SEVEN VARIABLE STARS IN SAGITTARIUS

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Abstract

New or updated periods are given for six long period variables and one eclipsing variable. Finder charts are supplied.

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During the summer of 1977, under the direction of Dr. Dorrit Hoffleit, I studied seven variable stars in the constellation Sagittarius. Five previously known long period variables, one eclipsing variable, and one new variable discovered by Pamela Dee Owensby in 1974 were examined on Nantucket plates taken from 1957 through 1977. These variables, all in the region of λ Sagittarii, are listed in Table 1. The first four columns, except for the last line, are taken from the General Catalog of Variable Stars.

The five variables with published periods were re-examined to determine if there had been any significant change in their periods during the last twenty years. Observations made for three of the variables, V1648, V1649, and V1684 Sgr, indicated that their published periods were still acceptable. V1650 Sgr, with a published period of 205 days, was reestimated to have a period of 204.2 days. However, due to the faintness of this variable on Nantucket plates, this period may not be the best fit. Further observations are necessary.

IQ Sgr presented more of a challenge. Its published period of 335 days was in general agreement with data from Nantucket plates, but there was a significant scatter of sixty days in times of maximum. Various graphical methods were used to try to improve the period, but all yielded a scatter of sixty days. It was concluded that since the observations were too sparse for a more accurate determination of the period, 335 days was still acceptable. More precise observational data are needed on IQ Sgr before any corrections to its period can be confidently made.

The eclipsing variable V1654 Sgr had already been examined by Harriet Dinerstein in 1973, but she was unable to find a satisfactory period for this star. I re-examined the star on Nantucket plates, in conjunction with the observations compiled by Dinerstein from Harvard MF, B, and A plates. A plot of the phases of minimum from JD 2424000 to JD2443000 revealed a correction to Dinerstein's preliminary period, and yielded a new period of 3.44821 days. This period was tested in an attempt to reveal any spurious periods, but none was found. It was concluded that this period was the best fit to all the observations.

The new variable was examined on Nantucket plates between JD 2436000 and JD 2443400. The observations revealed a change in the period of the star from 283 days to 288 days after JD 2438970. This change in period was found by examining the O-C diagram for this star, shown in Figure 2, which had been plotted for an initial estimate of 286 days for the period. This plot reveals lines of different slopes, indicating an abrupt change in the period of the star after JD 2438970. The position of the new variable was computed using three nearby reference stars.

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TABLE I

A Summary of Seven Sagittarius Variables

STAR	POSITION 1900		MAGNITUDE(pg)		GCVS PERIOD	NEW PERIOD	EPOCH	CHART
Sgr	RA	DEC	Max	Min	(days)	(days)	(JD2400000+)	
V1648	$18^h11^m18^s$	$-25^\circ15'.6$	14.4	16.2	256	same	43047	1
V1649	18 12 09	-24 00.4	13.6	15.9	198	same	37140	2
V1650	18 15 16	-23 17.6	14.3	16.2	205	204.2	42271	3
V1654	18 17 12	-23 18.2	13.2	15.8	3.449	3.44821	40064.653	4
V1684	18 27 05	-25 10.4	13.3	15.9	218	same	36785	5
IQ	18 27 16	-25 10.8	13.0	16.0	335	same	26590	5
NEW	18 40 57	-21 43.4	12.9	(14.8	---	283*	37846	6
						288	38970	

*283^d from 36037 to 38970; 288^d from 38970 to 43318.

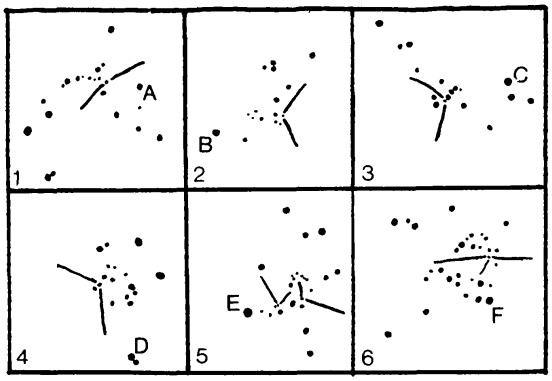

Figure 1. Finder charts, approximately 10' x 10', South at top.
1- V1648 Sgr, A=CoD $-25^\circ12979$ 4- V1654 Sgr, D=CoD $-23^\circ14319$
2- V1649 Sgr, B=CoD $-24^\circ14180$ 5- V1684 Sgr,(closer to)E=CoD $-25^\circ13227$,IQ Sgr
3- V1650 Sgr, C=CoD $-23^\circ14284$ 6- New variable, F=BD $-21^\circ5135$

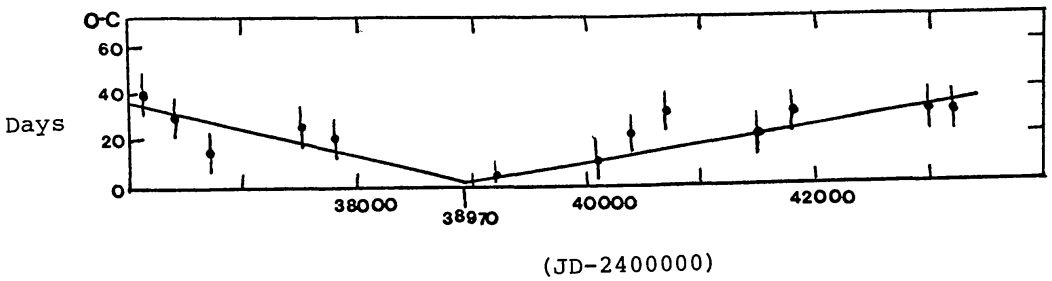

Figure 2. O-C plot for a trial period of 286^{d} for the new variable in Sagittarius. Initial mean slope of -0.01 indicates the period should be 3 days shorter, or 283 days; after JD 2438970 the slope is 0.008 indicating a period 2 days longer, or 288 days.