

PHOTOGRAPHIC OBSERVATION OF NOVAE:
(I) CP PUPPIS; (II) V 787 SAGITTARII;
(III) NOVA SCORPII 1950 (2) (*)

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SUMMARIVM — Trium stellarum novarum observationes photographicae eduntur, ab Auctore in Observatorio Collegii Riverviewensis in Australia factae. Variatio coloris stellae novae CP Puppis discutitur.

(I) CP PUPPIS

Photographic Observations

Estimates were made by the writer on 58 plates taken at Riverview College Observatory from November 1942 to March 1948, 27 with the R camera (Zeiss Astrotriplet) and 31 with the G camera (Grubb-Parsons-Ross triplet). Numbers 1, 2, 12, 14-16, 27, 31-35, 40, 46-49 of STOR's sequence [1] were used as comparison stars, with the photographic magnitudes determined by him. The observations are given in Table I. A colon denotes an observation of lower weight.

Colour Index

PETIT's long series of visual observations, made with a wedge photometer at Pasadena and Mount Wilson [2], were combined with the writer's photographic observations to obtain $m_{pg} - m_{vis}$, the colour index of the Nova. Magnitude differences between the photographic and visual curves were measured at

(*) Nota presentata il 25 maggio 1954.

TABLE I
Photographic Observations of CP Puppis

J. D.	Pg. Mag.	Plate Series	J. D.	Pg. Mag.	Plate Series
	m			m	
2430693.02	6.0	R	2431384.21	10.97	G
0704.02	6.82	G	1520.91	11.10	G
0704.02	6.83	R	1525.83	11.10	G
0730.96	7.18	R	1526.94	11.15	G
0764.93	7.53	R	1527.92	11.2:	G
0779.91	7.54	R	1874.92	11.6	G
0790.92	7.65	R	1874.92	11.5	R
0810.93	7.71	R	1876.91	11.7	G
0815.90	7.71	R	1876.91	11.6	R
0820.01	7.73	R	1881.92	11.7	G
0822.97	7.70	R	1905.91	11.7	G
0823.90	7.73	R	1907.88	11.8	G
0840.96	7.76	R	1917.87	11.7	G
0841.91	7.76	R	1932.87	11.8	G
0850.91	7.76	R	1942.87	11.7	G
0853.97	7.79	R	1944.87	11.9	G
0877.86	8.05	R	1946.90	11.9:	G
1079.01	9.34	G	1961.86	11.8	G
1081.07	9.42	G	1962.87	12.0:	R
1081.11	9.44	G	1963.86	12.0	R
1094.13	9.73:	G	1970.90	12.0	R
1108.98	9.71	G	1971.86	11.7	R
1142.97	9.84	G	1972.87	11.9	R
1162.92	9.87	G	2206.97	11.9	G
1165.97	9.80	G	2268.90	12.0:	G
1172.97	9.87	G	2559.95	12.3:	R
1177.97	9.81	G	2560.96	12.2:	R
1205.98	10.15	G	2593.93	12.2:	R
1262.84	10.30	G	2640.92	12.4:	R

TABLE II
Colour Index of CP Puppis.

J. D.	C. I.	J. D.	C. I.	J. D.	C. I.
	m		m		m
2430693	+ 0.7	2431080	+ 0.15	2431900	+ 0.8
0700	+ 0.6	1100.	+ 0.25	2000	+ 0.85
0750	+ 0.45	1150	+ 0.3	2200	+ 0.75
0800	+ 0.2	1200	+ 0.4	2300	+ 0.75
0830	+ 0.0	1400	+ 0.85	2600	+ 0.8
0850	- 0.4	1530	+ 1.0		

various times, during intervals when both curves were covered by observations. These values of the colour index are given in Table II.

The first observation in Table I was $17\frac{1}{2}$ days after maximum. The colour index was then $+0^m.7$ and it fell rapidly to $-0^m.4$ about J.D. 2430850. By J.D. 2431080 it was $+0^m.15$ and rose to $+1^m.0$ by J.D. 2431500. From J.D. 2431900 to 2432600 it appears to have remained fairly steady at about $0^m.8$. Not much stress is laid on the apparent slight rise to $1^m.0$ about J.D. 2431500, but the drop in colour index from about J.D. 2430700 to 2430850 is evidently real. PERRIN noted the whitish colour of the Nova from about J.D. 2430770 to 2430850, after which there was a break in his visual observations until J.D. 2431000.

The photographic light curve of CP Puppis is shown in Figure *a*. The variations in colour index are shown in Figure *b*.

