4.30 | -133.984 | -182.320 | -6.699 | -9.116 | -124.868 | -189.019 |
| +0.92 | +3.17 | +39.008 | +134.408 | +1.950 | +6.720 | +32.288 | +136.358 |
| +4.00 | +5.74 | +169.600 | +243.376 | +8.480 | +12.169 | +157.431 | +251.856 |
| -1.78 | +0.48 | -75.472 | +20.352 | -3.774 | +1.018 | -76.490 | +16.578 |

N. B. For determination of corrections, 0.05 X and 0.05 Y, see page 43, with curves.

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N.G.C. 6362. Count of Stars in Region.

Circle is drawn, see print, 96 m.m. Radius.
Diam. = 192 m.m.
Scale 5" to m.m.
60)960"
16' Diameter
8' Radius.

{Star near upper right hand edge,
{also " near Var. No. 12, is included in count.
Fainter than these not intended to be included.

| Section | First Estimate | Section | Est. |
|---|---|---|---|
| 1 | 30 | 9 | 42 |
| 2 | 14 | 10 | 50 |
| 3 | 20 | 11 | 47 |
| 4 | 46 | 12 | 22 |
| 5 | 26 | 13 | 14 |
| 6 | 22 | 14 | 36 |
| 7 | 53 | 15 | 27 |
| 8 | 44 | 16 | 12 |
| | 255 | 17 | 8 |
| | 268 | 18 | 10 |
| Total | 523 | | 268 |

Explanation of diagram, p. 39.
Circle marked, (see top of p. 38)
Sections marked 1 to 18.
Count made in each section.
Total = 523
Variables in circle = 15
∴ One star in 35 is a variable.

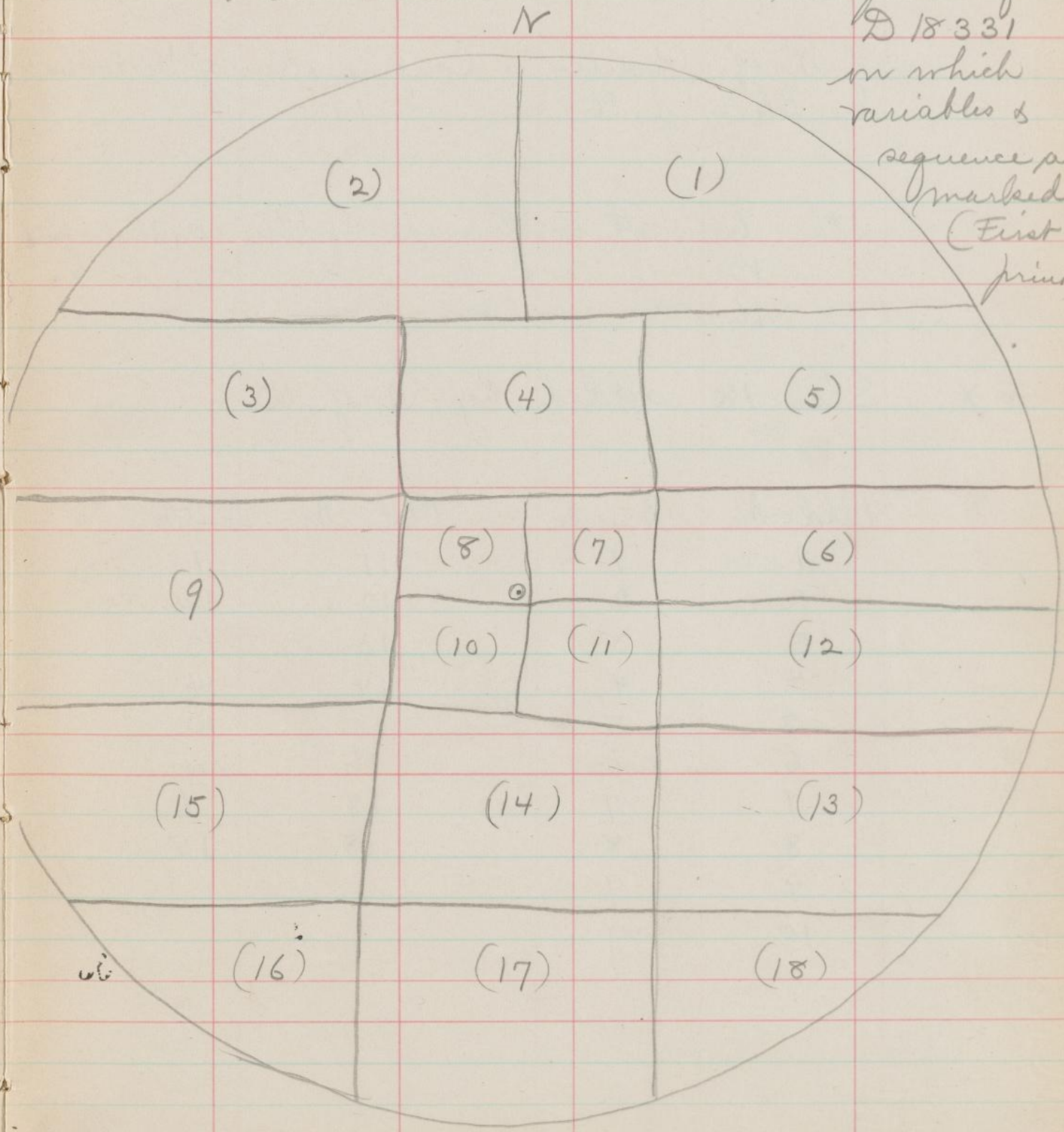
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1919phae.proj.1184w



N.G.C. 6362

From print of D 18331 on which variables & sequence are marked. (First print)




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A.G.C. 6362.

Prof. Bailey's Confirmation of Variables.

* See Bk. 5, f. 169.

Star 6 not confirmed by Prof. B., Star rejected
10 " " " " " " "
16 " " " " " " "

** Star 18 added by Prof. B.

| Old No. | New No. | Old No. | New No. |
|---|---|---|---|
| 1 | 1 | 11 | 11 |
| 2 | 2 | 12 | 12 |
| 3 | 3 | 13 | 13 |
| 4 | 4 | 14 | 14 |
| 5 | 5 | 15 | 10 |
| 6 | rej. | 16 | rej. |
| 7 | 7 | 17 | 6 |
| 8 | 8 | 18 | 15 |
| 9 | 9 | | |
| 10 | rej. | | |

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N.G.C. 6362.

| | Measures on D 18331 page 28 x | y | Meas. on X 12167 page 36 x | y | Diff. X Plate − D Plate x | y |
|---|---|---|---|---|---|---|
| E | +368.85 | +186.00 | +376.51 | +169.60 | +7.66 | −16.40 |
| a | −123.90 | −190.50 | −133.98 | −182.32 | −10.08 | +8.18 |
| b | +34.85 | +134.50 | +39.01 | +134.41 | +4.16 | −0.09 |
| c | +156.85 | +252.00 | +169.60 | +243.38 | +12.75 | −8.62 |
| d | −77.65 | +16.00 | −75.47 | +20.35 | +2.18 | +4.35 |

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| See curves plotted | X Plate 0.05 X | 0.05 Y | X Plate Corrected x − 0.05 Y | y + 0.05 X | X Plate Corrected − D Plate x | y |
|---|---|---|---|---|---|---|
| D Pl. X, Diff. X | ~~+18.83~~ | ~~+8.48~~ | | | | |
| | +18 83 | +8 48 | | | | |
| " X, " Y | ~~− 6.70~~ | ~~− 9.12~~ | +368.″03 | +188.″43 | −0.″82 | +2.″43 |
| | − 6.70 | − 9.12 | | | | |
| " Y, " X | ~~+1.95~~ | ~~+6.72~~ | −124.86 | −189.02 | −0.96 | +1.48 |
| | + 1.95 | + 6.72 | | | | |
| " Y, " Y | ~~+8.48~~ | ~~+12.17~~ | +32.29 | +136.36 | −2.56 | +1.86 |
| | + 8.48 | + 12.17 | | | | |
| Correction for | ~~−3.77~~ | ~~+1.02~~ | +157.43 | +251.86 | +0.58 | −0.14 |
| orientation = | − 3.77 | + 1.02 | − 76.49 | + 16.58 | +1.16 | +0.58 |
| − 0.05 Y | | | | | | |
| 0.05 X | | | | | | |

See plotting
D Pl. X Corrected
" X " " Y
" Y " " X
" Y " " Y

No evidence of further correction necessary for scale or orientation of X Plate.
See page 37 for reduction of all stars on X plate.

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N.G.C. 6362.

Will Miss Leavitt please confirm or change selection of sequence?

D.E.W.

X 11794 or 12161.

Interval b - c obviously large ?; are a and b surely needed.? Variable No. 2 (bright on X 12161) is fainter than d.

Interval d - e rather large.

Other comparison stars will do very well.

a - b difficult to find stars of right mags

c far off

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N.G.C. 6362. Position of Centre,

Coordinates from X Plate, see page 36.

| | | | | |
|---|---|---|---|---|
| A | $17^h\ 17^m\ 35^s.0$ | $-66°\ 45'.6$ | $x = -521''$ | $y = 4641''$ |
| (Subtract $\alpha$) | $-\ 1\ 28.0$ | $+\ 10'.7$ | $2.5343$ (recast $\delta$) | $= 10'.7$ |
| (Subtract $\delta$) | $17\ 19\ 3.0$ | $-66\ 56'.3$ | $15)1320.3703$ | |
| | | | $88^s.0247 = 1^m 28^s.0$ | |
| B | $17\ 16\ 27.0$ | $-67\ 10.0$ | $x = -889''$ | $y = -836''$ |
| | $-\ 2\ 32.7$ | $-\ 13'.9$ | $2.5771$ (recast $\delta$) | $= 13'.9$ |
| | $17\ 18\ 59.7$ | $-66\ 56'.1$ | $15)2291.0419$ | |
| | | | $152^s.7361 = 2^m 32^s.7$ | |
| C | $17\ 18\ 55.5$ | $-67\ 8.7$ | $x = -26''$ | $y = -757''$ (729) |
| | $-\ 0\ 4.5$ | $-12'.6$ | $2.5748$ (recast $\delta$) | $12'.6^2$ |
| | $17\ 19\ 0.0$ | $-66\ 56'.1$ | $15)66.9448$ | |
| | | | $4.^s630 = 0^m 4^s.5$ | |
| D | $17\ 21\ 8.0$ | $-66\ 58.2$ | $x = +740''$ | $y = -91''$ |
| | $+\ 2\ 6.1$ | $-\ 1'.5$ | $2.5564$ (recast $\delta$) | $= 1'.5$ |
| | $17\ 19\ 1.9$ | $-66\ 56'.7$ | $15)1891.7360$ | |
| | | | $126^s.1157 = 2^m 6^s.1$ | |
| E | $17\ 20\ 5.0$ | $-66\ 53.4$ | $x = +368$ | $y = +188''$ |
| | $+\ 1\ 2.5$ | $+\ 3'.1$ | $2.5476$ | $= 3'.1$ |
| | $17\ 19\ 2.5$ | $-66\ 56'.5$ | $15)937.5168$ | |
| | | | $62^s.5011 = 1^m 2^s.5$ | |
| F | $17\ 17\ 13.5$ | $-67\ 9.0$ | $x = -616$ | $y = -767''$ |
| | $-\ 1\ 45.8$ | $-\ 12'.8$ | $2.5753$ | $= 12'.8$ |
| | $17\ 18\ 59.3$ | $-66\ 56'.2$ | $15)1586.3848$ | |
| | | | $105^s.7590 = 1^m 45^s.8$ | |

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X Plate.

| | C.P.D. R.A. | Dec. | Resids. α | δ | δ |
|---|---|---|---|---|---|
| Centre, from A | 17h 19m 3.0s | -66° 56.'3 | +1.9 | 0.0 | +0.1 |
| " B | 17 18 59.7 | -66 56.1 | -1.4 | +0.2 | +0.3 |
| " C | 17 19 0.0 | -66 56.1 | -1.1 | +0.2 | -0.1 |
| " D | 17 19 1.9 | -66 56.7 | +0.8 | -0.4 | -0.3 |
| " E | 17 19 2.5 | -66 56.5 | +1.4 | ~~+~~0.2 | -0.1 |
| " F | 17 18 59.3 | -66 56.2 | -1.8 | +0.1 | +0.2 |
| | 3664 | 1.9 | +4.1 | +0.5 | +0.6 |
| | | | -43 | -0.6 | -05 |
| | 17 19 1.1 | -66 56.3 | (1875) | | +0.1 |
| Prec. from C.P.D. | + 2m 33s | - 1.5 | | | |
| | 17 21 34.1 | -66 57.8 | (1900) | | |
| H.A. 76, No. 4. | 17 21 30 | -66 58.1 | (1900) | | |

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July 14, 1919.

N.G.C. 6705. M11

$18^h 45^m 42^s$ $-6^\circ 23' 3$

References:—

H. a. 76, No. 4, p. 47.

Conclusion:—

No objects of interest in Cluster.

See Prof. Barnard's letter of July 10, 1919.

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1919phae.proj.1184w



N.G.C. 6705.

| Plates available; — | | | Ef. | 2. |
|---|---|---|---|---|
| X | 6910 | July 20, 1895 | 90 | 4 |
| | 6926 | July 25, 1895 | 80 | 4 |
| | ~~8933~~ | ~~October 19, 1897~~ | ~~90~~ | ~~3~~ |
| | 8942 | October 23, 1897 | 90m * | 3i |
| | 9898 | August 3, 1899. | 90 | 3 |

8942 two exposures,

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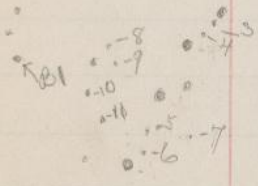
July 16 and 17, 1919.

N.G.C. 6705 M 11.

Letter of Prof. E. E. Barnard, July 10, 1919.

Var. 1. marked on print of July 5, 1916.

B 26206 shows cluster but not the variables (?)




Barnard's Var. 1 on B's print brighter than 3, and brighter than 5,

on I 6926, a little fainter than 4
on I 6910, abmt = 9
on I 6942, abmt = 4
on I 9898 little brighter than 4
on A 9514 abmt = 4, my print plate
on A 8506 " = 9
on A 1851 a little fainter than 4

between 4 and 9 are perhaps 2 differences
between 3 and 9 there is a large diff

Conclusion: a slight variation detected on Harvard plates.

A marked variation, if plate and print can be compared, is shown between Yerkes & Harvard

July 26.

This star is not the one ident. by Miss Leavitt as Barnard's star. I noticed it was a little out of position, but I shows two stars, one the star that shows on all Harvard plates and the extra star, which is B's variable. See letter to B. July , 1919

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July 17, 1919.

N.G.C. 6705 (cont)

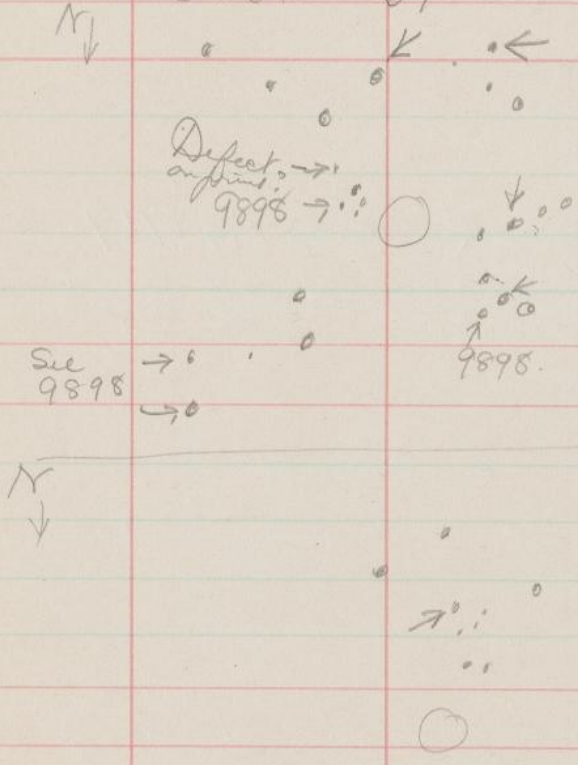
Var. 2. marked on print of June 17, 1919.
Does not appear on Harvard plates.
X 6926
X 9898
X 6910
a 1551
a 8506
a 9514
X 8942
Image on print does not look like other stars. Defect?

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N.G.C 6705




Comparison of Harvard Plates with Barnard's print

Several other differences in stars between Harvard plates and B.'s print. Miss Leavitt says it is ~~stuff~~ due to difference in color indices of different instruments.

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See also, Bk. No. 4, p. 10.

N.G.C. 2808.

Identification of Catalogue Stars.

See B 18897

| | | | | (1875) | | | | Magn. |
|---|---|---|---|---|---|---|---|---|
| | | | | h | m | s | ° ′ | |
| Chd by Miss Mackie | A | C.P.D. | -64° 1011 | 9 | 9 | 27.5 | -64 40.7 | 8.2 |
| | B | | -64 1017 | 9 | 11 | 55.5 | -64 32.1 | 8.2 |
| | C | | -64 1010 | 9 | 9 | 7.0 | -64 20.0 | 9.3 |
| | D | | -64 1009 | 9 | 8 | 49.5 | -64 6.0 | 9.2 |
| | E | | -64 1014 | 9 | 10 | 1.5 | -64 3.5 | 9.4 |
| | F | | -64 1013 | 9 | 10 | 1.5 | -64 36.3 | 9.5 |

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June 25, 1919

N.G.C. 2808.

Measures of Positions of Comparison and Catalogued Stars and Variables.

Measures of D 18388 form X 11939

| | vert. | hor. | vert. | hor. | | |
|---|---|---|---|---|---|---|
| A | Not on D Plate | | | | | |
| B | " " D " | | | | | |
| C | 1512 | 731 | 1513 | 732 | | |
| D | " " D " | | | | | |
| E | " " D " | | | | | |
| F | " " D " | | | | | |
| a | 684 | 954 | 684 | 953 | | |
| b | 911 | 1128 | 911 | 1128 | | |
| c | 1490 | 1500 | 1490 | 1500 | | |
| d | 1312 | 1832 | 1312 | 1831 | | |
| e | 1283 | 1532 | 1282 | 1531 | | |
| f | 1211 | 1412 | 1212 | 1412 | | |
| g | 1607 | 771 | 1607 | 771 | | |
| h | 1535 | 1389 | 1533 | 1389 | | |
| k | 1598 | 1452 | 1599 | 1451 | | |
| l | 1680 | 1419 | 1680 | 1418 | | |
| m | 1821 | 1232 | 1821 | 1233 | | |
| * n | 1763 | 1169 | 1760 | 1169 | 1761 | 1168 |
| o | 1710 | 1157 | 1710 | 1156 | | |
| p | 1748 | 1021 | 1747 | 1021 | | |

*diff of 3 in x. Third meas. made.

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(14450 11133)

| Mean Vert. Resids | Mean Hor. Resids. | Star-Centre | ver. x5" | hor. x5" |
|---|---|---|---|---|
| 15125 ~~75~~ 05 05 | 7315 05 05 | + 675 −3818 | +33.75 | −190.90 |
| 6840 00 00 | 9535 05 05 | − 7610 −1598 | −38050 | −7990 |
| 9110 00 00 | 11280 00 00 | − 5340 + 147 | −26700 | + 735 |
| 14900 00 00 | 15000 00 00 | + 450 +3867 | +2250 | +19335 |
| 13120 00 00 | 18315 05 05 | − 1330 +7182 | −6650 | +35910 |
| 12825 05 05 | 15315 05 05 | − 1625 +4182 | −8125 | +20910 |
| 12115 05 05 | 14120 00 00 | − 2335 +2987 | −11675 | +14935 |
| 16070 00 00 | 7710 00 00 | + 1620 −3423 | +8100 | −17115 |
| 15340 10 10 | 13890 00 00 | + 890 +2757 | +4450 | +13785 |
| 15985 05 05 | 14515 05 05 | + 1535 +3382 | +7675 | +16910 |
| 16800 00 00 | 14185 05 05 | + 2350 +3052 | +11750 | +15260 |
| 18210 00 00 | 12325 05 05 | + 3760 +1192 | +18800 | + 5960 |
| 17613 17 13 03 | 11687 03 03 07 | + 3163 + 554 | +15815 | + 2770 |
| 17100 00 00 | 11565 05 05 | + 2650 + 432 | +13250 | + 2160 |
| 17475 05 05 | 10210 00 00 | + 3025 − 923 | +15125 | − 4615 |

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June 25, 1919.

