TABLE VII

Probable Deviations r *of the Gaussian Distributions of Spectroscopic Absolute Magnitudes for Stars of given True Absolute Magnitude*

Spectral Class	Absolute Magnitude	r
B	all	± 0·42
A	all	± 0·30
F to M	> 3·0	± 0·30
F ,, M	1·0 to 3·0	± 0·42
F ,, M	< 1·0	± 0·55

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THE RADIAL VELOCITIES OF 343 STARS.

G. Shajn and V. Albitzky.

The present paper gives an abstract of the results of radial velocity observations secured during 1929–31 at the Simeis branch of the Pulkovo Observatory with the 40-inch reflector made by Sir Howard Grubb & Co. A detailed account of the work will shortly appear in the publications of the Pulkovo Observatory.

The spectrograph, used at the Cassegrain focus, is that of the Société Genevoise d'Instruments de Physique, with optical parts by Zeiss. The prism is of Jena glass, catalogue type 0·118″, and the camera objective is of Zeiss chromatic type (focal length 550 mm.), giving a satisfactory definition from λ 3600 to $H\alpha$, the difference in focus being about 0·25 mm. The linear dispersion is about 36 A. per millimetre at $H\gamma$. With the dispersion used, in good atmospheric conditions an hour's exposure gives the spectrum of a star of magnitude 6·3.

For the reductions of spectrograms two systems of wave-lengths have been used for the early- and late-type stars separately. The former is that compiled at Victoria.* For G, K and M stars we have used the lines and wave-lengths from the Mount Wilson Catalogue of 1013 stars.† A correction was added to reduce the wave-lengths in both systems to the international system.

The programme includes 301 stars mostly between magnitudes 5·75 and 6·50, and, in addition, 42 standard and other stars, with well-known velocities, down to magnitude 4·9 from the Lick Catalogue.‡ The main observed material is far from homogeneous as regards spectral type, but contains rather a selection of stars whose radial velocities have not hitherto been observed. Among the stars of Table I the percentages of types B8–A5, F and G–K are 34, 45 and 21 respectively. The inclusion of 135 stars of

* *Pub. D.A.O., Victoria*, **2**, No. 1, 1921.
† *Ap. J.*, **57**, 149, 1923.
‡ *Pub. Lick Obs.*, **16**, 1928.

type F in List 1 increases by about 15–20 per cent. the number of published velocities of this class. The spectrograms of the stars of types B, A and F may be of interest for the future investigation of the diffuseness, width, depth and other characteristics of spectrum lines, which for the stars even of the same spectral sub-class are highly various.

A minor detail of the programme is the attention paid to the radial velocities of double stars. We think that in three cases—βGC 1939, 6872 and 8788—the common radial velocity for both components may be considered as probably real.

Among the stars of List 1 there is a considerable number of new spectroscopic binaries: 15 B8–A5, 14 F0–F5 and 1 G5.

A large radial velocity was found for HR 1908.

In order to derive and check the systematic error we have obtained the radial velocities of the standard and other brighter stars. An investigation of the systematic error on the basis of the study of the stars with known velocities shows that a correction $-0{\cdot}5$ km./sec. is to be added to the velocities of stars of types G, K, M and $-0{\cdot}1$ km./sec. to those of the B8–F8 stars.

The accuracy of the observations depends largely on the quality of the spectra. In the case of G–M and A–F stars with numerous and good lines the probable error of the velocity is about $\pm$ 1·2 km./sec., and that for a single plate is $\pm$ 2·4 km./sec.; for the early-type stars with few good or many fair lines the probable errors of a velocity and of a plate are $\pm$ 1·5 and $\pm$ 3·0 respectively; for the spectra with many poor lines the corresponding errors are $\pm$ 2·4 and $\pm$ 5·1; and, lastly, for the spectra with few and poor lines, $\pm$ 3·5 and $\pm$ 7·0 km./sec. respectively.

