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PHOTOELECTRIC OBSERVATIONS OF 31 CYGNI IN THE 1972 ECLIPSE

On thirty-two nights between April and August of 1972,UBV photoelectric observations of 31 Cyg were carried out by Sato and Hayasaka at the Akita University with the 25 cm reflector (UBV), by Ogata at the Kanagawa Education Centre with the 20 cm refractor (BV), and by Kitamura at the Okayama Astrophysical Observatory with the 91 cm reflector (UBV). These cooperative observations were made to collaborate with the international campaign on 31 Cyg in the 1972 eclipse which was decided by the Commission 42 of IAU with Dr.K.O. Wright as coordinator.

The observations of 31 Cyg were made differentially with respect to 26 Cyg as the comparison star, and standard stars of Johnson were also observed on each night to make it possible to reduce the individual observations to the standard UBV system. Description of the photoelectric equipment used was already made elsewhere (e.g. Tokyo Astr.Bull.Sec.Series No.221, 1972).

Table 1  
 UBV Photoelectric Observations of 31 Cyg.

Date (UT) 1972	JD (Hel)	$\Delta U$	$\Delta B$	$\Delta V$	Observatory*	
Apr. 10	244 1418.1938	-1. <sup>m</sup> 676	-1. <sup>m</sup> 096	-1. <sup>m</sup> 258	A	
	.2034	-1.704	-1.093	-1.255	A	
	12 420.2786	-	-1.104	-1.282	K	
	14 422.3042	-	-1.075	-1.284	K	
	17 425.2633	-	-1.113	-1.274	K	
	27 435.2776	-	-1.091	-1.269	K	
	29 437.2579	-	-1.105	-1.269	K	
	May 1	439.2726	-	-0.821	-1.207	K
		2 440.2477	-	-0.742	-1.183	K
		6 444.2461	-	-0.719	-1.196	K
7 445.1465		-0.037	-0.698	-1.184	A	
.1504		-0.002	-0.662	-1.156	A	
9 447.1881		-0.047	-0.693	-1.165	A	
.1964		-0.072	-0.702	-1.162	A	
10 448.1287		-0.017	-0.668	-1.148	A	
.1370		-0.024	-0.678	-1.139	A	
11 449.2719		-	-0.712	-1.178	K	
14 462.2524	-	-0.690	-1.169	K		
18 466.2040	-	-0.696	-1.174	K		
31 469.1411	-0.018	-0.676	-1.158	A		
.1494	-0.026	-0.683	-1.143	A		
Jun. 1	470.1913	-	-0.715	-1.189	K	
	2 471.0974	-0.035	-0.692	-1.135	A	
	.1058	-0.019	-0.681	-1.152	A	
	5 474.0697	-0.020	-0.678	-1.162	A	
	6 475.0961	+0.002	-0.678	-1.168	A	
	.1045	+0.003	-0.679	-1.192	A	
	.1887	-	-0.708	-1.184	K	

Table 1. (continued)

