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NEW ECLIPSING BINARY SYSTEM HR 3872A

INTRODUCTION:

The discovery of a new eclipsing binary system HR 3872A ($V=6.1$, Sp.T. = B6V, $\alpha(1950) = 9^{\text{h}}42^{\text{m}}$, $\delta(1950) = -51^{\circ}$) is the result of a search conducted by the author for Beta Cephei stars among possible candidates in the southern hemisphere. HR 3872A was on the observing program as a comparison star. We did not find in the literature any comments on the optical variability of HR 3872A. However, a variable radial velocity of HR 3872 is noted by Hube(1970). The photometric observations reported here are not sufficient to completely define the system.

OBSERVATIONS:

The observations were obtained through a Strömngren 'v' filter using a 1P21 photometer attached to the 61 cm telescope of the University of Toronto, situated at Las Campanas in Chile. HR 3927 ($V = 5.7$, Sp.T. = A0, $\alpha(1950) = 9^{\text{h}}53^{\text{m}}$, $\delta(1950) = -50^{\circ}$) was used as the comparison star. Its constancy has been checked against HR 3955. The observations of Δm_b (HR 3872 - HR 3927) obtained on the five nights in 1976 and on two nights in 1977, are listed in Table 1. HR 3872B (separation = 2".1 and $\Delta m = 5.0$ mag.) was in the diaphragm along with HR 3872A during the observing but we do not think HR 3872B has any connection with the light variation of HR 3872A.

Mr. G. Grieve kindly obtained a spectrogram of HR 3872A for classification purposes, using the same telescope. On the basis of it HR 3872A has been classified by Dr. R.F. Garrison as a B6V star. The spectrum does not show any trace of the other component of the system.

Table 1
Observations of an eclipsing binary HR 3872A.

JD _⊙	Δm _b	JD _⊙	Δm _b	JD _⊙	Δm _b
2440000+					
2858.603	.412	2861.657	.595	2864.705	.422
.614	.414	.668	.590	.749	.448
.632	.410	.670	.588	.785	.440
.685	.415	.692	.591	2877.530	.414
.767	.414	.714	.588	.564	.411
.771	.410	.728	.585	.612	.411
.783	.403	.738	.578	3211.585	.409
2859.517	.400	.754	.572	.614	.415
.536	.406	.768	.554	.652	.416
.555	.407	.776	.542	.707	.409
2861.532	.504	.781	.544	.734	.410
.541	.501	.786	.534	.760	.416
.557	.532	.793	.533	3212.559	.405
.579	.571	.799	.516	.579	.402
.585	.574	2864.517	.399	.613	.410
.591	.576	.576	.402	.672	.412
.622	.586	.622	.407	.719	.423
.634	.591	.656	.411	.752	.420
				.784	.449

Figure 1

A plot of Δm_b (HR 3872-HR 3927) versus JD for three nights in 1976.

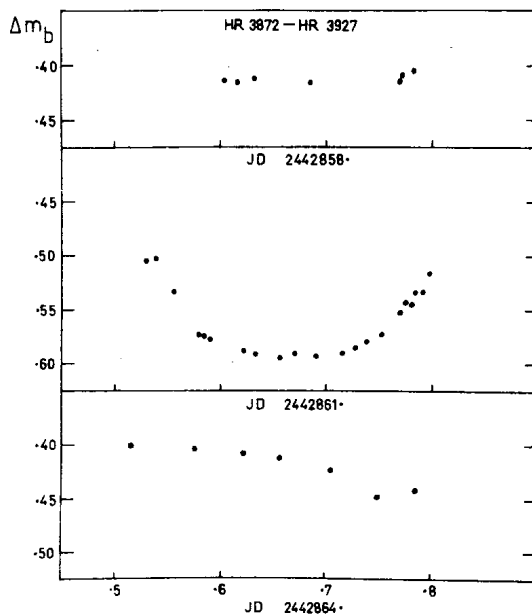


Figure 1 shows a plot of Δm_b versus JD for three nights in 1976. The system went through an eclipse on JD 2442861. It seems to be a primary eclipse particularly if the observations are compared to that of JD 2442864; on which the system seems to have gone through a secondary eclipse. The observations suggest that the eclipses are total and the primary eclipse is an occultation of the B6V component. The time of minimum was JD \circ 2442864.6697. The observations are not sufficient to deduce the period of the system. From the duration of the eclipse it can be said that the period can not be less than 1.25 days. If a phase difference of 0.5 is assumed between the primary and the secondary minima then the period of the system can be close to either 2 days or 5 days.

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Reference:

Hube, D. P. 1970, Mem. Roy. Ast. Soc. 72, 233