

ROYAL ASTRONOMICAL SOCIETY OF NEW ZEALAND.

VARIABLE STAR SECTION.

CIRCULAR No. 182.

TU PUPPIS.

Frank M. Bateson & A.F. Jones.

SUMMARY:

From visual observations during the interval 2,435,836 to 2,440,160, TU Pup is shown to be a Mira type variable with elements:-

Epoch (Max). 2,436,236 + 239^d.06. M-m 116^d.35
Range:- Max. Mean 9.86 (9.3 to 10.2). Min. Mean 13.87
(13.6 to 14.2).

The individual observations, dates of observed maxima and minima and details of the mean light curve are tabulated.

.....

INTRODUCTION: The discovery of TU Pup was announced in H.B. 842 (1927) where 7 dates on which the variable was bright and 4 when it was faint are listed. The G.C.V.S. (1970) lists it as of Mira type with a period of 238.2 days and a range of 10.6 to 15.9 ptg.

CHARTS & SEQUENCE: Charts 273 & 274 were published (1) and showed SP magnitudes for the brighter comparison stars. The fainter comparison stars were identified by letters pending determination of reliable magnitudes. V and B magnitudes have now been published (2).

OBSERVATIONS: Visual observations from J.D. 2,435,836 (1956 Dec.28) to 2,440,160 (1968 Oct. 30) are listed in Table 1 with the observers' abbreviations omitted. Most of the records are due to A.F. Jones, supplemented by some from F.M. Bateson.

DISCUSSION: Table 2 lists the observed maxima and minima in the usual form. The elements derived are:-

Epoch (Max). 2,436,236 + 239^d.06. M-m 116^d.35.
RANGE:- Mean Max. 9.86 (9.3 to 10.2). Mean Min. 13.87 (13.6 to 14.2).

Table 3 summarises the mean light curve. The first column lists the phase for ten day intervals, beginning near minimum to maximum (zero phase) and back to minimum. The second column gives the number of ten day means used in each phase. The mean magnitude for each phase is given in the third column. This was read off from the mean light curve plotted from ten day means.

Data for minima are not as reliable as for maxima largely because when TU Pup was faint there were many negative observations when the variable was invisible. However, the shape of the curve both on the rise and fall enabled dates of minima to be obtained by bisecting the chords over the major portion of the light curve.

1971 August 3

18 POOLES ROAD,
GREERTON.
TAURANGA.
NEW ZEALAND.

REFERENCES:

- (1) 1970. Bateson, F.M., Jones, A.F. & Stranson, I. "Charts for Southern Variables." Series 7. Published by F.M. Bateson.
- (2) 1971. Bateson, F.M., Gordon, P. & Menzies, B. Circ. 177. V.S.S., RASNZ.

TABLE 1.

TU PUPPIS --- VISUAL OBSERVATIONS.

