

COMMISSION 27 OF THE I. A. U.
 INFORMATION BULLETIN ON VARIABLE STARS

Number 1532

Konkoly Observatory
 Budapest
 1979 January 12

A NEW ECLIPSING BINARY IN VELA

In April 1978 a new eclipsing binary was found among early-type stars in the field of planetary nebula NGC 3132. The UB_V measurements were made using the 50 cm telescope and a pulse counting photometer (EMI 6256A photomultiplier) of the European Southern Observatory at La Silla, Chile. Stars in the E-regions (Cousins, 1973) served as photoelectric standards.

The finding chart shows the new variable as well as two comparison stars. The coordinates of these stars (Table 1) were measured on a Schmidt plate (ESO 1 m Schmidt camera) and calculated using 9 SAO stars. Table 1 also contains the average UB_V data together with their r.m.s. errors; n denotes the number of observations. In case of the variable star the magnitudes refer to observations outside eclipse.

Table 1

Star	Positions and mean UB _V magnitudes					
	A.R. (1950)	Decl.	V	B-V	U-B	n
Var Vela	10 ^h 02 ^m 06 ^s .94	- 40°31'52".8	12.825 ±6	0.294 ±6	0.172 ±4	15 m.e.
Comp. 1	02 04.99	31 05.7	12.393 ±5	0.531 ±6	0.059 ±6	9 m.e.
Comp. 2	01 57.86	30 35.2	12.74 ±1	0.57 ±1	0.08 ±2	3 m.e.

The star appeared to be variable on April 15/16 when a difference of about 0.4 mag between two measurements was noticed. On April 17/18 a secondary minimum and on April 19/20 a primary minimum were observed. In addition another primary minimum was measured on April 23/24 in one colour using the Bochum 60 cm photoelectric telescope at La Silla. The times of minima were determined graphically. A brief description of the eclipses is

given in Table 2.

Table 2
Observed minima

Min.hel. JD	Min.	Eclipse depth			Eclipse duration
		V	B	U	
2443616.6331 ±7 m.e.	II	0 ^m .117	0 ^m .093	0 ^m .089	0 ^d .241
3618.5908 ±2 m.e.	I	0.863	1.024	0.919	0.242
3622.5166 ±10 m.e.	I	-	1.02	-	-

A preliminary period of $P = 3^d.9258$ has been derived from the two primary minima. Two other possible periods $P/2$ and $P/4$ could be excluded due to our observations on April 17/18. The period $P/3$ has been ruled out by Surdej (1978) who observed no eclipse on May 10/11 using the 1 m and Bochum 60 cm telescopes.

Predictions of times of primary minima for the near future are given by the formula:

$$\text{Min.hel.I} = \text{JD } 2443618.5908 + 3^d.9258 \cdot E$$

±2 ±11 m.e.

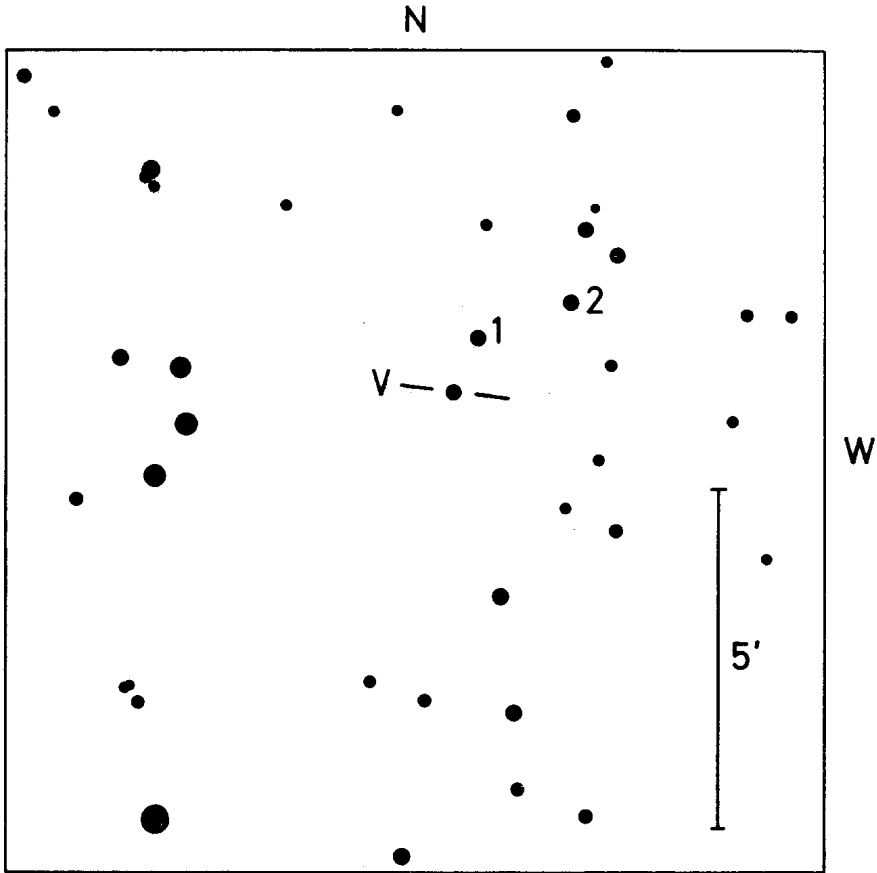
The secondary minimum is placed at phase 0.501, thus indicating a circular orbit of the binary. The data suggest no light variation outside eclipses and show an Algol type light curve.

The eclipses seem to be partial but it is also possible that totality was just reached. Assuming totality we estimated some photometric parameters and the spectral types of the two components (Table 3). The value of $k = r_2/r_1$ is 0.45. The system is slightly reddened and lies at a distance of about 1.7 kpc (mean abs. magnitudes corresponding to the spectral types given in Table 3 were adopted).

Table 3
Preliminary parameters of the binary system

	Component A	Component B
V	13.69	13.48
B-V	0.45	0.18
U-B	0.07	0.24
$A_V = 3.2E(B-V)$	0.20	0.25
Spectrum	F4 IV :	A3-4 V

Two objective-prism plates (1 m Schmidt, dispersion 450 Å/mm at H γ , Kodak IIa-O and IIIa-J, March 1978) show the spectrum of the binary outside eclipses. Only strong Balmer absorption lines



and a Ca II K line are visible. The resulting spectral class of A 2-5 is identical with that of the brighter component B (see Table 3).

Further observations would be necessary to analyse in more detail the light curve of this newly-discovered system.

The author wishes to thank J. Surdej for his additional observations of the variable, H.-E. Schuster for taking the Schmidt camera plates, Miss M. Klutz for assistance at the Bochum 60 cm telescope, and H.F. Henrichs, M.Klutz and I.Semeniuk who left to us some of their telescope time. The observations have been collected at the European Southern Observatory, La Silla, Chile.

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