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PHOTOELECTRIC MEASURES OF VARIABLE STARS OBSERVED AT MT. KOBAU (1970-73).

By Graham Hill, R.W. Hilditch* and E.L. Pfannenschmidt

ABSTRACT

A total of 1808 three colour photoelectric observations is presented for 43 programme stars. The variables involved are Ap stars, Be stars, early-type spectroscopic binaries, ζ *Aurigae* stars and supergiants. Many of these stars are also under spectroscopic investigation at the Dominion Astrophysical Observatory.

RÉSUMÉ

Les auteurs présentent les resultats des 1808 observations photoélectrique pour 43 étoiles. Ces étoiles sont des types spectrals Ap et Be, des binaries spectroscopiques avec composantes des types spectrals premiers, des étoiles du type ζ *Aurigae*, et des étoiles supergéantes. On observe la plupart des étoiles avec les spectrographes de l'Observatoire fédérale d'astrophysique.

*now at University Observatory, St. Andrews, Scotland.

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INTRODUCTION

It is well known (see e.g. Batten 1967) that there are many double-lined spectroscopic binaries of early spectral type whose orbital parameters are well determined. However, only a small fraction of these systems happen also to be eclipsing binaries and until recently it was only from these systems that masses and absolute dimensions of the components could be derived. With the advent of synthesis techniques in the solution of close binary light curves (Hill and Hutchings 1970, 1973; Wilson and Devinney 1971; Hutchings and Hill 1971a, 1971b, 1973; Wood 1971) the light variations of ellipsoidal variables have become usable in the derivation of masses and absolute dimensions (Hutchings and Hill 1971b). For any given orbital period, the more massive the stars, the more distorted are their configurations. Hence, there is a greater probability of observing light variations caused by the non-spherical nature of the stars even for systems of low orbital inclination. Thus the number of early-type (i.e. more massive) binary systems which could provide these fundamental data is, at least in principle, greatly increased.

Contemporaneously with the development of light-curve synthesis techniques, a great deal of theoretical work was done on the evolution of close binary systems (see Paczynski 1971 and references cited therein). Such work was able to suggest more precisely where observers might find evidence of advanced (i.e. post rapid mass transfer) stages of binary evolution. In particular, several supergiant stars, which were known or suspected members of binary systems, display spectroscopic phenomena characteristic of large-scale mass transfer. Accordingly, we suspected that light variations caused by the presence of gas streams may be observable even in systems of low orbital inclination.

With these factors in mind, and with a long-standing interest in the rapidly evolving early-type binaries, we decided to undertake a photometric survey programme of:

(a) known early-type SB2 systems whose minimum masses, $(m_{1,2}\sin^3 i)$ and orbital periods suggested the possibility of ellipsoidal light variations or whose light variations had already been discovered but not investigated in detail.

(b) early-type supergiant stars which were thought to be losing mass or were known or suspected members of binary systems. Many of these were suggested to us by J.B. Hutchings who was engaged in detailed spectroscopic studies of these stars (see e.g. Hutchings 1970).

(c) several OB stars, some in galactic clusters, discovered to be variable by Hill (1967b) but for which insufficient data had been obtained to be able to determine the period and type of variability. Some β Cephei stars identified by Hill (1967a) were also included.

In order to extend the observing programme as far as practicable towards being one which was complementary to the detailed spectroscopic work being carried out at the Dominion Astrophysical Observatory (DAO), we also undertook a survey of:

(d) the ζ Aurigae stars (31 and 32 Cygni, VV Cephei) to search for variations in brightness on time scales of months (i.e. short relative to the orbital periods). These observations would be complementary to the extensive series of spectra being obtained by K.O. Wright

and (e) bright peculiar A stars which were being observed spectroscopically at the DAO by G.C.L. Aikman.

However, not all these aims were realised, particularly those involved with the detection of small ($\sim 0^m.02$) light changes. This deficiency occurred because the photometer is unrefrigerated. Hence, while the internal precision of an individual observation was generally $\sim 0^m.003$-$0^m.005$ (all channels), the external precision of our data is not high ($\Delta(55) \sim 0^m.007$; $\Delta(44) \sim 0^m.007$; $\Delta(35) \sim 0^m.010$). This fact thwarted our attempts to detect low-amplitude light variations in the suspected β Cephei stars HD 149881, HD 165174 and HD 217035 (see Hill 1967a). The same is true of certain of the Ap stars, namely HD 140728 and HD 141988.

TECHNIQUES OF OBSERVATION AND REDUCTION

All observations were obtained at Mt. Kobau Observatory using the 16-inch telescope and the Walker four-channel photometer which had been designed and built at the DAO (see description by Walker, *et al.* 1970). The programme, which is continuing, was initiated in 1970 and has continued during the summer months (May to September) of each year. This publication reports all observations obtained from May 1971 to the end of September 1973. The 1970 season was used only as a preliminary test of the project. Stars deemed constant during 1970 (i.e. no variations in excess of $0^m.02$) were dropped from the programme in order to make it more manageable. These rejected stars are listed in Table 1.

TABLE 1

STARS DEEMED CONSTANT DURING 1970

Star	MK	(35-44)	n	(44-55)	n	B-V	V	n
129002	A1 V	—0.180	11	—0.002	9	—0.01	5.41	8
134064	A3 V	—0.096	8	+0.052	7	+0.05	6.05	8
152308	B9.5p Cr	—0.237	9	—0.039	7	—0.03	6.52	9
153286	Am	—0.003	4	+0.243	4	+0.28	7.04	8
176232	F0p: Sr Eu	—0.086	6	+0.208	10	+0.24	5.92	9
179761	B8 II-III; Hg	—0.640	7	—0.077	6	—0.09	5.14	7
179892	Am	—0.094	4	+0.288	4	+0.26	7.83	7
192678	A4p	—0.169	10	—0.021	7	—0.03	7.35	9

The photometer is that used in defining the DAO four-colour photometric system (Hill, Morris and Walker 1971) and its revision (Hill and Morris, paper in preparation). Late in 1970 something happened to the photometer which drastically altered the mechanical and/or optical alignment so that it was not possible to obtain a single-valued continuous transformation to the standard 38 channel. A check of the wavelength scale in the focal plane (utilising a mercury source) revealed that a scale change had occurred, but, because of the narrowness of the 38 passband (~ 150 Å) and the sensitivity of its positioning relative to the lines near 3750 Å, we could not recover the original system. The scale change has had no effect on the other passbands except to alter the scale factors of the transformations by a few percent. Because of thes

difficulties, we publish only the observations obtained through the 35, 44 and 55 channels.

An adequate number of standard stars (typically ~ 15) were observed during the short nights and a somewhat greater number (~ 20) were observed on nights in August and September. It was found that mean transformations to the standard system could be adopted for each "year" (i.e. 5 months). These values are given in Table 2.

TABLE 2

MEAN SCALE FACTORS FOR 1971-73

Year	S(35-44)	σ	n	S(44-55)	σ	n
1971	0.985	0.009	23	1.027	0.011	24
1972	0.969	0.008	26	1.010	0.010	26
1973	1.027	0.010	46	0.996	0.009	47

Comparison stars (*c*) for the selected variables (*v*) (i.e. programme stars) were chosen primarily on the basis of closely matching colours rather than proximity and a check star (*ck*) was always observed until such time that the comparison star had been "proved" constant in light. The observing sequence for programme stars was therefore typically *sky*, *c*, *v*, *ck*, *c*, *v*, *sky*. Each stellar observation consisted of six ten-second integrations taken consecutively. These observations were transformed to the standard DAO system colours (35-44) and (44-55) and *V* magnitudes on the *UBV* system. From each of the aforementioned sequences of observations, single mean differential magnitudes $\Delta(35)$, $\Delta(44)$ and $\Delta(55)$ were derived. These are the single observations listed in Table 5. Generally, two observations per variable star per night were obtained. This value was sometimes increased to four or five observations per night if the period was thought to be short (< 1 day) or if previous observations indicated rapid light variations over a particular phase interval.

It may be noted that with this type of observing sequence, a very large number of observations of comparison stars was obtained. Therefore, we adopted the best comparison stars as a set of secondary standards which were used in conjunction with the primary standards to maintain a very accurate control of zero point and/or extinction drifts through each night. As a result of this careful elimination of possible nightly and seasonal systematic differences we were able therefore, with confidence, to combine the observations of the variable stars over a period of three years.

THE OBSERVATIONS

The mean colours (35-44), (44-55) and (*B-V*) and *V* magnitudes of the 26 comparison stars, 23 check stars, and the 5 programme stars found to be constant are listed in Table 3. The (*B-V*) colours on the Johnson system are derived directly from the (44-55) colours using the linear transformation (*B-V*) = 1.174 (44-55) - 0.006. The number of observations used in forming these mean values are also given and, in most cases, cover observations over the three

years. All the programme stars and their associated comparison and check stars are listed in Table 4. The stars are identified by HD or BD numbers or "Hoag" cluster numbers (Hoag *et al.* 1961) and, for the programme stars, also by their variable star designation, suspected variable (SV) number, or Flamsteed number, whichever is appropriate. The spectral types are taken from the Jaschek MK catalogue and subsequent supplements circulated by Kennedy. We also provide the mean differential magnitudes in the three channels (together with standard deviation and number of observations used to form the mean values) between the programme and comparison stars and between the check and comparison stars in the sense (*v-c*) and (*ck-c*). Hence, if needed, mean colours for the programme stars can be derived using the data in Tables 3 and 4.

TABLE 3

MEAN COLOURS AND MAGNITUDES FOR COMPARISON, CHECK AND CONSTANT STARS

Star	(35-44)	*n*	(44-55)	*n*	(*B-V*)	*V*	*n*
2626	—0.584	33	+0.027	41	+0.02	5.93	39
2772	—0.562	20	—0.071	24	—0.09	4.72	21
136729	—0.058	56	+0.099	74	+0.11	5.66	63
137389	—0.218	36	—0.039	47	—0.05	6.01	34
137928	—0.057	27	+0.046	36	+0.05	6.45	31
141653	—0.079	67	+0.041	90	+0.04	5.20	65
142926	—0.556	18	—0.088	24	—0.11	5.75	22
144206	—0.538	25	—0.084	22	—0.10	4.74	22
145082	—0.183	7	—0.019	4	—0.03	6.67	6
150483	—0.100	86	+0.028	107	+0.02	6.08	60
151862	—0.155	71	+0.011	92	+0.01	5.91	81
156653	—0.096	27	+0.005	33	0.00	6.00	28
164353	—0.943	140	+0.044	131	+0.04	3.96	140
164432	—1.136	74	—0.048	67	—0.06	6.33	76
170878	—0.013	34	+0.046	33	+0.05	5.77	30
173880	—0.100	60	+0.104	58	+0.11	4.35	53
174866	—0.027	35	+0.168	35	+0.19	6.33	34
175640	—0.528	57	—0.034	57	—0.04	6.20	55
175869	—0.377	35	+0.015	34	+0.01	5.57	34
177817	—0.528	16	—0.025	15	—0.03	6.00	13
184606	—0.661	53	—0.081	53	—0.10	5.00	47
185423	—0.882	81	+0.048	89	+0.05	6.34	85
185859	—1.071	21	+0.365	27	+0.42	6.53	21
186122	—0.647	25	—0.064	25	—0.08	6.33	21
186689	—0.121	40	+0.151	46	+0.17	5.88	44
187235	—0.599	39	—0.077	44	—0.09	5.83	38

TABLE 3, continued

MEAN COLOURS AND MAGNITUDES FOR COMPARISON, CHECK AND CONSTANT STARS

Star	(35-44)	*n*	(44-55)	*n*	*(B-V)*	*V*	*n*
187640	—0.819	53	—0.087	62	—0.11	6.44	61
187811	—0.999	48	—0.132	60	—0.16	4.94	56
189395	—0.412	111	—0.056	132	—0.07	5.51	128
189432	—0.813	53	—0.085	63	—0.10	6.34	61
227634	—1.099	26	+0.229	25	+0.26	7.93	20
+35°3955	—1.103	17	+0.224	17	+0.26	7.39	15
191201	—1.207	118	+0.149	161	+0.17	7.25	147
191329	+0.054	13	+0.117	17	+0.13	6.54	18
191423	—1.201	45	+0.155	71	+0.17	8.03	67
191742	—0.077	9	+0.193	7	+0.22	8.14	9
191978	—1.222	11	+0.143	14	+0.16	8.03	14
194194	+0.783	32	+1.011	62	+1.18	7.41	27
194279	—1.126	84	+0.064	133	+0.07	8.12	119
197036	—0.900	41	—0.043	56	—0.05	6.60	48
197392	—0.730	21	—0.109	21	—0.13	5.67	21
199081	—0.913	49	—0.118	47	—0.14	4.77	41
202214	—1.200	84	+0.131	101	+0.14	5.63	94
205139	—1.172	56	+0.159	63	+0.18	5.51	59
208440	—1.138	72	+0.092	98	+0.10	7.93	91
212120	—0.821	46	—0.090	46	—0.11	4.54	43
213420	—1.108	96	—0.060	108	—0.07	4.50	105
214680	—1.505	200	—0.153	229	—0.18	4.87	206
215714	—0.305	32	+0.416	44	+0.48	7.59	46
+57°2602	—0.402	7	+0.594	4	+0.69	8.68	6
216532	—0.880	22	+0.498	63	+0.58	7.99	50
218537	—0.950	75	—0.007	93	—0.01	6.23	79
223386	—0.219	42	—0.012	42	—0.02	6.32	40
224404	—0.265	18	+0.040	21	+0.04	6.46	21

TABLE 4

PROGRAMME, COMPARISON AND CHECK STARS

VARIABLE NAME	COMPARISON NAME	Δ(35)	Δ(44)	Δ(55)	CHECK NAME	Δ(35)	Δ(44)	Δ(55)
			(A) BINARY SYSTEMS					
142926	144206	0.997	1.007	1.011	145082	2.329	1.984	1.934
		0.009	0.006	0.006		0.021	0.016	0.015
B9PSHELL	B9III	29	29	29		28	28	28
149881	150483	-0.520	0.798	0.955				
V600 HER		0.037	0.012	0.011				
B0.5III	A3VN	67	67	67				
175544	175640	0.859	1.337	1.185	175869	-0.432	-0.580	-0.631
		0.020	0.011	0.011		0.020	0.012	0.010
B3V	B9III	37	37	37	B8V	35	35	35
176853	174866	-0.391	0.353	0.300	177817	-1.022	-0.519	-0.315
V599 AQL		0.033	0.020	0.015		0.028	0.016	0.011
B2V	A7VN	31	31	31	B8IV	24	24	24
185507	185423	-1.300	-1.192	-1.184	186689	0.406	-0.364	-0.466
SIG AQL		0.026	0.029	0.030		0.022	0.012	0.010
B2.5V	B2IV	57	57	57		54	54	54
185936	184606	0.819	1.015	0.993	186122	1.361	1.348	1.334
QS AQL		0.030	0.027	0.026		0.016	0.011	0.009
B5V	B8IIIN	35	35	35	B9III	34	34	34
187399	189395	1.403	1.711	1.490	187640	0.493	0.908	0.938
		0.047	0.031	0.031		0.015	0.009	0.009
B7II	B9III	82	82	82	B5V	67	67	67
187879	189432	-0.961	-0.590	-0.657	187235	-0.286	-0.501	-0.509
V380 CYG		0.034	0.030	0.029		0.014	0.011	0.013
B1III	B5V	52	52	52	B8VN	31	31	31
190467	191201	1.370	0.923	0.930	191423	0.792	0.783	0.778
		0.071	0.047	0.044		0.016	0.012	0.011
B3III	O9III	93	93	93	O9IIIN	67	67	67
190918	227634	-1.382	-1.237	-1.122	35 3955	-0.548	-0.551	-0.546
SV102981	6871-5	0.024	0.020	0.019	6871-3	0.030	0.012	0.012
WN5.5A	B0IB	12	12	12		13	13	13
229196	194279	1.730	1.142	0.417	194194	2.212	0.212	-0.747
6910-4	6910-2	0.029	0.021	0.013	6910-1	0.051	0.009	0.012
O5		71	74	74		69	69	69
199081	197392	-1.112	-0.920	-0.890	197036	0.790	0.981	0.937
57 CYG		0.016	0.010	0.010		0.013	0.008	0.006
B5V	B8II-III	31	31	31	B5IV	46	46	46
203025	202214	1.205	0.843	0.769	205139	-0.067	-0.097	-0.126
SV8645		0.032	0.017	0.015		0.015	0.011	0.010
B3III	B0V	40	40	40	B1II	59	59	59
208392	208440	-0.528	-0.721	-0.889				
EM CEP	7160-3	0.049	0.041	0.041				
B1VN		50	50	50				
209481	213420	0.993	1.184	1.026	205139	-0.067	-0.097	-0.126
14 CEP		0.036	0.032	0.033		0.015	0.011	0.010
O9VN	B2IV	52	52	52	B1II	59	59	59
212120	213420	0.302	0.015	0.042	205139	-0.067	-0.097	-0.126
2 LAC		0.012	0.009	0.008		0.015	0.011	0.010
B6IV	B2IV	34	34	34	B1II	59	59	59

