

VARIABLE STAR SECTION.

CIRCULAR No. 144.

RY PISCIS AUSTRINI.

Frank M. Bateson, A.F. Jones & B. Menzies.

SUMMARY:-

V magnitudes for the comparison stars are now published. Observations from 1955 December 20 (J.D. 2,435, 462) to 1968 July 26 (2,440, 064) are tabulated in ten day means.

A list of 21 observed maxima is given. Elements determined for RY PsA are:-

EPOCH (Max) J.D. 2,437,120 + 224.39 days
 Mean Max. 9.54 visual (Range 8.8 - 11.0)
 Min. < 14.0 visual.

.....

INTRODUCTION:-

RY Piscis Austrini is listed in the Second Edition GCVS (1958) as Mira type with a range of 10 to < 13.5p. No period is given. At the request of B.V. Kukarkin this star was placed on the Section's observing list in 1955 December.

COMPARISON STARS:-

A.W. Cousins kindly supplied SP_v magnitudes of the brighter comparison stars as under:-

| R.A.-1950 | | | DEC. 1950 | | SP _g | SP _v | Spec. |
|-----------|-----|-----|-----------|------|-----------------|-----------------|-------|
| 21h | 46m | 35s | S. 36° | 55.8 | 9.59 | 8.01 | Ma |
| | 43 | 48 | 35 | 56.3 | 8.11 | 8.4 | AO |
| | 45 | 13 | 36 | 04.4 | 9.82 | 8.68 | KO |
| | 45 | 23 | 36 | 17.7 | 10.52 | 9.18 | K2 |
| | 42 | 51 | 36 | 53.4 | 10.46 | 10.4 | G0 |

Charts 29 and 30 (1) were issued showing the SP_v magnitudes as above. From a photo, kindly supplied by the Royal Observatory, Cape, A.F. Jones selected fainter stars for comparison purposes. These were assigned chart letters and are so designated on Charts 29 and 30.

V magnitudes for these stars have now been determined by Menzies and Christie at the Auckland Observatory using the 50cm Zeiss Cassegrain reflector and auxiliary equipment. Star CoD -36° 15021 (SP_v 9.18) was selected as zero point in determining this sequence. The V magnitudes determined are:-

| CHART LETTER. | V. | ADOPTED MAG. | CHART LETTER | V | ADOPTED MAG. |
|---------------|-------|--------------|--------------|-------|--------------|
| f | 10.15 | 10.2 | l | 12.24 | 12.2 |
| g | 10.14 | 10.1 | m | 12.39 | 12.4 |
| d | 10.40 | 10.4 | n | 13.19 | 13.2 |
| h | 11.06 | 11.1 | o | 13.32 | 13.3 |
| k | 11.80 | 11.8 | p | 13.62 | 13.6 |
| | | | r | 13.83 | 13.8 |
| | | | q | 14.00 | 14.0 |

V.S.S. CIRCULAR No. 144 (cont).

No magnitude has been determined for star "s". Visual observers should use the adopted magnitudes shown in the last column of the above list for their observations in future.

OBSERVATIONS:-

Observations are presented in Table 1 as ten day means. This table is in the usual form, column 1 giving the mean J.D., followed by the mean visual magnitude. In the last column is given the weight assigned to each mean on the normal basis of 1 (poor) to 5 (excellent).

There is considerable unevenness in the records, partly because of the position of the variable. This makes it difficult to observe in the first four months each year and records then are few. Observations up to 1960 October 31 mainly came from A.F. Jones, with a few from Bateson. Thereafter the star was better observed by a larger number of observers. Those who have contributed results are listed in Table 2.

DISCUSSION:-

Very few observations have been made when the star is faint since it is beyond the limit of most instruments at such times. This has prevented the formation of a complete light curve.

Table 3 lists the observed dates of maxima. The first column gives the J.D. of observed maxima; the second the visual magnitude at maxima; the third the interval in days between successive maxima. In the fourth column the weight on the scale of 1, poor, to 5, very good, with observations in good agreement throughout both rising and falling branches of the curve, is given. The final column lists the O-C residuals for the elements found which are:-

| | |
|--------------------------|------------------------------|
| EPOCH (Max ϕ) | J.D. 2,437,120 + 224.39 days |
| MEAN VISUAL MAG. AT MAX. | 9.54 |
| VISUAL RANGE AT MAX. | 8.8 to 11.0 |
| MIN. | < 14.0 |

ACKNOWLEDGEMENTS:-

The reductions have been made by Bateson; A.F. Jones prepared the original chart and selected the comparison stars, as well as contributing a large number of observations; Menzies, with assistance from Christie, has been responsible for the photo-electric determination of the sequence.