A by-product is the investigation of the system of wave-lengths of the lines used at Mount Wilson (mostly for late-type stars) and that for type A–F elaborated at Victoria. This is carried out on the basis of the residuals of radial velocities for individual lines on all good spectrograms. For many lines there are found sensible residuals which are primarily due to the errors of the assumed wave-lengths of the lines in question, and partly to the difference in the constants of the spectrographs (resolving power, purity). For several lines there is found a variation of wave-length with spectral type between the limits A–F and G–M. A detailed investigation of the problem in question and also of the systematic error and its dependence on the instrumental and other factors will be given in a Bulletin of the Pulkovo Observatory.

In Tables I and II, which are self-explanatory, are given the radial velocities of faint stars (List 1) and brighter ones (List 2). On the average, four spectrograms for each star were obtained. Many spectrograms were measured twice. With regard to List 1, V. Albitzky (A) is responsible for 118 stars and 521 spectrograms, G. Shajn (S) for 185 stars and 798 spectrograms, and other observers for 14 spectrograms.

The measurers are: V. Albitzky, 497; Mrs. P. Shajn, 1299; and G. Shajn, 499 spectrograms. In addition, Mrs. M. N. Abramova and Mrs. F. M. Neujmina have partly shared in the computations.

TABLE I

(*List* 1)

Star HR	α 1900	δ 1900	Vis. Mag.	Spec.	Rad. Vel. km./sec.	No. of Plates	P.E.	Obs.	
	h m	° ′							
17	0 3·5	+36 4	6·14	F5	− 14·0	4	±1·0	A	
40	8·2	+26 25	6·30	F5	− 13·0	4	1·8	A	
50	9·8	+ 8 16	5·87	F5	...	4	...	A	Sp. Bin. Two spectra. Separation 186 km.
59	11·5	+ 7 41	6·19	G5	+ 3·7	3	3·0	A	
71	13·4	+30 58	5·80	Ao	− 4·2	4	1·2	A	
81	15·8	+10 25	6·55	Ao	− 17·8	4	2·3	A	
131	27·3	+19 45	5·53	G5	− 13·0	4	1·6	A	M.W. −11·5