TABLE 4, continued

VARIABLE NAME	COMPARISON NAME	Δ(35)	Δ(44)	Δ(55)	CHECK NAME	Δ(35)	Δ(44)	Δ(55)
215835	215714	0.103	0.889	1.000	57 2602	1.291	1.180	1.049
DH CEP	7380-1	0.031	0.024	0.019	7380-3	0.036	0.012	0.006
05.5		24	24	24		5	5	5
216200	214680	1.934	1.279	1.045				
14 LAC		0.050	0.019	0.021				
B4III	08III	72	72	72				
216629	218537	4.131	3.662	2.949	216532	2.336	2.261	1.744
		0.055	0.020	0.018		0.019	0.018	0.010
B2IV-VNE	B2.5V	34	34	34	09.5V	28	28	28
(B) SUPERGIANTS								
2905	2626	-2.294	-1.641	-1.778	2772	-1.290	-1.310	-1.213
SV100038		0.027	0.025	0.024		0.011	0.007	0.008
B0.7IA	B9IIIN	19	19	19	B8VN	19	19	19
183143	187811	4.020	3.141	1.922	185859	2.003	2.072	1.575
SV102933		0.066	0.043	0.027		0.023	0.014	0.015
B6IA	B2.5V	40	40	40	B0.5IA	27	27	27
188001	187811	1.070	1.453	1.296	185859	2.003	2.072	1.575
9 SGE		0.023	0.018	0.021		0.023	0.014	0.015
O8IF	B2.5V	29	29	29	B0.5IA	27	27	27
190603	189395	0.216	0.687	0.128	187640	0.493	0.908	0.938
		0.032	0.023	0.021		0.015	0.009	0.009
B1.5IA	B9III	73	73	73	B5V	67	67	67
198478	197392	-0.499	-0.379	-0.833	197036	0.790	0.981	0.937
55 CYG		0.018	0.016	0.018		0.013	0.008	0.006
B2.5IA	B8II-III	47	47	47	B5IV	46	46	46
206165	202214	-0.466	-0.737	-0.885	205139	1.165	1.222	1.003
		0.030	0.023	0.020		0.011	0.010	0.009
B2IB	B0V	61	61	61	B1II	15	15	15
223385	223386	-0.202	-0.226	-0.859	224404	0.142	0.187	0.135
6 CAS		0.029	0.019	0.019		0.014	0.007	0.005
A3IA	A0V	24	24	24	B9III-IV	21	21	21
223960	223386	1.199	1.261	0.587	224404	0.142	0.187	0.135
		0.026	0.021	0.021		0.014	0.007	0.005
A2IA+	A0V	23	23	23	B9III-IV	21	21	21
225094	2626	0.269	0.605	0.297				
		0.029	0.024	0.023				
B3IAB	B9IIIN	20	20	20				
(C) AP, AM STARS								
133029	136729	0.089	0.507	0.736				
SV7162		0.027	0.016	0.010				
A0P	A4V	31	31	31				
140728	136729	-0.613	-0.314	-0.147	137928	0.738	0.739	0.792
BP BOO		0.019	0.011	0.007		0.020	0.012	0.009
B9P:SICR	A4V	46	46	46	A2IV	45	45	45
141988	141653	3.512	3.582	3.345	137389	0.576	0.723	0.799
		0.078	0.017	0.013		0.014	0.009	0.008
A2P	A2IV	52	52	52	A0P:SI	46	46	46
153882	151862	0.451	0.385	0.386	156653	0.140	0.079	0.086
V451 HER		0.017	0.008	0.009		0.015	0.008	0.010
A0P	A1V	42	42	42	A1V	39	39	39

TABLE 4, continued

VARIABLE NAME	COMPARISON NAME	Δ(35)	Δ(44)	Δ(55)	CHECK NAME	Δ(35)	Δ(44)	Δ(55)
173650	173880	1.921	2.090	2.184	170878	1.447	1.367	1.424
V535 HER		0.048	0.016	0.018		0.016	0.011	0.010
B9P:SI	A5III	36	36	36	A2V	36	36	36
191742	190781	2.219	2.136	1.986	191329	0.607	0.472	0.384
SV8444		0.031	0.009	0.008		0.025	0.007	0.007
A7P	A2IV	22	22	22	A3V	20	20	20
(D) UNKNOWN TYPES								
61 2213	208440	1.461	1.125	1.036				
7160-4		0.037	0.020	0.020				
		50	50	50				
57 2615	215714	2.557	2.565	2.633	57 2602	1.291	1.180	1.049
7380-4	7380-1	0.066	0.010	0.014	7380-3	0.036	0.012	0.006
		21	21	21		5	5	5
154228	150483	-0.303	-0.205	-0.164				
SV102817		0.022	0.014	0.013				
A1V	A3VN	42	42	42				
164284	164353	0.228	0.572	0.612	164432	2.086	2.286	2.386
66 OPH		0.017	0.017	0.014		0.025	0.009	0.007
B2VE	B5IB	22	22	22	B2IV	111	111	111
165174	164353	1.698	2.142	2.166	164432	2.086	2.286	2.386
V986 OPH		0.019	0.008	0.006		0.025	0.009	0.007
B0.5III	B5IB	121	121	121	B2IV	111	111	111
176162	174866	-1.830	-0.990	-0.807	177817	-1.022	-0.519	-0.315
		0.030	0.014	0.012		0.028	0.016	0.011
B5V	A7VN	29	29	29	B8IV	24	24	24
183537	187811	1.629	1.465	1.408	185859	2.003	2.072	1.575
7 VUL		0.059	0.032	0.031		0.023	0.014	0.015
B5V	B2.5V	38	38	38	B0.5IA	27	27	27
188209	189432	-1.288	-0.672	-0.708	187235	-0.286	-0.501	-0.509
		0.025	0.013	0.012		0.014	0.011	0.013
O9.5I	B5V	54	54	54	B8VN	31	31	31
191978	191201	0.759	0.774	0.787	191423	0.792	0.783	0.778
		0.018	0.009	0.008		0.016	0.012	0.011
O8	O9III	16	16	16	O9IIIN	67	67	67
216658	218537	3.594	3.276	2.614	216532	2.336	2.261	1.744
		0.042	0.021	0.020		0.019	0.018	0.010
B0V	B2.5V	33	33	33	O9.5V	28	28	28
217035	218537	1.949	1.943	1.489	216532	2.336	2.261	1.744
		0.019	0.006	0.008		0.019	0.018	0.010
B0.5VN	B2.5V	14	14	14	O9.5V	28	28	28
218674	214680	2.627	2.037	1.871				
		0.026	0.019	0.018				
B3IV	O8III	41	41	41				

TABLE 5

INDIVIDUAL DIFFERENTIAL MAGNITUDES

(A) BINARY SYSTEMS

STAR NAME HJD (2440 000+)	Δ(35)	Δ(44)	Δ(55)	HJD (2440 000+)	Δ(35)	Δ(44)	Δ(55)
HD 149881							
1117.7825	-0.513	0.793	0.959	1167.7619	-0.504	0.796	0.969
1117.7958	-0.511	0.796	0.948	1168.7469	-0.506	0.796	0.952
1117.8108	-0.519	0.798	0.961	1169.7880	-0.485	0.812	0.951
1117.8282	-0.517	0.806	0.962	1170.7549	-0.519	0.802	0.958
1117.8437	-0.476	0.815	0.971	1171.7726	-0.500	0.796	0.953
1117.8594	-0.506	0.797	0.946	1172.7538	-0.509	0.790	0.950
1117.8741	-0.492	0.802	0.973	1173.7643	-0.465	0.814	0.952
1117.8891	-0.469	0.834	0.995	1176.7430	-0.505	0.788	0.945
1131.7764	-0.510	0.790	0.930	1177.7348	-0.498	0.788	0.943
1131.7930	-0.509	0.795	0.956	1182.7303	-0.492	0.784	0.939
1131.8042	-0.526	0.792	0.942	1184.7195	-0.522	0.790	0.947
1131.8193	-0.485	0.798	0.954	1513.7895	-0.493	0.798	0.955
1131.8318	-0.492	0.814	0.975	1514.8202	-0.523	0.790	0.948
1131.8454	-0.481	0.813	0.974	1515.7626	-0.514	0.791	0.944
1131.8620	-0.473	0.827	0.977	1527.7630	-0.519	0.783	0.951
1131.8771	-0.494	0.809	0.949	1528.7790	-0.531	0.793	0.957
1131.8914	-0.485	0.815	0.963	1530.7721	-0.535	0.770	0.940
1131.9075	-0.481	0.799	0.954	1536.7469	-0.499	0.789	0.948
1131.9185	-0.467	0.816	0.967	1834.8335	-0.579	0.790	0.951
1134.7610	-0.499	0.807	0.962	1837.8035	-0.597	0.806	0.967
1134.7751	-0.503	0.799	0.956	1863.7654	-0.583	0.810	0.962
1134.7884	-0.502	0.798	0.950	1863.8356	-0.617	0.764	0.940
1134.8041	-0.489	0.812	0.963	1874.7884	-0.572	0.789	0.954
1134.8171	-0.511	0.799	0.953	1874.9285	-0.683	0.763	0.930
1134.8398	-0.494	0.801	0.950	1876.7707	-0.587	0.789	0.940
1134.8554	-0.511	0.800	0.958	1876.8990	-0.590	0.786	0.943
1134.8678	-0.492	0.801	0.955	1880.7425	-0.596	0.785	0.943
1134.8824	-0.485	0.803	0.965	1880.8687	-0.536	0.808	0.951
1134.8964	-0.517	0.792	0.950	1881.7720	-0.579	0.803	0.953
1134.9091	-0.515	0.798	0.951	1889.7768	-0.582	0.796	0.951
1134.9185	-0.514	0.796	0.951	1896.7281	-0.587	0.782	0.935
1161.7461	-0.512	0.784	0.948	1909.7389	-0.575	0.802	0.953
1162.7652	-0.510	0.802	0.959	1911.7298	-0.555	0.814	0.962
1165.7617	-0.512	0.790	0.956				
HD 175544							
1107.8450	0.849	1.332	1.175	1514.7599	0.842	1.342	1.186
1114.9095	0.869	1.325	1.189	1514.8686	0.843	1.339	1.190
1118.8959	0.857	1.336	1.189	1515.7762	0.892	1.348	1.196
1132.8882	0.860	1.328	1.177	1515.8453	0.851	1.351	1.200
1139.9145	0.850	1.329	1.183	1517.8334	0.875	1.352	1.199
1161.7851	0.861	1.338	1.177	1524.8423	0.847	1.342	1.185
1163.7980	0.862	1.322	1.167	1526.8195	0.857	1.337	1.195
1166.7944	0.871	1.340	1.179	1530.7847	0.832	1.324	1.181
1168.8129	0.840	1.324	1.170	1530.8689	0.857	1.326	1.180
1169.8185	0.831	1.326	1.173	1532.8570	0.856	1.334	1.186
1170.8113	0.833	1.330	1.177	1533.7664	0.830	1.339	1.175
1171.8171	0.830	1.320	1.171	1533.8338	0.864	1.346	1.203
1172.8052	0.843	1.315	1.164	1535.7671	0.865	1.349	1.197
1173.8482	0.861	1.345	1.189	1535.8393	0.861	1.342	1.194
1176.8044	0.841	1.333	1.181	1557.7133	0.897	1.350	1.200
1177.8539	0.844	1.323	1.169	1558.6800	0.876	1.357	1.198
1182.8321	0.835	1.328	1.183	1560.7005	0.903	1.354	1.199
1184.8013	0.881	1.333	1.170	1571.7028	0.893	1.344	1.189
1513.8386	0.888	1.353	1.197				
HD 176853							
1113.9109	-0.347	0.419	0.323	1128.8550	-0.382	0.375	0.299
1116.8777	-0.380	0.369	0.299	1128.8672	-0.397	0.348	0.307
1116.8877	-0.411	0.344	0.271	1139.8995	-0.389	0.354	0.309
1118.8780	-0.367	0.356	0.302	1161.9017	-0.336	0.387	0.321

TABLE 5, continued

HJD (2440 000+)	Δ(35)	Δ(44)	Δ(55)	HJD (2440 000+)	Δ(35)	Δ(44)	Δ(55)
			STAR NAME				
			HD 176853				
1162.8105	-0.338	0.381	0.331	1503.8210	-0.416	0.336	0.289
1165.7884	-0.401	0.337	0.293	1503.9118	-0.449	0.336	0.288
1168.7969	-0.398	0.341	0.292	1505.7986	-0.380	0.360	0.301
1170.7974	-0.449	0.326	0.272	1505.8831	-0.368	0.354	0.307
1171.8030	-0.332	0.372	0.319	1505.8931	-0.397	0.365	0.308
1176.7895	-0.391	0.350	0.292	1513.8233	-0.388	0.351	0.304
1177.8245	-0.372	0.356	0.306	1514.7845	-0.369	0.358	0.301
1182.8167	-0.348	0.369	0.310	1514.8559	-0.370	0.355	0.304
1184.7588	-0.379	0.359	0.304	1515.7886	-0.401	0.339	0.292
1501.7898	-0.429	0.341	0.277	1515.8339	-0.415	0.327	0.286
1501.8003	-0.432	0.335	0.289	1535.7538	-0.385	0.370	0.322
1501.8552	-0.442	0.328	0.281				
			HD 185507				
1107.8941	-1.216	-1.108	-1.095	1527.7764	-1.308	-1.203	-1.184
1118.9103	-1.299	-1.195	-1.182	1528.7908	-1.317	-1.215	-1.202
1128.9026	-1.325	-1.219	-1.182	1532.8658	-1.319	-1.199	-1.189
1132.8714	-1.326	-1.216	-1.203	1533.7742	-1.312	-1.197	-1.193
1160.8481	-1.291	-1.185	-1.184	1533.8409	-1.312	-1.194	-1.189
1163.8185	-1.301	-1.203	-1.189	1535.8580	-1.308	-1.194	-1.181
1165.8293	-1.318	-1.214	-1.202	1537.7952	-1.309	-1.195	-1.185
1166.8074	-1.322	-1.217	-1.200	1557.7775	-1.298	-1.188	-1.183
1167.8201	-1.334	-1.227	-1.197	1558.7745	-1.289	-1.183	-1.180
1168.8243	-1.306	-1.199	-1.190	1560.7715	-1.300	-1.194	-1.194
1170.8476	-1.313	-1.211	-1.207	1571.8112	-1.285	-1.173	-1.201
1172.8464	-1.318	-1.209	-1.192	1834.8765	-1.364	-1.232	-1.222
1176.8238	-1.304	-1.205	-1.186	1834.8870	-1.345	-1.225	-1.221
1177.8764	-1.311	-1.202	-1.189	1860.9109	-1.300	-1.193	-1.201
1182.8545	-1.281	-1.189	-1.179	1862.8156	-1.296	-1.168	-1.161
1184.8417	-1.302	-1.183	-1.168	1874.8312	-1.311	-1.207	-1.212
1211.7369	-1.327	-1.210	-1.201	1880.8268	-1.297	-1.187	-1.182
1217.7726	-1.311	-1.207	-1.196	1886.8443	-1.323	-1.198	-1.188
1218.7252	-1.302	-1.199	-1.188	1887.8388	-1.306	-1.196	-1.189
1513.8868	-1.299	-1.199	-1.198	1894.8769	-1.194	-1.073	-1.059
1514.7704	-1.292	-1.184	-1.180	1898.8719	-1.271	-1.152	-1.142
1514.8892	-1.312	-1.194	-1.193	1902.8219	-1.310	-1.192	-1.188
1515.8133	-1.304	-1.196	-1.195	1903.8210	-1.299	-1.187	-1.183
1515.8763	-1.302	-1.204	-1.189	1906.8020	-1.303	-1.189	-1.193
1517.8426	-1.296	-1.195	-1.188	1911.8976	-1.325	-1.228	-1.230
1518.8227	-1.294	-1.195	-1.187	1935.8074	-1.222	-1.092	-1.078
1522.8337	-1.318	-1.217	-1.208	1936.6750	-1.289	-1.181	-1.179
1524.8616	-1.293	-1.208	-1.194	1938.6741	-1.264	-1.160	-1.155
1524.8716	-1.274	-1.175	-1.187				
			HD 185936				
1107.8794	0.808	1.006	0.980	1218.7333	0.808	1.021	0.997
1118.9452	0.801	0.999	0.980	1497.8544	0.834	1.039	1.023
1128.8913	0.776	0.988	0.963	1503.7724	0.812	1.003	0.980
1160.8616	0.828	1.019	0.994	1505.8117	0.804	0.996	0.978
1162.8487	0.802	1.005	0.985	1513.8760	0.818	1.011	0.988
1163.8498	0.826	1.013	0.988	1514.9058	0.809	1.002	0.982
1165.8432	0.812	1.000	0.973	1515.8664	0.808	0.998	0.985
1167.8318	0.812	1.007	0.980	1516.7879	0.869	1.058	1.040
1169.8678	0.915	1.104	1.074	1517.8608	0.830	1.034	1.023
1170.8598	0.806	1.003	0.989	1518.8309	0.818	1.002	0.988
1172.8591	0.792	0.991	0.975	1527.8024	0.824	1.007	0.988
1175.8688	0.795	0.982	0.957	1535.8981	0.817	1.005	0.985
1176.8332	0.801	1.019	1.004	1537.8028	0.819	1.008	0.981
1177.8874	0.815	1.016	0.989	1557.7576	0.823	1.011	0.975
1182.8453	0.821	1.015	0.981	1557.7688	0.816	1.009	0.980
1184.8306	0.856	1.061	1.035	1558.8196	0.798	0.991	0.973
1211.7435	0.807	1.013	0.988	1560.7792	0.813	1.010	0.987
1217.7813	0.810	1.008	0.986				