(II) V 787 SAGITTARII (= H. V. 10322 = NOVA SAGITTARII 1937)

The only observations of V 787 Sagittarii that have been published are those made on Harvard plates by Miss SWOPE [3], who discovered the Nova.

Estimates of the Nova were made on 23 plates taken at Riverview with the P camera (Zeiss Astrotriplet). The comparison stars are listed in Table III, with their C.P.D., C.D. and H.D. numbers, H.D. spectrum and photographic magnitude. The magnitudes were determined by comparison with Harvard Standard Region E 7, using STORV's magnitudes [4].

TABLE III
Comparison Stars for V 787 Sagittarii

	C. P. D.	C. D.	H. D.	Spectrum	Pg. Mag.
<i>b</i>	- 30°5109	- 30°15034	316916	A0	^m 10.13
<i>c</i>	5134	15068	316923	F8	10.78
<i>d</i>	5135	15069	316911	A3	10.85
<i>e</i>	5153	15082	316907	A0	11.15
<i>f</i>	5150	15086	316910	G5	11.30
<i>g</i>	5145	15078			11.80
<i>h</i>		15074			12.3

The observations are given in Table IV. They complement Miss SWOPE's observations. In particular, the gap in the observations, during which the Nova probably reached its maximum brightness, is reduced from eighteen

to less than twelve days. Miss SWOPE's estimates appear to be systematically brighter than mine. There are only three days on which we both observed the variable. Her estimates on these days are the brighter by $1^m.0$, $0^m.9$ and $0^m.7$ respectively. The general run of the observations also indicates a systematic difference of the order of one magnitude. This is, of course, only a rough indication, for the descent from maximum cannot be represented by a smooth curve, as there are appreciable fluctuations of brightness. Miss SWOPE's comparison stars and their magnitudes have not been published, so that it is not possible to examine more fully the difference of zero point and scale between the two magnitude systems.

TABLE IV
Photographic Observations of V 787 Sagittarii

J. D. hel.	Pg. Mag.	J. D. hel.	Pg. Mag.
	^m		^m
2428670.117	[12.5	2428723.006	11.6
674.246	11.1	723.951	12.0
685.982	10.5	725.930	12.0
687.003	10.6	726.962	11.9
688.042	10.5	727.942	11.7
698.030	11.0	730.091	12.0
698.976	10.4	739.877	12.2
700.006	10.6	740.913	12.3
716.974	11.7	741.926	12.3
717.960	11.8	743.936	12.1
719.953	11.8	747.022	12.2
722.896	11.8		

It is likely that maximum occurred about J.D. 2428680. Full moon was on the previous day, which explains why there are no plates close to the time of maximum. There are two pre-maximum estimates of the Nova, Miss SWOPE's of $10^m.5$ on J.D. 2428673 and mine of $11^m.1$ on J.D. 2428674.25. We may take Miss SWOPE's observation as equivalent to about $11^m.5$ on my magnitude scale. It seems unlikely, then, that the maximum was much brighter than $9^m.0$ on my scale. McLAUGHLIN [5], extrapolating from Miss SWOPE's observations, finds a maximum of $7^m.2$. When my observations are taken into account, this appears to be too bright.

If the maximum is taken as $9^m.0$, a drop of three magnitudes from maximum took about 50 days, so that the Nova would still fall in McLAUGHLIN's

class of 'fast' Novae [6]. McLAUGHLIN found the distance of the Nova to be 7.6 kiloparsecs, neglecting absorption. For a maximum brightness of 9^m.0 the distance would be 17.4 kpc.

(III) NOVA SCORPII 1950 (2)

Nova Scorpii 1950 (2) was discovered by HARO on a plate taken at Tonanzintla on August 7 [7]. The writer estimated the Nova on thirteen plates taken at Riverview with the R and G cameras.

The comparison stars are listed in Table V, with their H.D. number, H.D. spectrum and photographic magnitude. The magnitudes were determined from four comparisons with Harvard Standard Region E7, using STOR's magnitudes [4].