143	30·4	− 1 4	5·93	F8	+ 4·3	4	0·7	S	
145	30·7	+12 40	6·40	F5	− 24·5	4	0·9	S	
149	31·1	+26 42	6·26	B8	+ 1·0	4	2·6	S	
205	40·7	+44 18	5·99	B8	− 6·6	4	1·4	S	
214	41·9	+19 1	6·06	A5	− 5	4	4·7	S	
249	48·0	+36 53	6·13	Ko	− 3·4	4	1·7	S	
254	49·3	+18 38	5·76	Ao	+ 8	4	6·0	S	
272	52·0	+45 18	6·24	Ko	+ 5·2	4	0·4	S	
275	52·7	+33 26	6·22	Ko	− 16·8	4	0·5	S	
277	53·0	+20 52	6·41	Ao	− 1	4	4·7	S	
289	57·3	+46 50	6·36	Fo	− 3·2	4	1·3	S	
HD 6226	58·2	+47 6	6·70	B8*p*	− 48·7	4	1·8	S	Ca^+ −18 km.
303	58·9	+29 9	6·08	F5	+ 4·1	4	1·3	S	
385	1 14·7	− 1 2	6·01	F5	+ 10·5	3	2·9	A	
407	20·1	+23 0	6·07	F5	...	4	...	A	Sp. Bin. Range 29 km. Plaskett, *J.R.A.S.C.*, 13, 193, 1919.
410	20·4	+34 4	6·26	F5	+ 15·1	4	1·6	A	
415	21·4	+33 50	6·28	F5	+ 14·5	4	1·0	A	
455	30·4	+14 9	6·20	B9	− 16	4	3·0	S	
457	30·5	+16 55	5·88	A5	− 2	4	3·0	S	
463	31·8	+11 38	5·63	Fo	− 5·5	5	1·7	S	
515	41·2	+16 55	6·46	Fo	− 8·1	4	1·9	S	
577	54·1	+20 34	6·06	Ko	− 1·8	4	1·3	S	
605	58·0	+25 28	5·68	F5	+ 14·4	4	0·9	S	
634	2 5·6	+31 3	6·20	Ao	...	9	...	A	Sp. Bin. Two spectra. Separation 135 km.
729	25·0	+19 25	6·14	Fo	+ 12·7	4	2·1	A	
738	26·8	+34 6	5·90	G5	− 2·7	3	0·7	A	
741	27·5	+14 36	6·07	F5	...	6	...	A	Sp. Bin. Range 27 km.
756	30·7	+38 18	5·94	F5	+ 0·4	4	1·9	S	
757	30·8	+31 10	6·16	Ko	+ 3·0	4	1·0	S	
760	31·1	+39 27	6·40	B8	...	3	...	S	Sp. Bin. Range 62 km.
761	31·1	+32 27	6·29	F5	+ 2·9	4	1·4	S	
770	32·7	+ 7 16	6·46	F5	+ 13·0	4	1·1	S	
816	40·1	+ 4 17	6·02	Fo	+ 19·9	4	1·7	S	
820	40·9	+35 9	6·34	F2	− 4·5	4	1·1	S	
856	47·6	+16 5	6·38	F2	+ 8·4	4	2·2	S	
927–8	59·6	+24 52	6·11	B8	+ 9·1	4	2·1	S	
958	3 7·1	+ 6 18	5·84	G5–A5	+ 3·6	4	1·9	A	
975	9·6	+32 29	6·34	Fo	+ 14·4	4	0·6	A	
995	14·0	+26 43	5·94	G5	− 1·1	4	2·2	A	
1039	21·8	+12 23	6·20	Ao	...	4	...	A	Sp. Bin. Range 32 km.
1067	25·4	+ 5 51	6·12	G5	+ 12·4	3	0·5	A	
1118	34·8	+25 0	6·15	Ao	...	4	...	S	Sp. Bin. Range 52 km. Plaskett, *J.R.A.S.C.*, 13, 193, 1919.