TABLE 5, continued

STAR NAME HJD (2440 000+)	Δ(35)	Δ(44)	Δ(55)	HJD (2440 000+)	Δ(35)	Δ(44)	Δ(55)
			HD 187399				
1211.7508	1.456	1.743	1.519	1874.8406	1.390	1.729	1.505
1218.7556	1.376	1.689	1.463	1874.8538	1.389	1.720	1.497
1497.8830	1.483	1.732	1.512	1877.8443	1.413	1.733	1.515
1501.7735	1.457	1.769	1.538	1880.8357	1.472	1.773	1.544
1501.8694	1.423	1.752	1.525	1880.8457	1.434	1.757	1.537
1503.7831	1.351	1.682	1.465	1881.8337	1.401	1.706	1.493
1505.8384	1.396	1.679	1.457	1882.8672	1.423	1.714	1.488
1513.9136	1.405	1.722	1.492	1887.8611	1.485	1.766	1.541
1514.9158	1.404	1.705	1.490	1889.7549	1.413	1.714	1.499
1515.8868	1.415	1.723	1.505	1889.8345	1.407	1.714	1.511
1515.9291	1.428	1.715	1.497	1889.9495	1.408	1.702	1.492
1517.8981	1.414	1.704	1.477	1890.9338	1.382	1.669	1.446
1518.8398	1.413	1.714	1.493	1891.7409	1.357	1.659	1.444
1521.7737	1.499	1.760	1.544	1891.8440	1.360	1.672	1.442
1521.7847	1.464	1.764	1.539	1894.7358	1.377	1.729	1.504
1522.7500	1.482	1.769	1.535	1894.8682	1.392	1.732	1.495
1522.8013	1.492	1.762	1.526	1894.9490	1.392	1.724	1.497
1524.7903	1.521	1.771	1.537	1895.8328	1.346	1.673	1.449
1524.9377	1.518	1.765	1.535	1895.9485	1.383	1.696	1.470
1525.7989	1.477	1.726	1.509	1896.7874	1.330	1.666	1.432
1526.7475	1.396	1.678	1.466	1896.8893	1.327	1.664	1.444
1528.7691	1.415	1.690	1.467	1896.9524	1.306	1.658	1.441
1530.7928	1.445	1.743	1.509	1897.7917	1.312	1.661	1.446
1530.9313	1.428	1.734	1.503	1898.8387	1.328	1.682	1.464
1532.7980	1.338	1.660	1.433	1900.8360	1.345	1.696	1.481
1532.9382	1.412	1.685	1.451	1901.8710	1.327	1.706	1.497
1533.8472	1.349	1.669	1.436	1902.8733	1.419	1.750	1.543
1533.9267	1.347	1.672	1.440	1902.8838	1.429	1.727	1.520
1535.7897	1.356	1.685	1.458	1903.8296	1.370	1.715	1.495
1535.9576	1.381	1.703	1.478	1903.8401	1.367	1.708	1.495
1536.7687	1.389	1.704	1.481	1906.8088	1.418	1.724	1.518
1536.9631	1.396	1.705	1.480	1910.8399	1.437	1.731	1.519
1537.7698	1.393	1.715	1.498	1911.8652	1.416	1.719	1.503
1557.9114	1.416	1.736	1.502	1912.8627	1.430	1.730	1.518
1558.8480	1.400	1.721	1.484	1912.9500	1.411	1.725	1.507
1560.8592	1.347	1.645	1.421	1913.7089	1.447	1.736	1.516
1571.8902	1.431	1.727	1.520	1926.8702	1.375	1.670	1.460
1849.8091	1.443	1.731	1.521	1927.8540	1.347	1.692	1.468
1859.8068	1.432	1.734	1.510	1935.7963	1.375	1.695	1.481
1861.7687	1.392	1.703	1.492	1936.7494	1.403	1.717	1.494
1862.8963	1.341	1.649	1.435	1938.7383	1.441	1.737	1.514
			HD 187879				
1107.9075	-0.924	-0.576	-0.643	1514.9300	-0.978	-0.608	-0.672
1119.8974	-0.872	-0.504	-0.573	1515.9201	-0.965	-0.608	-0.671
1132.8135	-0.999	-0.628	-0.696	1517.8869	-0.922	-0.558	-0.628
1160.8737	-0.955	-0.600	-0.662	1518.8515	-0.971	-0.615	-0.680
1162.8636	-0.939	-0.582	-0.658	1527.7884	-0.974	-0.615	-0.683
1164.8907	-0.979	-0.600	-0.665	1535.8835	-0.947	-0.582	-0.652
1167.8498	-0.967	-0.617	-0.676	1536.8202	-0.958	-0.598	-0.660
1168.8515	-0.957	-0.597	-0.663	1557.8975	-1.012	-0.636	-0.703
1169.8782	-0.885	-0.525	-0.590	1558.8620	-0.948	-0.586	-0.660
1170.8705	-0.977	-0.622	-0.685	1560.8937	-0.958	-0.598	-0.666
1172.8714	-0.961	-0.588	-0.651	1571.9041	-0.917	-0.541	-0.610
1176.8422	-0.974	-0.600	-0.670	1848.8631	-0.986	-0.600	-0.673
1177.8979	-0.984	-0.604	-0.667	1859.8512	-0.986	-0.599	-0.662
1179.8921	-1.002	-0.622	-0.689	1861.7559	-1.001	-0.614	-0.679
1182.8642	-0.953	-0.597	-0.662	1862.8611	-1.014	-0.633	-0.694
1184.8479	-0.978	-0.605	-0.675	1862.8743	-0.991	-0.620	-0.668
1211.7598	-0.877	-0.518	-0.585	1876.8477	-0.985	-0.595	-0.658
1217.8131	-1.004	-0.618	-0.690	1879.8647	-0.993	-0.610	-0.675
1497.8041	-0.885	-0.522	-0.594	1887.8229	-0.983	-0.605	-0.678
1503.8393	-0.956	-0.593	-0.660	1894.8868	-0.946	-0.560	-0.627
1505.8558	-0.942	-0.585	-0.652	1900.8675	-0.997	-0.611	-0.675
1513.9285	-0.970	-0.604	-0.672	1902.8608	-0.879	-0.498	-0.563

TABLE 5, continued

STAR NAME HJD (2440 000+)	Δ(35)	Δ(44)	Δ(55)	HJD (2440 000+)	Δ(35)	Δ(44)	Δ(55)
			HD 187879				
1903.8733	-0.989	-0.606	-0.667	1927.8741	-0.940	-0.553	-0.619
1906.8390	-0.976	-0.592	-0.659	1935.8317	-1.004	-0.620	-0.697
1913.7454	-1.002	-0.604	-0.679	1936.8089	-1.010	-0.620	-0.683
1926.8896	-0.948	-0.582	-0.650	1938.7724	-0.972	-0.594	-0.666
			HD 190467				
1162.8782	1.283	0.921	0.927	1877.7745	1.555	1.007	1.022
1162.8899	1.325	0.912	0.918	1877.9015	1.561	0.994	1.012
1163.8666	1.297	0.887	0.887	1879.8030	1.426	0.956	0.961
1164.9034	1.323	0.920	0.927	1879.8130	1.400	0.963	0.965
1165.8592	1.323	0.904	0.919	1879.9322	1.413	0.953	0.966
1166.9068	1.241	0.856	0.859	1881.7975	1.405	0.969	0.967
1167.8653	1.330	0.917	0.924	1881.9051	1.410	0.964	0.970
1168.8660	1.300	0.907	0.903	1882.8000	1.442	0.976	0.988
1169.8909	1.351	0.916	0.941	1882.9179	1.442	0.986	0.987
1170.8843	1.438	0.970	0.987	1887.7659	1.419	0.955	0.971
1172.8821	1.380	0.945	0.949	1887.9194	1.466	0.974	0.979
1172.8931	1.380	0.939	0.952	1889.7873	1.465	0.974	0.971
1173.8760	1.595	1.133	1.055	1889.9235	1.488	0.990	0.992
1179.9080	1.287	0.894	0.900	1891.7604	1.422	0.933	0.934
1180.8578	1.384	0.916	0.908	1894.7616	1.338	0.916	0.910
1182.8846	1.290	0.864	0.871	1894.8970	1.355	0.925	0.919
1184.8633	1.505	0.991	0.992	1895.7753	1.245	0.842	0.837
1184.9209	1.457	0.983	0.986	1895.9039	1.239	0.842	0.837
1211.7746	1.416	0.962	0.950	1896.7699	1.364	0.926	0.931
1217.8384	1.391	0.979	0.981	1896.8993	1.360	0.924	0.928
1497.8232	1.315	0.908	0.921	1897.7189	1.337	0.896	0.900
1503.8553	1.357	0.919	0.930	1897.8923	1.341	0.905	0.909
1505.8696	1.371	0.934	0.941	1898.7680	1.407	0.935	0.925
1517.9200	1.298	0.898	0.904	1898.9040	1.381	0.917	0.922
1518.8979	1.367	0.936	0.935	1900.7790	1.374	0.921	0.926
1526.8323	1.354	0.925	0.927	1900.9029	1.393	0.933	0.933
1536.8655	1.245	0.891	0.898	1901.7574	1.419	0.959	0.958
1557.7043	1.409	0.954	0.963	1901.9095	1.422	0.959	0.965
1557.9285	1.360	0.934	0.933	1902.7737	1.349	0.917	0.921
1558.7046	1.412	0.950	0.964	1902.7837	1.370	0.913	0.910
1558.8797	1.442	0.959	0.977	1902.9169	1.403	0.943	0.950
1560.7286	1.293	0.885	0.908	1909.7613	1.416	0.942	0.943
1560.8777	1.287	0.872	0.882	1909.9255	1.407	0.939	0.944
1571.7742	1.359	0.936	0.945	1910.7670	1.342	0.894	0.893
1571.7891	1.349	0.930	0.950	1910.9200	1.302	0.871	0.869
1571.8716	1.351	0.866	0.940	1911.7538	1.256	0.828	0.830
1855.9020	1.282	0.824	0.828	1911.9339	1.216	0.800	0.825
1863.8110	1.430	0.882	0.961	1923.8263	1.428	0.946	0.952
1863.8957	1.422	0.935	0.952	1931.7654	1.320	0.897	0.903
1872.7930	1.444	0.967	0.977	1931.9322	1.298	0.874	0.878
1872.9062	1.464	0.965	0.974	1935.6946	1.295	0.871	0.877
1874.7991	1.355	0.908	0.926	1935.8586	1.293	0.871	0.868
1874.8956	1.370	0.914	0.926	1936.6916	1.299	0.868	0.872
1874.9031	1.388	0.907	0.910	1936.8317	1.302	0.870	0.862
1875.8019	1.365	0.917	0.921	1938.6839	1.331	0.878	0.882
1876.7922	1.424	0.955	0.965	1938.8150	1.346	0.892	0.901
1876.9255	1.435	0.962	0.969				
			HD 190918				
1497.8946	-1.399	-1.247	-1.134	1533.8816	-1.383	-1.199	-1.089
1503.8990	-1.359	-1.209	-1.096	1536.8520	-1.374	-1.266	-1.147
1505.8987	-1.397	-1.253	-1.142	1557.9208	-1.359	-1.231	-1.115
1517.9119	-1.362	-1.201	-1.090	1558.8724	-1.345	-1.219	-1.103
1518.8697	-1.378	-1.249	-1.129	1560.8705	-1.365	-1.225	-1.104
1524.8804	-1.390	-1.233	-1.123	1571.9228	-1.443	-1.258	-1.143

TABLE 5, continued

HJD (2440 000+)	Δ(35)	Δ(44)	Δ(55)	HJD (2440 000+)	Δ(35)	Δ(44)	Δ(55)
			STAR NAME HD 229196				
1526.7687	1.744	1.137	0.400	1894.7812	1.773	1.157	0.434
1530.8041	1.761	1.155	0.406	1894.9064	1.734	1.156	0.424
1532.7779	1.706	1.142	0.414	1895.7856	1.725	1.138	0.416
1533.8608	1.644	1.163	0.417	1895.9131	1.753	1.158	0.431
1535.8185	1.645	1.153	0.422	1896.7796	1.737	1.157	0.432
1536.7901	1.706	1.164	0.427	1896.9083	1.735	1.147	0.424
1557.8133	0.0	1.156	0.427	1897.7354	1.704	1.129	0.408
1558.7151	1.700	1.159	0.410	1897.9017	1.749	1.155	0.427
1558.8896	1.707	1.158	0.408	1898.7785	1.764	1.146	0.420
1560.7383	0.0	1.153	0.406	1898.9129	1.690	1.140	0.410
1560.8852	0.0	1.146	0.392	1900.7879	1.719	1.134	0.420
1571.7610	1.751	1.191	0.435	1900.9112	1.710	1.138	0.414
1571.8586	1.759	1.037	0.438	1901.7669	1.734	1.151	0.431
1834.9231	1.885	1.155	0.415	1901.9300	1.762	1.148	0.428
1834.9346	1.631	1.134	0.420	1902.8055	1.681	1.129	0.411
1859.7790	1.727	1.152	0.426	1902.9294	1.710	1.132	0.409
1859.9012	1.780	1.155	0.392	1907.7547	1.749	1.157	0.430
1874.8166	1.724	1.133	0.408	1908.7427	1.730	1.132	0.415
1874.9200	1.706	1.144	0.408	1908.8567	1.703	1.129	0.409
1875.8135	1.743	1.149	0.432	1909.7294	1.761	1.155	0.436
1876.8025	1.731	1.136	0.425	1909.9158	1.735	1.157	0.438
1876.9141	1.746	1.148	0.427	1910.7551	1.696	1.122	0.397
1877.7886	1.717	1.144	0.418	1910.9086	1.732	1.117	0.391
1877.9306	1.761	1.149	0.428	1911.7651	1.740	1.154	0.429
1879.7939	1.751	1.147	0.427	1911.9474	1.763	1.179	0.419
1879.9197	1.730	1.158	0.434	1923.8149	1.756	1.138	0.412
1880.7742	1.727	1.136	0.420	1929.7444	1.727	1.135	0.411
1880.9368	1.814	1.162	0.423	1929.9378	1.738	1.126	0.392
1881.8101	1.740	1.142	0.420	1931.7776	1.699	1.120	0.403
1881.9211	1.750	1.147	0.424	1931.9441	1.728	1.137	0.411
1882.8105	1.736	1.152	0.427	1933.7704	1.752	1.155	0.419
1882.9278	1.763	1.160	0.437	1935.7029	1.710	1.132	0.411
1887.7762	1.700	1.123	0.400	1935.8727	1.723	1.134	0.395
1887.9316	1.735	1.131	0.408	1936.6824	1.735	1.165	0.434
1889.7962	1.732	1.132	0.403	1936.8409	1.770	1.141	0.420
1889.9329	1.744	1.125	0.406	1938.6927	1.730	1.153	0.433
1891.7709	1.752	1.128	0.404	1938.8251	1.759	1.162	0.429
			HD 203025				
1161.8941	1.175	0.826	0.765	1211.7898	1.170	0.816	0.739
1162.9118	1.198	0.836	0.760	1217.8628	1.199	0.840	0.769
1163.9189	1.178	0.826	0.748	1218.7465	1.184	0.829	0.757
1164.9170	1.192	0.832	0.754	1499.7558	1.275	0.882	0.804
1165.9246	1.187	0.835	0.772	1501.7531	1.237	0.866	0.779
1167.9040	1.174	0.825	0.743	1518.9070	1.236	0.870	0.789
1168.9130	1.205	0.838	0.758	1524.9207	1.246	0.865	0.788
1169.9266	1.205	0.836	0.765	1526.8576	1.217	0.856	0.778
1170.9206	1.178	0.827	0.760	1527.9064	1.227	0.860	0.786
1171.9405	1.150	0.805	0.740	1530.8506	1.218	0.858	0.786
1172.9294	1.189	0.833	0.761	1532.8390	1.235	0.854	0.781
1173.8970	1.164	0.823	0.769	1536.8874	1.232	0.852	0.777
1175.9048	1.167	0.828	0.757	1557.9833	1.203	0.842	0.769
1176.8772	1.164	0.838	0.756	1558.9244	1.205	0.845	0.768
1177.9206	1.181	0.836	0.770	1560.9352	1.229	0.841	0.784
1179.9202	1.189	0.830	0.759	1571.9725	1.212	0.856	0.788
1180.8898	1.172	0.830	0.757	1848.8074	1.266	0.871	0.810
1182.9187	1.199	0.832	0.763	1848.8179	1.278	0.859	0.789
1182.9429	1.193	0.829	0.754	1849.9258	1.254	0.870	0.787
1184.9402	1.190	0.850	0.774	1859.8323	1.244	0.864	0.781
			HD 208392				
1499.7657	-0.576	-0.768	-0.937	1524.8212	-0.547	-0.740	-0.900
1501.7408	-0.591	-0.766	-0.926	1525.8152	-0.539	-0.707	-0.875
1518.9171	-0.499	-0.677	-0.843	1526.7747	-0.622	-0.792	-0.958
1522.7854	-0.545	-0.757	-0.918	1530.8106	-0.635	-0.805	-0.974