We wish to record our appreciation to B.V. Kukarkin for directing our attention to this star; to A.W. Cousins and the Royal Observatory, Cape for the photo of the field and the magnitudes of the brighter stars. We are again indebted to the Auckland Observatory Trust Board for the use of their 50cm Zeiss Cassegrain reflector and auxiliary equipment. The assistance given by Christie is also much appreciated. We wish to thank the various observers for their records

REFERENCE:-

- (1). 1960. BATESON, F.M., & Jones, A.F. CHARTS FOR SOUTHERN VARIABLES, Series 11. Published by F.M. Bateson.

1970 February 6.

18 POOLES ROAD, GREERTON,
TAURANGA, NEW ZEALAND.

V.S.S. CIRCULAR No. 144 (cont).

TABLE 1.

RY PISCIS AUSTRINI--TEN DAY MEANS.

| <u>MEAN</u> <u>J.D.</u> | <u>MEAN</u> <u>MAG.</u> | <u>WT.</u> | <u>MEAN.</u> <u>J.D.</u> | <u>MEAN</u> <u>MAG</u> | <u>Wt.</u> | <u>MEAN</u> <u>J.D.</u> | <u>MEAN</u> <u>MAG.</u> | <u>Wt.</u> |
|----------------------------|----------------------------|------------|-----------------------------|---------------------------|------------|----------------------------|----------------------------|------------|
| 2,435,463 | <10.4 | - | 2,436,365 | <14.0 | - | 2,437,218 | 13.8 | 1 |
| 480 | <10.1 | - | 376 | 14.0? | 1 | 246 | <13.2 | - |
| 541 | 9.0 | 1 | 398 | 13.0 | 1 | 258 | <13.3 | - |
| 553 | 9.4 | 1 | 409 | 12.40 | 2 | 281 | <13.2 | - |
| 562 | 9.55 | 2 | 422 | 11.0 | 1 | 290 | <13.2 | - |
| 580 | 10.6 | 1 | 432 | 9.9 | 1 | 313 | 12.9 | 1 |
| 593 | 12.40 | 2 | 449 | 9.1 | 1 | 370 | 10.5 | 1 |
| 633 | 14.0 | 1 | 460 | 9.60 | 2 | 377 | 10.4 | 1 |
| 667 | <12.4 | - | 470 | 9.8 | 1 | 388 | 10.6 | 1 |
| 683 | <12.9 | - | 484 | 10.2 | 1 | 405 | 11.5 | 1 |
| 694 | <12.9 | - | 498 | 10.9 | 1 | 417 | 12.1 | 1 |
| 700 | <12.4 | - | 510 | 12.00 | 2 | 436 | 13.6 | 1 |
| 716 | <11.4 | - | 525 | 13.3 | - | 460 | 14.0 | 1 |
| 729 | 12.90 | 2 | 543 | <13.6 | - | 494 | <14.0 | - |
| 740 | 11.9 | 1 | 570 | <12.4 | - | 522 | 13.0 | 1 |
| 758 | 11.3 | 1 | 576 | <11.8 | - | 530 | 12.00 | 2 |
