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PHOTOELECTRIC OBSERVATIONS AND TIMES OF MINIMA OF Y Cygni

UBV observations of the eclipsing binary Y Cygni were made by the writer, between 1967 and 1969, with a 1P21 photomultiplier (cooled) on the 60 cm Zeiss reflector of the Vatican Observatory. The comparison star used was BD +34°4196 (B9), which is conveniently near to the variable in position and colour. The V magnitude and B-V, U-B colours of 34°4196 were determined from comparisons with Johnson-Morgan standard stars on several nights. They are given in Table 1, together with their probable errors. In the table are also given the V magnitude and colours of Y Cygni outside eclipse. The observations outside eclipse were not sufficiently spaced to determine the shape of the light curve, and the values given are simply the means of all the observations made outside eclipse. The probable errors of these values, when compared with those of the comparison star, go to indicate that the light-curve outside eclipse is not flat.

Table 1

	<u>V</u>	<u>B-V</u>	<u>U-B</u>	Number of obs.	nights
BD +34°4196	7 ^m .948 ±.003	-0 ^m .065 ±.003	-0 ^m .303 ±.005 (p.e.)	22	9
Y Cyg- 4196 (outside eclipse)	-0.651 ±.004	-.007 ±.006	-.660 ±.015 (p.e.)	19	8
Y Cyg- 4196 (mid-Minimum I)	-0.050	-.006			

The V magnitude and B-V of Y Cygni at the middle of Minimum I are also given in the table, from the only minimum observed, that of the night of November 2/3, 1969.

During that minimum, I made 83 observations of Y Cygni in B and V, each observation being the mean of two measures. The time of minimum was determined as;

$$\text{Minimum I} = \text{JD hel. } 2440528.2577 \pm .0005 \text{ (p.e.)}$$

This is epoch no. 10344 from the elements given by Dugan (Princeton Cont. No.12, p.28, 1931; Dugan's formulae are also given by H.Schneller in Information Bulletin No.61, 1964). The O-C of this minimum from that computed from Dugan's formula, using both sinusoidal terms, is $-0^d.0047$. The smallness of this correction, about seven minutes, goes to show both the regularity of the apsidal motion and the accuracy of Dugan's elements.

The period of Y Cygni is so unfavourable that it is impossible to observe the entire light curve from one observatory within a reasonable interval of time. Accordingly it was decided by IAU Commission 42, during the Brighton meeting, to organize an international campaign, with observers spread over a wide range of longitude. Professor Mario G. Fracastoro, (Director, Osservatorio Astronomico di Torino, 10025 Pino Torinese, Italy) and myself are the coordinators of the campaign.

Table 2

Predicted Minima of Y Cygni, June–November 1971

Epoch	Minimum I		Minimum II		
	JD hel.	JD hel.	JD hel.	JD hel.	
	2441	2441	2441	2441	
10540	115.553	117.294	10570	205.446	207.182
541	118.550	120.290	571	208.442	210.178
542	121.546	123.286	572	211.439	213.174
543	124.542	126.283	573	214.435	216.170
544	127.539	129.279	574	217.431	219.167
545	130.535	132.275	575	220.428	222.163
550	145.517	147.256	580	235.410	237.144
551	148.514	150.253	581	238.406	240.140
552	151.510	153.249	582	241.403	243.137
553	154.507	156.245	583	244.399	246.133
554	157.503	159.241	584	247.396	249.129
555	160.499	162.238	585	250.392	252.125
560	175.482	177.219	590	265.374	267.107
561	178.478	180.215	591	268.371	270.103
562	181.474	183.211	592	271.367	273.099
563	184.471	186.208	593	274.363	276.095
564	187.467	189.204	594	277.360	279.092
565	190.464	192.200	595	280.356	282.088

In Table 2 are listed the predicted times of both minima from June to November 1971. The times were computed with Dugan's elements, using both sinusoidal terms. A correction of -0.0047 (found from my observed minimum) was applied to the computed times of Minimum I. No correction was applied to the computed times of Minimum II; they should not be in error by more than a few minutes, at most.

The epoch numbers given in the table are those of Dugan's elements. Minima around the time of Full Moon were omitted from the table.

During this interval the mean period of Minimum I may be taken as $2^d996418$, and that of Minimum II as $2^d996258$.

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