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PHOTOGRAPHIC OBSERVATIONS OF NGC 2346 DURING 1983-84

We have previously reported photographic observations of the central star of NGC 2346 for the 1981-82 (Marino and Williams, 1983) and 1982-83 (Marino et al, 1984) observing seasons. Some of these magnitudes have been revised at fainter limits (Mendez et al., 1983) following receipt from R. Gathier of photoelectric V and B magnitudes for a number of the fainter field comparison stars around NGC 2346 (Marino et al., 1984A). Photography has been continued during the 1983-84 season just completed using the same equipment, observing methods and reduction techniques previously described, and the extended comparison star sequence.

We present in Table I a summary of the new photographic estimates. The phase positions have been calculated using the ephemeris E_n=2443126.0 + 15.991n (Mendez et al., 1982) determined from radial velocity observations before the beginning of the occultation.

In Table II we have summarised the observed maxima of magnitude 14.0 or brighter, and their phase positions, for the three observing seasons.

The 16 day periodicity observed in previous seasons is clearly seen occuring near phase 0.3 position. During the present season this continued until cycles 166-167 when a 1.5 cycle 'jump' appears to have occurred. The maximum following 166.3 occured at 167.8 and repeated on the succeeding cycles

near phase 0.8. No maxima were observed at either 166.8 or 167.3. With succeeding cycles the maxima appear to be brightening and increasing in width.

Table I

Photographic observations of the central star of NGC 2346 between 1983 November and 1984 June

J.D. 2445000+	m_V	phase	J.D. 2445000+	m_V	phase
654.0	14.2	158.09	802.9	14.0	167.40
703.9	14.5	161.21	808.8	13.8	167.77
704.9	14.3	161.27	809.9	13.5	167.84
710.0	14.0	161.59	810.9 fainter than	14.0	167.90
727.8 fainter than	14.4	162.70	811.8 fainter than	14.4	167.96
741.9 fainter than	14.0	163.59	813.8 fainter than	14.2	168.08
746.9	14.5	163.90	814.8	14.2	168.14
749.9 fainter than	14.6	164.09	815.8 fainter than	14.2	168.21
750.9 fainter than	14.6	164.15	820.8 fainter than	14.4	168.52
752.9	14.2	164.27	830.8 fainter than	14.2	169.15
753.9	13.9	164.34	834.8 fainter than	14.4	169.40
754.8	14.0	164.39	836.8 fainter than	14.4	169.52
757.9 fainter than	14.4	164.59	837.8 fainter than	14.4	169.58
770.9	14.4	165.40	838.8 fainter than	14.4	169.65
771.9	14.5	165.46	840.8	13.2	169.77
773.9	14.0	165.59	841.8	13.1	169.83
774.9 fainter than	14.4	165.65	851.8 fainter than	14.4	170.46
785.9	13.6	166.34	852.8 fainter than	14.2	170.52
792.8 fainter than	14.4	166.77	858.8	13.4	170.90
801.8 fainter than	14.4	167.33	860.8	14.0	171.02

The data are consistent with the central binary star reappearing from the following edge of the obscuring dust cloud, or of the system becoming visible through a hole in the cloud as it moves across the system. If the former is the case then the earlier suppression of the light curve observed in 1982-83 can be expected to reverse during the coming season and the light curve return eventually to its former constant brightness of 11.2 magnitudes. If the latter is the case then complex changes of the light curve are to be expected as the hole passes across the central star.

Table II

Approximate times and phases of maxima 14.0 or brighter for the central star of NGC 2346

J.D. 2445000+	m_V	phase	comments
098.8	11.4	123.37	start of the 1981-82 season
114.8	11.4	124.37	
129.8	11.3	125.31	
337.9	12.6	138.32	start of the 1982-83 season
354.6	12.3	139.36	
384.9	13.0	141.26	
400.9	12.9	142.26	
414.8	14.0	143.13	max probably later and brighter
433.9	13.4	144.32	
753.9	13.9	164.34	start of 1983-84 season
785.9	13.6	166.34	
(792.8	inv<14.4	166.77)	transition from peaks at
(801.8	inv<14.4	167.34)	0.3 to 0.8 phase position
809.9	13.5	167.84	
841.8	13.1	169.83	
858.8	13.4	170.90	max probably earlier and brighter

No photoelectric observations were made during the season as the star was too low in the sky when it became sufficiently bright at maximum to be observed using the Auckland Observatory equipment.

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