

ROYAL ASTRONOMICAL SOCIETY OF NEW ZEALAND

VARIABLE STAR SECTION

CIRCULAR No. 172.

SS INDI.

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SUMMARY:

V Magnitudes are given for comparison stars for SS Indi. From visual observations from 2,436,094 to 2,440,100 observed maxima and minima are tabulated. Elements derived are:-

EPOCH (Maximum) 2,436,544  $\pm$  190 days. Mean Range  
9.82 to 14.08 visual; M-m 89.25 days.

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INTRODUCTION:

SS Indi is CoD -67° 2521=HV 9734. Hoffmeister (1) assigned this star to the Mira Ceti class and gave its range as 11 to <13> ptg. The range given in the G.C.V.S. (1970) is 10 to 14 ptg. It was not included in Gaposchkin's survey of variables in Harvard Milton Field 53 (2). As far as is known SS Indi has never been properly investigated. It is one of the variables which B.V. Kukarkin requested Bateson to obtain data on range and period.

CHART & SEQUENCE:

Charts 227 and 228 (3) gave SPv magnitudes for comparison stars to magnitude 10.3 and designated comparison stars by letters. Chart 228 was traced from a photo supplied by the Royal Observatory, Cape. V magnitudes for the fainter comparison stars have been determined by Menzies in accordance with the procedures already published (4). Star "f" (CPD -67° 3862) was used as standard in these determinations using Cape values SPg 10.45; SPv 9.9; Spec. F5.

Table 1 details the complete sequence in which SPv magnitudes for the brighter stars appear in the third column and Menzies' V magnitudes for the fainter stars in the fourth column. The adopted magnitude, rounded off to tenths, appear in the final column. These are the values that should be used by visual observers.

OBSERVATIONS:

The individual observations are listed in Table 2 and cover the period 2,436,094 (1957 Sept. 11) to 2,440,100 (1968 Aug. 31). Almost all the observations have been made by A.F. Jones and form a very homogeneous series of records.

DISCUSSION:

Table 3 lists dates of observed maxima and minima in the usual form. The elements which satisfy the observations best are:-

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EPOCH (Maximum)	2,436,544
PERIOD	190 days
MINIMUM to MAXIMUM	89.25 days
MAX. MAG.	Mean 9.82 ( 9.2 to 10.3)
MIN. MAG.	Mean 14.08 ( 13.6 to 14.3)

O-C residuals from the above average  $\pm$  6.3 days for maxima;  
 $\pm$  3.8 days for minima.

The mean light curve is tabulated in Table 4, where phases, in days, and mean visual magnitudes are given for each twenty-fourth part of the period.

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1971 January 12

18 POOLES ROAD,  
 GREERTON.  
 TAURANGA.  
 NEW ZEALAND.

REFERENCES:

1. HOFFMEISTER, C. Erg. A.N., 12, 1, 29, 1940.
2. GAPOSCHKIN, S. H.A. 115, 2, 19, 1945.
3. BATESON, F.M., Jones, A.F. & STRANSON, I. "Charts for Southern Variables", Series 6, 1969. Published by F.M. Bateson.
4. BATESON, F.M. & MENZIES, B. Circ. 148, VSS,RASNZ 1970.

TABLE 1.

COMPARISON STARS FOR SS INDI.

<u>CHART</u> <u>LETTER</u>	<u>C.P.D.</u>	<u>SP</u> <sub>v</sub>	<u>V</u>	<u>ADOPTED.</u>
b	-67° 3854	9.25	...	9.3
c	-68 3463	9.18	...	9.2
d	-68 3462	9.34	...	9.3
e	-67 3858	9.93	...	9.9
f	-67 3862	9.9	...	9.9
g	-67 3856	10.3	...	10.3
j	-67 3855	...	10.22	10.2
k	-67 3866	...	10.31	10.3
h	-68 3458	...	10.36	10.4
l	-67 3860	...	10.81	10.8
n	...	...	11.35	11.4
p	...	...	11.88	11.9
q	...	...	12.10	12.1
r	...	...	12.19	12.2
t	...	...	13.33	13.3
u	...	...	13.66	13.7

TABLE 2.

