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PHOTOMETRY OF STARS IN THE FIELD
OF V345 AND V553 AQUILAE

V345 and V553 Aquilae are two Mira variables lying east of the galactic plane near the bright Cepheid η Aquilae. V553 Aql was added to the program of the American Association of Variable Star Observers (AAVSO) in 1991. However, no magnitudes were available for any comparison stars in the field. Thus, at the request of AAVSO chartmaker Charles Scovil, I observed several stars as faint as $V = 14.0$ on the chart covering the region, which includes the similarly-bright Mira V345 Aql.

There are no precise positions for these stars in the ordinary literature. However, V345 Aql appears in the IRAS catalogue, and V553 Aql is in the Guide Star Catalog:

	RA (2000)	Dec(2000)
V553 Aql = GSC 0484-1036:	19 ^h 51 ^m 52 ^s .0	+2°48'18"
V345 Aql = IRAS19512+0251:	19 53 47.5	+2 59 29

The IRAS identification IRAS19494+0240 for V553 Aql (end figures 55:4 and 27" for equinox 2000) might not be valid, since the variable lies just outside the error ellipse of the IRAS position. By means of the POSS-I prints and a plot of nearby GSC stars, I find that the position for V345 Aql reported by Hoffmeister (1933) in the paper announcing the discovery of variability is in error by $-1'$ in Declination. Correcting this allows the IRAS identification to be made.

I observed the stars using the Lowell 53cm photometric telescope on six nights in autumn 1992 and spring 1993. Strömgren y and b filters were used through either a 19" or 29" diaphragm. Each observation consisted of at least four 10s integrations on 'star' and two 10s integrations on 'sky', with greater numbers for stars fainter than $V \sim 9.0$. In addition to primary four-color standards (Perry, Olsen, and Crawford 1987), I have adopted a set of secondary standards to enable the calibration of V magnitudes of red and reddened stars beyond the color limits of the primary Strömgren standards. V magnitudes were taken mostly from the lists of Landolt (1983a, 1983b, 1992), supplemented by values from Menzies et al. (1991). Strömgren $b - y$ colors were taken from lists by Olsen (1983, 1993), Anthony-Twarog, et al. (1991), and Stetson (1991) - in that order of preference. Some V magnitudes come from these sources as well. Several of the Landolt stars have $b - y$ values determined using the Lowell 53cm telescope. The data for each night were reduced separately using linear transformations. Atmospheric extinction was measured on some nights and estimated on others.

Table 1. Standard Star Observations

Name	V (std)	$b - y$ (std)	V (obs)	$b - y$ (obs)	n
HD 109995	7.600	0.048	7.594	0.051	1
HD 118579	9.176	0.168	9.179	0.172	1
HD 120066	6.336	0.401	6.335	0.395	1
HD 122563	6.206	0.638	6.201	0.637	1
HD 125489	6.189	0.120	6.195	0.122	1
HD 126273	7.188	1.070	7.187	1.080	1
HD 129975	8.363	0.963	(8.344)	0.968	1
HD 132833	5.520	1.097	5.509	1.107	1
HD 139308	7.779	0.799	7.781	0.792	1
HD 140850	8.806	1.093	8.822	1.098	1
HD 143761	5.403	0.396	5.408	0.392	3
HD 149382	8.944	-0.146	8.944	-0.141	2
HD 149845	7.964	0.822	7.965	0.826	1
HD 153847	7.241	0.244	7.240	0.248	1
HD 160233	9.095	0.031	9.093	0.035	1
HD 160471	6.155	1.162	6.158	1.164	6
HD 161817	6.982	0.137	6.974	0.141	2
BD +04°3508	9.326	1.179	(9.359)	1.188	1
HD 162596	6.342	0.717	6.333	0.716	5
HD 165401	6.801	0.393	6.799	0.381	2
HD 172365	6.369	0.510	6.360	0.515	2
HD 172829	8.474	1.383	8.470	1.381	4
HD 175544	7.395	0.140	7.399	0.137	1
HD 182239	6.657	0.167	6.671	0.178	1
HD 184914	8.178	0.799	8.189	0.799	2
HD 184965	8.529	0.306	8.532	0.307	3
HD 185378	8.302	1.158	8.314	1.149	1
HD 186427	6.230	0.417	6.234	0.414	5
HD 190299	5.666	0.825	5.666	0.822	2
HD 191067	5.969	0.621	5.983	0.623	1
BD -00°4073	9.905	0.776	9.892	0.774	2
HD 199280	6.583	-0.030	6.583	-0.039	1
HD 218155	6.783	-0.004	6.779	-0.001	1
HD 222732	8.860	0.735	(8.835)	0.733	1

Because of the mix of standards, Table 1 shows both the adopted and observed mean V and $b - y$, along with the number of observations ‘n’. The stars are listed in equinox 2000 RA order. The V data for three stars (in parentheses) were omitted from the transformations. The mean deviations of the observed averages from the assumed values in this group of data are: $V = 0.001 \pm 0.007$; $b - y = 0.001 \pm 0.006$.