N.G.C. 2808

Measures of Comp. Stars and Vars.

| D 18388 | rect | hor. | rect. | hor. |
|---|---|---|---|---|
| g | 1778 | 1039 | 1778 | 1039 |
| r | 1666 | 1100 | 1666 | 1100 |
| s | 1800 | 890 | 1800 | 890 |
| t | 1683 | 1101 | 1684 | 1101 |
| u | 1871 | 910 | 1873 | 910 |
| w | 1679 | 1011 | 1678 | 1011 |
| x | 1652 | 1001 | 1651 | 1001 |
| y | 1896 | 910 | 1896 | 910 |
| | | | | |
| Vars. 1 | 1389 | 1338 | 1390 | 1338 |
| 2 | 1340 | 1166 | 1340 | 1167 |
| 3 | 1591 | 1089 | 1591 | 1089 |
| 4 | 1246 | 1046 | 1248 | 1048 |
| 5 | 483 | 1982 | 484 | 1981 |
| ~~6~~ | | | | |
| ~~7~~ | | | | |
| Centre ~~8~~ | 1445 | 1114 | 1445 1113 | 1445 1113 |
| ~~9~~ | | | | |
| ~~10~~ | | | | |
| ~~11~~ | | | | |
| ~~12~~ | | | | |
| ~~13~~ | | | | |
| ~~14~~ | | | | |
| ~~15~~ | | | | |
| Centre | 1455 | 1114 | | |

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(14450 11133)

| Mean vert. | Resids. | Mean hor. | Resids. | Star–Centre | cor. x5" | hor. x5" |
|---|---|---|---|---|---|---|
| 17780 | 00 00 | 10390 | 00 00 | +33.30 −7.43 | +166.50 | −37.15 |
| 16660 | 00 00 | 11000 | 00 00 | +22.10 −1.33 | +110.50 | −6.65 |
| 18000 | 00 00 | 8900 | 00 00 | +35.50 −22.33 | +177.50 | −111.65 |
| 16835 | 05 05 | 11010 | 00 00 | +23.85 −1.23 | +119.25 | −6.15 |
| 18720 | 10 10 | 9100 | 00 00 | +42.70 −20.33 | +213.50 | −101.65 |
| 16785 | 05 05 | 10110 | 00 00 | +23.35 −10.23 | +116.75 | −51.15 |
| 16515 | 05 05 | 10010 | 00 00 | +20.65 −11.23 | +103.25 | −56.15 |
| 18960 | 00 00 | 9100 | 00 00 | +45.10 −20.33 | +225.50 | −101.65 |
| 13895 | 05 05 | 13380 | 00 00 | −5.55 +22.47 | −27.75 | +112.35 |
| 13400 | 00 00 | 11665 | 05 05 | −10.50 +5.32 | −52.50 | +26.60 |
| 15910 | 00 00 | 10890 | 00 00 | +14.60 −2.43 | +73.00 | −12.15 |
| 12470 | 10 10 | 10470 | 10 10 | −19.80 −6.63 | −99.00 | −33.15 |
| 4835 | 05 05 | 19815 | 05 05 | −96.20 +8.82 | −480.75 | +43.10 |

~~14450 00 00 00 11133~~

14450 00 00 00 11133 07 03 03

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August 12, 1919.

N.G.C. 2808
Measures of Catalogue Stars on D 18389
C is on field of D 18388
A, B, D, E, F to be meas. on D 18389
Also, for comparison of results, measure
C, a, b, c, d, e, f, g, h.

| | vert | hor | vert. | hor. |
|---|---|---|---|---|
| A | | | | |
| B | | | | |
| C | 1468 | 941 | 1468 | 942 |
| D | 2311 | 796 | 2312 | 796 |
| E | 2492 | 1262 | 2490 | 1263 |
| F | 510 | 1331 | 510 | 1331 |
| a | 1052 | 1054 | 1052 | 1054 |
| b | 1166 | 1140 | 1165 | 1140 |
| c | 1454 | 1327 | 1455 | 1327 |
| d | 1368 | 1492 | 1368 | 1492 |
| e | 1351 | 1341 | 1352 | 1343 |
| f | 1317 | 1285 | 1318 | 1283 |
| g | 1515 | 962 | 1514 | 962 |
| h | 1479 | 1271 | 1480 | 1271 |
| Centre | 1439 | 1134 | 1438 | 1135 |
| | | | 1436 | 1136 |

D 18389 is very black. Difficult to see markings on plate or line of images that indicate centre of scale. A & B cannot be measured, too near

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edge. These stars are remeasured on I 11903, page 64. Probably measures on I 11903 will supersede those on D 18389.

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August 12, 1919.

N.G.C. 2808.

Measures of Cat. Stars. on I 11903

C is in field of D 18388

A, B, D, E, F Solved measured on I 11903.

Also, for comparison of results, measure

C, a, b, c,

| | Dert. | Hor. | Dert. | Hor. | | | |
|---|---|---|---|---|---|---|---|
| A | 1116 | 1275 | 1116 | 1275 | | | 1 |
| B | 1304 | 1448 | 1304 | 1450 | | | 1 |
| C | 1378 | 1150 | 1379 | 1150 | | | 1 |
| D | 1558 | 1058 | 1558 | 1059 | | | 1 |
| E | 1631 | 1150 | 1630 | 1150 | | | 1 |
| F | 1190 | 1302 | 1190 | 1303 | | | 1 |
| a | 1293 | 1204 | 1293 | 1203 | | | 1 |
| b | 1325 | 1214 | 1325 | 1215 | | | 1 |
| c | 1401 | 1235 | 1401 | 1236 | | | 1 |
| Centre of Cluster | 1387 | 1194 | 1385 | 1194 | 1385 | 1194 | 1 |

I 11903 can not be placed in frame exactly N & S, so correction will have to be applied for orientation.

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Dec. R.A.

(13857 11940)

| Mean Vert Res. | Mean Hor. Res. | Star - Centre | Vert. x42".4 | Hor. x42".4 |
|---|---|---|---|---|
| 11160 00 00 | 12750 00 00 | -2697 +810 | -1143.528 | +343.440 |
| 13040 00 00 | 14490 10 10 | - 817 +2550 | -346.408 | +1081.200 |
| 13785 05 05 | 11500 00 00 | - 72 - 440 | - 30.528 | - 186.560 |
| 15580 00 00 | 10585 05 05 | +1723 -1355 | +730.552 | -574.520 |
| 16305 05 05 | 11500 00 00 | +2448 - 440 | +1037.952 | -186.560 |
| 11900 00 00 | 13025 05 05 | -1957 +1085 | - 829.768 | +460.040 |
| | | | | |
| 12930 00 00 | 12035 05 05 | - 927 + 95 | - 393.048 | + 40.280 |
| 13250 00 00 | 12145 05 05 | - 607 +205 | -257.368 | + 86.920 |
| 14010 00 00 | 12355 05 05 | +153 +415 | + 64.872 | +175.960 |

13857 13 07 07 11940 00 00 00

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Plotting No. 1.

N.G.C. 2808.

| | from X 11903 p. 65. | | page 59 from D. 18388 | | Difference | |
|---|---|---|---|---|---|---|
| R.A. = | Hor. = X | Dec. = Vert. = Y | X | Y | Pl. − Dif. X | Pl. − Dif. Y |
| A | +343" | −1144" | | | | |
| B | +1081" | −346" | | | | |
| C | −187" | −31" | −191 | +34 | +4 | −65 |
| D | −5745" | +731" | | | | |
| E | −187" | +1038" | | | | |
| F | +460" | −830" | | | | |
| a | +40 | −393 | −80 | −380 | +120 | −13 |
| b | +87 | −257 | +7 | −267 | +80 | +10 |
| c | +176 | +65 | +193 | +22 | −17 | +43 |

Plotted X Pl. X (hor.), Diff. X (vert.)
X Pl. X (hor.), Diff. Y (vert)
X Pl. Y (hor.), Diff X (vert.)
X Pl. Y (hor.), Diff Y (vert.)

Correction in orientation { (360") 100" (0.278
(465) 137 (0.295 ✓
0.286 Mean.

No correction necessary for scale.

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| X 11903 Corrected X (page 66) | ×0.286 Y | ×0.286 | Corrected X | Corrected Y | Difference – Corrected X Pl. – Date. X | Y |
|---|---|---|---|---|---|---|
| +98″ | −327 | | +16 | −1242 | | |
| +309 | −99 | | +982 | −655 | | |
| −53 | −9 | | −196 | +22 | −5 | −12 |
| −164 | +209 | | −366 | +895 | | |
| −53 | +297 | | +110 | +1091 | | |
| +132 | −237 | | +223 | −962 | | |
| +11 | −112 | | −72 | −404 | +8 | −24 |
| +25 | −74 | | +13 | −282 | +6 | −15 |
| +50 | +19 | | +195 | +15 | +2 | −7 |
| | | | | | +16 | −58 |
| | | | | | −5 | |
| | | | | | 4) +11 | |
| | | | | | +3 | =14 |

Corrected X = X + .286 Y
" Y = Y + 0.286 X

Correction for Centre.

Plotted Corrected X Pl. X (hor.), Diff. X (vert.)
" " X (hor.), Diff Y (vert.)
" " Y (hor.), Diff. X (vert.)
" " Y (hor.), Diff. Y (vert.)

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Use ? see page 95.

reject ?

X 11903

| | Corr. X (page 67) | Corr. Y | (Correction for Center X = +3 | Y = −14) | Reverse sign of preceding. | |
|---|---|---|---|---|---|---|
| A | +16 | −1242 | +19 | −1256 | +13 | −1238 |
| B | +982 | −655 | +985 | −669 | +979 | −641 |
| C | −196 | +22 | −193 | +8 | −199 | +36 |
| D | −366 | +895 | −363 | +881 | −369 | +909 |
| E | +110 | +1091 | +113 | +1077 | +107 | +1105 |
| F | +223 | −962 | +226 | −976 | +220 | −948 |
| a | −72 | −404 | −69 | −418 | −75 | −390 |
| b | +13 | −282 | +16 | −296 | +10 | −268 |
| c | +195 | +15 | +198 | +1 | +192 | +29 |

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Reject

$\overline{X} + .052\overline{Y}$

| .052x / y | |
|---|---|
| -64 | - 51 |
| -33 | +946 |
| + 2 | -197 |
| + 47 | - 322 |
| + 57 | +164 |
| 49 | +171 |
| | |
| -20 | - 55 |
| -14 | - 4 |
| + 2 | +194 |

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| | X | Y |
|---|---|---|
| A | +343.440 | -1143.528 |
| B | +1081.200 | - 346.408 |
| C | - 186.560 | - 30.528 |
| D | - 574.520 | +730.552 |
| E | - 186.560 | +1037.952 |
| F | +460.040 | - 829.768 |

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Thursday, December 25, 1919.

& N.G.C. 2099. $5^h\ 46^m\ +32.^\circ5$

Cluster very open. Similar in appearance to open clusters previously studied. Very well separated even on I plates

These groups of plates are exam. by superposition, not by plate to plate comp. of groups of stars, as is usually done in thicker clusters.

Comparing I 7342 & I 8350

Object on I 8350 not on I 7342
not on I 22473, not on MC 16241 or 16280

Defect? or Var?

Plates are dissimilar images. For better images & fainter stars, see I 8350

Comparing C 3482 and C 12290
Images of C 12290 have trails, but the plates are comparable.
No objects suspected.
Compared C 11548, C 11784 with C 3482
No objects suspected.

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Note groups of stars similar to other clusters.

I 32621 is excellent plate

| | | | |
|---|---|---|---|
| Available plates | | 2. | |
| | I 7342 | 3 | |
| | X 8350 | 3 | |
| fairly good pl. | C 3482 | 4 | |
| | 10985 | 3 | Var. St. Off - |
| | 10996 | 3 | Var. St. Off. |
| | 11548 | 3 | November 6, 1898, Exp. 62m |
| | 11784 | 3 | February 23, 1899, Exp. 60m |
| | 11785 | 3 | February 23, 1899, Exp. 62m |
| | 12187 | 3i | |
| | 12290 | 3 | November 24, 1899 Exp. 61m |
| | MC 16241 | | |
| | 16280 | | |

Compared I 22473 with 32621
" I 10291 " "

August 22, 1921 — MC 16241, 16280 — Compared with each other and with I 8350. No objects suspected

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Monday, December 29, 1919.

Continued from page 10

N.G.C. 2422

Cont. on page 84.

Plates, available for comp.
MC 9598,
MC 9920, December 10, 1915, Eff. $10^m$
I 7446, April 16, 1896, Eff. $60^m$

I plate is excellent.

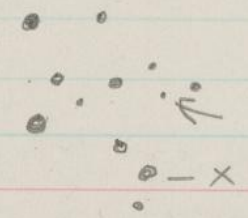
See MC 16604 Jan. - 1920.

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N or I 7446.



Watch

F1 or I 7446
Br. on MC 9920
This may be due to superposition of prismatic comp. of star listed × above. Position and magn. agree with this.

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Wednesday, December 31, 1919.

N.G.C. 6715 $18^h\ 46.1\ -30.6^\circ$

Cluster is very small and close.
On I plates it is impossible to compare stars of the cluster.

Comparing I 8010 and I 7885
I 7885 is not nearly as good as I 8010,
does not show finder stars.
No objects of interest found.

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Plates available:—

| | | | |
|---|---|---|---|
| | | 2 | |
| Too poor. | I 4945 | 4 | |
| Too poor. | 4945 | 4 | |
| Hazy. | 7885 | 3 | August 25, 1896, Exp. 110m |
| Best plate. | 8010 | 3 | September 28, " Exp. 120m |

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Thursday, January 1, 1920.

N.G.C. 6779. $19^h\ 12^m\ +30^\circ$

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Plates available:-

| | | |
|---|---|---|
| C 12147 | Sept. 28, 1899 | Eff. 63m |
| 12743 | June 24, 1900 | Eff. 60m |
| 12745 | June 25, 1900 | Eff. 60m |
| 12778 | Aug. 1, 1900 | Eff. 60m |

C plates are too poor for any comparison. All are hazy.

I. plates do not show cluster stars sufficiently clearly for comparison.

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January 1, 1920.

N. G. C. 6388 $17^h 26^m -44°$

Stars not separated enough for comparison

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Plates available:—

| | | | Qual. |
|---|---|---|---|
| X | 4953 | | 3 |
| | 7610 | June 15, 1896, Ef. 127m | 4 |
| | 7670 | July 9, 1896, Ef. 130m | 3 |
| | 7681 | July 13, 1896, Ef. 120m | 4 |

Object ? $17^h 27^m -44.^\circ 7$ (Approx. 1900) Identified by B 27107!

N or X 7610

Cluster

Not on other X Plates.

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N.G.C. 6981 $20^h 46^m -13^\circ$

No plates to compare with I 6811
Object too small and hazy for I plates?

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Plates available :—

2

I 6811 3. June 29, 1895 Eq. 63m

Two prov. 7034 3i Aug. 15, 1895 30m

C 5730

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Friday, February 6, 1920.

Cont. from page 75

N.G.C. 2422 and N.G.C. 2437.

Recent MC Plates available.

MC 16633 a dark plate, but good images.

Compared I 7446
MC 9920
16633
no objects suspected of variation.

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Saturday, June 18, 1921.

N.G.C. 2808.

Examination of later plates.
Comparison of X 11939 and X 13093

X 13093 is rather blurred and does not separate stars as the other plate
no objects found.

Comparison of X 11903 and X 13093
11903 too poor -

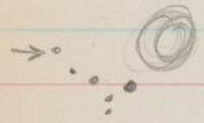
Comparison of X 11886 and X 13093
no objects.

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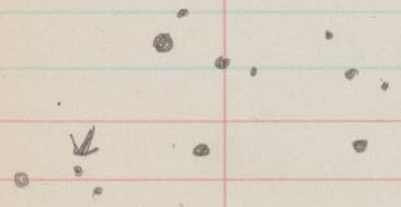


Comparison of X 11939 and X 13100



Br. 11939 Ft. 13100
Br. 11903

This is Var 1, new numbering. Also cl



Br. 11939 Ft. 13100
Br. 11903 Ft. 11886

This is Var. 5.

Comparison of X 11903 and X 13100
No objects found except Var. 2
Ft on 13100

Comparison of X 11886, and X 13100
No objects found except Var. 2.

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Comparison of X 11939 and X 13102.
Found No. 1 and No. ?
No other objects found.

Comparison of X 11903 and X 13102
No objects found Except Var. 2

Comparison of X 11886 and X 13102
No objects found except Vars. 1 and 2

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Pos. of Center 1875 = $9^h\ 9^m\ 34.^s0\ -64^\circ\ 21.'0$

N.G.C. 2808.

Reduction of Center from 6 Cat. Stars.

Positions, see page 56.

(Reverse signs.)

| | | | | |
|---|---|---|---|---|
| A | 9 9 27.5 | -64 40.7 | | |
| | +2.0 | −20.5 | | |
| | 9 9 25.5 | -64 20.2 | from A | 9 9 25.5 -64 20.2 −8.7 |
| | | | " B | 9 9 23.7 -64 21.4 −10.5 |
| B | 9 11 55.5 | -64 32.1 | " C | 9 9 37.6 -64 20.6 +3.4 |
| | +2 31.8 | −10.7 | " D | 9 9 45.8 -64 21.2 +11.6 |
| | 9 9 23.7 | -64 21.4 | " E | 9 9 45.2 -64 21.9 +11.0 |
| | | | " F | 9 9 27.3 -64 20.5 −6.9 |
| | | | | 2051 5.8 +26.0 |
| | | | (Center 1875) | 9 9 34.2 -64 21.0 −26.1 |
| | | | Prec. & P.D. | +29 −6.2 |
| | | | (1900) | 9 10 3.2 -64 27.2 |
| D pl. meas. | | | | |
| 9 9 7.0 | C | 9 9 7.0 | -64 20.0 | |
| 29.4 | | −30.6 | +0.6 | |
| 9 9 36.4 | | 9 9 37.6 | -64 20.6 | |
| | D | 9 8 49.5 | -64 6.0 | |
| | | −56.3 | +15.2 | |
| | | 9 9 45.8 | -64 21.2 | |
| | E | 9 10 1.5 | -64 3.5 | |
| | | +16.3 | +18.4 | |
| | | 9 9 45.2 | -64 21.9 | |
| | F | 9 10 1.5 | -64 36.3 | |
| | | +34.2 | −15.8 | |
| | | 9 9 27.3 | -64 20.5 | |

(1900) 9 10 58 -64 27.2
H.A. 76, No. 4.

| | | |
|---|---|---|
| from A | 9 9 25.5 | |
| " B | 9 23.7 | |
| " C | 9 36.4 | D Plate |
| " D | 9 45.8 | |
| " E | 9 45.2 | |
| " F | 9 27.3 | |
| (1875) | 9 9 34.0 | Dec. same as above. |
| | +29 | |
| (1900) | 9 10 3.0 | |

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Using coordinates page 68.

| | x | precaut $\delta$ | y |
|---|---|---|---|
| A | +13 | 2.3314 | $-1228'' = -20' 28''$ |
| | 2.3381 | .0067 | |
| | 15) +30.3953 | 2.3381 | |
| | +2.026 | | |
| | +0.8 | | |
| | −0.4 | | |
| B | +979 | 2.3228 | $-641'' = -10' 41''$ |
| | 2.3258 | .0030 | |
| | 15) 2276.9582 | 2.3258 | |
| | 151.797 | | |
| | +0.4 | | |
| | −0.2 | | |
| | −0.9 | | |
| | +0.5 | | |
| | +1.7 | | |
| | −1.5 | | |
| C | −199 from Dec. = 19′ | 2.3060 | $+36''$ Dec. = +34 |
| | 2.3088 | 23088 .0028 | |
| | 15) 459.4512 | 15) 440.99 2.3088 | |
| | 30.63. | 29.4 | |
| D | −369 | 2.2894 | $+909'' = +15' 9''$ |
| | 2.2894 | .0048 | |
| | 15) 844.7886 | 2.2860 | |
| | 56.32 | | |
| E | +107 | 2.2812 | $+1105'' = +18' 25''$ |
| | 2.2860 | .0048 | |
| | 15) +244.6020 | 2.2860 | |
| | 16.31 | | |
| F | +220 | 2.3314 | $-948 = -15' 48''$ |
| | 2.3318 | .0004 | |
| | 15) 512.9960 | 2.3318 | |
| | 34.2 | | |

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N.G.C. 2508. To correct orientation.

