

ROYAL ASTRONOMICAL SOCIETY OF NEW ZEALAND.

VARIABLE STAR SECTION.

CIRCULAR No. 171

THE RECURRENT NOVA U SCORPII.

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SUMMARY: V magnitudes for comparison stars are given. Summarised are 723 negative visual observations from 2,434,503 to 2,440,885.

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INTRODUCTION: The recurrent nova, U Scorpii, had outbursts in 1863 (9.1vis); 1906 (8.8 ptg) and 1936 (8.8 ptg). Minimum magnitude is <17.6 ptg. The rise is very rapid and the time U Sco stays at maximum extremely short.

In 1936 U Sco was 10.96 on June 21, rising thereafter to 8.99 in 2hrs 58mins (1). It decreased from maximum of 8.79 on June 22 to 9.82 within 8hrs 43 mins. The last positive observation was 15.22 on July 21, 1936. Pogson (2) observed the 1863 maximum on May 20. Eight days later U Sco had faded to 12.4 and thirteen days after maximum it was <13.3.

These examples show that maxima are so brief that it is possible that they can be missed entirely unless this star is observed on every possible occasion.

CHARTS & SEQUENCE:

Charts have been published by Thomas (1), Pogson (2), Brun & Petit (3), Bateson, Jones & Stranson (4). The last mentioned chart was based on a Lick Observatory photo supplied by G. Herbig. The fainter comparison stars on this chart (No. 100) were identified by letters.

Menzies has now determined V magnitudes for these stars, using as standard HD 148860 for which the following values are given by Hardie & Crawford (5):-

V= 8.05; B-V +0.15; U-B -0.07 Spec. B9

Menzies' values for the comparison stars are:-

<u>CHART LETTER</u>	<u>V</u>	<u>CHART LETTER</u>	<u>V</u>
d	10.61	l	12.65
f	10.94	m	12.84
h	11.53	p	13.74
k	12.63		

The above values, rounded off to tenths, should be used by visual observers.

OBSERVATIONS: Members of the VSS, RASNZ, have made 723 visual observations between 2,434,503 (1953 May 4) and 2,440,885 (1970 Oct. 25). All have been negative.

The main observing season for U Sco each year is March to September inclusive. October observations are few and confined to the early evening. No observations are possible in November and December on account of proximity to the Sun. January and February observations are few and confined to the morning hours.

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From 1953 to 1967 August all observations were made by Jones and Bateson. Thereafter the star has been better watched as illustrated in Table 1, which shows the monthly distribution of observations for each year.

Observers who have contributed records are listed in Table 2.

Naturally the thresholds visible each night varied because of the different sizes of instruments used and because of weather. It can be concluded that U Sco was probably <13.7 visual whenever observations were made and definitely <12.8 visual. A few records show U Sco as <14.0 to <15.0. The frequency of the observations and the impossibility of observing U Sco at certain seasons prevent us from stating definitely that U Sco was at minimum from 1953 to 1970.

The distribution of negative observations in the years 1854 to 1938 is such that there could have been maxima that have gone unobserved.

There is a star, magnitude 17.6, north and immediately preceding U Sco (1). This star may be variable. In 1969 February, Bateson and Jones found this star just visible. Nineteen estimates covering 2,440,271 to 2,440,378 were 14.0 to 14.4. Earlier observations in February had shown the star as <12.8. Since positive observations were spread over eight days it is unlikely that the star observed was actually U Sco on the decline, since the known rate of decline appears too rapid for U Sco to remain between 14.0 and 14.4 for this period. However, because of the closeness of the two stars to each other, the possibility that a maximum had taken place for U Sco at the end of 1968 or beginning of 1969 cannot be completely ruled out. Whatever the object recorded by Bateson and Jones was their independent observations are in excellent agreement despite the faintness of the object.

Observers should pay close attention to U Sco to make certain that no outburst is missed.

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Observers are thanked for their records, realising that watching recurrent novae calls for considerable patience and can be discouraging. The senior author wishes to thank G.H. Herbig for the photo supplied.

1971 January 12

18 POOLES ROAD,
GREERTON, TAURANGA.
NEW ZEALAND.

REFERENCES:

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- 3 BRUN, A. & PETIT, M. Variable Stars, 12, 1 (97) 1957.
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V.S.S. CIRCULAR No. 171 (cont).

TABLE 1.

U SCORPII--MONTHLY DISTRIBUTION OF OBSERVATIONS.

<u>YEAR.</u>	<u>JAN.</u>	<u>FEB.</u>	<u>MAR.</u>	<u>APL.</u>	<u>MAY</u>	<u>JUNE</u>	<u>JULY</u>	<u>AUG.</u>	<u>SEPT.</u>	<u>OCT.</u>	<u>TOTALS.</u>
1953	...	...	...	...	2	1	3	1	...	...	7
4	...	2	2	2	4	2	3	2	2	1	20
5	1	...	2	1	2	2	2	1	2	1	14
6	1	1	1	2	1	2	2	3	1	...	14
7	...	3	1	1	2	3	3	1	1	1	16
8	1	2	2	2	3	3	3	3	3	2	24
9	2	2	3	3	2	4	3	4	4	2	29
1960	1	1	2	2	3	5	4	2	3	1	24
1	1	2	3	3	2	5	4	3	2	1	26
2	...	1	3	2	2	4	3	3	1	1	20
3	1	...	2	3	3	3	3	3	1	1	20
4	1	...	1	...	1	1	2	2	3	1	12
5	1	2	2	2	3	4	1	4	4	1	24
6	1	1	1	3	4	6	8	9	1	1	35
7	...	3	3	10	11	17	16	17	9	4	90
8	1	7	9	15	17	10	15	33	15	4	126
9	..2	25	9	14	19	17	11	17	12	7	133
1970	..2	1	1	8	11	15	25	16	8	2	89
TOTALS	16	53	47	73	92	104	111	124	72	31	723

TABLE 2.

OBSERVERS.

BATESON,	F.M.	121	observations
CHRISTIE,	G.W.	4	"
CROMPTON,	A.	4	"
HOVELL,	S.R.	9	"
HUNTER,	K.	8	"
JONES,	A.F.	352	"
JONES,	M.V.	115	"
LAUDER,	C.S.	3	"
McMILLAN,	S.C.	18	"
MARINO,	B.F.	14	"
MENZIES,	B.	10	"
WALKER,	W.S.G.	65	"

TOTAL 723 observations.