TABLE 5, continued

HJD (2440 000+)	Δ(35)	Δ(44)	Δ(55)	HJD (2440 000+)	Δ(35)	Δ(44)	Δ(55)
STAR NAME							
				HD 208392			
1532.7618	-0.547	-0.745	-0.907	1900.8033	-0.530	-0.746	-0.917
1535.8245	-0.475	-0.676	-0.847	1900.9341	-0.507	-0.718	-0.885
1536.7803	-0.573	-0.754	-0.929	1901.9454	-0.492	-0.692	-0.861
1557.8229	-0.526	-0.715	-0.878	1907.7759	-0.530	-0.732	-0.904
1558.7508	-0.570	-0.755	-0.923	1908.8755	-0.514	-0.725	-0.895
1558.9328	-0.478	-0.662	-0.835	1909.7834	-0.536	-0.742	-0.905
1560.8083	-0.578	-0.727	-0.897	1909.9422	-0.429	-0.642	-0.808
1560.9250	-0.584	-0.729	-0.901	1910.7901	-0.495	-0.678	-0.845
1837.8269	-0.560	-0.694	-0.856	1910.9379	-0.534	-0.745	-0.910
1837.8389	-0.564	-0.688	-0.846	1923.8461	-0.581	-0.772	-0.936
1891.7989	-0.523	-0.686	-0.854	1929.7613	-0.457	-0.658	-0.824
1894.7997	-0.598	-0.780	-0.953	1929.9460	-0.584	-0.773	-0.949
1894.9242	-0.564	-0.755	-0.913	1931.7958	-0.400	-0.636	-0.811
1895.8052	-0.480	-0.694	-0.859	1931.9534	-0.516	-0.725	-0.891
1895.9288	-0.502	-0.710	-0.883	1933.7959	-0.430	-0.658	-0.825
1896.8002	-0.558	-0.766	-0.929	1935.7183	-0.500	-0.680	-0.854
1896.9289	-0.522	-0.739	-0.906	1935.9471	-0.538	-0.750	-0.918
1897.7519	-0.494	-0.699	-0.868	1936.7591	-0.539	-0.744	-0.916
1897.9162	-0.489	-0.687	-0.858	1936.8675	-0.529	-0.725	-0.897
1898.7972	-0.478	-0.695	-0.867	1936.9698	-0.469	-0.653	-0.818
1898.9324	-0.509	-0.707	-0.886	1938.7281	-0.585	-0.779	-0.948
				HD 209481			
1161.9145	0.945	1.139	0.977	1530.8755	1.018	1.201	1.050
1162.9272	0.995	1.186	1.019	1536.8996	1.009	1.212	1.064
1163.9351	1.014	1.206	1.044	1557.9695	0.947	1.140	0.979
1164.9351	0.948	1.138	0.994	1558.7645	1.040	1.225	1.068
1164.9456	0.969	1.156	0.980	1558.9468	1.012	1.200	1.046
1165.9408	1.005	1.197	1.038	1560.8445	0.963	1.155	0.990
1167.9378	0.933	1.134	0.985	1560.9456	0.956	1.143	0.987
1168.9339	1.001	1.195	1.046	1851.9178	1.023	1.222	1.067
1169.9433	0.985	1.185	1.030	1858.8727	0.944	1.144	0.982
1170.9396	0.946	1.136	0.977	1860.9122	1.012	1.208	1.058
1171.9578	1.014	1.209	1.053	1879.8990	1.005	1.200	1.039
1172.9440	0.986	1.182	1.014	1887.8677	0.956	1.149	0.983
1175.9241	0.961	1.160	1.006	1890.9571	0.948	1.148	0.994
1176.8948	0.988	1.171	1.009	1896.8350	0.974	1.173	1.015
1176.9070	0.977	1.160	0.999	1897.8797	1.032	1.225	1.069
1180.9092	1.012	1.216	1.051	1903.9070	1.008	1.204	1.042
1182.9292	1.004	1.187	1.026	1906.8704	0.998	1.195	1.032
1184.9560	0.949	1.144	0.985	1911.9202	1.016	1.210	1.059
1211.8009	1.032	1.216	1.050	1912.9307	0.984	1.183	1.023
1217.8760	1.027	1.217	1.056	1926.9334	1.014	1.205	1.050
1499.7770	0.933	1.130	0.979	1927.8943	0.958	1.143	0.992
1501.8069	1.112	1.262	1.099	1929.8505	0.997	1.187	1.023
1515.9314	1.023	1.213	1.058	1931.8685	1.051	1.240	1.083
1518.9355	1.044	1.217	1.060	1935.9803	0.981	1.183	1.032
1526.8744	0.988	1.167	1.022	1936.9163	0.968	1.161	1.012
1527.8282	1.028	1.213	1.056	1938.7936	0.960	1.152	0.998
				HD 215835			
1557.8345	0.140	0.915	1.000	1923.8608	0.063	0.875	0.981
1558.7840	0.173	0.903	0.995	1929.7890	0.085	0.896	0.997
1558.9559	0.121	0.913	1.006	1929.9668	0.068	0.873	0.980
1560.8184	0.085	0.893	0.975	1931.8232	0.101	0.902	1.001
1560.9532	0.102	0.901	0.998	1931.9822	0.067	0.886	0.991
1907.8008	0.096	0.883	0.981	1933.8246	0.163	0.832	1.057
1908.7930	0.087	0.900	0.996	1935.7453	0.142	0.912	1.009
1908.9037	0.058	0.865	0.976	1935.9689	0.141	0.913	1.012
1910.8055	0.062	0.887	0.984	1936.7809	0.095	0.902	1.005
1911.8498	0.084	0.891	0.994	1936.9023	0.099	0.908	1.016
1911.9579	0.076	0.867	0.991	1936.9805	0.118	0.911	1.016
1912.8760	0.088	0.882	1.005	1938.7604	0.087	0.887	0.990

TABLE 5, continued

HJD (2440 000+)	Δ(35)	Δ(44)	Δ(55)	HJD (2440 000+)	Δ(35)	Δ(44)	Δ(55)
STAR NAME							
HD 216200							
1132.8987	1.940	1.278	1.027	1558.6880	1.896	1.276	1.035
1133.9311	1.949	1.287	1.047	1558.9021	1.893	1.278	1.037
1139.9217	1.984	1.336	1.080	1560.6824	1.857	1.237	0.995
1160.9246	1.965	1.288	1.087	1571.6916	1.918	1.278	1.036
1160.9346	1.961	1.302	1.079	1571.7476	1.914	1.274	1.035
1161.9291	1.950	1.285	1.050	1571.8250	1.910	1.277	1.029
1162.9393	1.950	1.284	1.034	1571.9457	1.897	1.273	1.030
1163.9485	1.942	1.290	1.046	1891.8163	1.934	1.264	1.029
1164.9540	1.939	1.285	1.053	1894.8123	1.996	1.286	1.067
1165.9517	1.923	1.284	1.039	1894.9412	1.980	1.284	1.058
1167.9521	1.956	1.282	1.043	1895.8191	2.003	1.295	1.073
1168.9590	1.970	1.304	1.071	1895.9429	2.005	1.296	1.080
1169.9557	1.968	1.303	1.081	1896.8152	2.002	1.306	1.083
1170.9595	1.965	1.306	1.076	1896.9444	1.983	1.295	1.075
1172.9593	1.937	1.278	1.033	1897.7734	1.967	1.277	1.048
1175.9374	1.917	1.280	1.037	1897.9363	1.963	1.282	1.055
1176.9169	1.937	1.281	1.030	1898.8149	1.949	1.265	1.030
1179.9366	1.985	1.315	1.085	1898.9468	1.935	1.256	1.026
1180.9239	1.653	1.325	1.096	1900.8152	1.981	1.270	1.042
1184.9667	1.923	1.282	1.039	1900.9477	1.950	1.263	1.033
1211.8130	1.922	1.276	1.043	1901.9573	1.944	1.267	1.039
1217.8931	1.915	1.274	1.032	1907.7903	1.969	1.284	1.060
1517.9291	1.894	1.272	1.042	1908.8926	1.942	1.260	1.031
1518.8854	1.870	1.258	1.019	1909.8018	1.960	1.258	1.024
1522.7759	1.935	1.296	1.077	1910.8268	1.966	1.271	1.051
1524.8119	1.872	1.263	1.023	1923.8769	1.941	1.257	1.020
1526.7876	1.890	1.260	1.017	1929.7754	1.963	1.266	1.033
1527.8782	1.892	1.266	1.034	1929.9598	1.965	1.270	1.033
1528.8069	1.874	1.253	1.033	1931.8106	1.928	1.259	1.032
1530.8238	1.905	1.265	1.028	1931.9770	1.922	1.247	1.035
1532.7859	1.962	1.303	1.080	1933.8138	1.933	1.256	1.022
1533.8694	1.917	1.296	1.061	1935.7361	2.006	1.302	1.078
1535.8013	1.879	1.260	1.009	1935.9617	2.006	1.297	1.070
1536.7991	1.913	1.275	1.039	1936.7732	1.987	1.298	1.078
1537.7825	1.924	1.272	1.043	1936.8921	1.971	1.292	1.068
1557.8509	1.899	1.275	1.042	1938.7527	1.931	1.264	1.032
HD 216629							
1499.7911	4.241	3.720	2.980	1897.8365	4.125	3.639	2.937
1501.8172	4.096	3.676	2.954	1898.8776	4.149	3.635	2.929
1501.8250	4.164	3.670	2.951	1903.9341	4.142	3.642	2.950
1526.8833	4.063	3.660	2.962	1906.8787	4.119	3.659	2.955
1530.8877	4.184	3.690	2.987	1906.8970	4.128	3.663	2.956
1530.8997	4.134	3.690	2.980	1907.8184	4.130	3.670	2.969
1535.9043	4.191	3.678	2.972	1908.8096	4.094	3.638	2.944
1535.9153	4.118	3.683	2.974	1908.8252	4.097	3.641	2.920
1536.9230	4.078	3.659	2.962	1909.8666	4.118	3.653	2.935
1557.9517	4.071	3.670	2.932	1912.9037	4.081	3.642	2.922
1558.8019	4.124	3.677	2.945	1926.9434	4.100	3.666	2.949
1558.9709	4.117	3.658	2.933	1926.9551	4.122	3.665	2.946
1560.8301	4.131	3.680	2.944	1927.9062	4.231	3.656	2.949
1560.9651	4.067	3.684	2.938	1931.8786	4.100	3.634	2.935
1879.8869	4.072	3.643	2.938	1935.9902	4.075	3.655	2.957
1889.8691	4.105	3.645	2.941	1936.9289	4.117	3.647	2.938
1896.8647	4.125	3.629	2.932	1938.8022	4.148	3.680	2.966

(B) SUPERGIANTS

HD 2905							
1501.8763	-2.320	-1.673	-1.817	1889.8918	-2.222	-1.575	-1.714
1527.8428	-2.260	-1.621	-1.756	1896.8470	-2.271	-1.615	-1.749
1530.9169	-2.291	-1.664	-1.792	1897.8486	-2.291	-1.635	-1.777
1532.8840	-2.302	-1.671	-1.799	1903.9555	-2.346	-1.672	-1.805
1536.9469	-2.292	-1.663	-1.794	1906.9291	-2.298	-1.635	-1.775
1866.8464	-2.303	-1.637	-1.777	1908.9480	-2.289	-1.629	-1.774

TABLE 5, continued

HJD (2440 000+)	Δ(35)	Δ(44)	Δ(55)	HJD (2440 000+)	Δ(35)	Δ(44)	Δ(55)
STAR NAME							
HD 2905							
1909.8782	-2.291	-1.632	-1.776	1929.8913	-2.278	-1.628	-1.763
1912.9170	-2.348	-1.676	-1.812	1936.0105	-2.250	-1.598	-1.739
1926.9805	-2.307	-1.660	-1.794	1936.9510	-2.287	-1.626	-1.765
1927.9370	-2.297	-1.635	-1.772				
HD 183143							
1497.8697	4.000	3.139	1.910	1876.8152	3.967	3.101	1.895
1503.7959	4.017	3.155	1.924	1876.8311	3.955	3.105	1.896
1503.8062	3.965	3.158	1.919	1879.8379	4.012	3.141	1.935
1503.9241	4.002	3.163	1.922	1879.8516	4.036	3.157	1.951
1505.8249	4.043	3.176	1.930	1889.8506	3.994	3.112	1.905
1513.8998	4.021	3.167	1.938	1895.8594	3.944	3.100	1.896
1515.9065	4.054	3.191	1.951	1895.8694	3.959	3.095	1.905
1516.8003	4.043	3.188	1.952	1900.8826	3.924	3.069	1.868
1517.8741	4.107	3.198	1.955	1902.8379	3.955	3.073	1.861
1518.8094	4.066	3.217	1.969	1902.8506	3.966	3.076	1.875
1535.8687	4.005	3.137	1.902	1906.8238	3.958	3.104	1.898
1557.7881	4.036	3.183	1.931	1911.9112	3.977	3.029	1.892
1557.8047	4.012	3.178	1.930	1926.8457	4.019	3.105	1.899
1558.8284	4.055	3.196	1.943	1926.8599	4.338	3.092	1.911
1558.8384	4.055	3.194	1.943	1927.8335	3.976	3.119	1.903
1560.7911	4.035	3.210	1.954	1927.8440	3.983	3.114	1.905
1848.8396	4.025	3.139	1.958	1935.8191	3.990	3.120	1.900
1848.8516	4.028	3.153	1.962	1936.7068	3.970	3.129	1.924
1862.8345	4.116	3.179	1.962	1936.7244	4.042	3.148	1.936
1862.8484	4.061	3.145	1.941	1938.7117	4.032	3.138	1.929
HD 188001							
1497.8711	1.043	1.421	1.258	1862.8367	1.064	1.453	1.310
1503.8028	1.072	1.451	1.288	1876.8179	1.052	1.449	1.291
1503.9258	1.088	1.463	1.301	1879.8411	1.048	1.452	1.298
1505.8265	1.099	1.473	1.307	1889.8489	1.059	1.461	1.306
1513.9017	1.086	1.461	1.295	1895.8616	1.033	1.440	1.290
1515.9084	1.064	1.446	1.284	1900.8804	1.049	1.447	1.285
1516.8018	1.062	1.439	1.277	1902.8411	1.033	1.442	1.289
1517.8755	1.051	1.429	1.266	1906.8218	1.036	1.438	1.273
1518.8113	1.079	1.447	1.287	1911.9080	1.079	1.461	1.306
1535.8705	1.078	1.455	1.296	1926.8484	1.093	1.457	1.293
1557.7913	1.040	1.432	1.277	1927.8362	1.072	1.442	1.292
1557.8030	1.066	1.439	1.281	1935.8169	1.118	1.487	1.312
1558.8354	1.059	1.441	1.283	1936.7117	1.090	1.477	1.326
1560.7939	1.064	1.436	1.279	1938.7137	1.119	1.499	1.357
1848.8423	1.031	1.445	1.291				
HD 190603							
1211.7524	0.233	0.702	0.122	1528.7704	0.266	0.719	0.155
1217.7978	0.252	0.704	0.127	1530.7941	0.214	0.663	0.101
1218.7576	0.273	0.730	0.153	1530.9324	0.213	0.658	0.102
1497.8849	0.237	0.695	0.131	1532.8000	0.193	0.642	0.084
1501.7751	0.244	0.699	0.138	1532.9401	0.188	0.650	0.081
1501.8710	0.231	0.690	0.132	1533.8484	0.222	0.680	0.118
1503.7850	0.221	0.675	0.117	1533.9278	0.222	0.685	0.116
1505.8362	0.231	0.691	0.128	1535.7912	0.230	0.695	0.130
1513.9152	0.250	0.701	0.139	1535.9593	0.233	0.699	0.131
1514.9178	0.239	0.690	0.133	1536.7698	0.233	0.695	0.128
1515.8887	0.199	0.668	0.105	1536.9643	0.235	0.697	0.127
1517.8996	0.190	0.667	0.107	1536.9643	0.235	0.697	0.127
1518.8410	0.219	0.693	0.125	1537.7709	0.230	0.692	0.130
1521.7818	0.262	0.719	0.155	1557.9130	0.280	0.728	0.145
1522.7532	0.290	0.742	0.182	1558.8503	0.274	0.717	0.134
1522.8024	0.286	0.741	0.175	1560.8610	0.249	0.706	0.127
1524.7919	0.226	0.686	0.126	1571.8924	0.231	0.682	0.096
1524.9391	0.218	0.688	0.129	1849.8111	0.217	0.708	0.149
1525.8003	0.241	0.698	0.139	1859.8080	0.160	0.650	0.099
1526.7487	0.244	0.707	0.151	1861.7701	0.179	0.682	0.136