Star HR	α 1900	δ 1900	Vis. Mag.	Spec.	Rad. Vel. km./sec.	No. of Plates	P.E.	Obs.	
	h m	° ′							
1137	3 38·6	+20 37	6·03	B9	...	4	...	S	Sp. Bin. Range 54 km.
1194	45·7	+12 45	6·16	B9	+ 16·3	4	1·1	S	
1211	49·2	− 3 14	6·33	A3	+ 20·2	4	1·7	S	
1279	4 2·0	+14 54	5·94	Fo	+ 33·4	4	0·6	A	
1297	7·0	+22 9	6·16	B8	...	3	...	A	Sp. Bin. Range 24 km.
1319	10·1	+15 9	6·35	F5	+ 33·2	4	1·1	A	
1391	20·0	+15 43	6·39	F8	+ 33·7	4	1·1	A	M.W. +38·7.
1422	24·4	+15 25	5·70	Fo	+ 26·2	4	1·4	A	Sp. Bin. Victoria. Yerkes +20·7.
1432	26·2	+15 38	6·04	Fo	+ 26·7	4	2·3	A	
1459	30·5	+23 9	6·04	F2	+ 43·2	4	1·6	S	
1462	31·0	− 3 49	6·29	B9	+ 20	4	3·3	S	
1477	33·3	+25 2	6·27	A3	+ 17	4	2·5	S	
1499	37·2	+23 55	6·18	Go	+ 9·7	4	1·2	S	
1554	46·5	+27 44	5·91	F2	+ 37	4	5·0	S	
1566	49·0	+19 20	6·24	Fo	+ 31	4	2·8	S	
1591	52·2	− 1 14	6·23	F2	+ 11·6	4	2·1	S	
1691	5 6·6	+ 0 55	6·07	F5	− 19·4	5	3·3	A	
1822	23·4	+29 7	6·24	F5	+ 12·6	4	0·9	A	
1889	30·3	+25 53	6·32	F5	+ 2·6	4	2·1	S	
1908	31·5	+10 58	6·10	Ko	−118·8	4	0·9	S	
1967	38·0	− 6 51	5·98	F5	− 11	3	...	S	
1978	39·7	+ 3 58	6·14	Fo	+ 7·0	4	1·5	S	
2076	51·2	+11 30	6·08	G5	+ 21·5	4	1·6	S	
2111	54·7	+27 35	6·08	B8*p*	+ 16·6	4	1·6	S	
2122	56·3	+32 38	6·23	F5	+ 34·1	4	0·7	S	
2137	58·2	+37 58	6·40	F8	+ 5·1	4	1·3	S	
2139	59·0	+33 36	6·10	B9	+ 24·9	4	0·9	S	
2259	6 13·2	+ 9 6	6·38	Ko	− 14	4	3·6	A	Possibly Sp. Bin. Range 25 km.
2313	20·2	− 0 52	5·85	Fo	+ 44·1	4	0·5	A	
2339	22·7	+27 2	6·49	F5	− 6·9	3	1·3	A	
2452	34·9	+36 3	6·33	F5	+ 86·3	4	1·3	S	
2539	46·2	+38 59	6·06	F2	+ 2·7	4	1·2	S	
2542	46·4	+35 54	6·18	G5	+ 6·2	4	0·8	S	
2597	51·8	+12 2	6·16	Fo	+ 7·9	4	0·9	S	
2601	52·6	+26 13	6·10	F5	+ 6·4	4	0·8	S	
2779	7 14·3	+ 7 19	5·95	F8	+ 21·3	4	0·4	A	
2837	21·1	+20 27	5·88	Fo	− 0·2	4	2·6	A	
2918	31·2	+ 6 5	5·94	F8	+ 3·6	4	1·3	S	
2936	33·5	+32 14	6·14	Fo	+ 31·4	4	0·4	S	
3132	55·7	+25 22	6·20	Ao	− 8·7	4	1·0	S	
3134	55·8	+16 43	5·91	Ao	...	4	...	S	Sp. Bin. Range 49 km.
3184	8 3·1	+13 56	6·26	F5	− 8·2	4	1·0	A	
3222	7·4	+16 49	6·12	G5	− 20·9	5	1·9	A	
3589	55·9	+28 18	5·95	A5	...	4	...	S	Possibly Sp. Bin. Range 38 km.
3601	58·2	+28 18	6·34	Ao	− 26·1	3	4·9	S	
3625	9 2·7	+34 18	5·95	F8	+ 27·6	4	0·9	A	
3649	6·7	+ 5 53	6·21	Fo	+ 2·4	4	1·5	A	
3794	27·5	+ 2 19	6·15	F5	+ 27·6	4	2·0	A	
3879	41·3	+ 2 15	5·69	F2	+ 16·3	4	2·0	S	
3889	44·2	+21 39	6·01	Fo	+ 21	12	...	S	Sp. Bin. Two spectra. Separation > 80. Range 30 km. Plaskett, *D.A.O.*, 1, 163, 1920.
3893	45·3	+ 4 49	6·24	F5	+ 16·2	21	...	S	Sp. Bin. Two spectra. Separation 205 km.