Date (UT)	JD (Hel)	$\Delta U$	$\Delta B$	$\Delta V$	Observatory*
1972					
Jun. 10	244 1479.1026	$-0^m.016$	$-0^m.682$	$-1^m.156$	A
	.1109	$-0.016$	$-0.679$	$-1.162$	A
	.1186	$-0.034$	$-0.687$	$-1.171$	A
	.1739	-	$-0.715$	$-1.201$	K
18	487.1173	-	$-0.708$	$-1.203$	K
23	492.0731	$-0.012$	$-0.689$	$-1.176$	A
	.0802	$-0.036$	$-0.675$	$-1.167$	A
25	494.0567	$-0.042$	$-0.691$	$-1.152$	A
	.0646	$-0.022$	$-0.694$	$-1.158$	A
26	497.0899	-	$-0.710$	$-1.196$	K
27	498.0945	-	$-0.697$	$-1.192$	K
28	499.0741	-	$-0.715$	$-1.172$	K
Jul. 1	500.0917	$-0.054$	$-0.738$	$-1.173$	O
	.0955	-	$-0.777$	$-1.207$	K
	.1140	$-0.064$	$-0.743$	$-1.179$	O
	.1244	$-0.084$	$-0.762$	$-1.198$	O
	.1313	$-0.086$	$-0.767$	$-1.204$	O
	.1397	$-0.096$	$-0.759$	$-1.201$	O
	.1473	$-0.085$	$-0.766$	$-1.196$	O
	.1931	$-0.098$	$-0.775$	$-1.203$	O
3	502.0716	$-1.162$	$-0.974$	$-1.258$	A
	.0819	$-1.238$	$-0.997$	$-1.243$	A
7	506.0789	-	$-1.047$	$-1.269$	K
20	519.0325	-	$-1.083$	$-1.271$	K
Aug. 4	533.9956	-	$-1.055$	$-1.284$	K

\*Observatories: A=Akita, K=Kanagawa, O=Okayama.

Table 2.

Depths of the Minimum in UB $\bar{V}$ .

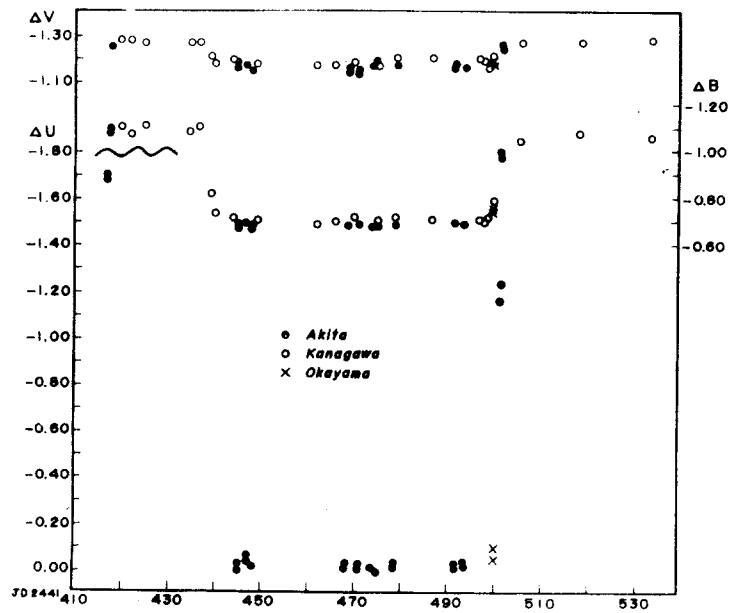
	$\Delta U$	$\Delta B$	$\Delta V$
Outside eclipse	$-1^m.690$ (2) $\pm 9$ (p.e.)	$-1^m.088$ (7) $\pm 5$	$-1^m.273$ (7) $\pm 3$
Within totality	$-0.025$ (20) $\pm 3$	$-0.690$ (28) $\pm 2$	$-1.168$ (28) $\pm 2$
Depth	1.665	0.398	0.105

Numbers in ( ) give the number of observations used.

All the results expressed in the magnitude-differences  $m_{31} \text{ Cyg} - m_{26} \text{ Cyg}$  in the UB $\bar{V}$  system are given in Table 1, where the notations have usual meanings and each Kanagawa value of  $\Delta B, \Delta V$  is the mean of several observations. The resultant observations are also plotted in the figure. A systematic difference of the order of  $0^m.02 \sim 0^m.03$  in  $B$  and  $\bar{V}$  remains between the Akita and Kanagawa observations. From the average values of  $\Delta U, \Delta B, \Delta V$  outside eclipse and within totality, the corresponding depths on the light curve are deduced as shown in

Table 2. From our light curve, the epoch of mid-eclipse can be estimated to be JD 2441469.5 and the duration of totality to be about 57 days.

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