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PERIOD AND LIGHTCURVE OF V 1 IN THE GLOBULAR CLUSTER NGC 6752

Of the three known variables in the globular clusters NGC 6752, V 1 and V 2 are given in Hogg's recent Catalogue (Hogg, 1973). V 3, discovered by Cannon and Stobie 1973, is on the giant branch and has a small amplitude. Little is known about V 2 as crowding makes photometry difficult.

We present the period, lightcurve and ephemeris of V 1. The material consists of 21 blue and 15 yellow plates obtained with the 74 in. Radcliffe reflector (Pretoria, South Africa) and 10 blue plates taken with the "blue" camera of the 20 in. Yale-Columbia refractor (El Leoncito, Argentina). The brightness of V 1 was determined by examining the plates with an eyepiece using the step method. The blue amplitude is of the order of a magnitude; the yellow amplitude is estimated 0.6 magnitude.

All the Radcliffe plates were taken within the interval JD 2433539-2438291. The South American plates were exposed between JD 2440828 and JD 2440858.

The South American plates, covering no more than a month, led to a rough determination of the period. This period was subsequently improved by the Radcliffe material.

Phases were computed according to the formula:

$$\text{phase} = 0.72562 (\text{JD} - 2430000)$$

Figure 1 shows the blue and yellow lightcurves over 1 1/2 period. Results from both telescopes are shown, it was assumed that systematic differences between the two series could be neglected.

The following ephemeris was found:

$$\text{JD of maximum} = 2438000.428 + 1^d 37813 \text{ E}$$

Cannon and Stobie give  $V = 13.0$ ,  $B-V = +0.4$  for the mean of their measures of V 1. Considering the horizontal branch at  $V = 13.5$ , they presumed V 1 to be a Population II Cepheid, a surmise now proven by our period and lightcurve.

Wesselink 1974 drew attention to the close similarity that seems to exist between the globular clusters NGC 6752 and M 13.

The establishment of V 1 - NGC 6752 as a short period Cepheid makes the resemblance with M13, which has three known short period Cepheids, even closer.

V 1, NGC 6752 is yet another example of Wallerstein's rule that globular clusters with Cepheid variables possess a strong blue horizontal branch.

Variables like V 1, NGC 6752 are considered to belong to the group of supra-horizontal branch (SHB) stars, which are roughly a magnitude brighter than the horizontal branch.

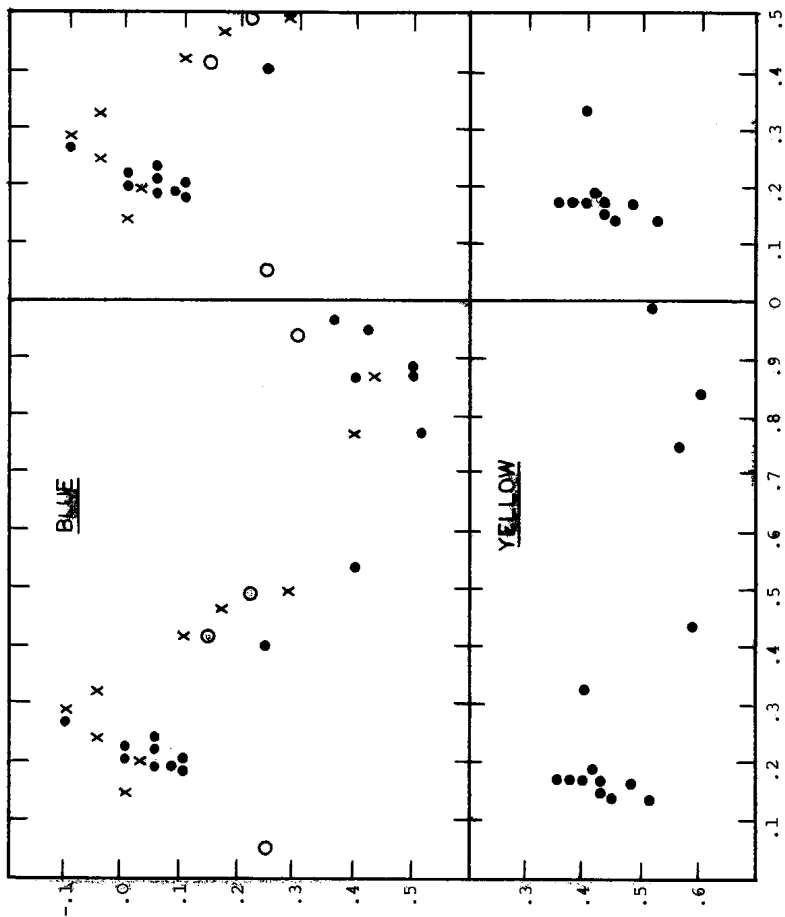
The SHB stars are considered (Sweigart, Mengel and Demarque, 1973) to evolve from the blue horizontal branch, which could not happen in the absence of that branch; hence Wallerstein's rule. For further details on the interesting consequences of modern evolutionary theories we refer to the literature.

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Blue and yellow lightcurves of V 1, NGC 6752. Solid dots: Full weight Radcliffe results. Open circles: Half weight Radcliffe results. Crosses: South American data.