Star HR	α 1900	δ 1900	Vis. Mag.	Spec.	Rad. Vel. km./sec.	No. of Plates	P.E.	Obs.	
	h m	° ′							
3936	9 52·8	+28 15	6·42	Fo	+ 35	4	...	S	Sp. Bin. Two spectra. Separation is difficult.
4006	10 8·2	+27 39	6·10	G5	...	4	...	A	Sp. Bin. Range 20 km.
4012	9·0	+21 41	6·12	F5	+ 17·3	3	1·8	A	
4079	18·1	+ 6 12	6·50	F2	+ 28·8	4	2·0	A	
4254	49·3	+26 1	6·18	Fo	+ 15·9	4	0·9	S	
4260	50·2	+25 17	6·30	A3	...	5	...	S	Possibly Sp. Bin. Range 52 km.
4410	11 20·7	+ 4 25	6·36	Fo	...	4	...	A	Sp. Bin. Range 34 km.
4433	25·3	+18 58	5·74	Ko	+ 30·5	3	2·0	A	
4455	29·3	+ 3 37	5·81	F5	− 0·4	4	1·4	A	M.W. +7·3
4533	43·9	+ 0 14	6·24	F8	+ 2·2	4	1·7	S	
4536	44·5	+35 29	5·76	F5	...	3	...	S	Sp. Bin. Range 65. Plaskett, *D.A.O.*, 1, 163, 1920.
4642	12 6·9	+29 6	6·40	F2	− 9·9	4	1·3	A	
4680	12 13·5	+30 49	6·15	F5–A2	− 8	4	±3·6	S	Exceptionally poor spectrum. An impression of super-position of two spectra. M.W. −31 km.
4684	14·0	+26 34	6·39	A3	+ 10	4	3·9	S	
4705	17·2	+25 19	6·02	Ao	− 4·1	5	0·9	S	
4746	22·8	− 4 4	6·03	F2	...	4	...	A	Sp. Bin. Range 50 km. M.W. −14·0
4780	28·6	+24 50	6·14	A2	+ 2·6	4	1·8	S	
4793	30·2	+22 26	6·06	Ko	− 13·9	4	1·9	S	
4822	36·1	−12 28	5·98	F5	...	4	...	S	Sp. Bin. Range 35 km.
4821	36·1	−12 28	6·08	F2	...	4	...	S	Sp. Bin. Range 90 km.
5007	13 11·4	+19 36	6·54	G5	− 44·9	4	1·3	A	
5050	19·3	− 4 39	5·76	F2	...	5	...	A	Sp. Bin. Range 19 km.
5088	25·2	− 5 57	6·07	A5	...	4	...	A	Sp. Bin. Range 36 km.
5143	35·8	+31 31	6·08	G5	− 14·0	4	1·1	S	
5161	38·3	+35 30	5·98	Ko	− 26	4	2·7	S	
HD 120005	41·7	+31 22	6·55	F5	...	5	...	S	Sp. Bin. Range 45 km.
5180	42·0	+39 0	6·00	Ko	− 11·9	4	0·6	S	
5258	54·6	− 3 3	6·30	F5	− 8·6	3	1·5	S	
5270	57·6	+10 11	6·12	Go	− 21·1	4	1·9	S	
5342	14 11·3	− 2 44	6·03	Ao	+ 1·6	5	1·8	A	
5385	18·5	+ 8 54	6·64	F2	− 20	3	2·9	S	
5387	18·6	+25 48	6·15	F2	− 11·5	4	0·8	A	
5441	29·3	+37 24	6·44	F5	+ 0·9	4	0·6	A	
5476	36·0	+16 51	5·81	Ao	− 16	4	2·8	S	Yerkes from +2·2 to +30·0.
HD 129537	38·0	+15 8	6·61	F2	− 23·1	4	1·9	S	
5522	43·8	− 0 26	6·06	Ao	− 15	4	2·8	S	
5534	45·8	+24 20	5·81	Gop	+ 3·4	4	0·9	S	
5631	15 2·7	+ 5 52	6·22	G5	+ 4·5	4	1·7	A	
5639	4·1	+13 37	6·07	Ko	− 48·6	4	1·5	A	
5726	18·9	+39 56	5·85	K5	− 11·1	5	1·3	A	
5740	21·4	+19 59	6·29	Go	− 2·9	4	1·8	A	
5796	31·1	+11 35	6·11	G5	− 23·8	5	1·9	S	
5804	31·9	+16 27	5·88	Fo	− 6·0	4	1·6	S	
5813	32·8	+30 19	6·52	F5	− 12·8	4	2·2	S	
5827	34·9	+35 0	6·19	Ko	+ 4·8	4	0·6	S	
5853	39·1	+ 2 50	5·80	G5	+ 9·4	4	0·6	S	
5874	43·6	+14 6	6·10	Ko	− 55·2	4	1·0	S	
5875	43·7	− 3 31	5·61	A3	− 18·3	4	1·1	S	