3 Cat. Stars to use = C, E, F.

C 9 9 7.0 -64 20.0 (Sec. × Cos. δ × 15)
Center 9 9 34.0 -64 21.0
-0 27.0 + 1.0

0.4337
.00083
0.43453
287

0.43453
287
27.0
11.68749
15
175.312350

E 9 10 1.5 -64 3.5
9 9 34.0 -64 21.0
+0 27.5 + 17.5

0.4384
.0009
0.4375
27.5
12.03125

12.03125
~~27.5~~ 15
180.46875

F 9 10 1.5 -64 36.3
9 9 34.0 -64 21.0
+0 27.5 - 15.3

0.4289
.0001
0.4288
27.5
11.79200

11.79200
15
58960
11792
176.88000

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| from Cat. Pos. x | | h.66 | from Cat. Pos. y | h.66 | Meas. - Cat. x | y |
|---|---|---|---|---|---|---|
| -175.31 | C from ~~D~~ Pl | -191 | + ~~6.0~~ 60."0 | from D Pl. = +34 | -16 | ~~+28~~ -26 |
| | | h.68 | | h.68 | | |
| | | + 107 | | 1105 | | |
| +180.47 | + | ~~+110~~ | +1050.0 | ~~+1091~~ | -73 | +55 |
| | | h68 | | h.68 | | |
| +176.88 | | +220 | -918.0 | -948 | +43 | -30 |

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N.G.C. 2808.

p. 90, Using Center from X plate readings.

Cat. Positions, page 56.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | | | | Cat. | x Caty |
| A | 9 9 27.5 | -64 40.7 | cos.δ = 0.4277 | 19.7 | -43 | -1182 | |
| | 9 9 34.2 | -64 21.0 | 6.7 | 60 | | | |
| | | | 2.86559 | 11820 | ~~Meas = 113 1828~~ | | |
| | - 6.7 | - 19.7 | 15 | | Meas - Cat = | | |
| | | | 42.98385 | | | | |
| B | 9 11 55.5 | -64 32.1 | 0.4299 | 11.1 | +911 | -666 | |
| | | | 141.3 | 60 | | | |
| | | | 60.74487 | 666.0 | | | |
| | +2 21.3 | - 11.1 | 15 | | | | |
| | | | 911.17305 | | | | |
| C | 9 9 7.0 | -64 20.0 | 0.4334 | 1.0 | -177 | +60 | |
| | | | 27.2 | 60 | | | |
| | | | 11.78846 | 60.0 | | | |
| | - 27.2 | + 1.0 | 15 | | | | |
| | | | 176.82690 | | | | |
| D | 9 8 49.5 | -64 6.0 | 0.4368 | 15' = 900" | -293 | +906 | |
| | | | 44.7 | | | | |
| | | | 19.52496 | | | | |
| | - 44.7 | + 15.0 | 15 | | | | |
| | | | 292.87440 | | | | |
| E | 9 10 1.5 | -64 3.5 | 0.4375 | 17.5' = 1050" | +179 | +1050 | |
| | | | 27.3 | | | | |
| | | | 11.94375 | | | | |
| | + 27.3 | + 17.5 | 15 | | | | |
| | | | 179.15625 | | | | |
| F | 9 10 1.5 | -64 36.3 | 0.4288 | 15.3 = 918.0 | +176 | -918 | |
| | | | 27.3 | | | | |
| | | | 11.70624 | | | | |
| | + 27.3 | - 15.3 | 15 | | | | |
| | | | 175.59360 | | | | |

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Final Results

| page 68 Meas. x | Meas. y | Meas. − Cat. X | Meas. − Cat. Y | .05X | .05Y | Corr. X | Corr. Y | Corr X+10 | Corr Y+10 | Meas. − Cat. X | Meas. − Cat. Y |
|---|---|---|---|---|---|---|---|---|---|---|---|
| +13 | −1228 | +56 | −46 | +0.39 | −36.84 | −24 | −1228 | −34 | | | +09 |
| | | | | .05x = +1.8 | .05y = −61 | | | −38 | −1219 | +05 | −37 |
| +979 | −641 | +68 | +25 | +29.37 | −19.23 | +960 | −670 | +950 | | | +39 |
| | | | | .05x = +49. | .05y = −32. | | | +957 | −680 | +46 | −14 |
| −199 | +36 | −22 | −24 | −5.97 | +1.08 | −198 | +42 | −208 | | | −31 |
| | | | | .05x = −10. | .05y = +2. | | | −187 | +56 | −10 | −04 |
| −369 | +909 | −76 | +9 | −11.07 | +27.27 | −342 | +920 | −352 | | | −59 |
| | | | | .05x = −18. | +45 | | | −314 | +937 | −21 | +37 |
| +107 | +1105 | −72 | +55 | +3.21 | +33.15 | +140 | +1102 | +130 | | | −79 |
| | | | | .05x = +5. | +55. | | | +172 | +1110 | −07 | +60 |
| +220 | −948 | +44 | −30 | +6.60 | −28.44 | +192 | −955 | +182 | | | +6 |
| Plotted | | | | .05x = +11 | −47. | | | +183 | −949 | +07 | −31 |

Diff. x, Meas. I  Corr. X = X + .05 Y + 10"
" x, Meas. V  Corr. Y = Y − .05 X + 10"
" y, Meas. X
" y, Meas. Y.

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Use N.S.L.
X.

Find Results

N.G.C. 2808 . D Plate. Coordinates f. 59

| | X | Y | .03X Reject | .03Y | .05X | .05Y | X+.05Y+10 | Y−.05X+10 |
|---|---|---|---|---|---|---|---|---|
| C | −191 | + 34 | −5.73 | +1.02 | −10. | +2. | −179 | +~~34~~ 54 |
| a | −80 | −380 | −2.40 | −11.40 | −4. | −19 | −89 | −~~374~~ 366 |
| b | + 7 | −267 | + .21 | −8.01 | 0 | −13 | + 4 | −257 |
| c | +193 | + 22 | +5.79 | +.66 | +10 | + 1 | +204 | +~~42~~ 22 |
| d | +359 | − 66 | +10.77 | −1.98 | +18 | −3 | +366 | − 74 |
| e | +209 | − 81 | + 6.27 | −2.43 | +10 | −4 | +215 | − 81 |
| f | +149 | −117 | + 4.47 | −3.51 | + 7 | −6 | +153 | −114 |
| g | −171 | + 81 | − 5.13 | +2.43 | − 9 | +4 | −157 | +100 |
| h | +138 | + 44 | + 4.14 | +1.32 | + 7 | +2 | +150 | + 47 |
| k | +169 | + 77 | + 5.07 | +2.31 | + 8 | +4 | +183 | + 79 |
| l | +153 | +118 | + 4.59 | +3.54 | + 8 | +6 | +169 | +120 |
| m | + 60 | +188 | + 1.80 | +5.64 | + 3 | +9 | + 79 | +195 |
| n | +~~28~~ 2 | +158 | + .84 | +4.74 | + 1 | +8 | + 46 | +167 |
| o | + 22 | +132 | + .66 | +3.96 | + 1 | +7 | + 39 | +141 |
| p | − 46 | +151 | − 1.38 | +4.53 | − 2 | +8 | − 28 | +163 |
| q | − 37 | +166 | − 1.11 | +4.98 | − 2 | +8 | − 19 | +178 |
| r | − 7 | +110 | − .21 | +3.30 | 0 | +6 | + 9 | +120 |
| s | −112 | +178 | − 3.36 | +5.34 | − 6 | +9 | − 93 | +194 |
| t | − 6 | +119 | − .18 | +3.57 | 0 | +6 | +10 | +129 |
| u | −102 | +214 | − 3.06 | +6.42 | − 5 | +11 | − 81 | +229 |
| w | − 51 | +117 | − 1.53 | +3.51 | − 3 | +6 | − 35 | +130 |
| v | − 56 | +103 | − 1.68 | +3.09 | − 3 | +5 | − 41 | +116 |
| y | −102 | +226 | − 3.06 | +6.78 | − 5 | +11 | − 81 | +241 |
| 1 | +112 | − 28 | + 3.36 | − .84 | + 6 | − 1 | +121 | − 24 |
| 2 | + 27 | − 52 | + .81 | −1.56 | + 1 | − 3 | + 34 | − 43 |
| 3 | − 12 | + 73 | − .36 | +2.19 | − 1 | + 4 | + 2 | + 84 |
| 4 | − 33 | − 99 | − .99 | −2.97 | − 2 | − 5 | − 28 | − 87 |
| 5 | +434 | −481 | +13.02 | −14.43 | +22 | −24 | +420 | −493 |

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N.G.C. 2808. To check coordinates

Catalogue Stars, see positions, page 56.

| | | Coordinates applied to Center. | O-C. |
|---|---|---|---|
| Centre | 9 9 34.2 -64 21.0 | -38" -1219" = | page 98 - page 56 |
| | − 5.9 − 20.3 | 2.3102 = recant δ 20' 19" | |
| from co-ordinates A = | 9 9 28.3 -64 41.3 | 15) 87.7876 | +0.8 −0.6 |
| | | 5.85+ | |
| Centre | 9 9 34.2 -64 21.0 | +957 -680" = | |
| | + 2 27.4 − 11.3 | 2.3102 11' 20" | |
| B = | 9 12 1.6 -64 32.3 | 15) 2210.8614 | + 6.1 −0.2 |
| | | 147.4 | |
| Centre | 9 9 34.2 -64 21.0 | -179 from D Plate +54" | |
| | − 27.6 + 0.9 | 2.3102 | |
| C = from D Pl. | 9 9 06.6 -64 20.1 | 27.6 15) 413.5258 | −0.4 − 0.1 |
| | − 28.8 0.9 | 27.6 187 from X Pl. 56" | − 1.6 − 0.1 |
| C = from X Pl. | 9 9 5.4 -64 20.1 | 23102 15) 432.0074 | |
| | | 28.8 | |
| | 9 9 34.2 -64 21.0 | -314 +937" = | |
| | − 48.4 + 15.6 | 2.3102 15.6 | |
| D = | 9 8 45.8 -64 5.4 | 15) 725.4028 | − 3.7 + 0.6 |
| | | 48.4 | |
| | 9 9 34.2 -64 21.0 | +172 +1110" = | |
| | + 26.5 + 18.5 | 2.3102 18.5 | |
| E = | 9 10 0.7 -64 2.5 | 15) 397.3544 | − 0.8 + 1.0 |
| | | 26.5 - | |
| | 9 9 34.2 -64 21.0 | +183 -949 = | |
| | + 28.2 − 15.8 | 2.3102 15.8 | |
| F = | 9 10 2.4 -64 36.8 | 15) 422.7666 | + 0.9 − 0.5 |
| | | 28.2 | |

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New Reduction, July, 1921.

## Reduction of Center from 6 Cat. Stars.

Cat. Pos., p. 56 X Pl. Coordinates from p. 65.

| | | | | |
|---|---|---|---|---|
| A | 9 9 27.5 | -64 40.7 | +343 | -1144" = 19.'1 |
| | +53.5 | -19.1 | 2.3381 | |
| | 9 8 34.0 | -64 21.6 | 15)801.9683 | |
| | | | 53.46 | |
| B | 9 11 55.5 | -64 32.1 | +1081 | -346" = 5.'8 |
| | +167.6 | -5.8 | 2.3258 | |
| | 9 9 7.9 | -64 26.3 | 15)2514.1898 | |
| | | | 167.6 | |
| C | 9 9 7.0 | -64 20.0 | -187 | -31 |
| | -28.8 | -0.5 | 2.3088 | |
| | 9 9 35.8 | -64 19.5 | 15)431.7456 | |
| | | | 28.8 | |
| D | 9 8 49.5 | -64 6.0 | -575 | +731" = |
| | -87.8 | +12.2 | 2.2894 | 12.'2 |
| | 9 10 17.3 | -64 18.2 | 15)1316.4050 | |
| | | | 87.8 | |
| E | 9 10 1.5 | -64 3.5 | -187 | +1038" = |
| | -28.5 | +17.3 | 2.2860 | 17.'3 |
| | 9 10 30.0 | -64 20.8 | 15)427.4820 | |
| | | | 28.5 | |
| F | 9 10 1.5 | -64 36.3 | +460 | -830" = 13.'8 |
| | +71.5 | -13.8 | 2.3318 | |
| | 9 8 50.0 | -64 22.5 | 15)1072.6280 | |
| | | | 71.5 | |

| | | | | |
|---|---|---|---|---|
| from a | 9 8 34.0 | -64 21.6 | -55.2 | -0.1 |
| " B | 9 9 7.9 | -64 26.3 | -21.3 | -4.8 |
| " C | 9 9 35.8 | -64 19.5 | +6.6 | +2.0 |
| " D | 9 10 17.3 | -64 18.2 | +48.1 | +3.3 |
| " E | 9 10 30.0 | -64 20.8 | +60.8 | +0.7 |
| " F | 9 8 50.0 | -64 22.5 | -39.8 | -1.0 |
| | 54 175.0 | 89 | +115.5 | +6.0 |
| Center | 9 9 29.2 | -64 21.5 | -115.7 | -5.9 |
| | | | -0.2 | +0.1 |

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1010phae.proj.1184w



# Catalogue Coordinates.

## Position - Center

| | | | | |
|---|---|---|---|---|
| A | 9 9 27.5 | -64 40.7 | $1.7^s = 11''$ | 1.7 |
| Center | 9 9 29.2 | -64 21.5 | $19'.2 = 1152''.0$ | 0.4277 cos δ |
| | -1.7 | -19.2 | | 0.72709 |
| | | | | 15 |
| | | | | 10.90545 |
| B | 9 11 55.5 | -64 32.1 | $2^m 26.^s3 = 943''$ | 146.3 |
| | | | $10'.6 = 636''.0$ | 0.4299 |
| | +2 26.3 | -10.6 | | 62.89437 |
| | | | | 15 |
| | | | | 943.41555 |
| C | 9 9 7.0 | -64 20.0 | $22.^s2 = 144''$ | 22.2 |
| | | | $1'.5 = 90''.0$ | 0.4332 |
| | -22.2 | +1.5 | | 9.61704 |
| | | | | 15 |
| | | | | 144.25560 |
| D | 9 8 49.5 | -64 6.0 | $39.^s7 = 259''$ | 39.7 |
| | | | $15'.5 = 930''.0$ | 0.4368 |
| | -39.7 | +15.5 | | 17.34096 |
| | | | | 15 |
| | | | | 260.11440 |
| E | 9 10 1.5 | -64 3.5 | $32.^s3 = 212''$ | 32.3 |
| | | | $18'.0 = 1080''.0$ | 0.4375 |
| | +32.3 | +18.0 | | 14.13125 |
| | | | | 15 |
| | | | | 211.96875 |
| F | 9 10 1.5 | -64 36.3 | $32.^s3 = 208''$ | 32.3 |
| | | | $14'.8 = 888''.0$ | 0.4288 |
| | +32.3 | -14.8 | | 13.85024 |
| | | | | 15 |
| | | | | 207.75360 |

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| | Cat. x | Cat. y | Meas. x | Meas. y | Meas.-Cat. x | Meas.-Cat. y | .335 x | .335 y |
|---|---|---|---|---|---|---|---|---|
| A | -11 | -1152 | +343 | -1144 | +354 | + 8 | +114.905 | -383.240 |
| B | +943 | -636 | +1081 | -346 | +138 | +290 | +362.135 | -115.910 |
| C | -144 | +90 | -187 | -31 | - 43 | -121 | - 62.645 | - 10.385 |
| D | -260 | +930 | -575 | +731 | -315 | -199 | -192.625 | +244.885 |
| E | +212 | +1080 | -187 | +1038 | -399 | - 42 | - 62.645 | +347.730 |
| F | +208 | -888 | +460 | -830 | +252 | +58 | +154.100 | -278.050 |
| a | + " | " | +40 | -393 | " | " | + 13.400 | - 131.655 |
| b | " | " | +87 | -257 | " | " | + 29.145 | - 86.095 |
| c | " | " | +176 | +65 | " | " | + 58.960 | + 21.775 |

plotted

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1919phae.prd.1104w



Use for Cat. stars except C. No corr. for Center?

Use X 1.59 D Pl.

| Corr. x | Corr. y | X Pl. Corr. for Center from plot. x +50 | y +35 | Cou. Meas. Cat. | D Pl. Meas. Corr. for Center | X-D Pl. |
|---|---|---|---|---|---|---|
| -40 | -1259 | +10 | -1224 | +21 -72 | " " +50 +35 | |
| +965 | ~~-230~~ -708 | +1015 | - 673 | +72 -37 | " " | |
| -198 | +32 | - 148 | + 67 | - 4 -23 | -191 +34 | -141 +69 -7 -2 |
| -330 | +924 | -280 | +959 | -20 ~~+29~~ + 9 | - " " | |
| +161 | +1101 | +211 | +1136 | - 1 +56 | " " | |
| +182 | -984 | +232 | - 949 | +24 -61 | " " | |
| -92 | -406 | - 42 | - 371 | | - 80 -380 | - 30 -345 -12 -26 |
| + 1 | -286 | + 51 | - 251 | | + 7 -267 | +57 -232 - 6 -19 |
| +198 | + 6 | +248 | + 41 | | +193 +22 | +243 +57 +5 -16 |

+117 ~~+56~~ +85
-25 ~~-202~~ +193
plotted

"Correction to Center is to be applied to computed center of cluster." Miss L.

9 9 29.2 -64 21.5 $\alpha = 50'' = 7^s.7$. sec. δ 2.3060
7.7 0.6 $\delta = 35''$ .0049
9 9 21.5 -64 22.1 2.3109
50
15) 115.5450
7.7

1919phae.proj,1184W



# New Position of Center.

Cat. Pos., see p. 56. Coordinates, final, see p. 103.

| | | | | | | |
|---|---|---|---|---|---|---|
| A | 9 9 27.5 | -64 40.7 | x -40″ | y -1259″ | | |
| | -6.2 | -21.0 | 2.3814 | 21.0 | | |
| Center | 9 9 33.7 | -64 19.7 | .0066 | | | |
| | | | 2.3380 | | | |
| | | | 40 | | | |
| | | | 15)93.5200 | | | |
| | | | 6.24 | | | |
| B | 9 11 55.5 | -64 32.1 | +965 | -708″ = | | |
| | +2 29.6 | -11.8 | 2.3228 | 11.8 | | |
| Center | 9 9 25.9 | -64 20.3 | .0029 | | | |
| | | | 2.3257 | | | |
| | | | 965 | | | |
| | | | 15)2244.3005 | | | |
| | | | 149.6 = 2m 29.6 | | | |
| C | 9 9 7.0 | -64 20.0 | -191 | +34″ | | |
| | -29.4 | +0.6 | 2.3060 | | | |
| Center | 9 9 36.4 | -64 20.6 | .0028 | | | |
| | | | 2.3088 | | | |
| | | | 191 | | | |
| | | | 15)440.9808 | | | |
| | | | 29.4 | | | |
| D | 9 8 49.5 | -64 6.0 | -330 | +924″ = | | |
| | -50.4 | +15.4 | 2.2894 | 15.4 | | |
| Center | 9 9 39.9 | -64 21.4 | 15)755.5020 | | | |
| | | | 50.36 | | | |
| E | 9 10 1.5 | -64 3.5 | +161 | +1101 | | |
| | +24.5 | +18.4 | 2.2812 | | | |
| Center | 9 9 37.0 | -64 21.9 | .0049 | | | |
| | | | 2.2861 | | | |
| | | | 161 | | | |
| | | | 15)368.0621 | | | |
| | | | 24.5 | | | |

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| | | | | | | |
|---|---|---|---|---|---|---|
| F | 9 | 10 1.5 | -64 36.3 | +182 | -984" = | |
| | | + 28.3 | - 16.4 | 2.3314 | 16.4 | |
| Center | 9 | 9 33.2 | -64 19.9 | 0004 | | |
| | | | | 2.3318 | | |
| | | | | 182 | | |
| | | | | 15)424.3876 | | |
| | | | | 28.3 | | |

Mean Center: (1875)

| | | | | α | Res. δ |
|---|---|---|---|---|---|
| Positions from A | 9 9 33.7 | -64 19.7 | | -0.7 | +0.9 |
| B | 9 9 25.9 | -64 20.3 | | -8.5 | +0.3 |
| C | 9 9 36.4 | -64 20.6 | | +2.0 | 0.0 |
| D | 9 9 39.9 | -64 21.4 | | +5.5 | -0.8 |
| E | 9 9 37.0 | -64 21.9 | | +2.6 | -1.3 |
| F | 9 9 33.2 | -64 19.9 | 123.8 | -1.2 | +0.7 |
| (1875) | 9 9 34.4 | -64 20.6 | | +10.1 | +1.9 |
| | | | | -10.4 | -2.1 |
| | +29 | - 6.2 | | | |
| (1900) | 9 10 3.4 | -64 26.8 | | | |

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1919phae.proj.1184W



# N.G.C. 2808

## 1875 Positions of Vars. 1 to 5.

Center, p. 105

| | | | |
|---|---|---|---|
| Center | 9h 9m 34.4 −64° 20'.6 | +1'12" | −28" |
| | +17.2 −0.5 | 2.3060 | |
| Var. 1 | 9 9 51.6 −64 21.1 | .0036 | |
| | | 2.3096 | |
| | | 112 | |
| | | 15)258.6752 | |
| | | 17.2 | |
| | 9 9 34.4 −64 20.6 | +27" | −52" |
| | +4.2 −0.9 | 2.3096 | |
| Var. 2 | 9 9 38.6 −64 21.5 | 15)62.3592 | |
| | | 4.16 | |
| | 9 9 34.4 −64 20.6 | −12" | +73" |
| | −1.8 +1.2 | 2.3096 | |
| Var. 3 | 9 9 32.6 −64 19.4 | 15)27.7152 | |
| | | 1.8 | |
| | 9 9 34.4 −64 20.6 | −33" | −99" |
| | −5.1 −1.6 | 2.3096 | |
| Var. 4 | 9 9 29.3 −64 22.2 | 15)76.2168 | |
| | | 5.08 | |
| | 9 9 34.4 −64 20.6 | +434" | −481" |
| | +1 6.8 −8.0 | 2.3096 | |
| Var. 5 | 9 10 41.2 −64 28.6 | 15)1002.3664 | |
| | | 66.8 | |

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1900 Positions of Vars. 1 to 5.

| | | | | | | |
|---|---|---|---|---|---|---|
| Var. 1 | (1875) | 9 | 9 | 51.6 | −64 | 21.1 |
| | | | + 29. | | | −6.2 |
| | (1900) | 9 | 10 | 20.6 | −64 | 27.3 |
| Var. 2 | (1875) | 9 | 9 | 38.6 | −64 | 21.5 |
| | | | + 29 | | | − 6.2 |
| | (1900) | 9 | 10 | 7.6 | −64 | 27.7 |
| Var. 3 | (1875) | 9 | 9 | 32.6 | −64 | 19.4 |
| | | | +29 | | | −6.2 |
| | (1900) | 9 | 10 | 1.6 | −64 | 25.6 |
| Var. 4 | (1875) | 9 | 9 | 29.3 | −64 | 22.2 |
| | | | +29 | | | −6.2 |
| | (1900) | 9 | 9 | 58.3 | −64 | 28.4 |
| Var. 5 | (1875) | 9 | 10 | 41.2 | −64 | 28.6 |
| | | | +29 | | | −6.2 |
| | (1900) | 9 | 11 | 10.2 | −64 | 34.8 |

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Using Prel. Magns. of Seq. 1 p. 111.

