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BO And, A LARGE AMPLITUDE ECLIPSING BINARY

In the third edition of the GCVS by Kukarkin et al. (1969) the light variation of the 5.79 days EA binary BO And = SVS 735 (spectral type B8 according to Bergedorfer Spektraldurchmusterung) is given from  $13^m.0$  to fainter  $14^m.0$ . These data are based on the estimates of Sonneberg patrol plates by L. Meinunger (MVS 3, 197, 1966) who derived the period of  $5^d.79725$ . Also the discoverer of this variable, S. Beljowsky (VS 5, 36, 1936), indicated a similar brightness variation. In contrast to these values, A.N. Deutsch (VS 5, 225, 1939) and later on P.P. Parenago (3rd suppl. to 1st edition of the GCVS, 1951) report  $>15^m.5$  and  $>16^m.0$ , respectively for the minimum magnitude.

During a blink survey of a variable star field centered at RA =  $22^h39^m.5$ , Decl. =  $+47^{\circ}.1$  by one of the present authors (Ge) in 1961 on plates of the four lenses Bruce astrographic camera (f/5, f=200cm) of Heidelberg Observatory (HD), BO And was found on one plate near its limit, which is about  $17^m$ . In recent years, for a preliminary study of the light curve of this binary further plates with the same center have been obtained with the four lenses astrographic camera (f/5, f=150cm) of the Hoher List Observatory (HL). On a total of 28 plates (16 HD-, 12 HL-plates) BO And has been measured with an iris photometer. The photographic magnitudes of the comparison stars, listed in Table 1 and identified in Figure 1, were established by several transfers from the nearby Selected Areas 42 on 3 HD- and 2 HL-plates. The large scatter of the characteristic iris-brightness relation is partly due to the badly known photographic magnitudes of the SA 42 standards. Accordingly from each single plate the least square fit of the characteristic iris-magnitude curve was used to correct the magnitudes. The averages from the five plates were adopted for the final magnitudes. Their standard deviations are about  $\pm 0^m.05$ . Since SA 42 and the surrounding of BO And have a distance of  $2^{\circ}.4$  and  $3^{\circ}.5$ , respectively from the

plate center, the given magnitudes for the comparison stars, and therefore also for BO And, are systematically too faint by some tenths of a magnitude, since the not well known differential field corrections have not been applied in Table 1.

It turned out that star C of this comparison sequence might be variable itself on a perhaps irregular time scale. These "variations" are more pronounced on Heidelberg plates, where this star is closer to the plate edges.

The obtained light curve of BO And is shown in Figure 2. Its brightness variations are between  $13^m.38$  and  $16^m.3$  in photographic light. There is an indication for a very short total eclipse phase in primary minimum. The secondary minimum is unobservable photographically. The light elements could be slightly improved by taking into account only those observed and published minima with brightnesses fainter than  $15^m.0$ :

$$\text{Min.} = \text{J.D. } 2428021.307 + 5.79733 \cdot E \text{ (hel.)} \\ \pm 0.00009$$

In Table 2 the time instants of the observed minima are listed on which these elements are based.

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Table 1  
Photographic magnitudes of the comparison stars of BO And

Star	$m_{pg}$	m.e.	Remarks
A	12.98	$\pm 0.04$	
B	13.07	0.05	comp.star a of Belj.
C	13.87	0.11	star probably variable
D	14.49	0.03	
E	14.99	0.04	
F	15.33	0.05	
G	15.41	0.06	
H	15.87	0.06	
I	15.99	0.08	
K	16.26	0.08	
L	16.28	0.10	
M	16.71	0.10	

Table 2  
Observed minima ( $m_{pg} > 15^m$ ) of BO And

J.D. hel.	Observer <sup>1)</sup>	E	O-C
2400000+			
27360.310	D	-114	-0.101 <sup>d</sup>
28021.375	B	0	+0.068
28050.339	B	+5	+0.046
29969.300	P	336	+0.091
30705.350	M	463	-0.119
36079.544	M	1390	-0.048
36485.415	M	1460	+0.010
37546.435	HD	1643	+0.120
37563.568	HD	1646	-0.141
37575.419	M	1648	+0.116
37633.313	HD	1658	+0.037
38288.442	M	1771	+0.068
39059.378	M	1904	-0.041
39088.292	M	1909	-0.114
43123.355	HL	2605	+0.009

<sup>1)</sup> B=Beljowsky, D=Deutsch, HD,HL=Geyer/Hänel, M=Meinunger, P=Parenago.

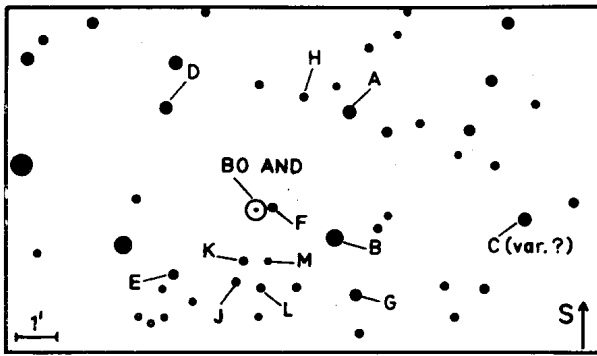


Fig. 1: Identification chart for the comparison stars of BO And

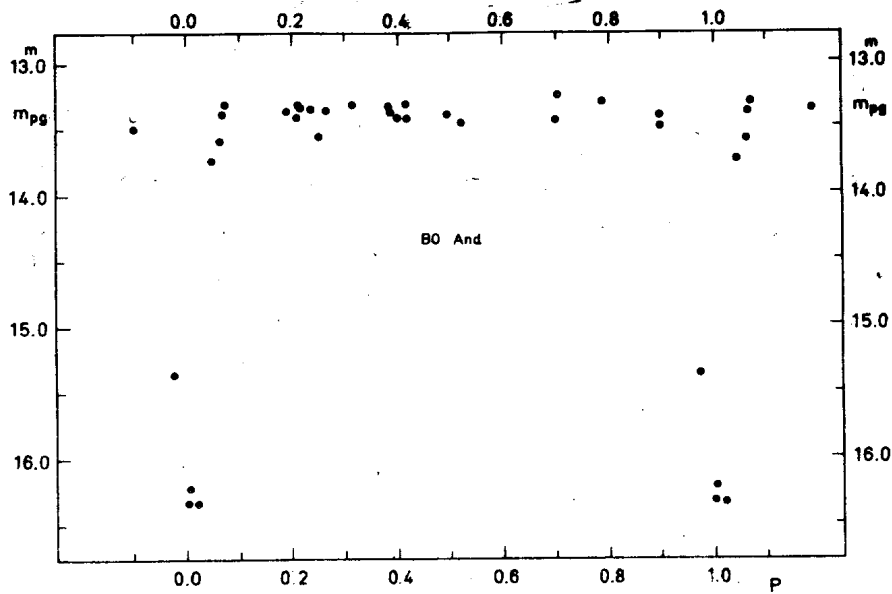


Fig. 2: Photographic light curve of BO And