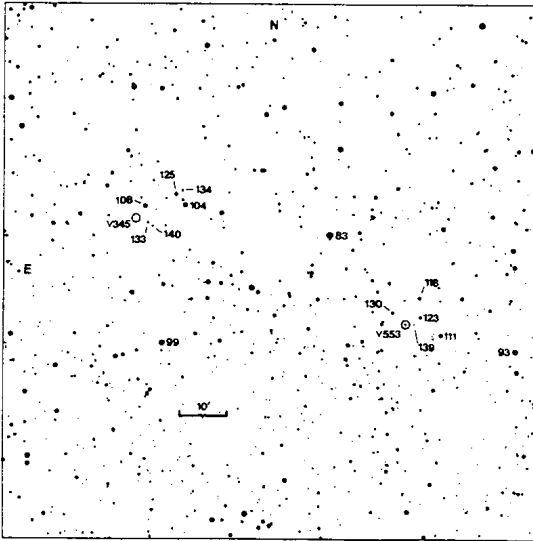


Figure 1. The field of V345 and V553 Aql showing stars from the GSC. V magnitudes are indicated to the nearest tenth with the decimal point omitted.

Table 2. Photometry of Stars in the Field of V553 Aql

Name	RA (2000)	Dec (2000)	V	$b - y$	n	Sp.
HD 187928	19 ^h 52 ^m 24. ^s 1	+2°57'48"	8.309	0.955	2	K2
			.030	.011		
HD 357395	19 51 04.7	+2 45 24	9.357	0.700	2	G
			.014	.013		
GSC 0484-1774	19 51 36.9	+2 47 07	11.055	0.622	1	
GSC 0484-1694	19 51 45.8	+2 51 03	11.780	0.451	1	
GSC 0484-1746	19 51 45.6	+2 49 01	12.268	0.734	2	
			.024	.025		
GSC 0484-0657	19 51 57.4	+2 49 31	13.037	0.800	2	
			.023	.045		
GSC 0484-2639	19 51 48.4	+2 48 17	13.864	0.498	3	
			.027	.005		

Results for the stars near the variables are shown in Tables 2 and 3, listed in order of decreasing brightness. The stars are identified by HD or GSC number; positions come from astrometric catalogues via SIMBAD or the GSC. SIMBAD is also the source of the spectral types from the literature. For stars observed on more than one night, uncertainties (sigma) are shown in the second line of each entry.

Table 3. Photometry of Stars in the Field of V345 Aql

Name	RA (2000)	Dec (2000)	V	$b-y$	n	Sp.
HD 188140	19 ^h 53 ^m 36 ^s .0	+2°46'14"	9.857	0.777	2	K0
			.027	.000		
HD 357390	19 53 26.1	+3 00 57	10.449	0.735	1	K2
HD 357391	19 53 43.5	+3 00 47	10.807	0.801	2	K5
			.011	.022		
GSC 0485-0649	19 53 30.0	+3 02 04	12.460	0.796	2	
			.006	.085		
GSC 0485-0784	19 53 27.2	+3 02 31	13.343	0.411	2	
			.005	.031		
GSC 0485-0961	19 53 42.3	+2 59 02	13.367	0.417	2	
			.009	.020		
GSC 0485-3213	19 53 40.3	+2 58 40	13.995	0.597	2	
			.022	.038		

For the convenience of observers, a chart derived from the GSC is shown in Figure 1. The comparison stars are indicated by their V magnitudes rounded to the nearest tenth (decimal point omitted) in the style of visual variable-star charts.

The photometric data herein were reduced using a clever IDL routine written by Laura Woodney and Eliza Fulton. Preparation of this report was facilitated by the use of SIMBAD, maintained by the Centre de Données astronomiques, Strasbourg, France.

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