May 20, 1922.

Exam. of range of Vars.

| | | | | |
|---|---|---|---|---|
| Var. 1 | 11886 | Br | | |
| 13.8 - 15.0 | 11903 | Br | | |
| | 11923 | Br | | |
| | 11939 | Brightest | 13.8 | (g.g) |
| | 13093 | Br. | | |
| | 13100 | Ft. | 15.0 | |
| | 13102 | Ft | | |
| Var. 2 | 11886 | Brightest | 13.0 | (about = f) |
| 13.0 - 16.0 | 11903 | | | |
| | 11923 | | | |
| | 11939 | Ft. | | |
| | 13093 | | | |
| | 13100 | Ft. | | |
| | 13102 | Ft. | 16.0 | |

Cont. p. 112

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1919phae.proj.1184w



N.G.C. 2808

Working Magns. (Approx.) derived.
Method.

Nearest comp. deg. = RW Carinae $9^h\ 18^m.1 - 68°\ 20'$ (1902)
Comp. stars mkd on B 52224.
Meas., Bk. 44, p. 154.
Means of three readings used: — as follows:

| | | |
|---|---|---|
| RW Carinae | A | 8.21 |
| | B | 8.87 |
| | a | 9.34 |
| | a' | 9.77 |
| | d | 10.26 |
| | d' | 10.56 |
| | e | 10.82 |
| | f | 10.83 |
| | g | 11.38 |
| | h | 11.64 |
| | l | 12.17 |
| | m | 12.59 |

Magns. of Cluster Deg.
Estimated on and 12902 — $9^h - 60°$

| | | | |
|---|---|---|---|
| N.G.C. 2808 | A | Br. | a 10.5 |
| | B | 8.2 | b 10.7 |
| | C | 9.7 | c 11.4 |
| | D | 9.5 | d F |
| | E | 9.9 | |
| | F | 10.2 | |

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N.B. Am 1831, off center, best plate for this cluster; Cl. Seg. and Var. Seg. both near Center

Magns. of Cluster Seg.
Estimated on Am ~~1902~~ 1831 ($9^h - 67.8^\circ$)

A Br.
B Br.
C 9.7
D 9.5
E 9.8
F 10.2
a 10.4
b 10.7
c 11.4
d F

** Use for Segmented (Means adopted to nearest tenth, according to inspection of plate.)

A Br.
B 8.2
C 9.7
D 9.5
E 9.9
F 10.2
a 10.5
b 10.7
c 11.4
d F

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1919phae.proj.1184w



May 26, 1922.
St. G.C. 2808.

X11939

Scale Measures of Sequence Stars.

| Scale P | | Se. 1 | Se. 2 | Mean. | Resid. | | Seq. letters as build on print | Redd. from Curve. |
|---|---|---|---|---|---|---|---|---|
| | A | 1.7 = 1.4 | | 1.40 | ~~a~~ | ~~00~~ | Hnw D 18388. Magn. p. 110 – Mean. ~~8.2~~ | |
| | B | 2.4 = 2.1 | | 2.10 | a | " | 6.10 | 8.2 8.2 |
| | C | 3.7 = 3.4 | | 3.40 | a | " | 6.30 | 9.8 9.7 |
| | D | 3.6 = 3.3 | | 3.30 | a | " | 6.20 | 9.6 9.6 |
| | E | 3.7 = 3.4 | | 3.40 | a | " | 6.50 | 9.8 9.7 |
| | F | 3.9 = 3.6 B | | 3.60 | a | " | 6.60 | 9.8 ~~9.9~~ 10.0 + use 9.9 |
| | ~~g~~ | | | | | | | |
| | a | 4.1 = 3.8 | 3.9 | 3.85 | 05 | 05 | 6.65 | 10.2 10.2 |
| | b | 4.4 = 4.1 | 4.2 | 4.15 | 05 | 05 | 6.55 | 10.5 10.5 |
| | c | 5.6 = 5.3 | 5.2 | 5.25 | 05 | 05 | 6.15 | 11.8 |
| | d | 5.7 = 5.4 | 5.5 | 5.45 | 05 | 05 | | 12.0 |
| | e | 6.4 = 6.1 | 6.2 | 6.15 | 05 | 05 | | 12.9 |
| | f | 6.5 = 6.2 | 6.4 | 6.30 | 10 | 10 | | 13.0 |
| | g | F | 7.1 | 7.10 | . | a | | 13.9 |
| | ~~k~~ | | 7.3 | 7.30 | . | a | | 14.2 |
| | k | | 7.5 | 7.50 | . | a | | 14.4 |
| | l | | 7.7 | 7.70 | . | a | | 14.6 |
| | m | | 7.9 | 7.90 | . | a | | 14.9 |
| | n | | 8.3 | 8.30 | . | a | | 15.3 |
| | o | | 8.6 | 8.60 | . | a | | 15.7 |
| | p | | 8.8 | 8.80 | . | a | | 15.9 |
| | q | | 8.9 | 8.90 | . | a | | 16.1 |
| | r | | 9.1 | 9.10 | . | a | | 16.3 |
| | s | | 9.2 | 9.20 | . | a | | 16.4 |
| | t | | 9.2 | 9.20 | . | a | | 16.4 |
| | u | | 9.4 | 9.40 | . | a | | 16.6 |
| | w | | 9.6 | 9.60 | . | a | | 16.8 |
| | x | | 9.7 | 9.70 | . | a | | 17.0 |
| | y | | 9.9 | 9.90 | . | a | | 17.2 |

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N.G.C. 2808.

(Vars. 1 & 2 see p. 108)

| | | | | |
|---|---|---|---|---|
| Var. 3 | 11886 | Ft. | | |
| 14.1 - 15.0 | 11903 | Br. × Max | | |
| | 11923 | Poor. | | |
| | 11939 | Br. · Max | 14.1 | (br. than R) |
| | 13093 | Br. × ~~Max~~ | | |
| | 13100 | Ft. × | 15.0 | |
| | 13102 | Ft. × Min | 15.0 | |
| Var. 4 | 11886 | Max | | |
| 14.7 - 16.0 | 11903 | | | |
| | 11923. | | | |
| | 11939 | Max | 14.7 | l-m |
| | 13093 | | | |
| | 13100 | | 16.0 | |
| | 13102 | | 15.2 | |
| Var. 5 | 11886 | Min | | |
| 13.8 - 15.0 | 11903 | Max | 13.8 | br. than g |
| | 11923 | ~~Poor~~ | ~~14.9~~ | ~~l-m~~ |
| | 11939 | | | |
| | 13093 | | | |
| | 13100 | Min | 14.9 | =m |
| | 13102 | Min | 15.0 | |

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Monday, June 26, 1922.

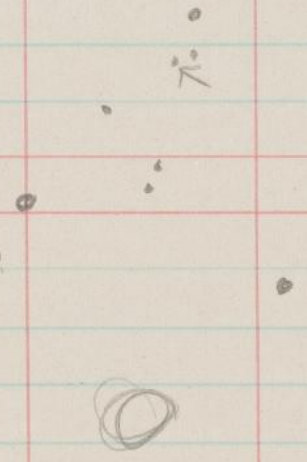
M 3

Examination of MC plates for variables, especially outside Cluster.

MC 18820

18822

18822 superposed



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120

Material & Instructions

Wednesday, January 24, 1923.

N.G.C. 104 = 47 Tucanae

Material
Hdl 38, Plate X print. Prof. B's sequence 6 vars. marked.
D.E.W. marked these on X 5443 & 5500

Vars. fund marked on X 5416 8 mkd on 5500

Vars. 1 & 2 discovered independently on B10331 & 24353

Comp. Seq. 200 K on B45667,
Magns. Bk. 48, p. 92.
Magns. 47 Tucanae, Bk. 44, p. 15

* Magn. as meas. Bk. 44 p. 15 are fmr B45769 Seq. marked

Prof. B.'s seq. fund mkd on X 5173

Comp. Stars on X 5500

per p. 150 ←

9 m.m. radius marked on A8202

see p. 174. Count all sectors + rings (except center) in four mag classes: [13, 13 to 14, 14 to 15, ]15

Straight lines to make 12 (12 sect) sectors 30°

Circles drawn on plain glass plate by Miss Gill.

3 m.m. radius of first circle.

Instructions Cont. to p. 193

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→ Watch star marked red 6 on print.



12.0 2
+2.3 or 12.4

X 5443

f • • -W 124

• -123 Y
+2.6

117 X

Est. of Magn. made on
B 45667
B 24353
B 12477

69

" Meas. 50 brightest stars
q' = 9mm on Bruce
5' 3⅓ mm on Bache
3 " "

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# Thursday, January 25, 1923.

| | 1 Magn. | | 2 B24353 | B45667 |
|---|---|---|---|---|
| | B6.44 | | I.E.W. estimates | |
| | h.15 | | compared with 200 K (independent of known magns.) | |
| α | 8.66 | 87 | 8.6 | |
| β | 9.39 | 94 | 9.4 | sequence too far to measure magns. |
| γ | 9.16 | 92 | 9.1 | |
| δ | 9.44 | 94 | 9.5 | |
| b | 10.54 | 105 | 10.5 | |
| d | 13.06 | 131 | 13.0 | |
| f | 13.42 | 134 | 13.2 | |
| g | 13.69 | 13.7 | Ft. | |
| w | | | 12.3 | .. |
| x | | | 11.7 | 11.7 |
| y | | | 12.3 | Too faint |
| z | | | 11.9 | " " |
| t | | | | |
| l | | | | |
| m | | | | |
| n | | | | |
| o | | | | |

Referred to C1 & C2

g may be double.

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Is x Comp. St. c ? See Coordinates and I 5416

3
I 5500
estimating
in grades

Mean of 1, 2, 3
Adopted
for meas. of Vars.

| | | |
|---|---|---|
| ~~8.6~~ | | |
| ~~9.4~~ | 8.6 | x |
| ~~9.2~~ | 9.4 | B |
| ~~9.1~~ | 9.2 | y |
| | 9.4 | d |
| | 10.5 | b |
| | 13.0 | d |
| | √3.3 | f |
| | 13.6 | g |
| | 12.4 | w |
| | 11.7 | x |
| | 12.3 | y |
| | 12.0 | z |
| | 13.6 | h |
| | 13.7 | l |
| | 13.9 | m |
| | 14.1 | n |
| | 14.2 | o |

d-f=.3 13.0 assumed for starting point
f-g=.2 13,3
g-k=1 13.5
12.4
11.8
12.3
12 12.0

k-l=1 = 13.6
13.7
l-m=.2 = 13.9
m-n=.2 = 14.1
n-o=.1 = 14.2 ✓

x to d as marked on B 45769
b to o as marked on Plate I H.A 38
w to z selected additional stars, I. E. W., p. 121 and I 5443

1922 Corr

In order

| | | |
|---|---|---|
| B | 9.4 | = 9.6 Magns |
| b | 10.5 | = 10.7 |
| y | 11.7 | 11.9 |
| z | 12.0 | 12.2 |
| y | 12.3 | 12.5 |
| w | 12.4 | 12.6 |
| d | 13.0 | 13.3 |
| f | 13.3 | 13.6 |
| g | 13.5 | Use 13.8 |
| k | 13.6 | 13.9 |
| l | 13.7 | 14.0 |
| m | 13.9 | 14.1 |
| n | 14.1 | 14.3 |
| o | 14.2 | 14.4 |

Seq. has not been given continuous letters in order to avoid confusion of magn. w, x, z were added as initials were needed.

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for ident of 2 see
d. 7142
n. 7227
*9338

(See papers for approx. periods)

* Var. 2 } difficult, confused with another star
Var. 4 } on many plates. 2 assumed to be the northern one. * indicates overlapping of stars.

Measures of Vars. on selected group of
Using Mags. on p. 123. Difficult in case of
bright stars falling between b & K

| * | Var. 1 | Corr. Magn. | Var. 2.* | Var. 3 | Var. 4 |
|---|---|---|---|---|---|
| I 5289 | 11.2 | =11.4 | 12.9 ? | 11,5 ? | .. |
| 5298 | Perhaps 11.2 | =11.4 | .. | 11,4 or 5 | .. |
| 5333 | 11.3 | =11.5 | .. | 11,5 | .. |
| 5350 | 11.4 | =11.6 | .. | 11,4 | .. |
| 5358 | 11.6 | =11.8 | .. | 11,4 | .. |
| 5408 | 12.3 | =12.5 | .. | .. | .. |
| 5416 | Confirmed by 2nd est. 13.3 Plate Marked marked – large images | =13.6 | about 14.0 superposed | 11,4 ? | about 12.5 superposed |
| *5443 N 126 5452 | 13.4 | =13.7 | Ft. Too poor for est. | 12.1 | about 12.0 |
| 5453 | Ft. Too poor for estimate | | .. | .. | .. |
| 5476 | 13.6 | =13.9 | Ft | 12.1 | 12.0 |
| 5500 | 13.9 | =14.1 | 14.0* | 13.5 | 11.9* |
| 5508 | 13.7 | =14.0 | Ft | 13.7 | 12.0 |

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1919phae.proj.116tw

Clear plates, good images

| | | | |
|---|---|---|---|
| 5443 | 7003 | 8953* | 8886 |
| 5476 | 7004* | 8980 | **8907 |
| 6995 | 7227 | 8877 | |
| 6996 | 7263 | | |

Bruster near 7 chrom. dbl on 7227 & 8277

125

Plates. Chosen covering 1893, 1895 and late plates from ledger -

6 is affected by adj. stars on many plates

| Var. 5. | Var. 6 | Var. 7 | | |
|---|---|---|---|---|
| 13.5? | 13.2 | 13.4 | Oct. 2, 1893 | 2412739 |
| " | " | | " 3 " | 12740 |
| " | 13.2 | | " 7 " | 12744 |
| 13.5 | 13.2 | | " 14 " | 12751 |
| " | " | | " 18 " | 12755 |
| 12.9 | 13.2 | | " 28 " | 12765 |
| 12.7 | perhaps 13.7 | 13.4 | Oct. 31 / Nov. 1 | 12768 / 12769 |
| 13.3 | 13.1 | 13.1 | Nov. 16 | 12784 |
| " | " | " | " 16 | 12784 |
| 13.5 | 13.1 | 13.1 | " 18 | ~~12~~786 |
| 12.5 4 | 13.5 | 13.3 | Dec. 4 | 12802 |
| 12.3 | 13.2 | 13.1 | " 5 | 12803 |

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add 5501

Corr. Magns. used.

| | Var. 1 | Var. 2 | Var. 3 | Var. 4 |
|---|---|---|---|---|
| X5443 | 13.4 = 13.7 | ~~Ft.~~ | 12.0 | 12.3 |
| ~~5501~~ | ~~Ft~~ | ~~Ft~~ | | ~~12.1~~ |
| 5502 | Ft. | " | " | " |
| | Too poor | | | |
| 5504 | Ft. | Ft. | 13.7 | about 12.0 |
| | Too poor. Images double and blurred. | | | |
| 5590 | 13.6 = 13.9 | Ft. | 13.7 | about 12.4 |
| 6913 | Apparently Ft. | " | " | " |
| | Plate very poor — out of focus. | | | |
| 6930 | Apparently Ft | " | " | " |
| | Plate poor | | | |
| 6976 | " | " | " | " |
| | Plate too poor. | | | |
| 6977 | " | " | " | " |
| | Plate too poor. | | | |
| 6987 | 13.3 = 13.6 | X " | < 14.3 | 12.4 |
| 6988 | 13.4 = 13.7 | " | < 14.4 | 12.4 |
| 6989 | Too poor | | | |
| 6995 | 13.4 = 13.7 | " | < 14.4 | 12.4 |
| 6996 | 13.4 = 13.7 | " | < 14.4 | 12.5 |
| 7001 | 13.4 = 13.7 | about 14.0 | < 14.4 | 12.1* |
| 7002 | 13.4 = 13.7 | ft. if any, blurred. | < 14.4 | 12.5 |

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7 ft on 5590
Small but real
change – see
Aug. 6

| Var. 5 | Var. 6. | Var. 7 | Date | J.D. |
|---|---|---|---|---|
| 13.3 | 13.0 | 13.1 | Nov. 13, 1893 | 12781 |
| | | | ~~Dec. 5~~ | ~~12803~~ |
| " | " | " | Dec. 5 | 12803 |
| 12.7? | 13.1 | 13.1 | " 6 | 12804 |
| 13.0 | 13.1 | 13.8 | June 14, 1894 | 12994 |
| " | | | July 20, 1895 | 13395 ~~13030~~ |
| " | | | " 25 " | 13400 |
| " | | | Aug. 5 " | 13411 |
| " | | | " 5 | 13411 |
| 13.3 | 13.4 | 13.3 | " 6 | 13412 |
| 13.4 | 13.5 | 13.6 | " 6 | 13412 |
| 13.4 | 13.4 | 13.7 | " 7 | 13413 |
| 13.5 | 13.5 | 13.6 | " 7 | 13413 |
| 13.5 | 13.3 | 13.6 | " 8 | 13414 |
| 13.5 | 13.5 | 13.6 | " 8 | 13414 |

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Very Ft. Stars seen — 9338
9338 n.B. Ft neb.? near b

| | Var. 1 | Var. 2 | Var. 3 | Var. 4 |
|---|---|---|---|---|
| I 7003 | 13.4 = 13.7 | 14.1? | < 14.4 | 12.5 |
| 7004 | 13.4 = 13.7 | 14.2 | < 14.4 | 12.2 |
| 7005 | 13.4 = 13.7 | 14.3 or little fainter | < 14.4 | 12.3 |
| 7006 | 13.5 = 13.8 | Ft not est. | < 14.4 | Br. not est |
| 7142 | 13.9 = 14.1 (large overlapping images) | 13.5 | < 14.3 | 13.7 |
| | Is this var. or background stars? | | | |
| 7227 | n.s. < 0 14.2 < 14.4 | 11.2 | 13.8 | 13.7 |
| 7263 | n.s < 0 14.2 < 14.4 ~~n.s < g 13.5~~ | 11.4? | 13.4 | 13.5 |
| 7281 | n.s. < g 13.5 < 13.8 | 11.4 | 12.7 | Too faint |
| 7289 | Too faint | | | |
| 7290 | Too faint | 11.4 | " | " |
| 8938 (8987 was in envelope 8938) | ~~11.3~~ 11.3 | about 14.0 | < 14.5 (a bit light) | about 13.0 |
| ~~8938~~ 8987 → | 12.3 = 12.5 | about 14.3 | 13.8 | 13.2 |
| 8953 | 11.3 = 11.5 | 14.2 | 14.0 | 13.2 |
| | Feb. 10 Remeas. 11.8 | | | |
| 8980 | 12.3 = 12.5 | 14.2 | 13.8 | 13.2 |
| 9338 | 13.8 = 14.1 | 13.2 | about 14.4 | 13.6 |