TABLE 5, continued

HJD (2440 000+)	Δ(35)	Δ(44)	Δ(55)	HJD (2440 000+)	Δ(35)	Δ(44)	Δ(55)
STAR NAME							
HD 190603							
1862.8978	0.202	0.677	0.126	1898.8409	0.180	0.666	0.118
1874.8428	0.146	0.647	0.095	1900.8378	0.189	0.675	0.125
1874.8560	0.147	0.641	0.084	1901.8727	0.183	0.674	0.119
1877.8465	0.208	0.693	0.141	1902.8750	0.181	0.680	0.133
1880.8437	0.233	0.712	0.144	1902.8855	0.189	0.668	0.115
1881.8313	0.191	0.673	0.121	1903.8318	0.201	0.684	0.127
1881.8423	0.181	0.671	0.124	1903.8418	0.206	0.680	0.124
1882.8686	0.196	0.681	0.130	1906.8102	0.157	0.647	0.089
1887.8528	0.192	0.669	0.110	1910.8421	0.176	0.659	0.105
1887.8643	0.187	0.668	0.117	1911.8666	0.164	0.652	0.099
1889.7531	0.242	0.717	0.161	1912.8644	0.179	0.670	0.119
1890.9350	0.259	0.730	0.172	1913.7104	0.213	0.694	0.142
1891.7419	0.245	0.729	0.177	1926.8716	0.239	0.716	0.158
1894.7370	0.194	0.684	0.136	1927.8562	0.252	0.725	0.157
1895.8345	0.171	0.664	0.114	1935.7978	0.212	0.686	0.129
1896.8904	0.167	0.656	0.108	1936.7510	0.229	0.701	0.145
1897.7931	0.164	0.654	0.101	1938.7397	0.209	0.694	0.140
HD 198478							
1501.7342	-0.503	-0.393	-0.859	1898.7883	-0.497	-0.378	-0.821
1503.8841	-0.532	-0.409	-0.874	1898.9250	-0.496	-0.377	-0.824
1524.9062	-0.478	-0.357	-0.826	1900.7961	-0.497	-0.376	-0.824
1526.8451	-0.492	-0.382	-0.838	1900.9261	-0.491	-0.370	-0.824
1527.8138	-0.501	-0.377	-0.831	1901.7748	-0.492	-0.369	-0.814
1530.8354	-0.482	-0.357	-0.820	1901.9388	-0.482	-0.366	-0.815
1536.8764	-0.462	-0.353	-0.811	1907.7654	-0.487	-0.375	-0.826
1557.9440	-0.493	-0.380	-0.854	1908.8664	-0.492	-0.372	-0.817
1558.7398	-0.520	-0.402	-0.862	1909.7735	-0.497	-0.378	-0.830
1558.9167	-0.508	-0.386	-0.859	1909.9350	-0.496	-0.379	-0.830
1560.7627	-0.505	-0.382	-0.843	1910.7815	-0.518	-0.396	-0.850
1560.9079	-0.502	-0.372	-0.842	1910.9286	-0.515	-0.395	-0.848
1880.7834	-0.478	-0.362	-0.812	1923.8335	-0.493	-0.364	-0.816
1889.8067	-0.473	-0.354	-0.802	1929.7527	-0.524	-0.400	-0.851
1889.9407	-0.474	-0.352	-0.799	1929.9258	-0.532	-0.403	-0.853
1891.7922	-0.514	-0.394	-0.841	1931.7857	-0.491	-0.367	-0.822
1894.7919	-0.484	-0.363	-0.810	1933.7825	-0.495	-0.385	-0.829
1894.9146	-0.467	-0.354	-0.802	1933.9397	-0.464	-0.345	-0.808
1895.7950	-0.516	-0.388	-0.838	1935.7104	-0.515	-0.389	-0.840
1895.9217	-0.509	-0.387	-0.844	1936.6995	-0.518	-0.401	-0.856
1896.7923	-0.518	-0.384	-0.837	1936.8489	-0.523	-0.403	-0.858
1896.9206	-0.501	-0.374	-0.827	1938.7005	-0.512	-0.392	-0.842
1897.7431	-0.485	-0.367	-0.820	1938.8365	-0.501	-0.382	-0.836
1897.9089	-0.489	-0.367	-0.816				
HD 206165							
1161.8978	-0.481	-0.747	-0.866	1211.7913	-0.455	-0.728	-0.879
1162.9128	-0.462	-0.716	-0.862	1217.8647	-0.482	-0.739	-0.887
1163.9203	-0.441	-0.708	-0.856	1218.7482	-0.473	-0.742	-0.889
1164.9186	-0.468	-0.738	-0.886	1499.7537	-0.480	-0.756	-0.905
1165.9261	-0.477	-0.745	-0.881	1501.7541	-0.440	-0.705	-0.862
1167.9058	-0.527	-0.779	-0.915	1518.9091	-0.463	-0.717	-0.873
1168.9147	-0.526	-0.782	-0.914	1524.9224	-0.466	-0.732	-0.888
1169.9280	-0.529	-0.782	-0.923	1526.8589	-0.486	-0.746	-0.908
1170.9222	-0.522	-0.773	-0.919	1527.9080	-0.491	-0.738	-0.904
1171.9419	-0.532	-0.781	-0.923	1530.8472	-0.421	-0.697	-0.850
1172.9305	-0.505	-0.761	-0.904	1532.8403	-0.443	-0.717	-0.869
1173.8987	-0.512	-0.762	-0.879	1536.8871	-0.490	-0.743	-0.898
1175.9073	-0.485	-0.748	-0.894	1557.9850	-0.448	-0.713	-0.870
1176.8791	-0.480	-0.739	-0.887	1558.9252	-0.478	-0.731	-0.889
1177.9220	-0.462	-0.729	-0.875	1560.9361	-0.458	-0.721	-0.878
1179.9217	-0.478	-0.750	-0.900	1571.9695	-0.471	-0.730	-0.891
1180.8914	-0.467	-0.723	-0.866	1848.8086	-0.457	-0.747	-0.886
1182.9202	-0.449	-0.735	-0.886	1848.8201	-0.461	-0.752	-0.903
1182.9446	-0.467	-0.740	-0.890	1849.9268	-0.471	-0.751	-0.892
1184.9418	-0.478	-0.742	-0.889	1859.8343	-0.436	-0.716	-0.868

TABLE 5, continued

HJD (2440 000+)	Δ(35)	Δ(44)	Δ(55)	HJD (2440 000+)	Δ(35)	Δ(44)	Δ(55)
STAR NAME							
				HD 206165			
1862.9109	-0.439	-0.726	-0.876	1903.9463	-0.464	-0.748	-0.896
1875.8572	-0.439	-0.726	-0.887	1906.8603	-0.506	-0.781	-0.931
1880.8736	-0.391	-0.679	-0.833	1909.8376	-0.482	-0.762	-0.915
1881.8459	-0.456	-0.720	-0.876	1910.8531	-0.467	-0.751	-0.905
1887.8050	-0.428	-0.717	-0.865	1926.9189	-0.482	-0.751	-0.894
1894.8462	-0.450	-0.737	-0.883	1929.8362	-0.446	-0.724	-0.879
1895.8727	-0.432	-0.722	-0.871	1931.8566	-0.452	-0.735	-0.883
1897.8008	-0.460	-0.736	-0.887	1935.8411	-0.444	-0.726	-0.878
1898.8575	-0.466	-0.750	-0.895	1936.8174	-0.440	-0.724	-0.872
1900.8537	-0.447	-0.729	-0.877	1938.7862	-0.491	-0.759	-0.913
1901.8875	-0.455	-0.734	-0.888				
				HD 223385			
1501.8323	-0.227	-0.240	-0.876	1897.8118	-0.178	-0.217	-0.844
1530.9064	-0.241	-0.245	-0.886	1902.9380	-0.168	-0.210	-0.835
1532.8750	-0.240	-0.229	-0.876	1902.9485	-0.144	-0.209	-0.842
1535.9405	-0.227	-0.232	-0.870	1903.9162	-0.176	-0.212	-0.836
1536.9369	-0.223	-0.232	-0.869	1906.9156	-0.175	-0.213	-0.846
1558.9833	-0.227	-0.223	-0.866	1908.9169	-0.181	-0.217	-0.841
1560.9759	-0.214	-0.222	-0.863	1912.9382	-0.187	-0.213	-0.842
1571.9856	-0.204	-0.211	-0.865	1926.9670	-0.164	-0.200	-0.833
1863.9029	-0.198	-0.226	-0.858	1927.9242	-0.193	-0.211	-0.853
1866.8643	-0.176	-0.215	-0.847	1929.8782	-0.218	-0.231	-0.855
1866.8772	-0.199	-0.225	-0.857	1936.0021	-0.258	-0.278	-0.902
1889.8805	-0.180	-0.219	-0.852	1936.9405	-0.251	-0.281	-0.906
				HD 223960			
1501.8339	1.217	1.252	0.572	1902.9402	1.143	1.229	0.564
1530.9081	1.161	1.246	0.562	1902.9502	1.183	1.243	0.561
1532.8735	1.163	1.231	0.557	1903.9209	1.163	1.235	0.582
1535.9427	1.186	1.263	0.581	1906.9175	1.167	1.250	0.572
1536.9382	1.199	1.263	0.587	1908.9186	1.211	1.263	0.593
1558.9848	1.206	1.282	0.591	1912.9399	1.220	1.272	0.612
1560.9777	1.230	1.276	0.587	1926.9692	1.240	1.292	0.626
1571.9876	1.211	1.246	0.574	1927.9261	1.235	1.289	0.612
1863.9047	1.172	1.214	0.551	1929.8797	1.229	1.289	0.616
1866.8804	1.197	1.265	0.594	1936.0038	1.217	1.278	0.612
1889.8823	1.199	1.268	0.598	1936.9418	1.228	1.286	0.612
1897.8137	1.177	1.237	0.568				
				HD 225094			
1501.8776	0.353	0.669	0.352	1903.9567	0.263	0.611	0.304
1527.8448	0.242	0.580	0.273	1906.9306	0.309	0.638	0.324
1530.9186	0.264	0.586	0.279	1908.9506	0.268	0.614	0.301
1532.8857	0.234	0.573	0.268	1909.8799	0.262	0.600	0.288
1536.9496	0.255	0.578	0.272	1912.9186	0.242	0.596	0.289
1866.8481	0.256	0.604	0.296	1926.9822	0.279	0.594	0.289
1889.8937	0.271	0.606	0.299	1927.9393	0.283	0.612	0.308
1896.8450	0.285	0.607	0.306	1929.8926	0.272	0.617	0.309
1896.8550	0.288	0.612	0.308	1936.0125	0.231	0.580	0.263
1897.8500	0.292	0.631	0.326	1936.9526	0.230	0.576	0.262
				(C) AP, AM STARS			
				HD 133029			
1107.7588	0.112	0.517	0.748	1169.7344	0.070	0.505	0.731
1111.8018	0.116	0.520	0.737	1170.7122	0.105	0.512	0.721
1114.7913	0.108	0.516	0.741	1171.7190	0.149	0.531	0.746
1116.8577	0.072	0.505	0.730	1172.7112	0.111	0.503	0.724
1118.7642	0.098	0.521	0.735	1173.7305	0.086	0.494	0.724
1139.7874	0.123	0.527	0.744	1175.7605	0.072	0.489	0.721
1160.7859	0.090	0.507	0.756	1177.7715	0.101	0.531	0.762
1163.7327	0.105	0.520	0.745	1182.7378	0.098	0.518	0.743
1165.7200	0.119	0.525	0.748	1184.7671	0.075	0.497	0.731
1167.7227	0.094	0.509	0.731	1513.7626	0.060	0.504	0.734

TABLE 5, continued

STAR NAME							
HJD (2440 000+)	Δ(35)	Δ(44)	Δ(55)	HJD (2440 000+)	Δ(35)	Δ(44)	Δ(55)
				HD 133029			
1514.7931	0.086	0.511	0.736	1525.7784	0.077	0.500	0.725
1515.7372	0.114	0.519	0.741	1557.7187	0.073	0.499	0.729
1516.7371	0.101	0.507	0.735	1560.7102	0.092	0.509	0.738
1518.7778	0.089	0.512	0.738	1571.7205	0.053	0.468	0.733
1521.8169	0.082	0.495	0.732	1571.7305	0.045	0.471	0.731
1521.8274	0.128	0.525	0.751				
				HD 140728			
1107.7620	-0.584	-0.308	-0.142	1521.8249	-0.603	-0.310	-0.145
1111.8062	-0.618	-0.316	-0.153	1525.7808	-0.627	-0.316	-0.154
1114.7935	-0.590	-0.304	-0.142	1557.7211	-0.626	-0.326	-0.153
1116.8594	-0.640	-0.333	-0.157	1560.7129	-0.604	-0.296	-0.128
1118.7676	-0.604	-0.311	-0.147	1571.7283	-0.628	-0.331	-0.147
1139.7908	-0.610	-0.305	-0.150	1834.7798	-0.676	-0.341	-0.170
1160.7898	-0.592	-0.315	-0.140	1834.7935	-0.631	-0.321	-0.151
1163.7349	-0.627	-0.308	-0.151	1837.7768	-0.583	-0.296	-0.137
1165.7227	-0.621	-0.309	-0.141	1859.7676	-0.599	-0.305	-0.144
1167.7256	-0.618	-0.316	-0.142	1859.8892	-0.591	-0.301	-0.138
1169.7371	-0.623	-0.317	-0.141	1863.7831	-0.597	-0.308	-0.146
1170.7146	-0.603	-0.301	-0.152	1872.7676	-0.592	-0.308	-0.143
1171.7212	-0.564	-0.310	-0.141	1872.8522	-0.604	-0.303	-0.141
1172.7134	-0.625	-0.326	-0.148	1875.7769	-0.606	-0.305	-0.143
1173.7332	-0.672	-0.347	-0.167	1877.7588	-0.615	-0.312	-0.149
1175.7644	-0.611	-0.317	-0.152	1877.8874	-0.600	-0.303	-0.137
1177.7737	-0.608	-0.317	-0.136	1882.7729	-0.628	-0.318	-0.147
1182.7405	-0.612	-0.310	-0.142	1882.8940	-0.632	-0.320	-0.146
1513.7648	-0.610	-0.310	-0.148	1887.7239	-0.600	-0.310	-0.144
1514.7948	-0.634	-0.323	-0.157	1887.8826	-0.645	-0.337	-0.166
1515.7392	-0.599	-0.307	-0.147	1894.7469	-0.595	-0.301	-0.142
1516.7391	-0.599	-0.302	-0.150	1901.7278	-0.625	-0.305	-0.146
1518.7803	-0.627	-0.322	-0.156	1910.7300	-0.615	-0.317	-0.150
				HD 141988			
1107.7773	3.501	3.574	3.334	1518.7903	3.600	3.605	3.357
1111.8394	3.513	3.565	3.338	1522.8139	3.458	3.604	3.354
1111.8501	3.550	3.578	3.340	1536.7369	3.474	3.579	3.345
1114.8111	3.497	3.579	3.337	1557.7424	3.437	3.585	3.336
1116.8926	3.486	3.568	3.326	1834.8157	3.439	3.555	3.330
1116.9026	3.477	3.579	3.338	1837.7554	3.631	3.581	3.345
1118.7855	3.503	3.568	3.335	1837.7659	3.574	3.563	3.316
1139.8094	3.558	3.586	3.338	1837.9289	3.573	3.503	3.378
1160.8047	3.532	3.568	3.334	1874.7720	3.489	3.591	3.344
1160.8162	3.474	3.573	3.352	1874.9078	3.484	3.585	3.341
1162.7891	3.463	3.577	3.337	1876.7554	3.458	3.596	3.344
1165.7364	3.509	3.577	3.341	1876.8816	3.485	3.589	3.347
1166.7398	3.492	3.575	3.336	1880.7488	3.486	3.593	3.347
1167.7430	3.486	3.586	3.338	1880.9012	3.521	3.599	3.352
1169.7499	3.455	3.570	3.337	1881.7532	3.510	3.582	3.346
1170.7393	3.578	3.574	3.340	1881.8655	3.489	3.585	3.339
1171.7460	3.490	3.576	3.337	1887.7347	3.488	3.597	3.341
1172.7845	3.501	3.580	3.339	1887.8923	3.514	3.594	3.346
1173.8066	3.572	3.570	3.333	1896.7118	3.497	3.589	3.344
1175.7962	0.0	3.596	3.385	1901.7409	3.486	3.582	3.339
1177.7852	3.524	3.582	3.335	1903.7829	3.465	3.579	3.344
1182.7530	3.512	3.595	3.349	1903.8821	3.541	3.607	3.356
1513.7751	3.492	3.587	3.348	1903.8936	3.492	3.586	3.351
1514.8058	3.478	3.580	3.342	1907.7405	3.491	3.575	3.342
1515.7963	3.578	3.599	3.359	1908.8351	3.491	3.597	3.361
1516.7505	3.567	3.636	3.409	1911.7153	3.488	3.589	3.343
				HD 153882			
1107.7967	0.447	0.392	0.390	1124.8235	0.433	0.368	0.367
1111.8782	0.466	0.382	0.386	1139.8497	0.432	0.375	0.386
1114.8478	0.430	0.380	0.409	1145.7815	0.396	0.366	0.364
1118.8201	0.437	0.370	0.370	1161.7597	0.466	0.394	0.384