OBSERVATIONS OF SS INDI.

J.D.	MAG	J.D.	MAG	JD	MAG	JD	MAG	JD	MAG
2,436,000+		2,436,000+		2,437,000+		2m438,000+		2,439,000+	
094	<12.1	823	<13.7	581	13.7	397	11.2	288	13.6
101	12.9	835	<13.7	590	13.6	420	9.9	295	14.0
110	12.0	845	<13.3	601	<13.3	434	9.9	306	13.9
114	11.9	861	<13.7	614	<13.3	471	10.6	327	13.3
123	11.3	864	<13.7	629	12.6	495	12.1	334	12.1
133	10.9	870	13.5	638	11.8	505	12.8	347	11.8
141	10.3	880	12.5	643	11.7	536	<13.3	358	11.1
153	10.2	893	11.3	657	10.4	553	<12.2	379	9.9
162	9.9	902	10.8	671	9.9	568	13.3	394	9.9
185	9.9	930	10.3	691	9.9	588	13.7	407	10.2
201	10.4	943	10.3	698	9.5	605	9.8	415	9.9
224	11.7	966	11.0	706	9.8	624	9.9	443	11.9
245	13.1	989	11.8	738	11.2	641	10.4	463	13.1
277	<13.3	2,437,000+		761	13.3	651	10.4	474	13.6
312	11.9	000	12.9	790	<13.3	667	11.0	498	<13.7
321	11.0	023	13.6	823	11.7	676	11.6	509	<13.7
334	10.4	033	13.6	839	10.8	695	12.6	519	13.6
342	9.9	042	<13.3	853	9.9	703	13.6	529	12.4
354	9.9	058	12.6	867	9.3	716	<12.2	561	9.9
364	9.9	081	10.7	883	9.6	727	<13.7	599	9.9
374	10.3	090	9.8	906	10.4	736	14.1	628	10.6
384	10.2	100	9.5	915	10.6	750	<13.3	645	11.8
397	11.0	112	9.2	931	11.9	757	12.9	656	13.1
411	11.9	120	9.4	944	12.6	765	12.5	671	14.0
423	13.1	130	9.7	962	<13.3	773	11.9	682	<13.7
450	<13.3	144	9.8	973	<13.3	785	11.0	709	13.7
461	<13.7	159	10.4	988	14.2	795	10.2	737	11.5
467	<13.3	172	11.2	997	14.0	813	9.9	761	10.2
484	13.3	189	13.1	2,438,000+		826	9.9	775	9.9
498	12.1	202	13.6	006	<12.2	848	10.4	787	10.2
507	11.1	218	<13.7	015	13.1	876	12.1	796	10.4
512	10.7	229	<13.7	022	12.4	885	13.3	807	10.4
521	10.2	246	12.9	029	12.4	892	13.6	817	10.7
529	9.8	250	12.2	041	12.2	914	<13.3	826	11.3
543	9.9	258	11.9	049	11.1	924	<13.3	834	11.7
550	9.9	262	11.3	062	10.2	940	13.4	843	12.2
556	9.9	279	11.2	074	10.3	952	12.4	851	13.1
570	10.3	287	10.7	102	10.7	973	11.5	869	<12.2
575	10.3	296	10.2	118	12.1	979	11.0	879	14.1
578	10.3	309	9.9	140	13.5	2,439,000+		890	<13.7
585	10.9	314	9.9	156	14.1	001	10.3	905	13.1
604	12.1	336	10.4	168	<13.7	008	10.4	912	12.7
614	12.7	347	11.2	179	14.0	021	9.9	942	10.4
635	<13.3	376	13.1	202	12.9	034	10.7	954	10.0
646	<12.2	388	<13.7	212	11.9	051	11.5	971	9.9
662	<13.3	408	<13.7	236	10.3	065	12.4	984	9.9
680	13.7	419	<12.1	245	9.9	094	13.6	2,440,000+	
700	12.1	437	13.5	255	9.9	106	<13.3	009	11.4
720	10.5	450	12.1	267	10.2	123	14.1	015	11.7
731	9.9	460	11.8	290	10.8	138	13.1	038	13.3
738	10.3	468	11.3	301	10.9	151	12.4	055	<13.7
751	9.9	477	10.9	309	11.7	165	11.3	068	<13.7
759	10.0	492	10.4	318	12.4	200	9.3	092	9.9
767	10.5	506	10.1	337	<13.3	217	9.9		
781	11.3	524	10.4	350	13.1	228	9.9		
791	12.4	541	11.1	357	<13.3	238	10.4		
804	13.6	559	12.4	366	13.6	266	12.9		
818	<13.7	570	13.1	380	12.2	275	13.4		