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| Var. 5 | Var. 6 | Var. 7 | Date | J.D. |
|---|---|---|---|---|
| 13.5 | 13.4 | 13.6 | Aug. 8, 1895 | 13414 |
| 13.4 | 13.3 | 13.5 | " 8, " | 13414 |
| 13.5 | 13.5 | 13.5 | " 8, " | 13414 |
| 13.5 | 13.3 | 13.4 | " 8, " | 13414 |
| 13.3 | ~~13.0~~ 13.5 | 13.7 | Sept. 16 " | 13453 |
| 13.3 | 13.5 | 13.5 | | |
| | | | Oct. 26 " | 13493 |
| 13.5 | 13.5 | 13.4 | | |
| | | | Nov. 4 " | 13502 |
| 13.5 | " | " | Nov. 8 " | 13506 |
| | | | Nov. 11 " | 13509 |
| " | " | " | Nov. 11 " | 13509 |
| 13.4 | 13.7 | 13.3 | Oct. 20, 1897 | 14218 |
| 13.6 or 5 | 13.3 | 13.2 | ~~Oct. 20~~ Nov. 27, 1897 | 14256 ~~14218~~ |
| 13.5 | 13.3 | 13.4 | Nov. 19 " | 14248 |
| 13.5 | 13.4 | 13.3 | Nov. 26 " | 14255 |
| 13.0 | 13.4 | 13.2 | Oct. 12, 1898 | 14575 |

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| | Var. 1 | Var. 2 | Var. 3 | Var. 4 |
|---|---|---|---|---|
| I 9339 | abt 13.9 = 14.1 | 13.4 | <14.7 [3] | 13.3 |
| 9340 | 13.9 = 14.1 | 13.3 | 14.0 | 13.2 |
| 9920 | 12.3 = 12.5 | 13.7? | 11.2 | 13.0 |
| 10024 | < 13.3 < 13.6 | 11.2 | < 13.6 | 12.0 |
| | Poor pl. | | | |
| 10051 | < 14.1 < 14.3 | 11.3 | < 14.3 | 12.3 |
| 10084 | < 14.1 < 14.3 | 11.3 | < 14.3 | 11.8 |
| 10091 | < 13.7 < 14.0 | 11.3 | < 14.0 | 11.9 |

I Plates too poor for estimates.

| | |
|---|---|
| 4991 | 6976 |
| 4992 | 6977 |
| 5189 | 7519 |
| 5218 | 7520 |
| 5226 | 7631 |
| 5286 | 8163 |
| 5287 | 8168 |
| 5318 | 8169 |
| 6913 | |
| 6930 | |

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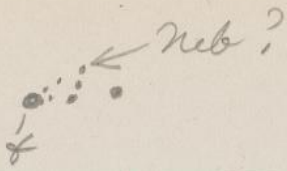


| Var. 5 | Var. 6 | Var. 7 | Date | J.D. |
|---|---|---|---|---|
| 13.1 | 13.5 | 13.3 | Oct. 12, 1898 | 2414575 |
| 13.2 | 13.5 | 13.1 | Oct. 12, 1898 | 14575 |
| 13.5 | 13.5 ? | 13.3 | Aug. 10 1899 | 14877 |
| 12.9 | 12.6 | " | Oct. 9 1899 | 14937 |
| 13.0 | 12.8 | 13.2 | Oct. 17, " | 14945 |
| 13.5 | 13.5 | 13.3 | Oct. 28, " | 14956 |
| 13.5 | 13.5 | 13.4 | Oct. 31 " | 14959 |

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See 9338
8953
7004 like ft. star in 7004
other, better, plates show ft. neb.?

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Est. of Variables were arranged in Ledger form, Periods attempted,

Periods, Magns., Dr. Shapley's conclusions!

Discussed in H. B. 783.

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| | Date | J.D. | Var. 1 | Var. 2 | V |
|---|---|---|---|---|---|
| B 5592 | | | Too poor | | |
| 6920 | | | Too poor | | |
| 8491 | | | Too poor | | |
| 9625 | June 20, 1893 | 2412635 | reject 11.2 = 11.4 | | |
| | very poor, hazy plate. | | nearer 12.5 or 6 | | |
| 10331 | Sept. 27, 1893 | 2412734 | 11.2 = 11.4 | | |
| 10746 | | | Too poor | | |
| 10747 | | | Apparently Ft | | |
| 12477 | Nov. 10, 1894 | | Apparently Br | | |
| 14486 | | | Ft? | | |
| 16830 | | | Br. or defect | | |
| 19764 | July 3, 1897 | | Br. | 11.3 | |
| 22948 | | | Ft. | | |
| 24353 | | | Ft | 11.2 | |
| 28063 | | | Ft | | |

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Var. 3

11.4

11.4

about 12.4

12.8 ?

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B pl. showing separate stars :.
*24353 *28900

| | | | |
|---|---|---|---|
| *B | 28900 | | Br. not Max. |
| | 30128 | | " |
| | 32206 | | " |
| | 45667 | | " |
| | 45769 | | " |

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? Spiral — 28900



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Corr. Magns. used.

Additional plates

| | Var. 1 | Var. 2 | Var. 3 | Var. 4 |
|---|---|---|---|---|
| ~~I 4930~~ 91 | Too poor | | | |
| 4992 | Too poor | | | |
| 4993 | Fr. | 11.3 | 13.7 | 12.2? |
| | Too poor for est. | | | |
| 4998 | Fr. | 11.3? | 14.2? | 12.5? probably right magn. tak |
| | Plate exceedingly poor, trailed, blurred, etc. | | | |
| 5173 | 12.4 | 10.9 | 13.8 | 12.7 |
| 5188 | 12.1 or 2 | 11.0 | 13.8 | 12.7 |
| 5189 | Too poor | 11.2? | .. | .. |
| 5193 | 12.1 | 11.1 | 13.8 | 12.8 |
| 5219 | 11.0 | 11.6 | Remeas 12.7 (12.4) | 12.5 |
| 5224 | Too poor | 11.6 | .. | about 12.5 |
| 5226 | Too poor about 11.0? | 11.6 | .. | .. |
| 5264 | 11.2 | 12.0 | about 11.9 | .. |
| ~~7953~~ 7519 | Very poor 11.8 | about 14.2 | < 14.3 | 13.9 |
| 7996 | 13.3 | 0 ÷ .2? var < 14.6 | 14.5? | 14.0 |

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| Var. 5 | Var. 6. | Var. 7. | | |
|---|---|---|---|---|
| 13.0 | 12.8 | 13.5? | July 20, 1893 | 12665 |
| bly 13.1 | " | 13.7? | July 21, 1893 | 12666 |
| 13.7 | 13.6 | 13.4 | Aug. 16, " | 12692 |
| 13.8 | 13.6 | 13.3 | " 20, " | 12696 |
| " | " | | | |
| 13.8 | 13.5 | 13.3 | " 21, " | 12697 |
| 12.5 | 12.7 | " | Sept. 10, " | 12717 |
| " | " | | | |
| " | " | | Sept. 11, " | 12718 |
| " | " | " | " 20, " | 12727 |
| 13.0 | 13.3 | 13.4 | Sept. 5 1896 | 13808 |
| 13.1 | 13.6 | 13.5 | " 18, " | 13821 |

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1) Best (?) Min 8178
8903 excl. pl. but scratch
8907 excl. images

| | Var. 1 | Var. 2 | Var. 3 | Var. 4 |
|---|---|---|---|---|
| X 8015 | abont 13.6 | abont 13.9 | < 14.3 | 13.7 |
| | double images of all brighter stars. Lower image est. | | | |
| 8026 | 13.5 | 14.0 | < 14.4 | 13.5 |
| 8064 | 14.0 | 14.1 | 14.0 | 13.7 |
| 8079 | 14.0 | 13.9 | 13.8 | 13.5 |
| 8122 | < 14.0 | 12.9 | 12.7 | 12.1 |
| 8178 | Var. < 14.4 o distinctly seen | 11.1 a.2 | 11.5 | 12.5 |
| 8277 | 14.0 | 12.8 | 12.9 | 13.9? |
| 8712 | < 14.1 may be Trace of Var. | 11.5 | 11.3 | 13.1 |
| 8877 | abont 11.2 | 14.0 | Probably abont 14.6 Seen, ff. or still fainter than 14.6 | 13.6 |
| 8886 | 11.4 | 14.1 | same note as 8877 | 13.6 |
| 8898 | 11.4 | 14.0 | same note as above | 13.3 |
| 8903 | 11.4 | Perhaps 14.7 Seen, o bright | same as above | 13.6 |

*3 may not be seen exc. background

Defect in Christie Scratch

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* NB 2s 3 cum on 8877 ? 8886 see ft. stars Superpose 8178 & 8907 also 8953

Probably range exceeds this magnd and star is not seen; background only seen.

| Var. 5 | Var. 6 | Var. 7 | | |
|---|---|---|---|---|
| 13.5 | 13.3 | 13.7 | Sept. 30, 1896 | 13833 |
| † | | | | |
| 13.5 | 12.7 | 13.6 | Oct. 1, " | 13834 |
| 13.5 | 13.5 | 13.4 | " 15, " | 13848 |
| 13.3 | 13.4 | 13.5 | " 17 " | 13850 |
| 13.3 | 13.2 | 13.6 | Nov. 11 " | 13875 |
| 13.3 | 13.2 | 13.4 | Nov. 25, " | 13889 |
| 13.2 | 13.2 | 13.0 | Jan. 26, 1897 | 13951 |
| 13.3 | 13.~~4~~ | 13.2 | June 17, " | 14093 |
| 13.2 | 13.7 | 13.1 | Oct. 5, " | 14203 |
| 13.3 | 13.7 | 13.3 | Oct. 6, " | 14204 |
| 13.2 | 13.6 | 13.2 | Oct. 7, " | 14205 |
| 13.1 | 13.7 | 13.1 | Oct. 8, " | 14206 |

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| | Var. 1 | X | Var. 2 | Var. 3 | Var. 4 |
|---|---|---|---|---|---|
| X 8907 | 11.3 or 4 | | 14.5 | same note as 8877 | 13.7 |
| 8923 | 11.4 | | Too poor. | Fr or N.S. as estimate | 13.2 |
| 8924 | 11.4 | | Too poor. | N.S. | 13.3 |

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| Var. 5 | Var. 6 | Var. 7 | | |
|---|---|---|---|---|
| 13.2 | 13.7 | 13.1 | Oct. 11, 1897 | 14209 |
| 13.0 | 13.5 | 13.1 | Oct. 14, " | 14212 |
| 12.9 | 13.4 ? | 13.0 | " 14, " | 14212 |

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a Plates of region

| | | | Var. 1 | Var. 2 |
|---|---|---|---|---|
| a | 8202 | Nov. 19, 1906 | 17534.539 | <14.0 | 12.3 |
| | 8203 | November 19, 1906 | 17534.563 | <14.3 | 12.3 |
| | 9023 | August 19, 1908 | 18173.840 | " | about 14.5 |
| | 10612 | too poor | | " | |
| | 10614 | | | " | |
| | 10616 | Oct. 1, 1912 | 19677.604 | " | |
| | 10617 | " 8, " | 19684.526 | " | |
| | 10618 | " 8, " | 19684.591 | " | Br. |
| | 10796 | | | " | Br. |
| | 10798 | Sept. 23, 1913 | 20034.772 | " | 12.0? |
| | 10803 | " 28, " | 20039.624 | <14.1 | 12.5 |
| | 10804 | Sept. 29, 1913 | 20040.535 | <14.0 | 12.4 |
| | 10805 | poor | | | |
| | 10817 | Oct. 28, 1913 | 20069 | " | " |
| | 11575 | too poor | | | |
| | ~~11577~~ | | | | |
| | 11581 | extreme edge — too poor | | | |
| | 11583 | Oct. 16, 1916 | extreme edge | | |
| | 11706 | Sept. 13, 1917 | 21485 | 13.8 | sun, ray ft. <14.1 |
| | 11708 | Sept. 14, 1917 | 21486 | 13.8 | about 14.0 |
| | 11710 | Sept. 15, 1917 | 21487 | 13.8 | ft. if sun. |
| | 11716 | " 18, " | 21490 | 13.9 | " |
| | 11782 | poor images | | | |

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| Var. 3. | Var. 4 | Var. 5 | Var. 6 | Var. 7 | |
|---|---|---|---|---|---|
| 12.8 | Br. overlapping | 13.0 | Br. | 13,3 | |
| ~~13.2~~ 12,7 | " | 12.8 | | 13.3 | poor images |
| 12.1 | " | 12.2 | " | 13.2 | |
| Bright Br. | | | | | |
| 11.2 | | | | | |
| 11.3 | | | | | |
| 11.1 | " | " | " | " | |
| " | " | " | " | " | |
| " | " | " | " | " | |
| 12.0 | " | 12.6 | " | 13.2 | |
| 12.0 | " | 12.5 | " | 13.3 | |
| 11.2 | " | " | " | " | |
| ~~ft~~ very very ft. | " | 13.2 | 13.7 | 13.3 | |
| <14.3 | | | | | |
| <14.3 | " | 13.2 | 13.5 | 13.4 | |
| <14.4 | " | 13.4 | " | 13.3 | |
| <14.1 | " | 13.5 | 13.6 | 13.5 | |
| Br. | | | | | |

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| | | | | | Var. 1 | Var. 2 |
|---|---|---|---|---|---|---|
| | 6983 | October 1, 1904 | 16755.628 | " | | 11.7 |
| a | 2183 | Nov. 24, 1896 | 13888.576 | " | | 11.3 |
| | 2187 | Nov. 29 1896 | 13893 | " | | 11.2 |
| | | " 30 | 13894 | | | |
| | 2189 | Dec. 1 & Dec. 2 1896 | 13895 / 13896 | " | | 11.3 |
| | 3393 | Sent to Kapteyn | | | | |
| | ~~4600~~ | | | | | |
| | ~~4603~~ | | | | | |
| | 6913 | – Sept. 3, 1904 | 16727.653 | " | | " |
| | 6980 | " 29, " | 16753.625 | " | | 11.6 ? |
| 2 confirmed | 6982 | Sept. 30, 1904 | 16754.598 | 12.5 | | 12.1 (2nd = 12.0) |
| 2 " | 6982 | Oct. 1, 1904 | 16755.544 | 12.5 | | 12.1 12.0 |
| | 6986 | Oct. 4, 1904 | 16758.559 | " | | 11.8 |
| | 6987 | " 4, " | 16758.644 | " | | 11.8 |
| | 6988 | " 5 " | 16759.606 | " | | 11.8 |
| | 6989 | " 6, " | 16760.531 | " | | 11.9 |
| | 6990 | " 6, " | 16760.614 | " | | 11.8 |
| | 6991 | " 6, " | 16760.697 | " | | 11.7 |
| | 6992 | two poor | | " | | " |
| | 8043 | Aug. 24, 1906 | 17447.825 | Fr. | | Fr. |
| | 8129 | Sept. 22, 1906 | 17476.649 | " | | Fr. Obs |
| | 8415 | Aug. 7, 1907 | 17795.822 | 11.1 | | 12.7 |
| | 8491 | edge magns. distorted | | Br. | | |
| | ~~8492~~ | wing rej. | | | | |
| | ~~8459~~ | " " | | | | |
| | ~~10239~~ | " " | | | | |
| | 10806 | poor Sept. 30, 1913 | 20041 | " | | " |
| | 10829 | poor | | " | | " |

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| Var. 3 | Var. 4 | Var. 5 | Var. 6 | Var. 7 |
|---|---|---|---|---|
| 13.9 | " | 13.4 | " | 13.1 |
| 11.3 | | 12.5? | | 13.1 |
| 11.3 | " | 12.5 | " | 13.1 |
| 11.3 | " | 12.5 | " | 13.1 |
| | | | | |
| may be also < 14.3 | " | 12.6 | " | 13.1 |
| 14.0 | | 13.1 | " | 13.1 |
| 13.9 (2nd rec. = 12.0) | " | 12.7 | " | 13.1 |
| 13.9 (12.0) | " | 13.3 | " | 13.1 |
| 13.8 ~~13.4?~~ | " | 13.4? | " | 13.2 |
| 13.7 | " | 13.5 | " | 13.2 |
| 13.7 | " | 13.2 | " | 13.0 |
| 13.8 | " | 13.0? | " | 13.1 |
| 13.7 | " | 13.0 | " | 13.0 |
| 13.7 | " | 13.2 | " | 13.1 |
| " | " | " | " | " |
| 14.1 | " | 12.4 | | 13.5 |
| <14.3 | | 12.8 | | 13.3 or ft. |
| 12.3 | " | 12.4 | " | 13.4 |
| | | | | |
| | | | | |
| | | | | |
| Very Br. 11.4? | " | " | " | " |
| " | " | " | " | " |

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| | | | Var. 1 | Var. 2 |
|---|---|---|---|---|
| 10831 | Too few. | | " | " |
| 11580 | | | " | " |
| 11582 | | | " | " |
| 11714 | Sept. 17, 1917 | 21489 | 13.9 | Ft. |

| | | | | | |
|---|---|---|---|---|---|
| | 3306 | | | | |
| br. | 3307 | | | | |
| | 4794 | Sept. 4, 1900 | 15297.631 | 12.0 | " |
| Excellent pl. | 8105 | Sept. 18, 1906 | 17472.656 | < 14.4 | about 14.0 |
| | 10797 | Sept. 23, 1913 | 20034.600 | " | 12.0 |
| 21475 = Mark 3 = P = 194, 144 Conf. by Δ | 11699 | Sept. 6, 1917 | 21478.732 | 13.6 | 13.9 |
| | 11700 | | | | |
| | 11701 | Sept. 7, 1917 | 21479.730 | 13.7 | 13.9 |
| | 11705 | " 10, " | 21482 | " | " |
| | 11712 | " 16, " | 21488 | ~~13.1~~ | " |

| | | | | | |
|---|---|---|---|---|---|
| | 3326 | | | | |
| | 11702 | Sept. 7, 1917 | 21479 | " | " |

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| Var. 3 | Var. 4 | Var. 5 | Var. 6 | Var. 7 |
|---|---|---|---|---|
| " | " | " | " | " |
| " | " | " | " | " |
| " | " | " | " | " |
| 14.4 | " | 13.4 | 13.7 | 13.3 |
| | | | | |
| | | | | |
| | | | | |
| 12.7 | " | 13.2 | " | 13.3 |
| <14.4 | " | 13.2 | " | 13.5 |
| 12.2 | " | 13.0 | ~~13.5~~ " | 13.2 |
| 13.8 | " | 12.7 | 13.5 | 13.4 |
| | | | | |
| 14.0 | " | 13.0 | 13.6 | 13.3 |
| 14.0 | " | 13.2 | " | 13.3 |
| 14.1 | " | 13.1 | " | 13.2 |
| | | + | | |
| | | | | |
| " | " | 13.0 | " | 13.4 |

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1919phae.proj.1184W



Use B plates, short exp.

To estimate 50 brightest stars near and in 47 Tucanae
Area of 9 m.m. radius selected on A 8202.
Stars examined for brightness and marked from
1 to -- on chart in Plate I, Mkd. Copy H.A. 38.
From these selected stars, -- brightest may be ta
B 24353 F 6996 Exp 30m B28063 X

all stars were marked that seemed bright on a good plate
B = 1

| | | |
|---|---|---|
| | 2 | 13.4 |
| | 3 | 13.4 |
| | 4 | 13.2 |
| | 5 | 13.7 ? |
| | 6 | 12.5 overlapping others? |
| | 7 | 12.5 4 |
| | 8 | 13.1 |
| | 9 | — |
| | 10 | 13.4 |
| | 11 | 13.3 |
| | 12 | 13.3 |
| | 13 | — |
| | 14 | — 13.6 |
| | 15 | about 13.7 |
| | 16 | 13.4 |
| | 17 | 13.5 |
| — | 18 | 13.0 |
| | 19 | 13.4 |
| | 20 | 13.5 |
| d = | 21 | 13.3 not estimated |
| | 22 | 12.7 |
| — | 23 | [13.5] reject probably not correctly seen. |
| | 24 | 13.0 |
| | 25 | 13.4 |

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1919phae.proj.1104w



...anal.

Best B plates. chosen from some 20 ± plates;

2h 5 B 12477 10m Exp. fair, rather hazy images
24353 10 " excellent, Cl. in center!
28063 10 " " " " "

10m. I Pl.

taken.