TABLE 5, continued

HJD (2440 000+)	Δ(35)	Δ(44)	Δ(55)	HJD (2440 000+)	Δ(35)	Δ(44)	Δ(55)
STAR NAME							
				HD 153882			
1163.7593	0.401	0.372	0.383	1558.6938	0.458	0.395	0.393
1166.7287	0.456	0.378	0.369	1560.6877	0.435	0.382	0.391
1168.7248	0.417	0.386	0.390	1571.7129	0.437	0.377	0.377
1170.7289	0.446	0.385	0.381	1834.8423	0.474	0.394	0.384
1171.7353	0.467	0.382	0.381	1849.9206	0.473	0.397	0.390
1172.7302	0.457	0.379	0.397	1860.8531	0.438	0.372	0.381
1176.7555	0.448	0.384	0.385	1862.7859	0.481	0.394	0.386
1177.7475	0.463	0.390	0.394	1866.8113	0.441	0.377	0.377
1182.7179	0.427	0.387	0.396	1872.8326	0.439	0.380	0.399
1184.7273	0.416	0.386	0.391	1877.8307	0.450	0.392	0.398
1497.7925	0.450	0.386	0.376	1882.8361	0.478	0.393	0.388
1499.7488	0.439	0.378	0.382	1891.8379	0.494	0.411	0.412
1501.7253	0.467	0.393	0.384	1896.7510	0.451	0.380	0.394
1505.7773	0.450	0.394	0.392	1900.7369	0.467	0.400	0.395
1513.8058	0.476	0.392	0.387	1903.8030	0.453	0.386	0.388
1514.8327	0.453	0.380	0.378	1906.7851	0.461	0.394	0.390
1515.8213	0.445	0.391	0.375	1910.7419	0.459	0.380	0.375
				HD 173650			
1107.8255	1.875	2.072	2.160	1184.8101	1.966	2.107	2.200
1114.8954	1.982	2.116	2.202	1211.7279	1.992	2.103	2.199
1118.8633	1.902	2.083	2.163	1218.7128	1.865	2.070	2.165
1128.8412	1.903	2.090	2.185	1497.8418	1.881	2.068	2.173
1139.8849	1.942	2.115	2.205	1503.7626	1.972	2.103	2.202
1160.8334	1.950	2.111	2.204	1505.7867	1.886	2.081	2.170
1162.8246	1.965	2.114	2.207	1513.8649	1.967	2.098	2.199
1165.7746	1.922	2.093	2.173	1514.8965	1.913	2.091	2.180
1166.7809	1.891	2.086	2.179	1515.8562	1.866	2.073	2.165
1167.7897	1.857	2.075	2.163	1516.7718	1.856	2.069	2.165
1169.8293	1.956	2.100	2.188	1517.8509	1.889	2.073	2.175
1170.8216	1.954	2.109	2.206	1527.8957	1.897	2.071	2.168
1172.8310	1.985	2.111	2.195	1532.8301	1.976	2.099	2.206
1173.8592	1.935	2.076	2.178	1535.8476	1.865	2.075	2.170
1175.8168	1.898	2.083	2.176	1557.7353	1.880	2.074	2.170
1176.8130	1.847	2.075	2.163	1558.7253	1.946	2.090	2.187
1177.8631	1.847	2.069	2.158	1560.7415	1.966	2.107	2.205
1182.8030	1.984	2.109	2.202	1571.7972	1.969	2.096	2.206
				(D) UNKNOWN TYPES			
				BD 61 2213			
1499.7671	1.467	1.111	1.019	1896.9305	1.466	1.128	1.027
1501.7400	1.546	1.112	1.019	1897.7536	1.443	1.113	1.027
1505.9292	1.529	1.170	1.061	1897.9178	1.486	1.126	1.030
1518.9197	1.501	1.113	1.020	1898.7992	1.453	1.107	1.020
1522.7869	1.555	1.164	1.076	1898.9341	1.428	1.098	1.010
1524.8227	1.430	1.122	1.038	1900.8052	1.420	1.104	1.009
1525.8147	1.418	1.145	1.048	1900.9356	1.452	1.121	1.031
1526.7759	1.471	1.114	1.025	1901.9466	1.435	1.097	1.005
1530.8116	1.391	1.105	1.027	1907.7774	1.459	1.129	1.044
1532.7635	1.474	1.130	1.037	1908.8771	1.511	1.173	1.070
1535.8260	1.452	1.118	1.028	1909.7851	1.424	1.111	1.029
1536.7814	1.415	1.132	1.044	1909.9434	1.480	1.123	1.026
1557.8230	1.388	1.099	1.011	1910.7917	1.444	1.113	1.021
1558.7527	1.472	1.153	1.064	1910.9396	1.444	1.096	1.004
1558.9349	1.463	1.126	1.033	1923.8481	1.474	1.134	1.043
1560.8096	1.429	1.130	1.035	1929.7625	1.447	1.126	1.033
1560.9263	1.427	1.096	0.998	1929.9473	1.449	1.143	1.048
1837.8387	1.601	1.147	1.068	1931.7974	1.472	1.144	1.061
1891.8033	1.452	1.129	1.047	1931.9551	1.442	1.120	1.030
1894.8014	1.427	1.105	1.007	1933.7974	1.442	1.100	1.016
1894.9258	1.482	1.133	1.057	1935.7178	1.449	1.134	1.039
1895.8069	1.439	1.112	1.019	1935.9485	1.438	1.146	1.057
1895.9302	1.463	1.124	1.034	1936.7608	1.455	1.120	1.042
1896.8030	1.493	1.169	1.085	1936.8687	1.421	1.118	1.032

TABLE 5, continued

HJD (2440 000+)	Δ(35)	Δ(44)	Δ(55)	HJD (2440 000+)	Δ(35)	Δ(44)	Δ(55)
STAR NAME							
				BD 61 2213			
1936.9712	1.436	1.125	1.028	1938.7293	1.427	1.107	1.024
				BD 57 2615			
1557.8361	2.580	2.565	2.623	1929.9689	2.528	2.576	2.636
1558.7853	2.532	2.554	2.636	1931.8218	2.596	2.583	2.618
1558.9571	2.405	2.548	2.631	1931.9849	2.596	2.572	2.650
1560.8199	2.486	2.559	2.599	1933.8240	2.652	2.549	2.650
1560.9543	2.532	2.556	2.610	1935.7477	2.693	2.568	2.647
1910.8017	2.528	2.566	2.616	1935.9678	2.482	2.552	2.635
1911.8517	2.588	2.557	2.607	1936.7825	2.535	2.566	2.638
1911.9599	2.558	2.573	2.613	1936.9042	2.535	2.561	2.643
1912.8786	2.571	2.579	2.624	1936.9795	2.512	2.574	2.631
1923.8630	2.559	2.566	2.630	1938.7620	2.498	2.572	2.643
1929.7915	2.553	2.565	2.634				
				HD 154228			
1117.7881	-0.300	-0.200	-0.155	1134.8311	-0.291	-0.214	-0.183
1117.8018	-0.303	-0.202	-0.170	1134.8484	-0.301	-0.208	-0.178
1117.8196	-0.284	-0.171	-0.125	1134.8611	-0.320	-0.218	-0.171
1117.8379	-0.308	-0.208	-0.158	1134.8743	-0.304	-0.199	-0.166
1117.8511	-0.266	-0.197	-0.167	1134.8894	-0.311	-0.214	-0.178
1117.8650	-0.289	-0.204	-0.172	1134.9026	-0.339	-0.228	-0.182
1117.8809	-0.275	-0.204	-0.151	1134.9146	-0.337	-0.211	-0.164
1117.8948	-0.310	-0.213	-0.171	1161.7454	-0.323	-0.222	-0.156
1131.7847	-0.305	-0.210	-0.174	1162.7654	-0.338	-0.232	-0.196
1131.7996	-0.312	-0.201	-0.154	1165.7620	-0.331	-0.227	-0.183
1131.8186	-0.286	-0.205	-0.163	1167.7615	-0.316	-0.217	-0.168
1131.8372	-0.306	-0.201	-0.158	1168.7466	-0.297	-0.207	-0.153
1131.8521	-0.309	-0.197	-0.156	1169.7881	-0.305	-0.205	-0.168
1131.8699	-0.293	-0.206	-0.175	1170.7544	-0.353	-0.204	-0.156
1131.8826	-0.316	-0.203	-0.166	1171.7725	-0.335	-0.217	-0.176
1131.8987	-0.248	-0.153	-0.125	1172.7532	-0.316	-0.203	-0.153
1134.7615	-0.294	-0.195	-0.153	1173.7637	-0.266	-0.184	-0.158
1134.7747	-0.330	-0.233	-0.184	1176.7439	-0.294	-0.200	-0.157
1134.7881	-0.287	-0.209	-0.166	1177.7339	-0.276	-0.199	-0.163
1134.8035	-0.289	-0.201	-0.163	1182.7300	-0.308	-0.200	-0.160
1134.8162	-0.278	-0.185	-0.164	1184.7200	-0.276	-0.200	-0.158
				HD 164284			
1107.8127	0.238	0.575	0.614	1168.7685	0.217	0.566	0.611
1111.9030	0.244	0.529	0.620	1169.8046	0.214	0.571	0.617
1114.8798	0.234	0.561	0.602	1170.7718	0.208	0.577	0.606
1114.8877	0.235	0.558	0.605	1171.7884	0.220	0.582	0.608
1118.8367	0.242	0.571	0.629	1172.7735	0.234	0.588	0.622
1119.9167	0.243	0.583	0.630	1173.7825	0.238	0.583	0.612
1128.8227	0.242	0.575	0.617	1176.7725	0.214	0.572	0.602
1139.8664	0.218	0.563	0.608	1177.8141	0.213	0.576	0.608
1161.7723	0.220	0.579	0.603	1182.7808	0.187	0.526	0.569
1163.7831	0.241	0.588	0.620	1182.7930	0.185	0.521	0.562
1166.7698	0.223	0.582	0.623	1184.7438	0.243	0.581	0.612
				HD 165174			
1135.7510	1.694	2.136	2.165	1135.9081	1.685	2.127	2.157
1135.7626	1.709	2.146	2.178	1135.9184	1.710	2.139	2.166
1135.7746	1.705	2.130	2.168	1144.7613	1.698	2.133	2.164
1135.7870	1.701	2.140	2.174	1144.7731	1.695	2.127	2.161
1135.7992	1.696	2.130	2.164	1144.7845	1.702	2.134	2.169
1135.8129	1.697	2.127	2.156	1144.7983	1.699	2.128	2.170
1135.8251	1.715	2.137	2.160	1144.8102	1.701	2.135	2.165
1135.8365	1.714	2.141	2.159	1144.8227	1.694	2.129	2.168
1135.8486	1.712	2.148	2.176	1144.8378	1.698	2.130	2.149
1135.8603	1.710	2.139	2.165	1144.8525	1.682	2.128	2.159
1135.8741	1.712	2.137	2.171	1144.8642	1.696	2.131	2.184
1135.8862	1.711	2.148	2.171	1144.8752	1.701	2.143	2.176
1135.8976	1.710	2.138	2.163	1144.8857	1.695	2.136	2.164

TABLE 5, continued

STAR NAME							
HJD (2440 000+)	Δ(35)	Δ(44)	Δ(55)	HJD (2440 000+)	Δ(35)	Δ(44)	Δ(55)
				HD 165174			
1144.8976	1.687	2.132	2.172	1502.7729	1.715	2.157	2.172
1144.9098	1.693	2.133	2.163	1502.7829	1.712	2.153	2.176
1144.9202	1.698	2.144	2.175	1502.7924	1.704	2.155	2.166
1145.7593	1.721	2.147	2.174	1502.8008	1.704	2.150	2.170
1145.8045	1.699	2.138	2.166	1502.8110	1.714	2.154	2.165
1145.8149	1.698	2.138	2.160	1502.8207	1.707	2.146	2.169
1145.8251	1.693	2.134	2.161	1502.8301	1.704	2.151	2.165
1145.8370	1.696	2.132	2.172	1502.8393	1.712	2.153	2.171
1145.8503	1.694	2.129	2.162	1502.8498	1.705	2.142	2.168
1145.8606	1.710	2.142	2.163	1502.8603	1.709	2.147	2.170
1145.8713	1.714	2.140	2.166	1502.8710	1.711	2.147	2.176
1145.8810	1.715	2.141	2.170	1502.8816	1.711	2.147	2.168
1145.8902	1.721	2.157	2.176	1502.8902	1.708	2.147	2.166
1145.8995	1.698	2.150	2.188	1502.8985	1.717	2.159	2.176
1145.9084	1.723	2.144	2.174	1502.9063	1.715	2.155	2.171
1145.9175	1.723	2.152	2.184	1502.9148	1.717	2.155	2.168
1167.7762	1.713	2.155	2.179	1502.9214	1.726	2.158	2.175
1168.7598	1.703	2.135	2.160	1513.8511	1.690	2.133	2.155
1169.8028	1.719	2.149	2.173	1514.7480	1.698	2.140	2.160
1170.7701	1.694	2.148	2.166	1514.8798	1.707	2.140	2.165
1171.7867	1.708	2.150	2.169	1515.7554	1.703	2.142	2.168
1172.7712	1.699	2.137	2.164	1526.8022	1.708	2.149	2.168
1173.7803	1.690	2.129	2.164	1528.7981	1.693	2.137	2.162
1176.7706	1.691	2.137	2.159	1532.8208	1.707	2.138	2.154
1177.8124	1.701	2.133	2.157	1533.7583	1.718	2.160	2.179
1180.8201	1.670	2.118	2.147	1533.8246	1.721	2.156	2.182
1182.7793	1.704	2.127	2.150	1837.8130	1.679	2.150	2.174
1182.7898	1.678	2.119	2.140	1837.8245	1.663	2.147	2.167
1184.7416	1.682	2.131	2.157	1863.7779	1.678	2.143	2.170
1500.7500	1.701	2.149	2.168	1872.7825	1.690	2.148	2.172
1500.7654	1.695	2.143	2.159	1872.8981	1.692	2.154	2.185
1500.7720	1.702	2.140	2.160	1875.7934	1.659	2.130	2.155
1500.7785	1.701	2.150	2.161	1876.7836	1.689	2.157	2.179
1500.7859	1.697	2.143	2.156	1876.9397	1.669	2.139	2.165
1500.7936	1.707	2.149	2.165	1877.8011	1.657	2.135	2.156
1500.8020	1.713	2.147	2.164	1880.7660	1.658	2.126	2.153
1500.8108	1.712	2.139	2.159	1880.9317	1.676	2.144	2.149
1500.8201	1.695	2.144	2.161	1881.7868	1.676	2.137	2.161
1500.8287	1.714	2.150	2.170	1882.7900	1.662	2.129	2.153
1500.8381	1.704	2.151	2.173	1882.9086	1.662	2.136	2.162
1500.8536	1.719	2.148	2.165	1887.7554	1.663	2.145	2.170
1500.8666	1.733	2.154	2.171	1887.9101	1.588	2.150	2.167
1500.8774	1.712	2.148	2.171	1894.8240	1.619	2.115	2.150
1500.8882	1.709	2.146	2.166	1900.7477	1.665	2.133	2.166
1500.8987	1.716	2.153	2.175	1910.7250	1.683	2.152	2.177
1500.9086	1.705	2.144	2.157	1911.7433	1.672	2.136	2.164
1500.9170	1.689	2.127	2.154	1913.7355	1.667	2.146	2.170
1502.7622	1.708	2.156	2.170				
				HD 176162			
1113.9131	-1.837	-0.997	-0.808	1184.7570	-1.827	-0.991	-0.808
1116.8854	-1.798	-0.975	-0.822	1501.7920	-1.868	-1.001	-0.826
1118.8799	-1.750	-0.952	-0.794	1501.8025	-1.863	-1.008	-0.816
1128.8577	-1.813	-0.957	-0.785	1501.8569	-1.833	-0.991	-0.808
1128.8699	-1.830	-0.974	-0.798	1503.8179	-1.872	-1.013	-0.820
1139.9017	-1.849	-1.005	-0.822	1503.9131	-1.883	-1.007	-0.814
1161.8044	-1.802	-0.992	-0.831	1505.8035	-1.782	-0.945	-0.780
1162.8122	-1.816	-0.976	-0.798	1505.8948	-1.895	-0.999	-0.812
1165.7901	-1.782	-0.977	-0.801	1513.8257	-1.839	-0.986	-0.793
1168.7991	-1.840	-1.013	-0.837	1514.7864	-1.815	-0.982	-0.806
1170.7991	-1.825	-0.988	-0.806	1514.8578	-1.837	-0.991	-0.797
1171.8050	-1.795	-0.972	-0.790	1515.7903	-1.830	-0.988	-0.792
1176.7920	-1.807	-0.992	-0.810	1515.8360	-1.849	-0.996	-0.799
1177.8299	-1.817	-0.972	-0.795	1535.7560	-1.815	-0.974	-0.789
1182.8188	-1.831	-0.994	-0.810				