TABLE V
Comparison Stars for Nova Scorpii 1950 (2)

	H. D.	Spectrum	Pg. Mag.
<i>a</i>	162085	B9	^m 7.70
<i>b</i>	162891	B9	7.94
<i>c</i>	162762	B9	8.13
<i>d</i>	162839	A0	8.39
<i>e</i>	162942	A0	8.55
<i>f</i>	162516	B9	9.03
<i>g</i>	162286	A0	9.42
<i>h</i>	162458	A3	9.55

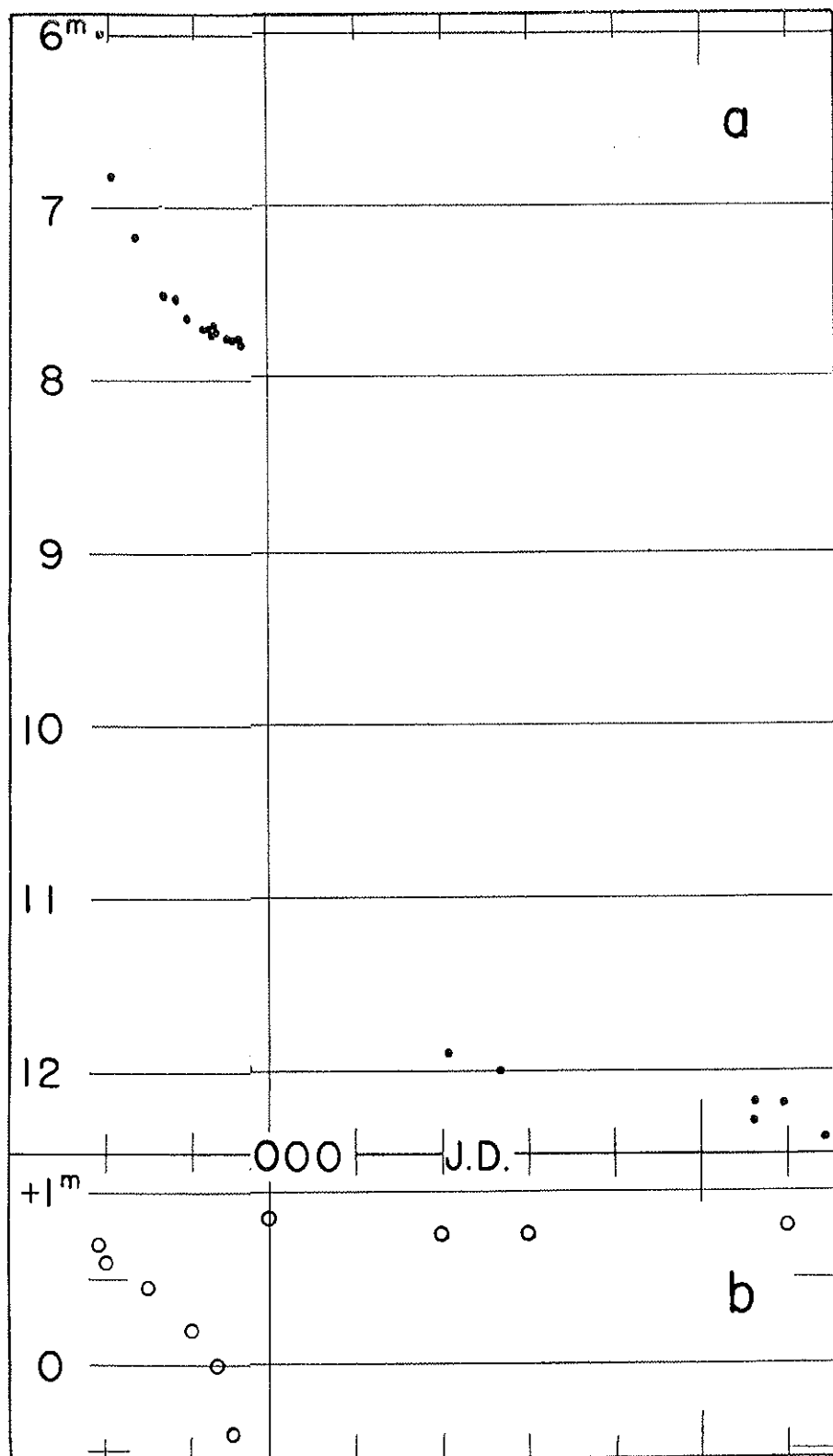
The observations are given in Table VI. A plot of the observations shows a well determined maximum at J.D. 2433499.9, the photographic magnitude being 7^m.8.

TABLE VI
Photographic Observations of Nova Scorpii 1950 (2)