I 8907 Exp. 50m I 8923 Exp. 10m

List of brightest ✓ Means by HS Rec 1924

| | | | |
|---|---|---|---|
| 1 | | | |
| 2 | 13.7 | | |
| 3 | 13.6 | | |
| 4 | 13.1 | | 13.15 |
| 5 | 13.6 | | |
| 6 | 13.5 | | |
| 7 | 13.5 | | 12.95 ✓ |
| 8 | 12.5 | ✓ | 12.8 ✓ |
| 9 | 13.1 | | 13.1 ✓ |
| 10 | 13.6 | | |
| 11 | | | |
| 12 | 12.4 | ✓ | 12.65 ✓ |
| 13 | | | |
| 14 | | | |
| 15 | | | |
| 16 | 13.5 | | |
| 17 | 13.6 | | |
| 18 | 13.34 | | 13.2 |
| 19 | | | |
| 20 | | | |
| 21 | | | |
| 22 | 13.0 | | 12.85 ✓ |
| 23 | 12.7 | | 12.7 ✓ |
| 24 | 13.4 Close to ~~Comp. with~~ another ft st. | | 13.2 |
| 25 | 13.3 | | |
| 25a | 13.2 | | |
| 25b | 12.3 if alone | | 12.3 ? ✓ |

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1919phae.proj.1184W



| | B24353 | | B | B28063 |
|---|---|---|---|---|
| 26 | 13.3 | | | |
| b = 27 | 10.7 | not ~~estimated~~ | | |
| w = 28 | 12.6 | not est. | | |
| 29 | 13.5 | | | |
| 30 | 12.4 | | | |
| 31 | 12.4 | | | |
| 32 | 13.7 | | | |
| 33 | 13.5 | | | |
| 34 | 13.4 | | | |
| 35 | } Comb. | | | |
| 36 | | | | |
| 37 | 13.4 ? | | | |
| 38 | 13.0 | | | |
| 39 | 13.4 | | | |
| Br. St. at Center - close to other stars 40 | 11.0 | | H.0 | 11.0 |
| 41 | 13.4 | | | |
| y = 42 | 12.5 | | | |
| 43 | about 13.5 | Difficult | | |
| 44 | about 13.5 | " | | |
| 45 | about 13.5 | " | | |
| 46 | 12.9 | | | |
| 47 | 13.0 | | | |
| 48 | } Combined | | | |
| 49 | | | | |
| 50 | — | | | |
| 50a | 13.0 | | | |
| 50b | Hazy, DBL ? | | | |
| 50c | 13.0 | | | |

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X 8923

| | | Means |
|---|---|---|
| 26c | 13.3 | |
| 26a | 13.2 | 13.2 |
| 26b | 13.2 | 13.2 |
| 26 | 13.2 | 13.25 |
| b = 27 | | ✓ 10.7 Br |
| W = 28 = | | ✓ 12.6 ✓ |
| 29 | | |
| 30 | 13.0 | 12.7 ~~✓~~ |
| 31 | 12.9 | 12.65 ~~✓~~ |
| 32 | 13.6 | |
| 33 | 13.5 | |
| 34 | | |
| 35 | 13.0 | 13.0 ✓ |
| 36 | | |
| 37 | 13.0 | 13.2? |
| 38 | 13.0 | 13.0 ✓ |
| 39 | 13.5 | |
| 40 | 10.7 m.8 | ✓ 10.9 ~~✓~~ Br |
| 41 | 13.6 | |
| y = 42 | 12.5 not est. | ✓ 12.5 ✓ |
| 43 | 13.6 | |
| 44 | 13.5 | |
| 45 | 13.8 | |
| 46 | 12.8 Another star close but probably does not affect est. | 12.85 ✓ |
| 47 | 13.4 | 13.2 |
| 48 | 13.2 | |
| 49 | 13.6 | |
| 50 | 13.3 | |
| 50a | 13.6 | |
| 50b | 13.7 | |
| 50c | 13.1 | 13.05 ✓ |

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Possible Vars?

Watch star near 75 13.7 to 14.0 - on X 6996
0-75 on B24353 ft on chart in 38
- ?

Watch 6

| | | | |
|---|---|---|---|
| 51 | 13.5 | | |
| 52 | — | | |
| 53 | about 13.0 if a single star | | |
| 54 | — | | |
| 55 | — Pretty bright but comb. with 54 | | |
| 56 | — | | |
| 57 | — | | |
| 58 | — | | |
| 59 | 13.3 | | |
| 60 | 13.5 | | |
| 61 | 12.7 | | |
| 62 | 13.0 | | |
| Watch for → Var. 63 | 13.7 | | 13.7 |
| ~~Stars 2 brighter on X pl.~~ 64 | 13.5 | | 13.6 |
| 2 = 65 | 12.2 Not estimated | | |
| 66 | affected by ft. stars | | |
| 67 | 13.4 | | |
| 68 | 13.4 | | |
| 69 | 13.4 | | |
| 70 | 13.7 | | |
| 71 | 13.7 | | |
| 72 | 13.1 | | |
| 73 | 13.4 | | |
| 74 | 13.4 | | |
| 75 | 13.2 | | |

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| | X 8923 | Means |
|---|---|---|
| 51 | 13.0 | |
| 52 | | |
| 53 | | |
| 54 | 13.5 | |
| 55 | — | |
| 56 | | |
| 57 | 12.9 | 12.9 ✓ |
| 58 | 13.0 | 13.0 ✓ |
| 58a | 13.1 | 13.1 ✓ |
| 59 | 13.0 | 13.15 |
| 60 | 13.2 | |
| 61 | 12.9 | 12.8 ✓ |
| 62 | 13.3 | 13.15 |
| 63 | 13.6 | |
| 64 | 13.6 | |
| Z=65 | 12.2 hottest | ✓ 12.2 Br |
| 66 | 12.3 | ✓ 12.3 ✓ |
| 67 | 13.3 | |
| 68 | | |
| 69 | 13.4 | |
| 70 | ~~Ft~~ | |
| 71 | ~~Ft~~ | |
| 72 | 12.9 | 13.0 ✓ |
| 73 | 13.0 | 13.2 |
| 74 | 13.0 | 13.25 |
| 75 | 13.0 | 13.1 ✓ |

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76
77 } Comb.
78 — (13.0 if alone) affected by close Star?
79 13.4
80 12.7
81 12.7
82 12.8
83 12.5
84 12.9
85 12.8
86 13.5
87 13.4
88 12.9
~~89~~ ~~12.3~~ See 157
~~90~~ ~~12.4~~

Var ① Max
② "
③ "
④ "
⑤ Med.
⑥
⑦

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Saturday, February 17, 1923.

Confined X 8886 & 8907, (best plates)
for faint stars.

Near Nebulae (?)

X 8923

Exam. of X 8907
marked in Print, H.A. 38.

No. 1 confirmed

| | | | | | |
|---|---|---|---|---|---|
| 79 | 13.0 | X 8877 | 13.2 | = | |
| 80 | 12.7 | X 8953 | 12.7 | ✓ | |
| ~~81~~ | | ~~* X 8886~~ | | | |
| 81 | -12.8 | | 12.75 | ✓ | |
| 82 | 12.7 | | 12.75 | ~~✓~~ | |
| 83 | 12.6 | | 12.53 | ~~✓~~ | |
| 84 | | | 12.9 | ~~✓~~ | |
| 85 | | | 12.8 | ~~✓~~ | |
| 86 | | | | | |
| 87 | | | | | |
| 88 | -13.1 | | 13.0 | ✓ | |
| 89 | 12.3 | | ✓ 12.3 | ✓ | |
| 90 | 12.65 | | ✓ 12.5 | ✓ | |
| 91 | 11.6 | | ✓ 11.6 | Br | |
| 92 | 12.2 | | ✓ 12.2 | ~~Br~~ | |

Means

Collecting "25"

12.85
12.8
.65
.85
.7
.3
.6
.5
.9
.8
.3
.75
.3
.5
12.7
13.0
0
1
0
1
.05
0
0
13.1 25 ✓
12.95
19.80
12.80 Mean
-1.51 M
14.3 m-M
π = 0".00014

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Saturday, Feb. 17, 1923

Compared ~~X~~ 8886 & 8907, best plates

New Nebulae?
exam. of X 8907
marked on print, H. A. 38

No. 1 confirmed on
~~X~~ 8877
~~*~~ 8886
8953

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Corr. Magns used. Tuesday, March 13, 1923.

47 Tucanae Estimates of Vars. on recently received A Plates.

| | | | | | | |
|---|---|---|---|---|---|---|
| new Var.? | A 12149 | Var. 1 | Var. 2 | Var. 3 | Var. 4 | Va |
| 12.6 | A 12149 | " | " | 13.5 | " | |
| 12.5 | 12151 | " | " | 13.4 | " | |
| Br. nucleus | 12154 | " | " | 13.4 | " | |
| 11.8? | 12192 | " | " | 11.3 | " | |
| blacks but small. | | | | | | |
| 12.6 | 12197 | " | " | 11.2 | " | |
| " | 12201 | perhaps 13.1 | " | 11.2 | " | |
| 12.3 | 12232 | near Max. Not est. 12.2 ? | " | 11.0 | " | |
| 12.2 | 12234 | ? perhaps 12.0 | " | 11.0 | " | |
| 12.2 | 12235 | 12.2 | " | 11.0 | " | |
| 12.5 * | 12236 | 12.5 | " | 11.1 | " | |
| 12.4 | 12237 | 12.3 | " | 11.2 | " | |

Estimates of new Var(?) are unsatisfactory — affected by diurnal pa

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Note: Change in Br. star at center?
A 12235, compare with I 8923

Look up 2 – dates of Max. No apparent Max in these plates.

| Var. 5 | Var. 6 | Var. 7 | Date | J.D. |
|---|---|---|---|---|
| 13.4 | " | 13.5 | August 20, 1922 | 23287 |
| 13.3 | " | 13.4 | Aug. 21, " | 23288 |
| ~~12.7~~ 13.4 | " | 13.1 | Aug. 23, " | 23290 |
| 12.9 | " | 13.3 | Sept. 17, " | 23315 |
| 13.0 | " | 13.2 | Sept. 22, " | 23320 |
| 13.0 | " | 13.1 | Sept. 23, " | 23321 — |
| 12.8 | " | 13.1 | October 10, " | 23338 |
| 13.0 | " | 13.4 | Oct. 12, " | 23340 |
| 13.1 | " | 13.3 | " ~~12~~ 13, " | 23340 |
| 13.1 | " | 13.3 | " 13, " | 23341 |
| 13.1 | " | 13.2 | " 13, " | 23341 |

ol portion of Cl.

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| | | Var. 1 | Var. 2 | Var. 3 | Var. 4 |
|---|---|---|---|---|---|
| 12.5 | a 12239 | 12.5 | " | 110 | " |
| 12.6 | 12248 | 12.4 | " | 11.0 | " |

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| Var. 5 | Var. 6 | Var. 7 | | |
|---|---|---|---|---|
| 13.2 | " | 13.3 | October 15, 1922 | 23343 |
| 13.0 | " | 13.2 | " 16, " | 23344 |

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For Cant see X5443

Not to be announced as Var. See f. 172
8953 shows ft. star separate

New Var. — Br. Star at Center. See f. 161

* Note: Was marked by Prof. B. as 1 on X 5173 but apparently not proved as var, as it is not marked in H.A. 38 print.

March 14. Var. confirmed by Dr. S.

Note: on X 8923 & 8953 a faint star is seen separate from this star but very close. On many plates this must overlap, giving combined magn. These plates are noted in measures — see Rem. "c l"

* X 5416 & 7227 was apparently marked by Prof B with later numbering of Vars. — this star not included

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Examined Yellow plate — B46100

Estimates of New Var.

Est are uncertain owing to large diff. b − x and prob. comb. light.

| | | |
|---|---|---|
| X5173 (black center) | 11.0 | |
| X 4993 | 11.1 | c light |
| 4998 | 11.3 | c l |
| 5188 | 11.2 | c l |
| 5193 | 11.3 | c. l |
| 5219 | 10.7 | |
| 5224 | 10.6 or 10.7 | |
| 5264 | 10.6 | |
| 5289 5298 | 10.6 10.5 | |
| 5333 | 10.7 | |
| 5350 | 10.5 | |
| 5358 | 10.5 | |
| 5408 | 10.6 | |
| NB* V 5416 | 11.5? | |
| 5443 | 10.6 | |
| 5452 | 10.6 | |
| 5453 | 10.7 | |
| 5476 | 11.0 | |
| 5501 | 10.6 | |
| 5504 | 11.2 | |
| 5505 | 11.2 | |
| 5590 | 10.7 | |
| 6987 | 11.1 | |

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8903 exc. pl.

Cf. in ledger

Ests. of new Var. — Br. stars at Center

| | | |
|---|---|---|
| X 6988 | 11.2 | |
| 6995 | 11.0 | |
| 6996 | 10.9 | |
| 7001 | 10.9 | |
| 7002 | 11.1 | |
| 7003 | 11.1 | |
| 7004 | 11.1 | |
| 7005 | 11.3 | |
| 7006 | 10.9 | large image prob. affected by adj. star |
| 7142 | 10.7 | |
| 7227 | 10.7 | |
| 7263 | 10.9 | |
| 7281 | 10.9 | c.l. |
| 7290 | 10.6 | |
| 7953 | 10.9 | |
| 7996 | 11.0 | |
| 8015 | 11.0 | |
| 8026 | 10.8 | |
| 8064 | 11.1 | |
| 8079 | 10.9 | |
| 8122 | 10.9 | |
| 8178 | 10.8 | |
| 8277 | 10.6 or 10.7 | |
| 8712 8877 | 11.1 10,6 or 10.7 c.l. | |
| 8886 | 10.9 | |
| 8898 | 10.8 | |
| 8903 | 11.2 | |

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Cont.

| | | |
|---|---|---|
| X 8923 | 10.8 | |
| 8924 | 10.7 | |
| 8938 | 11.0? & 11.2? Blacks | |
| 8953 | 10.7 | |
| 8980 | 11.0 | |
| 8987 | 10.6 | |
| 9338 | 11.5? | |
| 9339 | 10.~~9~~ | |
| 9340 | 11.2 | |
| 9920 | 11.1 | |
| 10024 | 10.8 | c.l. |
| 10051 | 11.2 | |
| 10084 | 10.9 | |
| 10091 | 11.0 | |
| ~~8715~~ | ~~10.6 a 10.7~~ | ~~c.l.~~ |

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9625?

B Plates Cont.

| | | | |
|---|---|---|---|
| | B 5592 | " | T. 00 foor. Probably abt 11.2 |
| | 6920 | Br. | |
| | 8491 | 10.6? | |
| * | 9625 | 12.8? | Poor pl, Var. certainly FF |
| | 10331 | 11.3? | |
| | 10746 | " | 00 foor. Center all blacks |
| * | 10747 | 12.5 or 12.6 | |
| | 12477 | 11.5? | |
| | 14486 | 11.5 | |
| | 16830 | 11.5 | |
| | 19764 | 11.2 | |
| | 22948 | 11.7 or 11.8 | |
| | 24353 | 11.5 | |
| | 28063 | 11.5 | |
| * | 28900 | 12.3 or 12.4 | |
| | 30128 | 11.5 | |
| | 32206 | 11.7? Poor | |
| | 45667 | 11.1 | |
| | 45769 | 11.2 | |

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| | | |
|---|---|---|
| July 24, 1890 | | |
| September 17, 1891 | 11993 | |
| Sept. 5, 1892 | 12347 | |
| June 20, 1893 | 12635 | — |
| Sept. 27, 1893 | 12734 | |
| Dec. 4, 1893 | 12802 | |
| Dec. 5, 1893 | 12803 | — |
| Nov. 10, 1894 | 13143 | |
| Aug. 31, 1895 | 13437 | |
| July 13, 1896 | 13754 | |
| July 3, 1897 | 14109 | |
| July 30, 1899 | 14805 | |
| Oct. 12, 1899 | 14940 | |
| July 26, 1901 | 15592 | |
| Dec. 4, 1901 | 15723 | — |
| June 17, 1902 | 15918 | |
| July 14, 1903 | 16310 | |
| Sept. 9, 1915 | 20750 | |
| Sept. 16, " | 20757 | |

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Thursday, March 15, 1923.

Bright Var. St. near center.

Est. on A Plates. Cont.

| | | | |
|---|---|---|---|
| a | 11575 | perhaps | 12.0 |
| | 11705 | " | 11.7 |
| | 11706 | " | 12.4 image Seems flecks but small. |
| | 11708 | | 11.8 |
| | 11710 | | 12.0 |
| | 11712 | | 12.0 |
| | 11716 | | defecture |
| | 11782 | | 12.3? small image? |
| | | | H |
| | 10803 | | 11.5- |
| | 10804 | | 11.4 |
| | 10805 | | 11.3 |
| | 10817 | | 11.3 |
| | 10614 | | 11.3 |
| | 10616 | abnt | 11.8 |
| | 10617 | | 11.5 |
| | 10618 | | 11.6? |
| | 11699 | | 11.8? |
| | 10612 | | 11.5- |
| | 9023 | | 11.8? |
| | 11701 | | 11.8 |
| | 11702 | | 11.8 |
| | 8203 | | 11.4 |

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Sept. 28, 1916
Sept. 10, 1917
" 13, "
" 14, "
" 15, "
" 16, "

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March 15.

In exam. measures of this new Var.(?) for possible Period, I found that B 107/47 12.6 December 5, 1893 Eph
X 5501 10.6 " 5, "
are of identically same date and same exposure.

Reported to Dr. Shapley.

This led to investigation of results by Dr. Shapley.

All X plates show star bright
~~all~~ A " " " faint

On the B " there is a large diff. in the density of the Clusters due to shorter or longer exposures. And the Var.(?) appears to be so much affected by this (Eberhard) effect) that its Variation cannot be accepted as other than photographic.

Not to be announced at present.

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from 0h 20m to 1h 25m
0 20 to 1 25

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# Count of all Stars

## 47 Tucanae.

(many) Some stars are covered by lines. Effort was made to include the br. ones in one of the adjoining circles.

see p. 120
Standards of Magn. as Mbd on $\frac{X}{500}$.
Sections as represented p. 175.

| | | | |
|---|---|---|---|
| Sec. 1 | ]13 | 2 | |
| | 13-14 | 41 | |
| | 14-15 | 12 | |
| | [15 | ~~167~~ 390 | |
| | | ~~219~~ 445 | |
| Sec. 2 | ]13 | 1 | |
| | 13-14 | 33 | |
| | 14-15 | 20 | |
| | [15 | ~~154~~ 375 | |
| | | ~~208~~ 429 | |
| Sec. 3 | ]13 | 1 | |
| | 13-14 | 25 | |
| | 14-15 | 23 | |
| | [15 | ~~189~~ 358 | |
| | | ~~238~~ 407 | |
| Sec. 4 | ]13 | ~~48~~ 0 | |
| | 13-14 | 48 | |
| | 14-15 | 15 | |
| | [15 | 400 | |
| | | ~~453~~ 463 | |
| Sec. 5 | ]13 | 2 | – 1 prob. dbl. add to 2 |
| | 13-14 | 36 | |
| | 14-15 | 16 | |
| | [15 | 336 | |

390

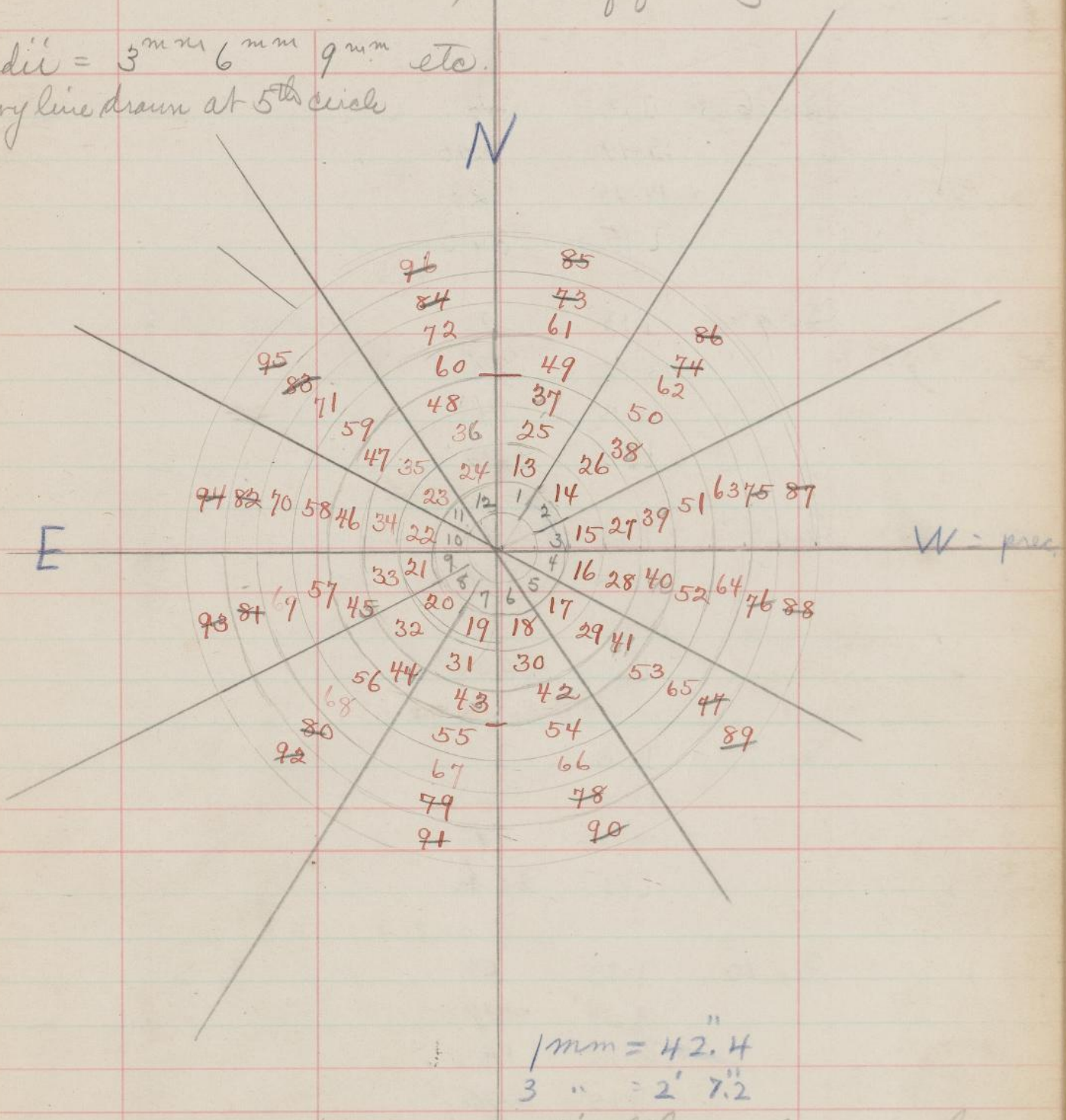
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1919phae.proj.1104w



X 8907 superposed on ruled glass plate
(fastened by tapes & pins) 50m exp
Reseau has ink lines, circles of following radii:

Radii = 3mm 6mm 9mm etc.
Heavy line drawn at 5th circle




1 mm = 42.4"
3 " = 2' 7.2"

As two plates are adjusted, centers may be slightly off from exact center of circles, black portion of cluster. Hold head a little to left of center to correct this. Note red ink numbers.