| 771 | 11.9 | 1 | 634 | <11.8 | - | 541 | 10.9 | 1 |
| 781 | 11.0 | 1 | 649 | 11.1 | 1 | 549 | 11.25 | 2 |
| 789 | 11.40 | 2 | 662 | 10.4 | 1 | 559 | 10.44 | 3 |
| 801 | 12.4 | 1 | 682 | 10.6 | 1 | 573 | 9.87 | 4 |
| 810 | <12.4 | - | 697 | 10.2 | 1 | 579 | 9.77 | 4 |
| 822 | <12.4 | - | 711 | 10.4 | 1 | 589 | 10.30 | 3 |
| 840 | <11.9 | - | 720 | 10.8 | 1 | 601 | 10.23 | 3 |
| 899 | <11.4 | - | 733 | 11.8 | 1 | 613 | 11.10 | 2 |
| 930 | <11.4 | - | 738 | 12.0 | 1 | 638 | 12.3 | 1 |
| 937 | 12.4 | 1 | 751 | 12.9 | 1 | 660 | <11.8 | - |
| 958 | 12.4 | 1 | 760 | 13.6 | 1 | 671 | <11.8 | - |
| 969 | 11.00 | 2 | 767 | 13.8 | 1 | 740 | <11.8 | - |
| 983 | 9.4 | 1 | 785 | <13.8 | - | 761 | 12.1 | 1 |
| 989 | 9.5 | 1 | 807 | <13.6 | - | 769 | <11.8 | - |
| 2,436,011 | 10.13 | 3 | 822 | <12.4 | - | 793 | 9.6 | 1 |
| 021 | 10.8 | 1 | 843 | 12.0 | 1 | 798 | 9.2 | 1 |
| 026 | 11.00 | 3 | 849 | 11.95 | 2 | 822 | 10.1 | 1 |
| 043 | 11.90 | 2 | 861 | 11.70 | 2 | 839 | 10.7 | 1 |
| 050 | 11.9 | 1 | 870 | 10.90 | 3 | 853 | 11.7 | 1 |
| 073 | 13.5 | 1 | 880 | 10.4 | 2 | 867 | <13.2 | - |
| 082 | <12.5 | - | 890 | 10.2 | 1 | 917 | <13.2 | - |
| 097 | <13.0 | - | 901 | 9.4 | 1 | 931 | <13.2 | - |
| 117 | <11.9 | - | 931 | 10.2 | 1 | 936 | 13.3 | 1 |
| 127 | <13.0 | - | 2,437,017 | <12.4 | - | 946 | 12.7 | 1 |
| 142 | <12.4 | - | 033 | <12.4 | - | 963 | <13.2 | - |
| 159 | <12.2 | - | 058 | 13.2 | 1 | 972 | <12.4 | - |
| 175 | 12.1 | 1 | 078 | 11.6 | 1 | 983 | <12.2 | - |
| 185 | 12.0 | 1 | 096 | 11.1 | 1 | 992 | 12.20 | 3 |
| 211 | 9.5 | 1 | 111 | 10.20 | 2 | 998 | 11.60 | 3 |
| 224 | 9.1 | 1 | 119 | 9.35 | 2 | 2,438,006 | 10.3 | 1 |
| 263 | 10.9 | 1 | 132 | 9.4 | 1 | 018 | 10.33 | 3 |
| 283 | 12.3 | 1 | 144 | 9.6 | 1 | 030 | 10.35 | 2 |
| 310 | <13.6 | - | 159 | 10.2 | 1 | 053 | 10.8 | 1 |
| 340 | <13.8 | - | 172 | 11.1 | 1 | 104 | <11.8 | - |
| 354 | <13.8 | - | 189 | 12.3 | 1 | 116 | <14.0 | - |
| | | | 202 | 12.90 | 2 | 142 | <13.8 | - |
| | | | | | | 168 | <13.8 | - |

