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OBSERVATIONS OF 26, 27 AND 28 CMa

In an attempt to learn a bit more about their variability 27 and 28 CMa were observed by the author on 11 nights in January 1970 with the 6" Zeiss telescope on La Silla Mountain. 26 CMa was used as a comparison star together with HD 55857. But both comparison stars proved to be variables themselves. One of them, HD 55857 turned out - as already reported in IBVS No 807 - to be a  $\beta$  CMa with a period of only  $2^{\text{h}}40^{\text{m}}$  and an amplitude  $\leq 0.2$  in V. Corrected for the corresponding small fluctuations, the deflection curves for that star differed so very little among themselves that it seemed safe to conclude from them that the average brightness of HD 55857 did not suffer night to night variations and that it could be used as a standard for the evaluation of the three other stars' brightnesses and their variations. This was actually done and the magnitude  $6^{\text{m}}.11$  adopted for  $m_{\text{HD 55857}}$  in accordance with the value given by Cousins and Stoy (1).

The comparison with the deflection curves of the three other stars gave the following results.

1. 26 CMa ( $\equiv$  HD 55522,  $\alpha_{1900} = 7^{\text{h}}08^{\text{m}}07^{\text{s}}$ ,  $\delta_{1900} = -25^{\circ}47'$ ,  $m=5.86$ , S=B 3) \*

No significant variation could be seen in the course of the 5h- 6h runs that were made on the star, but there were definite changes from one night to another in the difference  $\Delta m(\text{HD 55522}-\text{HD 55857})$  as illustrated by Figure 1. The dots representing these differences lie satisfactorily on a sine curve with period  $P = 2^{\text{d}}.68$  and amplitude  $\Delta m = 0.037$ .

Since no star in the spectral range B 0 - B 3 is known to pulsate with such a long period, it seems plausible to admit that we are dealing with a spectroscopic binary, in which case the photometric period just given has to be doubled to yield the orbital period  $P_{\text{orb}} = 5^{\text{d}}.36$ . Spectroscopic observations are needed to check this point.

\* The data within brackets are taken from the "Catalogue of Bright Stars" 3<sup>d</sup> edition, 1964.

2. 27 CMa ( $\equiv$  HD 56014,  $\alpha_{1900}=7^h10^m11^s$ ,  $\delta_{1900}=-26^\circ11'$ ,  $m=4,42$ ,  
S= B 3 III pe)

The star is classified as a unique variable under the name 27 CMa in volume I of the 3<sup>d</sup> edition of the G.C.V.S. and an extensive bibliographical note is devoted to it on p. 417 \*\* of that volume.

The first aim of our photometric investigation was to find out whether the short period 0<sup>d</sup>.261975 discovered in the RV variations by Ringuélet-Kaswalder (2) and which could be traced back - though with a considerably reduced amplitude - in our own RV measurements of December 1969 and January 1970 (see Table 1 and Figure 2) would also be detectable in the brightness variation. The result of this investigation was negative; the shots made on the star in one and the same night showed nothing but an irregular scatter of a few thousandths of a magnitude around a mean that stayed stable, at 1<sup>m</sup>.46 below HD 55857, over the whole observation campaign. Putting as already mentioned  $\bar{m}_{HD\ 55857}=6^m11$  we thus find  $m_{27\ CMa}=4^m65$ .

This value is exactly the one which the G.C.V.S. mentions for the minimum observed brightness of the star, its maximum being 4<sup>m</sup>.3.

Table 1

RV's of 27 CMa			RV's of 27 CMa				
Date	JD -2440000	RV km/sec	phase	Date	JD -2440000	RV km/sec	phase
1969				1969			
Dec 21	576 <sup>d</sup> .7102	- 32.0	.711	Dec 28	583 <sup>d</sup> .8416	- 33.9	.933
22	77.8457	- 35.0	.045	29	84.8298	- 36.6	.705
23	78.7930	- 37.5	.611	30	85.8513	- 31.0	.604
24	79.7500	- 29.0	.314	1970			
25	80.8347	- 27.1	.455	Jan 21	607.5356	- 25.0	.665
26	81.8359	- 34.0	.277		.7209	- 15.5	.372
27	82.8416	- 33.2	.115		.8682	- 12.4:	.118
				22	08.5503	- 22.1	.538
					.7175	- 16.5	.177

Phases are for period 0<sup>d</sup>.261975 and origin JD 2440576<sup>d</sup>.0000

3. 28 CMa ( $\equiv$   $\omega$  CMa=HD 56139,  $\alpha_{1900}=7^h10^m45^s$ ,  $\delta_{1900}=-26^\circ36'$ ,  
 $m=3.83$ , S=B 3 IVe)

The star is classified in the G.C.V.S. (1969) as of type Ia, with observed brightness limits 3<sup>m</sup>.82 and 4<sup>m</sup>.04 in V.