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1919phae.proj.1184W



12 300 / 5600

| | | |
|---|---|---|
| Sec. 6 | ] 13 | ~~26~~ 1. |
| | 13-14 | 38 |
| | 14-15 | 28 |
| | [ 15 | 346 |
| | | 413 |
| Sec. 7 | ] 13 | 2 (1 Var. St. 4) |
| | 13-14 | 28 |
| | 14-15 | 14 |
| | [ 15 | 326 |
| | | 370 |
| Sec. 8 | ] 13 | 0 |
| | 13-14 | 44 |
| | 14-15 | 8 |
| | [ 15 | 320 |
| | | 372 |
| Sec. 9. | ] 13 | 3 |
| | 13-14 | 43 |
| | 14-15 | 15 |
| | [ 15 | 266 |
| | | 327 |
| Sec. 10 | ] 13 | 0 |
| | 13-14 | 49 |
| | 14-15 | 13 |
| | [ 15 | 225 |
| | | 287 |

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| | | |
|---|---|---|
| Sec. ~~10~~ 11 | ] 13 | 1 |
| | 13-14 | 39 |
| | 14-15 | 23 |
| | [15 | 278 |
| | | 341 |
| Sec. 12 | ] 13 | 0 |
| | 13-14 | 52 |
| | 14-15 | 22 |
| | [15 | 340 |
| | | 414 |
| Sec. 13 | ] 13 | 2 |
| | 13-14 | 18 |
| | 14-15 | 10 |
| | [15 | 201 |
| | | 231 |
| Sec. 14 | ] 13 | 1 |
| | 13-14 | 21 |
| | 14-15 | 12 |
| | [15 | 257 |
| | | 291 |
| Sec. 15 | ] 13 | 0 |
| | 13-14 | 31 |
| | 14-15 | 14 |
| | [15 | 240 |
| | | 285 |

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1919phae.proj.1184W



| | | |
|---|---|---|
| Sec. 16 | ]13 | 2 |
| | 13-14 | 45 |
| | 14-15 | 18 |
| | [15 | 305 |
| | | 370 |
| Sec. 17. | ]13 | ~~029~~ probably dbl? |
| | 13-14 | 29 |
| | 14-15 | 12 |
| | [15 | 275 |
| | | 316 |
| Sec. 18 | ]13 | 1 probably dbl. |
| | 13-14 | 26 |
| | 14-15 | 12 |
| | [15 | 245 |
| | | 284 |
| Sec. 19 | ]13 | 0 |
| | 13-14 | 21 |
| | 14-15 | 4 |
| | [15 | 366 |
| | | 391 |
| Sec. 20 | ]13 | 1 |
| | 13-14 | 22 |
| | 14-15 | 14 |
| | [15 | 420 |
| | | 457 |

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Sec. 21 ] 13 1
13-14 26
14-15 14
[ 15 340

381

Sec. 22 ] 13 0 1 Var. = Star 7
13-14 ~~+8 22~~
14-15 10
[ 15 310

342

Sec. 23 ] 13 2
13-14 ~~26~~
14-15 19
[ 15 355

402

] 13 ~~1 330~~
Sec. 24 13-14 30
14-15 14
[ 15 298

343

Sec. 25 ] 13 2
13-14 ~~2 1~~
~~14~~-15 ~~+6~~ 5
[ 15 355

383

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1919phae.proj.1184W

| | | | |
|---|---|---|---|
| Sec. 26 | ] 13 | 0 | |
| | 13-14 | 17 | 15 |
| | 14-15 | 5 | |
| | [ 15 | 373 | |
| | | | 393 |
| Sec. 27 | ] 13 | 3 | |
| | 13-14 | 14 | |
| | 14-15 | 10 | |
| | [ 15 | 268 | |
| | | | 295 |
| Sec. 28 | ] 13 | 0 | |
| | 13-14 | 16 | |
| | 14-15 | 5 | |
| | [ 15 | 385 | |
| | | | 406 |
| Sec. 29 | ] 13 | 0 | |
| | 13-14 | 15 | |
| | 14-15 | 3 | |
| | [ 15 | 376 | |
| | | | 394 |
| Sec. 30 | ] 13 | 0 | |
| | 13-14 | 36 | |
| | 14-15 | 7 | |
| | [ 15 | 330 | |
| | | | 373 |

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1919phae.proj.1184w



| | | | |
|---|---|---|---|
| Sec. 31 | ] 13 | 2 | |
| | 13-14 | 13 | |
| | 14-15 | 4 | |
| | [15 | 332 | |
| | | | 351 |
| Sec. 32 | ] 13 | 2 | |
| | 13-14 | 18 | |
| | 14-15 | 5 | |
| | [15 | 436 | |
| | | | 461 |
| Sec. 33 | ] 13 | 1 | |
| | 13-14 | 15 | |
| | 14-15 | 6 | |
| | [15 | 410 | |
| | | | 432 |
| Sec. 34 | ] 13 | 0 | |
| | 13-14 | 18 | |
| | 14-15 | 6 | |
| | [15 | 357 | |
| | | | 381 |
| Sec. 35 | ] 13 | 1 | |
| | 13-14 | 15 | |
| | 14-15 | 10 | |
| | [15 | 410 | |
| | | | 436 |

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1919phae.proj.1184W

| | | | |
|---|---|---|---|
| Sec. 36 | ] 13 | 1 | |
| | 13-14 | 14 | |
| | 14-15 | 9 | |
| | [15 | 370 | |
| | | | 394 |
| Sec. 37 | ] 13 | 1 | |
| | 13-14 | ~~8~~ 11 | |
| | 14-15 | 3 | |
| | [15 | 410 | |
| | | | 425 |
| Sec. 36 | ] 13 | 0 | |
| | 13-14 | 12 | |
| | 14-15 | 2 | |
| | [15 | 360 | |
| | | | 375 |
| Sec. 39 | ] 13 | 0 | |
| | 13-14 | 8 | |
| | 14-15 | 1 | |
| | [15 | 425 | |
| | | | 434 |
| Sec. 40 | ] 13 | 2 | |
| | 13-14 | 21 | |
| | 14-15 | 6 | |
| | [15 | 460 | |
| | | | 489 |

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1919phae.proj.1184w



| | | | |
|---|---|---|---|
| Sec. 41 | ] 13 | 2 | |
| | 13-14 | 17 | |
| | 14-15 | 6 | |
| | [ 15 | 275 | |
| | | | 300 |
| Sec. 42 | ] 13 | 0 | |
| | 13-14 | 6 | |
| | 14-15 | 3 | |
| | [ 15 | 385 | |
| | | | 394 |
| Sec. 43 | ] 13 | 2 | |
| | 13-14 | 14 | |
| | 14-15 | 7 | |
| | [ 15 | 322 | |
| | | | 345 |
| Sec. 44 | ] 13 | 0 | |
| | 13-14 | 12 | |
| | 14-15 | 2 | |
| | [ 15 | 250 | |
| | | | 264 |
| Sec. 45 | ] 13 | 0 | |
| | 13-14 | 7 | |
| | 14-15 | 3 | |
| | [ 15 | 383 | |
| | | | 393 |

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| | | | |
|---|---|---|---|
| Sec. 46 | ]13 | 0 | |
| | 13-14 | 10 | |
| | 14-15 | 5 | |
| | [15 | 298 | |
| | | | 313 |
| Sec. 47 | ]13 | 1 | |
| | 13-14 | ~~13~~ 11 | |
| | 14-15 | 3 | |
| | [15 | 318 | |
| | | | 333 |
| Sec. 48 | ]13 | 2 | |
| | 13-14 | 9 | (3 over line) |
| | 14-15 | 2 | |
| | [15 | 305 | |
| | | | 318 |
| Sec. 49 | ]13 | 2 | |
| | 13-14 | 6 | |
| | 14-15 | 2 | |
| | [15 | 325 | |
| | | | 335 |
| Sec. 50 | ]13 | 1 | |
| | 13-14 | 10 | (1 counted as Dbl.) 1 of these may be faint |
| | 14-15 | 3 | |
| | [15 | 277 | |
| | | | 291 |

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| | | | |
|---|---|---|---|
| Sec. 51 | ] 13 | 1 | |
| | 13-14 | 3 | |
| | 14-15 | 2 | |
| | [15 | 165 | |
| | | | 171 |
| Sec. 52 | ] 13 | 0 | |
| | 13-14 | 12 | |
| | 14-15 | 3 | |
| | [15 | 300 | |
| | | | 315 |
| Sec. 53 | ] 13 | 0 ~~+2~~ | |
| | 13-14 | 12 | |
| | 14-15 | 4 | |
| | [15 | 257 | |
| | | | 273 |
| Sec. 54 | ] 13 | 0 | |
| | 13-14 | 8 | |
| | 14-15 | 2 | |
| | [15 | 153 | |
| | | | 163 |
| Sec. 55 | ] 13 | 1 | |
| | 13-14 | 4 | |
| | 14-15 | 3 | |
| | [15 | 142 | |
| | | | 150 |

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| | | | |
|---|---|---|---|
| Sec. 56 | ]13 | 1 | |
| | 13-14 | 8 | |
| | 14-15 | 2 | |
| | [15 | 212 | |
| | | | 223 |
| Sec. 57 | ]13 | 0 | |
| | 13-14 | 6 | |
| | 14-15 | 2 | |
| | [15 | 242 | |
| | | | 250 |
| Sec. 58 | ]13 | 0 | |
| | 13-14 | ~~+2~~ 8 | |
| | 14-15 | 3 | |
| | [15 | 208 | |
| | | | 219 |
| Sec. 59 | ]13 | 0 | |
| | 13-14 | 14 | |
| | 14-15 | 3 | |
| | [15 | 239 | |
| | | | 256 |
| Sec. 60 | ]13 | 1 | |
| | 13-14 | 5 | |
| | 14-15 | 2 | |
| | [15 | 220 | |
| | | | 228 |

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| | | | |
|---|---|---|---|
| Sec. 61 | ]13 | 0 | |
| | 13-14 | 6 | |
| | 14-15 | 3 | |
| | [15 | 188 | |
| | | | 197 |
| Sec. 62 | ]13 | 1 | |
| | 13-14 | 7 | |
| | 14-15 | 1 | |
| | [15 | 140 | |
| | | | 149 |
| Sec. 63 | ]13 | 0 | |
| | 13-14 | 9 | |
| | 14-15 | 2 | |
| | [15 | 153 | |
| | | | 164 |
| Sec. 64 | ]13 | 0 | |
| | 13-14 | 5 | |
| | 14-15 | 3 | |
| | [15 | 129 | |
| | | | 137 |
| Sec. 65 | ]13 | 0 | |
| | 13-14 | 12 | |
| | 14-15 | 3 | |
| | [15 | 150 | |
| | | | 165 |

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| | | |
|---|---|---|
| Sec. 66. | 9 | 0. |
| | 2 | 9 |
| | | 2 |
| | 239 | |
| | | 250 |
| Sec. 67 | 1 | |
| | 7 | 1 seems defective |
| | 2 | |
| | 160 | |
| | | 170 |
| Sec. 68 | 0 | |
| | 1 | |
| | 2 | |
| | 198 | |
| | | 201 |
| Sec. 69 | 1 | |
| | 4 | |
| | 4 | |
| | 163 | |
| | | 172 |
| Sec. 70 | 0 | |
| | 8 | |
| | 3 | |
| | 190 | |
| | | 201 |

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Sec. 71

05
57
2
195

202

Sec. 72

1
6
6
175

188

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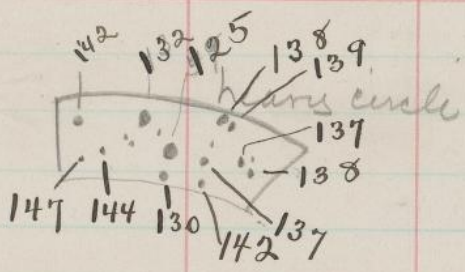
attempt to ret. all stars in selected sections.

Sections

1=125

130
132
2 = 137
2 = 138
139
2 = 142
144
147

37




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Summary

2 13,0 and br.
6 13.0 to 14.0
4 14.0 to 15.0

12.8
13.0
13 7
3 = 138
139 14.0
14.4
2 = 14.8

150
10

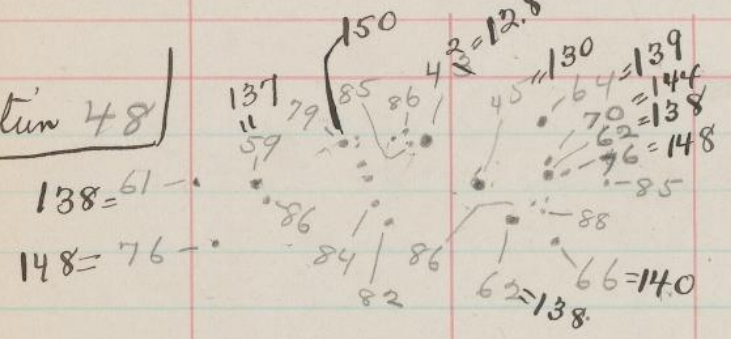
See Scale N, Scale 2

Mags. 13,0 to 14.0 = 4.5 to 6.5
(on 5500)

14.0 to 15.0 = 6.5 to 8.0

Star marked 15.0 ? on 5500 is considered a little too bright for 150

Section 48




138 = 61 —
148 = 76 —

44

| | | | | |
|---|---|---|---|---|
| | 13.0 | = 4.5 of Scale | | 40 |
| | 13.1 | = 4.7 | 12.8 | 4.1 |
| | 13.2 | 49 | | 4.2 |
| d | 13.3 | 51 | 129 | 4.3 |
| | 13.4 | 53 | | 44 |
| | 13.5 | 55 | 13.0 | 45 |
| | 13.6 | 57 | | |
| | 13.7 | 59 | | |
| | 13.8 | 61 | 15.0 | 8.0 |
| | 13.9 | 63 | | |
| b | 14.0 | 65 | | |
| | 141 | ~~69~~ | 66 | |
| | 142 | ~~69~~ | 67 | |
| | 143 | ~~71~~ | 68 | |
| o | 144 | ~~73~~ | 70 | |
| | 145 | ~~75~~ | 72 | |
| | 146 | ~~77~~ | 74 | |
| | 147 | ~~79~~ | 75 | |
| | 148 | ~~84~~ | 76 | |
| | 149 | ~~83~~ | 7.8 | |
| | 150 | ~~85~~ | 8.0 | |

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1919phae.proj.1184w

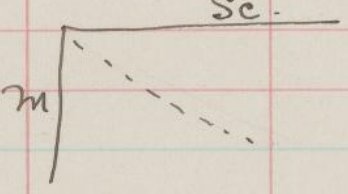


November 1923.

47 Tucanae Instructions Continued

Nov. 15. Luminosity Curve. (copied from Dr. S.'s paper)

1. Plate 8907 with "reseau" superposed.
2. Measure with Scale N Comp. Stars on 8907 Plot. Scale vs. Corr. Mag.




See N.S.

3. Measure all stars with scale in Sections 48, 37, 36, 25, 43, 42, 30, 31 (See page 175)

4. Determ. mags. from above curve. Tabulate.

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November 15, 1923.

47 Tucanae

Sequence

Scale Readings

on I 8907 which is fastened with reseau, as described, p. 175

Scale N

| | Sc. A. | Sc. B. | ~~Sc.~~ | Sc. C. | Mean | Corr. Magn. p. 123 |
|---|---|---|---|---|---|---|
| B | +0.3 = +0.1 | | | | 0.10 a . . | 9.6 |
| b | 1.4 = 1.2 | — | | | 1.20 a . . | 10.7 |
| X | 3.0 = 2.8 | 3.2 = 2.8 | | | 2.80 00 00 . | 11.9 |
| z | | | | | | 12.2 |
| y | 3.1 = 2.9 | 3.2 = 3.0 | | | 2.95 05 05 . | 12.5 |
| W | 3.7 = 3.5 | 3.8 = 3.4 | | — | 3.45 05 05 . | 12.6 |
| d | 3.9 = 3.7 | 4.3 = 3.9 | | 4.0 | 3.87 -17 +03 13 | 13.3 |
| f | — | 4.6 = 4.2 | | 4.4 | 4.30 . 10 10 | 13.6 |
| g | | 5.6 = 5.2 | | 5.4 | 5.30 . 10 10 | 13.8 |
| h | | 6.5 = 6.1 | | 6.1 | 6.10 . 00 00 | 13.9 |
| l | | 6.8 = 6.4 | | 6.2 | 6.30 . 10 10 | 14.0 |
| m | | 7.4 = 7.0 | | 7.1 | 7.05 . 05 05 | 14.1 |
| n | | 7.7 = 7.3 | | 7.4 | 7.35 . 05 05 | 14.3 |
| o | | 7.8 = 7.4 | | 7.6 | 7.50 . 10 10 | 14.4 |

Scale N
Corr. Sc A. = -0.2
Sc. B. = -0.4
C = 0.0

Readings are affected by lines of the reseau Especially f, n
Also, probably all readings are a little too faint as thickness of the reseau dims the images on 8907

z not meas.; is under a line and seems fainter than f. 121. Omit for present.

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1910phae.proj.1184w



Scale P, supposed to be used for A & X plates, is not as comparable as N or R

November 17, 1923.

film up

## Scale Readings

X 8.178

probably as good a x plate as could be had but not meaning very fr. stars = 60 sec.

| | Sc. A. | Sc. B. | Sc. C | Mean | | | |
|---|---|---|---|---|---|---|---|
| B | +0.7 = 0.5 | | | 0.50 | | | |
| b | 1.7 = 1.5 | – | – | 1.50 | | | |
| X | 3.3 = 3.3 | 3.7 = 3.3 | – | 3.30 | | | |
| Z | 3.7 = 3.5 | 3.8 = 3.4 | | 3.45 | | | |
| y | dbl. | | | | | | |
| w | 4.1 = 3.9 | 4.3 = 3.9 | 4.1 | 3.97 | 07 | 07 | 13 |
| d | 5.0 = 4.8 | 5.3 = 4.9 | 4.9 | 4.87 | 07 | 03 | 03 |
| f | — | 5.9 = 5.5 | 5.7 | 5.60 | . | 10 | 10 |
| g | | 7.1 = 6.7 | 6.8 | 6.75 | . | 05 | 05 |
| h | | 7.9 = 7.5 | 7.6 | 7.55 | . | 05 | 05 |
| l | | 8.8 = 8.4 | 8.3 7.9 | 8.35 | . | 05 | 05 |
| m | | — | 9.4 | 9.40 | . | . | a |
| n | | — | 9.6 | 9.60 | . | . | a |
| o | | — | 9.8 | 980 | . | . | a |

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9.6
10.7
11.9
12.2
12.5
12.6
13.3
13.6
13.8
13.9
14.0
14.1
14.3
14.4

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# Scale Readings with Scale R.