V.S.S. CIRCULAR No. 144 (cont).

TABLE 1 (cont).

| <u>MEAN</u> <u>J.D.</u> | <u>MEAN</u> <u>MAG.</u> | <u>Wt.</u> | <u>MEAN</u> <u>J.D.</u> | <u>MEAN</u> <u>MAG.</u> | <u>Wt.</u> |
|----------------------------|----------------------------|------------|----------------------------|----------------------------|------------|
| 2,438,179 | 13.5 | 1 | 2,439,092 | 12.4 | 1 |
| 202 | 12.2 | 1 | 110 | 12.10 | 2 |
| 210 | 11.6 | 1 | 122 | 10.90 | 2 |
| 230 | 10.55 | 2 | 190 | <12.4 | - |
| 238 | 9.4 | 1 | 209 | 12.1 | ?1 |
| 254 | 9.4 | 1 | 218 | <11.8 | - |
| 261 | 9.20 | 2 | 231 | <13.2 | - |
| 280 | 9.7 | 1 | 238 | <13.8 | - |
| 291 | 10.60 | 2 | 263 | <14.0 | - |
| 312 | 12.20 | 2 | 270 | <14.0 | - |
| 318 | 12.6 | 1 | 288 | 14.3 | 1 |
| 337 | <14.0 | - | 295 | 14.2 | 1 |
| 354 | <13.8 | - | 306 | 12.8 | 1 |
| 370 | <13.6 | - | 320 | 12.17 | 3 |
| 380 | <11.8 | - | 330 | 11.12 | 3 |
| 405 | <11.8 | - | 345 | 9.6 | 1 |
| 478 | 10.20 | 2 | 357 | 9.65 | 2 |
| 499 | 11.05 | 2 | 368 | 9.6 | 1 |
| 511 | 11.6 | 1 | 383 | 10.4 | 1 |
| 536 | <13.2 | - | 433 | 11.9 | 1 |
| 552 | <12.4 | - | 441 | 13.07 | 3 |
| 559 | <12.2 | - | 462 | <13.3 | - |
| 585 | <12.2 | - | 467 | <13.8 | - |
| 595 | <13.2 | - | 494 | <11.8 | - |
| 610 | <11.8 | - | 501 | <11.1 | - |
| 624 | <13.2 | - | 570 | <10.1 | - |
| 635 | <11.8 | - | 594 | 9.5 | 1 |
| 647 | 11.80 | 3 | 600 | 9.90 | 2 |
| 672 | 10.36 | 3 | 621 | 10.4 | 1 |
| 679 | 9.47 | 4 | 630 | 11.63 | 3 |
| 694 | 9.25 | 3 | 653 | 12.9 | 1 |
| 700 | 9.45 | 3 | 657 | 12.65 | 2 |
| 708 | 9.70 | 4 | 672 | <13.2 | - |
| 721 | 10.50 | 4 | 680 | <12.2 | - |
| 727 | 10.64 | 4 | 703 | <12.2 | - |
| 737 | 11.10 | 4 | 710 | <13.8 | - |
| 756 | 13.4 | 1 | 735 | 13.2 | 1 |
| 823 | <11.8 | - | 757 | 12.5 | 1 |
| 846 | <13.2 | - | 766 | 11.9 | 1 |
| 861 | <10.4 | - | 790 | 9.45 | 3 |
| 878 | 12.3 | 1 | 799 | 9.44 | 4 |
| 888 | 11.90 | 2 | 812 | 9.65 | 3 |
| 909 | 10.37 | 3 | 819 | 9.52 | 2 |
| 917 | 10.40 | 2 | 830 | 10.25 | 2 |
| 940 | 10.40 | 2 | 839 | 10.33 | 2 |
| 947 | 10.95 | 2 | 848 | 10.4 | 1 |
| 962 | 11.85 | 3 | 953 | <12.2 | - |
| 971 | 12.20 | 3 | 974 | 12.00 | 2 |
| 978 | 13.25 | 3 | 981 | 12.4 | 1 |
| 992 | <12.2 | - | 986 | <11.8 | - |
| 2,439,001 | <13.3 | - | 2,440,003 | 11.30 | 2 |
| 009 | <13.6 | - | 009 | 10.70 | 3 |
| 020 | <12.2 | - | 037 | 10.15 | 3 |
| 030 | <12.2 | - | 060 | 10.60 | 3 |
| 051 | <14.0 | - | | | |
| 065 | <13.6 | - | | | |
| 080 | <12.2 | - | | | |

V.S.S. CIRCULAR No. 144 (cont).

TABLE 2.

LIST OF OBSERVERS.

AVERY, (Dr.) J.G.
 BATESON, F.M.
 EMMERSON, R.
 HARRIES-HARRIS, E.
 JONES, A.F.
 JONES, M.V.
 MATCHETT, (Dr.) V.L.
 MENAGER, L.
 MENZEL, K.
 ORR, J.B.
 POTTER, D.R.
 POWELL, C.W.R.
 TREGASKIS, T.B.
 WARD, D.
 WELCH, R.G.

TABLE 3.

RY PISCIS AUSTRINI---OBSERVED MAXIMA.

| <u>J.D.</u> | <u>MAG.</u> v | <u>INT.</u> d | <u>WT.</u> | <u>O-C.</u> d |
|-------------|------------------|------------------|------------|------------------|
| 2,435,530 | 8.8 | ... | 1 | -19 |
| 776 | 11.0? | 246 | 2 | + 2 |
| 989 | 9.6 | 213 | 3 | - 9 |
| 2,436,225 | 9.1 | 236 | 2 | + 3 |
| 446 | 9.1 | 221 | 4 | - 1 |
| 688 | 9.8 | 242 | 1 | +17 |
| 904 | 9.4 | 216 | 2 | + 8 |
| 2,437,120 | 9.4 | 216 | 4 | ± 0 |
| 353 | 9.8 | 233 | 1 | + 9 |
| 578 | 9.8 | 225 | 4 | + 9 |
| 797 | 9.2 | 219 | 3 | + 4 |
| 2,438,026 | 10.3 | 229 | 1 | + 8 |
| 252 | 9.1 | 226 | 3 | +10 |
| 456 | 9.5 | 204 | 1 | -10 |
| 693 | 9.2 | 237 | 3 | + 2 |
| 916 | 9.8 | 223 | 3 | + 1 |
| 2,439,139 | 10.0 | 223 | 1 | - 1 |
| 360 | 9.4 | 221 | 3 | - 4 |
| 594 | 9.5 | 234 | 1 | + 6 |
| 806 | 9.3 | 212 | 3 | - 7 |
| 2,440,027 | 9.4 | 221 | 2 | -10 |