Star HR	α 1900	δ 1900	Vis. Mag.	Spec.	Rad. Vel. km./sec.	No. of Plates	P.E.	Obs.	
	h m	° ′							
5913	15 49·1	+16 23	6·14	F2	− 3·0	4	1·8	S	
5919	49·8	+ 8 52	6·20	A2	− 2·1	4	3·7	S	
5983	59·6	+36 55	5·85	F5–A2	− 5	4	4·0	S	
5989	16 0·4	− 6 1	6·36	F5	− 10·6	7	0·6	A, S	According to A, possibly Sp. Bin. A plate not included in the mean gives −32 km.
6014	4·3	+ 6 41	6·02	G5	− 3·9	3	1·7	A	
6041	7·7	− 3 58	6·08	Ao	− 16·4	3	1·9	A	
6067	11·6	− 3 42	6·12	Fo	− 11·3	4	3·6	A	
6087	15·8	+21 23	6·14	G5	− 23·9	4	2·2	A	
6124	21·9	+ 2 35	6·18	G5	+ 1·0	4	0·9	A	
6144	25·1	− 7 17	6·39	A5	− 0·9	3	1·9	S	
HD 149504	30·2	+38 18	6·59	F5	− 49·4	4	1·0	S	
6181	33·2	+13 54	6·20	F2	− 21·2	4	1·1	S	
6239	43·5	+13 46	6·32	G5	+ 1·0	4	0·5	S	
6277	49·0	− 1 27	6·21	Fo	− 21	4	4·8	S	
6290	50·7	+13 47	6·16	F2	...	4	...	S	Sp. Bin. Range 32 km.
6333	58·2	+25 40	5·95	Ko	− 49·4	4	0·8	S	
6341	59·1	+13 44	5·86	Ao	− 37·8	4	0·3	S	M.W. −37.
6349	17 0·2	+ 0 49	5·94	F8	− 18·0	3	0·2	S	M.W. −18·6.
6352	0·4	+19 45	6·13	Ao	− 30·2	4	4·1	A	
6353	0·4	− 0 45	5·62	B3	...	4	...	A	Possibly Sp. Bin. Range 21 km. Ca^+ −26·2.
6367	3·1	− 0 57	6·02	Ao	− 17·7	5	4·2	A	
6469	18·4	+40 5	5·72	F8	...	4	...	A	Sp. Bin. Plaskett, *D.A.O.*, 1, 171, 1920.
6488	20·7	+38 41	6·42	F8	− 26·0	4	0·6	A	
6489	20·7	− 1 32	6·31	F5	− 23·8	3	4·5	A	
6499	22·0	+26 57	6·36	A5	− 28·7	4	2·1	A	
6524	26·4	+ 2 48	5·59	Gop	...	5	...	A	Sp. Bin. Harper, *D.A.O.*, 1, 297, 1921.
6541	29·1	+19 20	5·59	F5	− 58·6	4	0·6	A	M.W. −61·0.
6577	34·4	+13 23	6·29	F2	...	4	...	S	Sp. Bin. Range 37 km.
6609	39·5	+ 2 37	6·25	Ao	− 40·6	4	1·0	S	
6610	39·6	+ 2 37	6·64	Ao	− 25	4	3·0	S	
6619	41·9	+31 33	6·25	B9	+ 1·0	4	1·0	S	
6655	46·6	+22 20	5·91	A3	+ 4·0	4	1·3	S	
6676	49·6	+11 10	6·26	F2	...	4	...	S	Sp. Bin. Range 38 km.
6686	51·5	− 4 4	5·60	Ko	− 40·8	3	1·4	S	
6719	56·0	+ 6 16	6·18	B8	...	4	...	S	Probably Sp. Bin. Range 29 km.
6720	56·1	+19 31	6·42	B9	− 29	4	2·7	S	Ca^+ −23 km.
6722	56·4	+15 7	6·30	G5	+ 4·3	4	0·3	S	
6726	56·9	+33 14	6·07	K5	− 15·3	4	0·7	S	
6754	18 0·6	+23 56	6·25	Fo	− 37·8	3	1·3	A	
6764	1·5	+40 5	6·48	F5	− 1·0	4	1·2	A	
6776	3·2	+13 3	6·46	Ao	− 21·4	4	1·4	A	
6784	4·0	+14 16	6·30	A2	− 8·7	4	0·1	A	
6797	4·8	+ 3 6	5·73	F5	− 15·8	4	1·4	A	
6882	18·0	+23 14	5·66	K5	− 57·4	5	0·4	A	M.W. −57·4.
6898	19·8	− 1 38	6·11	F5	− 11·1	4	3·2	A	
6955	26·6	+16 52	5·67	Ao	− 8·2	4	1·7	A	
6957	26·8	− 1 4	5·81	A2	− 27·3	5	1·4	A	
7047	40·5	+23 29	6·17	F2	− 10·4	4	2·0	S	
7057	41·3	+37 30	5·87	A5	− 28	5	2·7	S	
7079	44·1	+23 24	6·04	F5	− 0·2	4	0·9	S	
7101	46·1	− 3 26	6·04	A3	+ 12·9	4	1·5	S	M.W. +12.