X 8178

Scale R

| | | | | | |
|---|---|---|---|---|---|
| B | 4.6 = 4.9 | | 4.90 | | |
| b | 5.8 = 6.1 | | 6.10 | | |
| Y | 7.8 = 8.1 | | 8.10 | | |
| Z | 8.2 = 8.5 | | 8.50 | | |
| y | 7 | | | | |
| w | 8.7 = 9.0 | | 9.00 | | |
| d | 9.2[3] = 9.6 | 9.8 | 9.70 | 10 | 10 |
| f | 9.8 = 10.1 | 10.4 | 10.25 | 15 | 15 |
| g | 10.6 | 11.5 | 11.50 | . | @ |
| p | 10.8 | 12.3 | 12.30 | . | @ |
| l | 11.0 | 12.8 | 12.80 | . | @ |
| m | | — | | | |
| n | | — | | | |
| o | | — | | | |

amis

Scale R, Sc. 1
Corr. = +0.3

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Monday, December 15, 1924

Instructions of p. 193 are to be carried out now.
(Postponed, 1923)

Scale Measures, Sc. N. p. 123

| | Sc. A | B . C | Mean. | Magn. |
|---|---|---|---|---|
| b | 1.2 = 1.0 | | 1.0 | 10.7 |
| d | 4.2 = 4.0 | 4.3 = 3.9 3.9 | 3.93 | 13.3 |
| f | 4.3 = 4.1 | 4.6 = 4.2 4.2 | 4.17 | 13.6 |
| g | | 5.6 = 5.2 5.4 | 5.30 | 13.8 |
| h | | 6.2 = 5.8 5.7 | 5.75 | 13.9 |
| l | | 6.4 = 6.0 5.8 | 5.90 | 14.0 |
| m | | 7.2 = 6.8 6.7 | 6.75 | 14.1 |
| n | | 7.3 = 6.9 6.7 | 6.80 | 14.3 |
| o | | 7.3 = 6.9 6.8 | 6.85 | 14.4 |
| p | | 8.1 = 7.8 7.6 | 7.~~70~~ 65 | — |
| w | 3.6 = 3.4 | 3.9 = 3.5 | 3.45 | 12.6 |
| z | 3.5 = 3.3 | 3.6 = 3.2 | 3.25 | 12.2 |
| x | 2.9 = 2.7 | 3.0 = 2.6 | 2.65 | 11.9 |

Star marked 15.0 ? on ☒5500

| | | | | |
|---|---|---|---|---|
| | ~~7.4~~ | 7.4 = 6.9 6.9 | 6.95 | (Est 15.0) |

See plotting

Cor. mag. → Sc. Read.

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Measures of brighter stars in sections, See p. 175

See p. 193, sections required

48, 37, 36, 25.

43, 42, 30, 31

Section 48 Sc. N. – Sc. B

Each section meas. left to right.

6.2 = 5.8
6.1 = 5.7
4.6 = 4.2
7.6 = 7.2
4.5 = 4.1
6.4 = 6.0
6.7 = 6.3
6.5 = 6.1
5.8 = 5.4
5.9 = 5.5

3 over bright line – not est.

Sc. B. Corr. = −0.4

| | | final Corr. |
|---|---|---|
| 1 | 4.1 | 13.5 |
| 1 | 4.2 | 13.5 |
| 1 | 5.4 | 13.8 |
| 1 | 5.5 | 13.9 |
| 1 | 5.7 | 13.9 |
| 1 | 5.8 | 13.9 |
| 1 | 6.0 | 14.0 |
| 1 | 6.1 | 14.0 |
| 1 | 6.3 | 14.1 |
| 1 | 7.2 | 14.4 |

13 total, p. 184
10 total
3 omitted
− 3

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75 Section 37 Scale N. Sc B

5.9 = 5.5
7.1 = 6.7
6.9 = 6.5
4.9 = 4.5
Sc. A 3.6 = 3.4 3.8 = 3.4 Mean 3.40
5.7 = 5.3
6.2 = 5.8
6.2 = 5.8
about 8.0 = 7.6
6.2 = 5.8
6.7 = 6.3
6.1 = 5.7
6.3 = 5.9
8.2 = 7.8

---

| | | |
|---|---|---|
| 1 | 3.4 | 12.6 |
| 1 | 4.5 | 13.6 |
| 1 | 5.3 | 13.8 |
| 1 | 5.5 | 13.9 |
| 1 | 5.7 | 13.9 |
| 3 | 5.8 | 13.9 |
| 1 | 5.9 | 14.0 |
| 1 | 6.3 | 14.1 |
| 1 | 6.5 | 14.2 |
| 1 | 6.7 | 14.3 |
| 1 | 7.6 | 14.6 |
| 1 | 7.8 | 14.6 |
| 14 | | |

15 total, p. 182
✓ 14 total
– 1

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Section 36 Scale n - Sc. B.

| | |
|---|---|
| 4.5 | = 4.1 |
| 7.8 | = 7.4 |
| 5.9 | = 5.5 |
| 7.9 | = 7.5 |
| 6.2 ? (line) | = 5.8 |
| 7.5 | = 7.1 |
| 6.5 | = 6.1 |
| 6.3 | = 5.9 |
| 8.0 | = 7.6 |
| 7.9 | = 7.5 |
| 8.0 | = 7.6 |
| 8.0 | = 7.6 |
| 7.0 | = 6.6 |
| dbl 6.2 | = 5.8 |
| 6.4 | = 6.0 |
| 6.1 | = 5.7 |
| 6.2 | = 5.8 |
| 7.1 | = 6.7 |
| 5.7 | = 5.3 |
| 5.9 | = 5.5 |
| 6.0 | = 5.6 |
| 6.0 | = 5.6 |
| 7.2 | = 6.8 |
| 7.0 | = 6.6 |
| 7.3 | = 6.9 |
| 7.7 | = 7.3 |
| 7.9 | = 7.5 |
| 7.9 | = 7.5 |
| 7.9 | = 7.5 |

Cont. Sc B.

| | |
|---|---|
| 8.1 | = 7.7 |
| 8.1 | = 7.7 |

31

| | | final Corr. | |
|---|---|---|---|
| 1 | 4.1 | - | 13.5 |
| 1 | 5.3 | - | 13.8 |
| 2 | 5.5 | = | 13.9 |
| 2 | 5.6 | = | 13.9 |
| 1 | 5.7 | - | 13.9 |
| 3 | 5.8 | = | 13.9 |
| 1 | 5.9 | - | 14.0 |
| 1 | 6.0 | - | 14.0 |
| 1 | 6.1 | - | 14.0 |
| 2 | 6.6 | = | 14.2 |
| 1 | 6.7 | - | 14.3 |
| 1 | 6.8 | - | 14.3 |
| 1 | 6.9 | - | 14.3 |
| 1 | 7.1 | - | 14.4 |
| 1 | 7.3 | - | 14.5 |
| 1 | 7.4 | - | 14.5 |
| 5 | 7.5 | = | 14.5 |
| 3 | 7.6 | = | 14.6 |
| 2 | 7.7 | = | 14.6 |
| √31 | total | | |
| 24 | total, p. 182 | | |

+ 7

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Section 25 Scale Nr - Sc. B.

| | |
|---|---|
| 6.0 | = 5.6 |
| 5.9 | = 5.5 |
| 6.0 | = 5.6 |
| 5.8 | = 5.4 |
| 5.9 | = 5.5 |
| 4.7 | = 4.3 |
| 5.2 | = 4.8 |
| 7.9 | = 7.5 |
| 7.8 | = 7.4 |
| 6.8 | = 6.4 |
| 4.4 | = 4.0 |
| 6.9 | = 6.5 |
| 7.3 | = 6.9 |
| 7.2 | = 6.8 |
| 6.9 | = 6.5 |
| 6.8 | = 6.4 |
| 4.9 | = 4.5 |
| 4.2 | = 3.8 |
| 5.7 | = 5.3 |
| 7.1 | = 6.7 |
| 5.2 | = 4.8 |
| 7.5 | = 7.1 |
| 6.6 | = 6.2 |
| 6.7 | = 6.3 |
| 6.7 | = 6.3 |
| 6.6 | = 6.2 |
| 7.1 | = 6.7 |
| 7.2 | = 6.8 |

28

| | | |
|---|---|---|
| 1 | 3.8 | - 13.2 |
| 1 | 4.0 | - 13.4 |
| 1 | 4.3 | - 13.5 |
| 1 | 4.5 | - 13.6 |
| 2 | 4.8 | = 13.7 |
| 1 | 5.3 | - 13.8 |
| 1 | 5.4 | - 13.8 |
| 2 | 5.5 | = 13.9 |
| 2 | 5.6 | = 13.9 |
| 2 | 6.2 | = 14.1 |
| 2 | 6.3 | = 14.1 |
| 2 | 6.4 | = 14.1 |
| 2 | 6.5 | = 14.2 |
| 2 | 6.7 | = 14.3 |
| 2 | 6.8 | = 14.3 |
| 1 | 6.9 | - 14.3 |
| 1 | 7.1 | - 14.4 |
| 1 | 7.4 | - 14.5 |
| 1 | 7.5 | - 14.5 |

28 total

28 total, L. 179

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Section 43 Scale N - Sc B.

6.9 = 6.5
7.1 = 6.7
7.5 = 7.1
Sc. a 2.9 = 2.7 3.0 = 2.6 Mean = 2.65
6.2 = 5.8
7.1 = 6.7
8.1 = 7.7
5.8 = 5.4
7.3 = 6.9
7.3 = 6.9
6.4 = 6.0
6.5 = 6.1
7.6 = 7.2
8.2 = 7.8
7.8 = 7.4
5.8 = 5.4
Sc. A - 0.4 = -0.6 B -0.6
7.2 = 6.8
7.2 = 6.8
7.4 = 7.0
6.8 = 6.4
7.5 = 7.1
7.9 = 7.5
7.2 = 6.8
6.8 = 6.4

25

Sc. A Corr. = -0.2
B " = -0.4

| | | |
|---|---|---|
| 1 | -0.6 | 9.8 |
| 1 | 2.65 | 11.9 |
| 2 | 5.4 | 13.8 |
| 1 | 5.8 | 13.9 |
| 1 | 6.0 | 14.0 |
| 1 | 6.1 | 14.0 |
| 2 | 6.4 | 14.1 |
| 1 | 6.5 | 14.2 |
| 2 | 6.7 | 14.3 |
| 3 | 6.8 | 14.3 |
| 2 | 6.9 | 14.3 |
| 1 | 7.0 | 14.4 |
| 2 | 7.1 | 14.4 |
| 1 | 7.2 | 14.4 |
| 1 | 7.4 | 14.5 |
| 1 | 7.5 | 14.5 |
| 1 | 7.7 | 14.6 |
| 1 | 7.8 | 14.6 |

√25 total

23 total, p. 183
+ 2

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Section 42 Scale Ar–ScB

| | | | |
|---|---|---|---|
| 5.5 | = | 5.1 | |
| 5.6 | = | 5.2 | |
| 6.3 | = | 5.9 | |
| 7.2 | = | 6.8 | |
| 8.4 | = | 8.0 | |
| 7.9 | = | 7.5 | |
| 8.1 | = | 7.7 | |
| 7.1 | = | 6.7 | |
| 7.3 | = | 6.9 | |
| 7.2 | = | 6.8 | |
| 7.8 | = | 7.4 | |
| 6.8 | = | 6.4 | |
| 7.9 | = | 7.5 | |

13

| | | |
|---|---|---|
| 1 | 5.1 | 13.8 |
| 1 | 5.2 | 13.8 |
| 1 | 5.9 | 14.0 |
| 1 | 6.4 | 14.2 |
| 1 | 6.7 | 14.3 |
| 2 | 6.8 | 14.3 |
| 1 | 6.9 | 14.3 |
| 1 | 7.4 | 14.5 |
| 2 | 7.5 | 14.5 |
| 1 | 7.7 | 14.6 |
| 1 | 8.0 | 14.7 |

√ 13 total

9 total, p. 183

+4

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Dec. 16. 1924

Section 31 Scale N-Sc B

| | | | |
|---|---|---|---|
| 7.8 = 7.4 | | | |
| 7.6 = 7.2 | 1 | 4.1 - | 13.5 |
| 8.2 = 7.8 | 1 | 4.5 - | 13.6 |
| 7.9 = 7.5 | 1 | 4.8 - | 13.7 |
| 6.8 = 6.4 | 1 | 5.2 - | 13.8 |
| 5.6 = 5.2 | 1 | 5.8 - | 13.9 |
| 5.2 = 4.8 | 1 | 6.1 - | 14.0 |
| 7.3 = 6.9 | 1 | 6.2 - | 14.1 |
| 6.5 = 6.1 | 2 | 6.3 - | 14.1 |
| 7.2 = 6.8 | 1 | 6.4 - | 14.1 |
| 4.9 = 4.5 | 2 | 6.8 = | 14.3 |
| 4.5 = 4.1 | 2 | 6.9 = | 14.3 |
| 7.8 = 7.4 | 1 | 7.0 - | 14.4 |
| 7.4 = 7.0 | 1 | 7.2 - | 14.4 |
| 6.2 = 5.8 | 1 | 7.3 | 14.5 |
| 7.2 = 6.8 | 2 | 7.4 = | 14.5 |
| 6.7 = 6.3 | 2 | 7.5 - | 14.5 |
| 6.6 = 6.2 | 1 | 7.6 | 14.6 |
| 7.3 = 6.9 | 2 | 7.8 - | 14.6 |
| 6.7 = 6.3 | √ 24 | total | |
| 7.9 = 7.5 | 19 | total | 181 |
| 8.0 = 7.6 | +5 | | |
| 8.2 = 7.8 | | | |
| 7.7 = 7.3 | | | |
| 24 | | | |

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Section 30 Scale Nr - Sc B.

6.8 6 on line = 6.2
4.9 = 4.5
6.7 = 6.3
7.0 = 6.6
7.9 = 7.5
7.7 = 7.3
6.3 = 6.9
5.8 = 5.4
8.2 = 7.8
7.8 = 7.4
7.9 = 7.5
7.2 = 6.8
7.9 = 7.5
7.8 = 7.4
7.6 = 7.2
8.3 = 7.9
5.9 = 5.4
7.7 = 7.3
7.5 = 7.1
7.2 = 6.8
7.8 = 7.4
7.1 = 7.3
7.7 = 7.3
6.9 = 6.5
8.5 = 8.1
7.3 = 6.9
6.8 = 6.4
7.1 = 6.7
5.9 = 5.5

8.2 = 7.8
7.2 = 6.8
7.3 = 6.9
7.4 = 7.0
8.5 = 8.1
8.5 = 8.1
4.8 = 4.4
6.9 = 6.5
7.2 = 6.8
6.8 = 6.4
7.1 = 6.7
7.1 = 6.7
7.6 = 7.2
7.2 = 6.8
8.6 = 8.2
8.5 = 8.1
6.8 = 6.4
7.1 = 6.7
47

| | | |
|---|---|---|
| 1 | 4.4 | 13.6 |
| 1 | 4.5 | 13.6 |
| 2 | 5.4 | 13.8 |
| 1 | 5.5 | 13.9 |
| 1 | 5.9 | 14.0 |
| 1 | 6.2 | 14.1 |
| 1 | 6.3 | 14.1 |
| 3 | 6.4 | 14.1 |
| 2 | 6.5 | 14.2 |
| 1 | 6.6 | 14.2 |
| 4 | 6.7 | 14.3 |
| 5 | 6.8 | 14.3 |
| 2 | 6.9 | 14.3 |
| 1 | 7.0 | 14.4 |
| 1 | 7.1 | 14.4 |
| 2 | 7.2 | 14.4 |
| 4 | 7.3 | 14.5 |
| 3 | 7.4 | 14.5 |
| 3 | 7.5 | 14.5 |
| 2 | 7.8 | 14.6 |
| 1 | 7.9 | 14.7 |
| 4 | 8.1 | 14.7 |
| 1 | 8.2 | 14.8 |
| 47 | total | |
| 43 | total of .180 | |

+ 4

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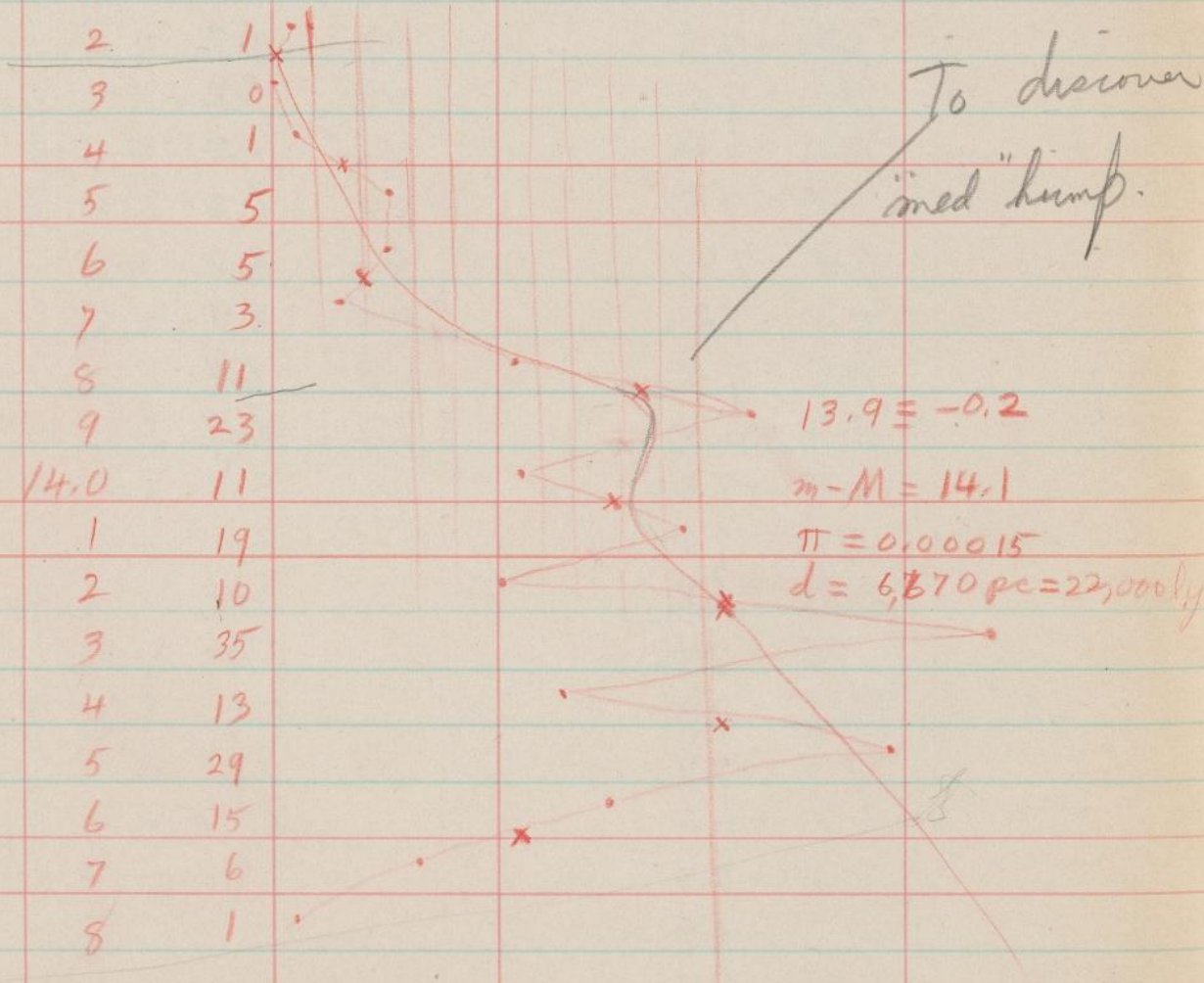
1919phae.proj.1184W



# Luminosity Curve – 47 Tucanae

(Pages 202 – 209 inc.)

| Pg. Mag. | $n_1$ |
|---|---|
| 9.8 | 1 |
| 11.9 | 1 |
| 12.6 | 1 |
| 13.0 | 0 |
| .1 | 0 |
| 2 | 1 |
| 3 | 0 |
| 4 | 1 |
| 5 | 5 |
| 6 | 5 |
| 7 | 3 |
| 8 | 11 |
| 9 | 23 |
| 14.0 | 11 |
| 1 | 19 |
| 2 | 10 |
| 3 | 35 |
| 4 | 13 |
| 5 | 29 |
| 6 | 15 |
| 7 | 6 |
| 8 | 1 |
| | 191 |




13.9 ≡ −0.2

m − M = 14.1

π = 0.00015

d = 6,670 pc = 22,000 ly

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