2,430,000 +

<u>J.D.</u>	<u>MAG.</u>	<u>J.D.</u>	<u>Mag.</u>	<u>J.D.</u>	<u>Mag.</u>	<u>J.D.</u>	<u>Mag.</u>	<u>J.D.</u>	<u>Mag.</u>	<u>J.D.</u>	<u>Mag.</u>
5,864	<12.5	6601	<13.2	7310	<13.2	7940	11.3	8669	11.8	9425	<13.0
898	<13.0	615	<13.2	325	<13.2	959	11.4	678	12.0	442	<13.2
905	<12.5	635	12.5	338	<13.2	976	13.3	698	13.2	469	<13.2
918	<12.0	643	11.9	350	13.5	997	13.2	710	13.2	489	<13.2
938	12.0	662	10.5	368	12.7	8015	13.6	727	<13.2	498	13.2
958	11.8	673	10.6	378	12.1	027	<13.2	735	<13.2	509	12.6
960	10.4	687	9.8	384	12.0	043	<13.2	752	<13.1	520	12.8
966	10.3	698	8.8?	395	10.8	053	13.5	761	13.2	529	12.3
983	9.8	701	9.8	405	10.3	074	13.2	780	<13.2	538	12.0
987	9.6	715	9.5	409	10.2	086	13.2	793	13.6	551	10.7
999	10.7?	721	9.6	413	9.8	095	12.1	805	12.8	561	10.5
6,007	10.2	728	9.4	436	9.4	101	11.6	813	12.1	568	10.2
011	10.1	732	9.8	442	9.1	109	11.7	822	11.5	577	10.1
024	10.7	747	11.3	447	9.4	118	10.7	831	11.3	585	9.8
045	12.9	754	11.1	454	9.9	125	10.4	844	10.3	596	10.0
049	13.0	760	11.7	460	10.1	132	10.2	854	10.1	610	10.6
075	<13.1	767	12.3	462	10.3	142	9.4	859	10.1	617	11.2
081	<13.0	778	<12.3	469	10.5	149	9.6	870	10.2	624	11.5
112	<13.1	786	<12.3	483	11.4	163	9.7	879	10.4	639	12.9
130	<12.5	809	<13.2	492	12.1	169	10.0	886	10.5	647	13.0
141	<13.0	825	<13.2	502	12.3	176	10.3	915	12.1	669	<12.3
161	<13.2	841	<13.2	512	<12.3	182	10.4	929	<12.3	678	<13.2
174	<13.0	870	<13.2	522	12.9	223	12.4	938	13.0	707	<13.2
184	12.6	923	10.9	529	13.5	233	<12.3	945	13.4	718	<13.2
211	10.6	934	10.2	549	<13.2	238	13.2	973	<13.0	733	13.1
224	10.2	942	9.7	562	<13.2	244	13.1	9000	13.2	763	12.0
236	10.3	954	10.0	575	<13.2	263	13.2	008	<13.2	773	11.7
244	10.3	966	10.1	587	<13.2	290	<13.2	022	13.2	791	10.8
260	10.5	973	10.1	614	12.1	313	<12.3	031	13.2	802	10.7
271	11.2	989	11.0	620	12.0	328	11.8	123	10.2	816	10.2
290	12.4	998	11.9	641	10.5	345	11.0	139	11.5	833	10.7
306	12.8	7020	13.2	650	10.1	356	10.8	152	11.9	844	10.4
315	13.7?	028	13.2	663	9.8	362	10.3	159	12.5	857	11.4
334	<13.1	042	13.7	674	9.7	380	9.8	171	12.7	866	12.3
341	<13.1	058	<13.2	689	9.8	390	9.9	182	13.1	876	12.2
349	<13.1	070	<13.2	697	10.1	403	10.1	199	13.5	886	13.4
362	<13.1	082	<13.2	705	10.7	417	10.3	206	13.3	894	13.3
375	<13.1	099	<13.2	719	11.6	429	10.7	233	<13.2	906	13.2
413	12.5	102	<13.2	730	12.3	440	11.4	243	<13.2	918	13.4
425	12.1	112	<13.2	739	13.0	468	<12.3	261	13.1	936	<13.2
432	11.4	127	13.5	763	<13.2	473	<12.3	270	12.1	943	13.7
446	10.3	134	13.5	780	<13.2	488	<12.3	283	12.1	963	12.5
453	10.1	144	<13.1	807	<12.3	522	<12.3	295	11.2	974	12.1
464	10.2	166	10.7	821	<13.2	530	<13.0	302	10.5	981	12.4
482	10.3	194	10.1	838	<12.1	553	<13.0	316	10.2	991	11.9
498	10.6	205	10.0	850	<13.1	575	11.4	330	10.1	2,440,000 +	
512	11.1	225	10.8	877	12.3	588	11.2	348	9.7	003	11.4
528	12.2	235	11.7	883	12.0	608	10.3	355	10.2	010	11.0
547	13.0	247	11.9	890	11.0	620	9.8	379	11.3	044	9.7
556	12.9	258	12.0	902	10.6	629	10.0	394	12.3	052	9.3
572	<13.2	266	12.7	914	10.2	642	10.0	407	13.1	064	10.0
585	<13.2	286	13.7	920	10.3	657	10.6	414	13.2	071	10.1

V.S.S. CIRCULAR No. 182 (cont).

TABLE 2.

TU PUPPIS ---OBSERVED MAXIMA & MINIMA.

<u>MAXIMA</u>					<u>MINIMA.</u>				
<u>J.D.</u>	<u>MAG.</u>	<u>Int.</u> _d	<u>Wt.</u>	<u>O-C</u> _d	<u>J.D.</u>	<u>MAG.</u>	<u>Int.</u> _d	<u>Wt.</u>	<u>O-C</u> _d
2,435,983	9.8	...	3	-14	2,436,092	<14.0	...	1	-28
2,436,236	10.2	253	5	+ 0	351	14.0	259	2	- 8
455	10.2	219	5	-20	593	13.8	242	3	- 5
718	9.5	263	4	+ 4	830	<14.0	237	1	- 7
953	10.0	235	3	+ 0	2,437,082	14.0	252	3	+ 6
2,437,196	10.1	243	4	+ 4	319	14.2	237	4	+ 4
435	9.3	239	5	+ 4	568	14.0	249	2	+14
676	9.7	241	5	+ 6	810	<14.0	242	1	+17
913	10.2	237	4	+ 4	2,438,046	13.7	236	4	+14
2,438,151	9.6	238	5	+ 3	280	13.7	234	3	+ 9
379	9.8	228	5	- 8	510	<14.0	230	1	+ 0
632	10.0	253	3	+ 5	749	14.1	239	3	+ 0
853	10.1	221	4	-13	978	13.6	229	2	-10
2,439,110	10.0?	257	1	+ 5	2,439,237	13.9	259	4	+10
339	9.8	229	5	- 5	457	13.8?	220	3	- 9
587	9.8	248	5	+ 4	689	13.8	232	4	-16
816	10.2	229	4	- 6	933	13.7	244	3	-11
2,440,053	9.3	237	5	- 8					

TABLE 3.

TU PUPPIS ---MEAN LIGHT CURVE.

<u>PHASE.</u> _d	<u>No.</u>	<u>MEAN</u> <u>Mag.</u>	<u>PHASE</u> _d	<u>No.</u>	<u>MEAN</u> <u>Mag.</u>
-110	2	13.50	+ 10	14	9.94
100	1	13.45	20	10	10.26
90	5	13.10	30	17	10.77
80	7	12.83	40	12	11.65
70	4	12.50	50	9	12.05
60	8	12.32	60	12	12.37
50	10	11.81	70	11	12.73
40	9	11.40	80	5	13.01
30	13	10.77	90	7	13.24
20	14	10.41	100	4	13.43
10	10	9.97	110	3	13.55
0	17	9.81	+120	1	13.70