TABLE 5, continued

HJD (2440 000+)	Δ(35)	Δ(44)	Δ(55)	HJD (2440 000+)	Δ(35)	Δ(44)	Δ(55)
STAR NAME							
				HD 183537			
1497.8675	1.605	1.456	1.402	1862.8457	1.632	1.458	1.401
1503.7935	1.629	1.465	1.415	1876.8125	1.632	1.465	1.409
1503.8042	1.623	1.470	1.408	1876.8274	1.628	1.466	1.406
1503.9228	1.627	1.472	1.413	1879.8345	1.591	1.440	1.389
1505.8230	1.613	1.448	1.391	1879.8489	1.598	1.455	1.388
1513.8974	1.600	1.454	1.400	1889.8489	1.573	1.425	1.368
1515.9043	1.600	1.460	1.408	1895.8577	1.589	1.440	1.391
1516.7984	1.576	1.443	1.385	1895.8677	1.556	1.430	1.371
1517.8721	1.592	1.448	1.393	1900.8814	1.599	1.443	1.385
1518.8074	1.639	1.475	1.416	1906.8221	1.586	1.436	1.369
1535.8672	1.590	1.447	1.396	1911.9087	1.600	1.432	1.383
1537.8091	1.616	1.458	1.405	1926.8428	1.780	1.539	1.481
1557.7854	1.580	1.446	1.389	1926.8577	1.774	1.548	1.490
1557.7974	1.583	1.441	1.390	1927.8296	1.725	1.532	1.473
1558.8315	1.569	1.433	1.381	1927.8418	1.756	1.537	1.471
1560.7889	1.587	1.439	1.379	1935.8173	1.714	1.501	1.444
1848.8352	1.665	1.495	1.434	1936.7051	1.741	1.526	1.465
1848.8494	1.654	1.495	1.423	1936.7227	1.728	1.521	1.464
1862.8311	1.639	1.466	1.408	1938.7100	1.720	1.503	1.445
				HD 188209			
1107.9046	-1.259	-0.669	-0.698	1527.7857	-1.260	-0.656	-0.694
1119.8943	-1.292	-0.676	-0.708	1535.8808	-1.286	-0.675	-0.708
1132.8101	-1.257	-0.646	-0.681	1536.8180	-1.278	-0.673	-0.705
1160.8713	-1.282	-0.682	-0.710	1557.8721	-1.240	-0.647	-0.686
1162.8505	-1.257	-0.657	-0.697	1557.8877	-1.263	-0.672	-0.701
1164.8885	-1.275	-0.661	-0.698	1558.8595	-1.261	-0.666	-0.702
1167.8467	-1.266	-0.671	-0.700	1560.8921	-1.270	-0.672	-0.712
1168.8486	-1.282	-0.668	-0.709	1571.9059	-1.264	-0.645	-0.712
1169.8754	-1.245	-0.640	-0.672	1848.8602	-1.303	-0.667	-0.709
1170.8678	-1.276	-0.682	-0.712	1859.8488	-1.314	-0.673	-0.711
1172.8680	-1.290	-0.675	-0.705	1861.7537	-1.328	-0.686	-0.722
1176.8395	-1.262	-0.678	-0.715	1862.8555	-1.328	-0.684	-0.715
1177.8949	-1.307	-0.681	-0.713	1862.8711	-1.328	-0.683	-0.724
1179.8898	-1.281	-0.678	-0.717	1876.8448	-1.341	-0.697	-0.731
1182.8645	-1.283	-0.686	-0.718	1879.8616	-1.316	-0.675	-0.714
1184.8461	-1.259	-0.678	-0.698	1887.8207	-1.292	-0.659	-0.700
1211.7582	-1.288	-0.687	-0.732	1894.8849	-1.308	-0.664	-0.707
1217.8112	-1.261	-0.647	-0.690	1900.8652	-1.324	-0.685	-0.722
1497.8016	-1.274	-0.671	-0.707	1902.8583	-1.298	-0.652	-0.689
1503.8370	-1.289	-0.678	-0.712	1903.8709	-1.329	-0.687	-0.719
1505.8472	-1.268	-0.668	-0.700	1906.8367	-1.322	-0.681	-0.717
1505.8577	-1.279	-0.672	-0.698	1913.7471	-1.311	-0.668	-0.707
1513.9258	-1.264	-0.663	-0.695	1926.8865	-1.298	-0.669	-0.704
1514.9275	-1.279	-0.673	-0.706	1927.8721	-1.321	-0.669	-0.714
1515.9179	-1.302	-0.699	-0.735	1935.8301	-1.325	-0.678	-0.718
1517.8847	-1.279	-0.674	-0.707	1936.8074	-1.312	-0.671	-0.698
1518.8493	-1.245	-0.645	-0.681	1938.7712	-1.282	-0.656	-0.696
				HD 216658			
1499.7923	3.632	3.320	2.647	1896.8666	3.586	3.249	2.597
1501.8182	3.586	3.293	2.629	1897.8384	3.574	3.261	2.611
1526.8848	3.591	3.283	2.644	1898.8791	3.575	3.246	2.589
1530.8899	3.575	3.313	2.672	1903.9285	3.659	3.283	2.626
1530.9009	3.694	3.291	2.641	1906.8772	3.584	3.263	2.593
1535.9058	3.567	3.294	2.640	1906.8953	3.626	3.259	2.599
1535.9163	3.534	3.288	2.640	1907.8201	3.614	3.295	2.627
1536.9241	3.510	3.285	2.630	1908.8118	3.563	3.253	2.596
1557.9534	3.573	3.293	2.614	1908.8235	3.572	3.243	2.577
1558.8034	3.601	3.296	2.611	1909.8681	3.613	3.272	2.602
1558.9725	3.653	3.276	2.601	1912.9057	3.581	3.262	2.595
1560.8317	3.618	3.304	2.621	1926.9456	3.615	3.252	2.618
1560.9662	3.591	3.302	2.611	1926.9590	3.590	3.244	2.619
1879.8885	3.558	3.258	2.600	1927.9078	3.652	3.265	2.614
1889.8708	3.559	3.269	2.616	1931.8802	3.569	3.252	2.603

TABLE 5, continued

HJD (2440 000+)	Δ(35)	Δ(44)	Δ(55)	STAR NAME HJD (2440 000+)	Δ(35)	Δ(44)	Δ(55)
				HD 216658			
1935.9916	3.556	3.260	2.609	1938.8036	3.567	3.280	2.611
1936.9302	3.606	3.261	2.608				
				HD 217035			
1499.7889	1.959	1.948	1.495	1536.9217	1.931	1.938	1.489
1501.8196	1.968	1.941	1.493	1557.9545	1.944	1.942	1.479
1526.8809	1.909	1.937	1.487	1558.8003	1.961	1.943	1.480
1530.8848	1.980	1.945	1.497	1558.9639	1.939	1.932	1.474
1530.8982	1.968	1.948	1.505	1558.9739	1.951	1.934	1.473
1535.9021	1.910	1.947	1.496	1560.8284	1.951	1.946	1.487
1535.9131	1.941	1.932	1.491	1560.9634	1.939	1.951	1.487
				HD 218674			
1211.8111	2.587	2.005	1.835	1898.9444	2.621	2.018	1.856
1217.8910	2.617	2.072	1.898	1900.8135	2.647	2.044	1.878
1517.9267	2.607	2.025	1.871	1900.9455	2.605	2.014	1.846
1518.8827	2.625	2.049	1.877	1901.9546	2.655	2.036	1.867
1518.9275	2.614	2.035	1.869	1907.7881	2.595	2.014	1.852
1522.7765	2.592	2.045	1.879	1908.8902	2.655	2.063	1.895
1524.8088	2.604	2.048	1.883	1909.7996	2.629	2.030	1.863
1524.9621	2.634	2.040	1.880	1910.8239	2.620	2.030	1.867
1526.7878	2.617	2.054	1.884	1923.8752	2.618	2.026	1.854
1527.8783	2.637	2.060	1.900	1929.7732	2.671	2.065	1.897
1527.9383	2.619	2.056	1.890	1929.9576	2.573	2.001	1.830
1891.8143	2.645	2.041	1.868	1931.8085	2.631	2.035	1.871
1894.8124	2.658	2.037	1.873	1931.9750	2.604	2.007	1.850
1894.9388	2.682	2.057	1.891	1933.8052	2.609	2.033	1.869
1895.8169	2.657	2.047	1.880	1933.8157	2.627	2.010	1.877
1895.9407	2.655	2.039	1.867	1935.7336	2.587	2.011	1.844
1896.8130	2.641	2.037	1.875	1935.9590	2.638	2.052	1.884
1896.9424	2.656	2.053	1.885	1936.7710	2.645	2.059	1.886
1897.7707	2.659	2.035	1.870	1936.8899	2.613	2.023	1.862
1897.9335	2.663	2.053	1.878	1938.7508	2.653	2.054	1.881
1898.8120	2.634	2.043	1.876				

In Table 5, we present a total of 1808 observations of 42 programme stars; eleven of these programme stars are newly discovered variables. Mean colours and magnitudes and mean differential magnitudes of the five programme stars found to be constant in light have already been given in Tables 3 and 4 respectively. Their individual differential magnitudes are not quoted in Table 5 although notes on these stars are appended. The columns in Table 5 refer in order to (1), (5) heliocentric Julian date, (2) - (4) and (6) - (8) Δ(35), Δ(44), Δ(55) the differential magnitudes in the sense variable minus comparison on the DAO system. Accompanying Table 5 we have made notes on each variable regarding its type of variability. These notes are not intended to be bibliographically complete but serve only to state what these particular observations indicate. We have also provided some representative light curves. We hope in the near future to gather all relevant information (radial velocities, colours, spectral types) on the binary systems in order to determine, where possible, masses and absolute dimensions and the evolutionary state of these systems. Some other stars are "mysteries", e.g. HD 190467, whose interpretation in terms of a meaningful physical model still eludes us. We expect the data on the variable supergiant stars to be utilised by Dr. J.B. Hutchings in conjunction with his spectroscopic data.

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NOTES TO TABLE 5

(a) Binary Systems

HD 142926. A known shell star (Cowley, Cowley, Jaschek and Jaschek, 1969) found by Harmanec, Koubský and Krpata (1973) to be a spectroscopic binary of period 46.0227 days. Observations by Cowley and Hiltner (1968) show that spectrum changes occur. Harmanec *et al.* interpreted some of the changes as due to a partial eclipse, an eclipse which would be consistent with their orbital data. Our observations, which cover the expected time of eclipse, indicate that the star is constant in brightness.

HD 149881. Initially identified as a variable by Lynds (1959) and confirmed later by Hill (1967a) who concluded that it was a β Cephei star (period $\sim$ 8 hrs.). Lynds had observed the star spectroscopically with a prism spectrograph (51 Å mm^{-1} at Hγ) and later observations by Hill were combined with the earlier data to yield an orbit (period = 5.20065 days; K = 21.4 km s^{-1}). Extensive radial velocity data suggest that it is a β Cephei star (period $\sim$ 0.18 days). Early photometric observations at Mt. Kobau indicated that the star was also an ellipsoidal variable (later supported by Jerzykiewicz 1974). This star was the subject of a Master's thesis by Drolet (1973) who utilised all of the available DAO material to derive a model for the system.

HD 175544. Double-lined spectroscopic binary (Thackeray and Tatum 1966). This system has no light variations in excess of $0^{m}.02$ in blue light. However, *complete* phase coverage has not been obtained because of the difficult orbital period (1.99 days).

HD 176853. Observations of this eclipsing binary were abandoned since its southerly declination (δ = -10°) made it difficult to obtain reliable photometry from Mt. Kobau.

HD 185507. A known eclipsing binary with well determined spectroscopic orbit. The difficult orbital period (1.95 days) has resulted in a very poor phase distribution of these observations; the light curve is of the β Lyrae type. A well observed light curve together with the available spectroscopic data could provide accurate masses, radii etc.

HD 185936. A known eclipsing binary with intrinsic variations superposed (G.F. Knipe - many notes in MNASSA). We abandoned observations of this star in 1972 since continuous monitoring is required before the light variations can be understood.

HD 187399. Newly discovered variable with an extremely asymmetric light curve; note that this light curve (Fig. 1) has repeated extremely well over two separate seasons. A known spectroscopic binary (Merrill 1949), its shell characteristics were discussed recently by Hutchings and Laskarides (1972). Hutchings and Redman (1973) have also provided a consistent qualitative interpretation in terms of gas streaming of the appearance of this light curve and of the spectroscopic phenomena.

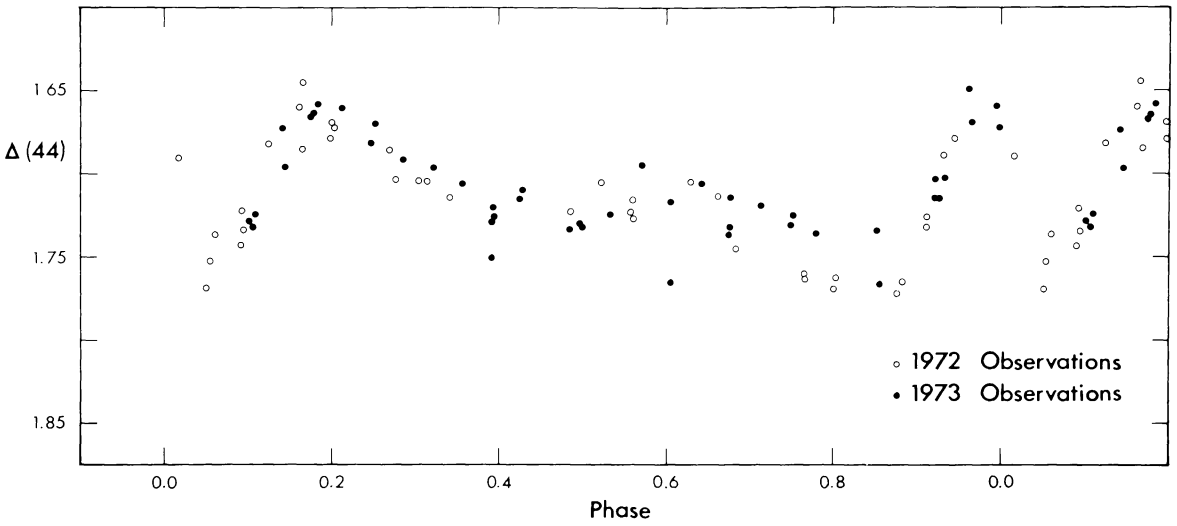

Fig. 1. Blue observations of HD 187399 plotted against phase from Merrill's spectroscopic ephemeris $JD_{\odot}$ 32465.98 + 27.97E.

HD 187879. The light variations outside eclipses are extremely asymmetric indicating the presence of extensive gas streams between the stars. The overall appearance of our light curve is the same as that obtained by Kron (1935) between 1923 and 1930! Extensive photometric observations have been obtained at Bologna and some of them have been published in a discussion of apsidal motion (Battistini, Bonifazi and Guarniere 1974).

HD 190467. First noted as an interesting star by Petrie and Pearce (1961) and later observed photometrically by Percy (1970). Hill (unpublished) finds that it is a spectroscopic binary of period $\sim$ 57 days. Neither the photometric data of Percy nor that of this present paper can be reconciled with this orbit. The orbit has been thoroughly checked by further observations which rule out any other period. A very interesting, if enigmatic object.

HD 190918. A Wolf-Rayet star in NGC 6871 with an orbital period of 85 days (Wilson 1949) and a double-lined spectrum. Our present observations *are not* satisfied by this orbital period.

HD 229196. (NGC 6910-4) An O star whose double-lined spectrum was first detected by Pearce (unpublished). Currently it is under observation for a spectroscopic orbit by Hill. The small light changes ($\Delta(55) \sim 0^{m}.04$) suggest that we might be able to derive masses and radii for the components.

HD 199081. Double-lined spectroscopic binary with well determined orbital elements and an apsidal period of 203 ± 4 years (Hilditch 1973). The system is constant in brightness.

HD 203025. A spectroscopic binary (Sanford 1926) and noted as a variable by Hill (1967b) who detected changes of $0^{m}.05$. The star forms a triple system (Sanford 1926) embedded in nebulosity but the light changes we find (supporting the earlier photometry of Hill) cannot be correlated with either of the orbital periods.

HD 208392. (NGC 7160-2) Discovered by Lynds (1959) to be an eclipsing binary of short period (0.8 days). A spectroscopic study is being made by Hilditch using spectrograms at 30 Å mm^{-1} on IIIaJ emulsion.

HD 209481. Ellipsoidal variable discovered independently by Rao (1972) and by this survey. Also a well known double-lined spectroscopic binary which appears to be an evolved system similar to LY Aurigae (Hilditch 1974). This is a most important system for the determination of masses and absolute dimensions. A light curve is shown in Fig. 2 and indicates possibly unequal maxima.

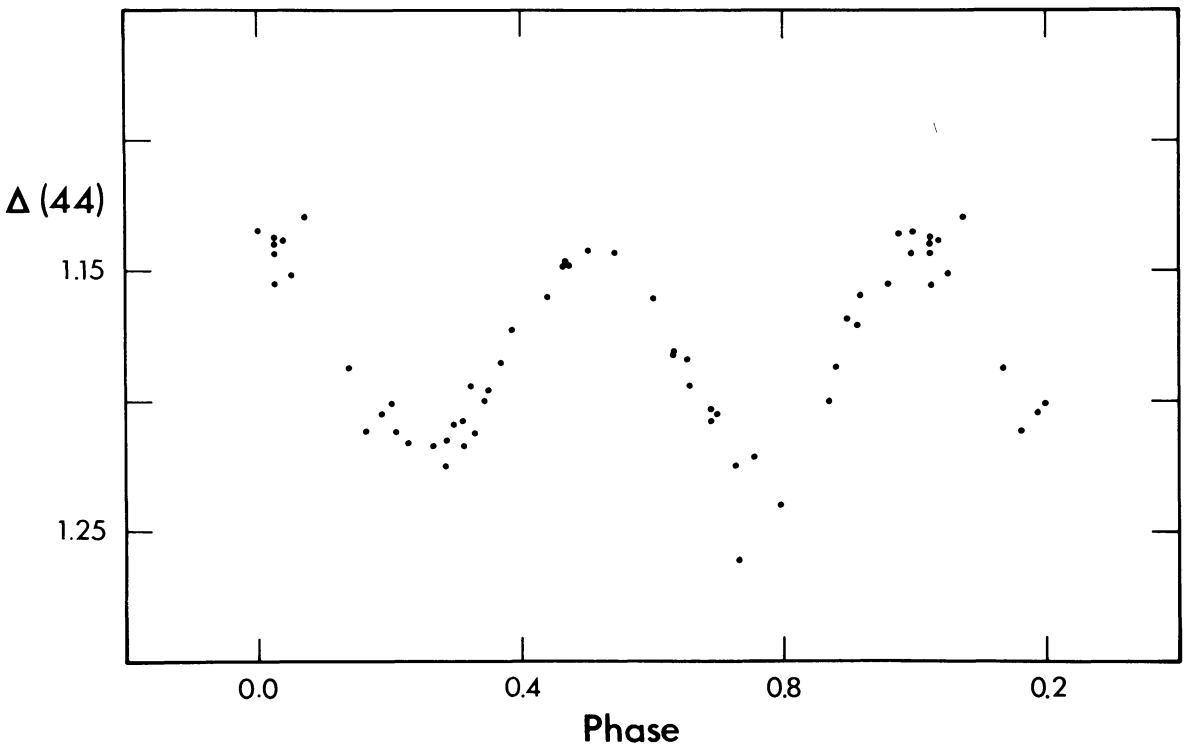

Fig. 2. Blue observations of HD 209481 plotted against orbital phase from Hilditch's spectroscopic ephemeris $JD_{\odot}$ 37182.42 + 3.070508E.