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TABLE 3.

SS INDI---OBSERVED MAXIMA & MINIMA.

<u>MAXIMA.</u>					<u>MINIMA.</u>				
<u>J.D.</u>	<u>MAG</u>	<u>INT</u> <u>d</u>	<u>Wt.</u>	<u>O-C</u> <u>d</u>	<u>J.D.</u>	<u>MAG.</u>	<u>INT.</u> <u>d</u>	<u>Wt.</u>	<u>O-C</u> <u>d</u>
2,436,168	9.9	...	3	+ 4	2,436,270	13.8	...	1	+ 5
355	9.9	187	4	+ 1	456	14.0	186	2	+ 1
544	9.8	189	5	+ 0	657	14.0	201	3	+12
742	9.9	198	4	+ 8	840	14.2	183	3	+ 5
930	10.3	188	4	+ 6	2,437,029	13.6	189	5	+ 4
2,437,110	9.2	180	5	- 4	213	14.2	184	3	- 2
309	9.9	199	4	+ 5	407	14.3	194	3	+ 2
507	10.1	198	5	+13	596	14.1	189	4	+ 1
691	9.7	184	4	+ 7	783	13.8	187	2	- 2
868	9.3	177	5	- 6	980	14.2	197	4	+ 5
2,438,081	9.9	213	4	+17	2,438,166	14.2	186	5	+ 1
250	9.9	169	5	- 4	349	14.0	183	1	- 6
429	9.9	179	4	-15	544	14.1	195	2	- 1
619	9.8	190	3	-15	723	14.3	179	5	-12
817	9.9	198	5	- 7	916	14.0	193	4	- 9
2,439,010	9.9	193	5	- 4	2,439,111	14.1	195	4	- 4
200	9.3	190	4	- 4	302	14.0	191	5	- 3
393	9.9	193	5	- 1	496	14.2	194	4	+ 1
580	9.8	187	3	- 4	685	14.3	189	3	+ 0
777	9.9	197	3	+ 3	874	14.2	189	4	- 1
968	9.9	191	3	+ 4	2,440,068	14.0	194	1	+ 3

TABLE 4.

SS INDI---MEAN LIGHT CURVE.

<u>24th PART</u>	<u>PHASE.</u> <u>d</u>	<u>MEAN</u> <u>MAG<sub>v</sub></u>	<u>24th PART</u>	<u>PHASE</u> <u>d</u>	<u>MEAN MAG.</u> <u>v</u>
0	0.0	9.82	12	94.8	13.87
1	7.9	9.93	13	102.7	14.00
2	15.8	10.12	14	110.6	13.95
3	23.7	10.40	15	118.5	13.84
4	31.6	10.75	16	126.4	13.57
5	39.5	11.08	17	134.3	13.20
6	47.4	11.43	18	142.2	12.77
7	54.3	12.00	19	150.1	12.20
8	62.2	12.42	20	158.0	11.63
9	71.1	12.98	21	165.9	11.08
10	79.0	13.45	22	173.8	10.60
11	86.9	13.75	23	181.7	10.23