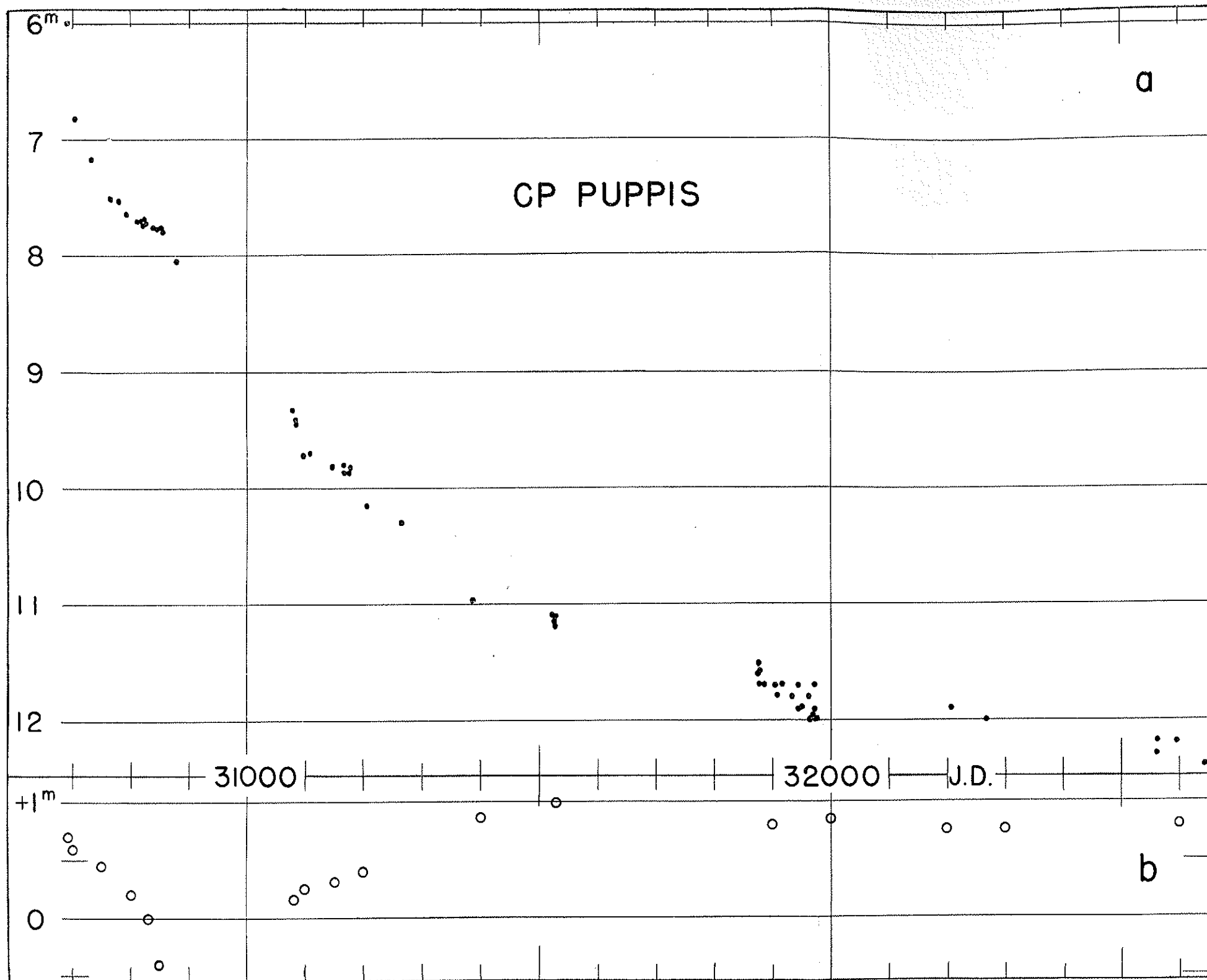
J. D. hel.	Pg. Mag.	Plate Series
2433477.977	[12	R
496.938	8.50	R
496.938	8.55	G
497.948	8.32	R
499.935	7.81	R
500.945	7.99	R
500.945	7.94	G
503.967	8.51	R
506.930	8.55	R
507.884	8.55	R
511.933	9.47	R
523.902	[12.5	R
525.888	[13	G

REFERENCES

- [1] R. H. STOV, M.N.R.A.S., 104, 236, 1944.
- [2] E. PETTIT, P.A.S.P., 55-61, 1943-49, *passim*.
- [3] H. H. SWOFF, H.B. 913, 12, 1940.
- [4] R. H. STOV, *Standard Magnitudes at -45° Declination*. Cape Observatory Mimeograph, 1948.
- [5] D. B. McLAUGHLIN, A.J., 51, 140, 1945.
- [6] D. B. McLAUGHLIN, A.J., 51, 137, 1945.
- [7] I.A.U. Circular 1283.



CP Puppis — Abscissa $m_{pg} - m_{vis}$, (figure b). Dots represent photographic estimates



CP Puppis — Abscissae are Julian Days — 2400000. Ordinates are Photographic Magnitudes (figure a) and Colour Index, $m_{pg} - m_{vis}$, (figure b). Dots represent photographic estimates and open circles colour index.