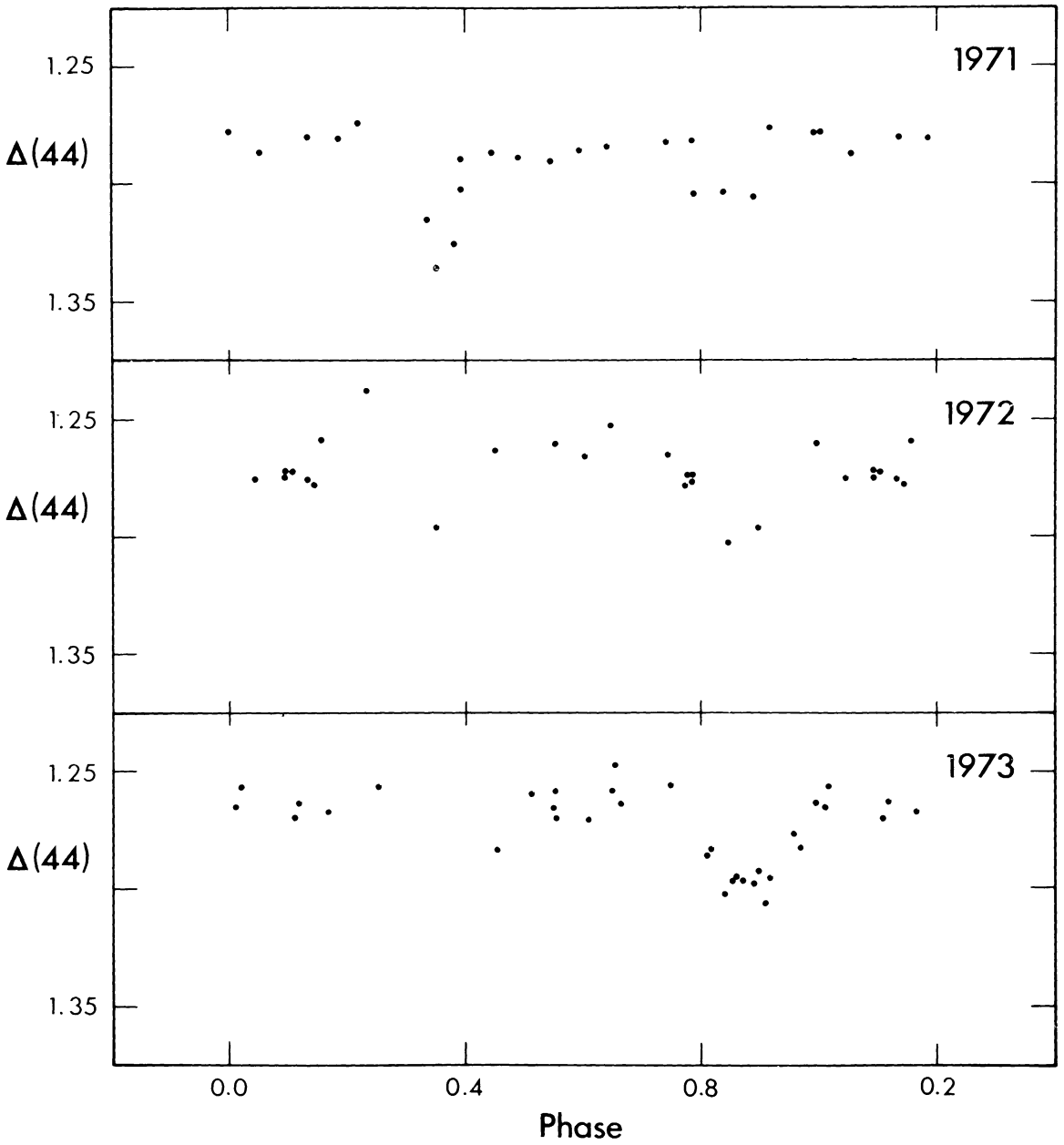

Fig. 3. Blue light curves of HD 216200 obtained in 1971, 1972 and 1973. Phase calculated from arbitrary epoch (first observation JD$_\odot$ 41132.8985) and Hill's spectroscopic period of 20.15 days.

HD 212120. Double-lined spectroscopic binary with well determined orbital elements (Hilditch 1974). The system is constant in brightness.

HD 215835. (NGC 7380-2) Discovered to be a double-lined spectroscopic binary by Pearce (1949). On the basis of his derived minimum masses, Pearce concluded that the system must be variable in brightness. Since we have been unable to find any photometric observations in the literature, it appears that this system received variable star status on the basis of spectroscopic

observations alone! Our observations confirm the suggested variability which corresponds to an ellipsoidal light curve of amplitude $\sim 0^{m}.05$ in blue light. Further spectroscopic data have been obtained by Hilditch (to be published).

HD 216200. An ellipsoidal variable of period near 20 days (see Fig. 3). Continuing spectroscopic observations are being made by Hill. The star was used as a comparison star by Walker (1952), who considered it to be a low amplitude variable, in his photometric study of the β Cephei star 16 Lac and the shell star HD 217050 (Walker 1953). These analyses should be redone in view of our current results.

HD 216629. Considered by Hill (1967b) to be an eclipsing binary (period $\sim$ 1.4 days) of amplitude $0^{m}.3$. Found later to be constant in velocity by Garmany (1973) from six low dispersion spectrograms (63 Å mm^{-1}); a blended spectrum could simulate this result. Our present data confirm the variability of this star ($\Delta(55) \sim 0^{m}.07$) but neither the amplitude nor the period given by Hill.

(b) Supergiants

HD 2905. Found to be variable with an amplitude of the order of $0^{m}.1$. This star is being studied spectroscopically by Hutchings at the DAO.

HD 183143. This highly reddened supergiant was suggested as a programme star by Hutchings who is continuing to observe it spectroscopically at the DAO. Our photometric observations indicate light variations in excess of $0^{m}.15$ in blue light but, as yet, no clear periodicity (see Fig. 4).

HD 188001. A known velocity variable (Underhill 1959), its mass loss characteristics have been studied by Hutchings (1970, 1976). Light variations of at least $0^{m}.06$ in blue light are observed and could be indicative of an eclipsing binary of long period (> 80 days) and low orbital inclination.

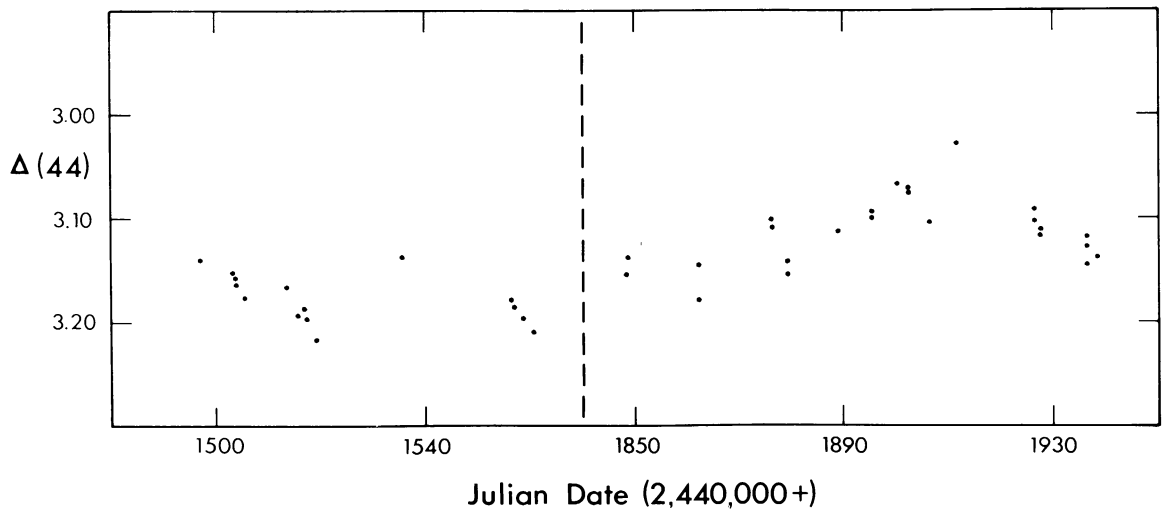

Fig. 4. Observations in blue light of HD 183143 plotted against heliocentric Julian date. The dashed line separates the 1972 and 1973 observations.

HD 190603. Variable by $0^{m}.08$ in blue light and could be quasi-periodic with $P \sim 26$ days. Suggested as a programme star by Hutchings who is observing it spectroscopically.

HD 198478. Another variable ($\sim 0^{m}.05$) supergiant with no clear periodicity. Granes and Herman (1971) reported a possible ~ 12 day spectroscopic period.

HD 206165. Our data confirm the $0^{m}.06$ variations found by Hill (1967b) but there is no clear periodicity.

HD 223385. Under spectroscopic observation by Hutchings. Irregularly variable by $0^{m}.05$.

HD 223960. Originally adopted as a comparison star but proved to be variable with amplitude $\sim 0^{m}.08$.

HD 225094. Under spectroscopic investigation by Hutchings. Possible irregularly variable.

(c) Ap, Am Stars

HD 133029. Variations at the limit of detection for our photometer. Nevertheless, these data confirm the period (2.881 days) and amplitude ($\sim 0^{m}.02$ in blue light) found by Winzer (1974) and by Wolff and Morrison (1975). See Fig. 5.

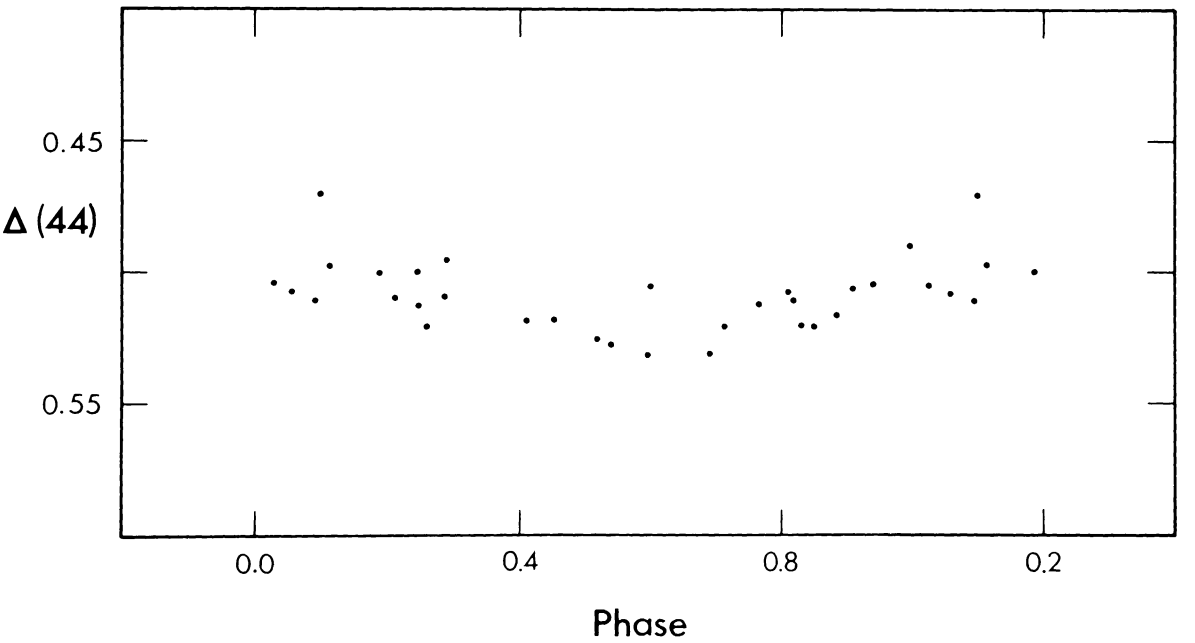

Fig. 5. Blue light curve of HD 133029. Phase from photometric ephemeris of Wolff and Morrison $JD_{\odot}$ 41461.70 + 2.8881E.

HD 140728. These data confirm the amplitude ($\sim 0^{m}.014$) of the light variations found by Wehlau (1962) but not the period. However, such variations are at the limit of detection for our photometer.

HD 141988. A known Am star which is probably variable with an amplitude $\sim 0^{m}.015$ in blue light.

HD 153882. A magnetic variable (Babcock 1958) studied photometrically by Jarzebowski (1960). Jarzebowski's data show a single peak when plotted against the 6-day period derived from the magnetic observations. In contrast our data show a double peak.
HD 173650. These observations confirm the period and $0^m.04$ light variation found by Burke *et al.* (1969). A known peculiar A star.
HD 191742. Observed in 1971 only. No variations in excess of $0^m.01$ in blue light were detected.

(d) Variables of Unknown Type

BD +61 2213 (NGC 7160-4). Identified as a variable by Hill (1967b) who thought that it *could* be an eclipsing binary. These present observations confirm the variations found by Hill.
NGC 7380-4. Thought by Hill (1967b) to be an eclipsing binary of amplitude $\sim 0^m.04$. These present observations confirm the size of the variation. Observations for a spectroscopic orbit are slowly being accumulated by Crampton and Hill at the DAO.
HD 154228. Was originally a comparison star for HD 153882. Suspected of variability by Jarzebowski (1960).
HD 164284. Observations of this star were abandoned after the 1971 season since they failed to show any variations in excess of $0^m.02$. The star remains a suspected variable.
HD 165174. This star was first studied by Lynds (1959) who thought that it was a possible β Cephei star (period $\sim$ 7 hours). Later observations by Hill (1967a) appeared to confirm this conclusion although recently Jerzykiewicz (1975), who had observed the star again photometrically, warns that the nature of the variation is still not certain. Many spectroscopic observations (dispersion 15 Å mm^{-1}) have been obtained at the DAO by Hill.
HD 176162. Originally a check star (1970) which proved to be variable with amplitude $\sim 0^m.05$. No obvious periodicity.
HD 183537. A variable of amplitude $0^m.1$ in blue light with no clear periodicity.
HD 188209. A comparison star in 1970 and found to be variable. Shows variations of $\sim 0^m.05$ maximum in blue light but with no clear evidence of periodicity over three years of observation.
HD 191978. A check star in 1970 considered possibly variable. Observations in 1971 indicate that it is constant.
HD 216658. A check star for HD 216629 and HD 217035 in Cepheus OB3 but appears to be variable over the long term, brightening by $\sim 0^m.04$ between 1972 and 1973.
HD 217035. Originally thought by Hill (1967a) to be a β Cephei star (period $\sim$ 6 hours). Observations by Deupree (1970) did not confirm these variations. Many low dispersion (60 Å mm^{-1}) spectrograms taken by Hill show significant line changes within hours, behaviour characteristic of β Cephei stars. Because our unrefrigerated photometer could not give us the accuracy needed for a study of this kind we abandoned observations after one season.
HD 217476. Smolinski's star. Studied extensively by Dr. J. Smolinski at the DAO in 1970. He found that the spectrum changed rapidly from night to night so we observed it hoping to detect some dramatic changes in either the colour or the magnitude. The star is variable by $0^m.05$ (see Fig. 6).

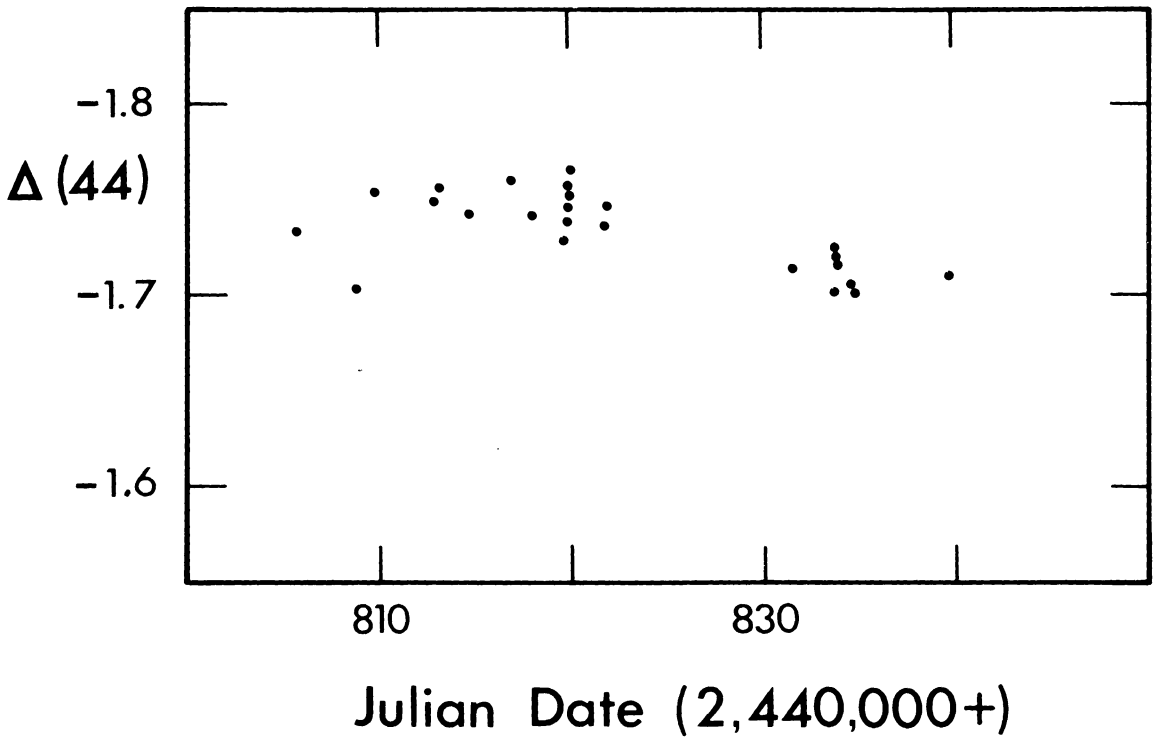

Fig. 6. Blue observations of Smolinski's star HD 217476 obtained in 1970.

HD 218674. Hill (1967b) thought that it was a velocity variable with a period ~ 1 month. We monitored the star in 1970 and found significant variations ($\Delta(44) \sim 0^{m}.04$) over two hours. Since then, we have been making extensive spectroscopic observations of this interesting object. Hill has many spectrograms (dispersion 15 Å mm^{-1}) of the star.

November, 1976.

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