Besides the eleven nights on La Silla in 1970, fractions of five more nights were devoted to it in March 1973 at Boyden, where the star was observed photometrically with the 60" telescope.

\*\*It is somewhat misleading that the reference numbers  $\leq$ [0596] there given do not correspond to those of the "Bibliography" beginning p.A.42 of that volume, but do refer to those of the "Literature" beginning p.365 of the 2<sup>d</sup> Supplement to the 2<sup>d</sup> edition (1967) of the G.C.V.S.

Its magnitude, averaged over the night, and derived from its difference with the average magnitude  $6^m.11$  of HD 55857 varied as Table 2 shows

Table 2  
Night-averages of  $m_{28}$  CMa

Date	m	Date	m
1970 Jan 4/5	3.62	1970 Jan 16/17	3.64
5/6	3.62	22/23	3.64
6/7	3.63	24/25	3.66
9/10	3.63	1973 Mar 15/16	4.15
10/11	3.60	20/21	4.17
12/13	3.63	21/22	4.17
13/14	3.63	22/23	4.18
14/15	3.65	30/31	4.18

So, the limits of the brightness variation given in the G.C.V.S. are to be widened seriously. But not only the night average changed slightly from one night to the next; there were also slight changes visible in the course of the  $6^h$  runs on some nights. They suggested variations with a characteristic interval of  $20^h-22^h$ , but efforts to find a real period of that order remained unsuccessful. It is perhaps not out of order to reproduce here the results of RV observations made with the 152 cm telescope on two other nights in January 1970 on La Silla - and reported already elsewhere (3) - since they too indicate a rather quick variation.

Table 3  
RV's of 28 CMa

Date	U.T.	JD	RV <sub>absor</sub> km/sec	RV <sub>em</sub> km/sec
1970 Jan 21	0 <sup>h</sup> 52 <sup>m</sup>	2 440607 <sup>d</sup>	5398 +34	+21.5
	5 32		.7341 +41	- 9.7
	8 51		.8730 +39	+17.1
22	1 15	08.5557	+12	+26.8
	5 13		.7217 +11	+28.0
	5 58		.7522 +21	+23.1

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References:

- (1) A.W.J. Cousins and R.H. Stoy, Royal Obs. Bull. No 64, 1963
- (2) A.E. Ringuelet-Kaswalder, Ap.J. 135, 755, 1962
- (3) A. Van Hoof, Mededelingen v.d. Kon. Acad. v. Wet. Lett. en Sch. K. v. Belgie, XXXV, No 4, 1973

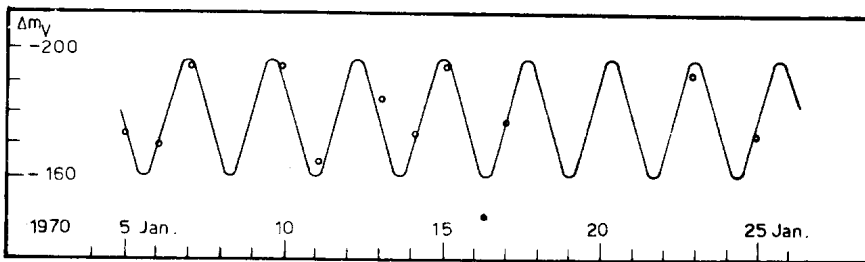


Fig. 1

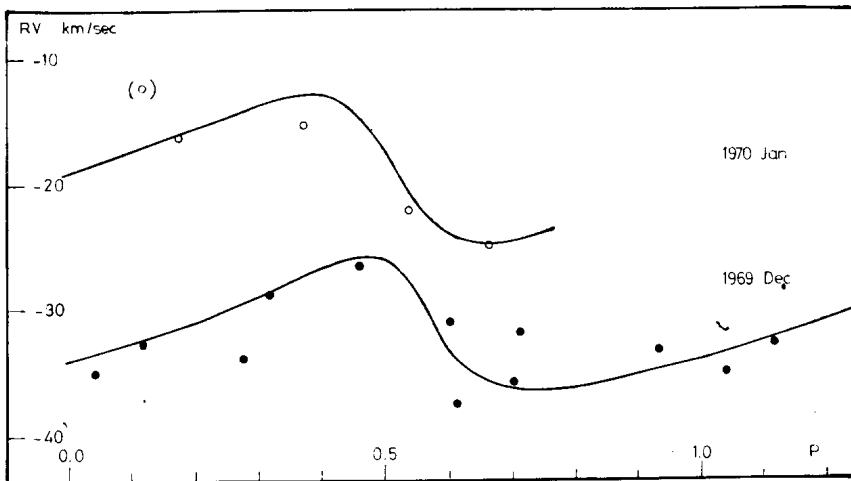


Fig. 2