Star HR	α 1900	δ 1900	Vis. Mag.	Spec.	Rad. Vel. km./sec.	No. of Plates	P.E.	Obs.	
	h m	° ′							
7140	18 51·2	+33 51	6·08	Go	− 24·7	4	1·4	S	
7143	51·2	− 1 56	6·20	Ao	− 22·6	4	2·5	S	
7163	53·5	+ 6 7	6·38	F5	− 9·4	4	1·9	S	
7171	54·5	+19 39	6·22	B8	− 1·0	3	3·0	S	
7204	57·3	+33 40	6·15	Ko	− 25·8	4	0·3	S	
7209	57·6	− 3 51	5·55	Ao	− 42·7	4	0·8	S	Yerkes −33·2.
7222	59·4	+21 7	6·50	F2	+ 4·0	3	1·8	S	
7250	19 2·5	+24 6	5·72	A5	− 20·5	4	1·2	A	
7260	3·5	+16 43	5·99	G5	...	29	...	A	Sp. Bin. Adams, Joy, Sanford, *P.A.S.P.*, 36, 138, 1924. Range 27 km.
7308	12·0	+27 45	6·06	F8*p*	− 18·2	4	2·0	A	
7332	15·2	+11 21	6·02	A2	− 22·5	4	3·4	A	
7354	18·0	+ 9 43	6·25	F8	− 19·5	3	0·5	A	
7357	18·6	+14 44	6·56	A3	+ 4·0	4	1·8	A	
7389	21·8	+12 49	5·77	F5	− 34·6	4	1·6	A	M.W. −33·9.
7421	27·2	+26 24	5·96	Ko	− 5·0	4	1·5	A	
7438	30·4	+ 2 42	6·50	F2	+ 3·4	4	1·8	S	
HD 184905	31·5	+43 43	6·58	Ao*p*	− 11·7	4	0·7	S	
7452	31·8	+22 22	6·12	B9	− 31	4	3·0	S	
7454	31·9	−14 31	5·60	F8	− 25·3	4	1·5	S	
7456	32·1	+11 3	6·16	G5	− 0·1	4	0·6	S	
7460	32·5	− 4 52	5·52	F2	− 38·8	4	1·5	S	
HD 196885	35·1	+10 53	6·42	F8	− 28·3	4	1·2	S	
7493	37·5	+11 58	6·26	B9	− 31·8	4	1·8	S	
7501	38·8	+29 5	6·44	Fo	− 26·2	4	0·8	S	
7505	39·3	+30 26	6·06	B9	− 30·6	4	2·4	S	
7540	43·6	+25 8	6·04	Ko	− 16·7	4	0·6	S	
7542	43·7	+10 26	6·38	Go*p*	− 4·9	4	1·9	S	
7556	45·9	+28 12	6·29	B8	...	5	...	S	Probably Sp. Bin. Range 47 km.
7569	47·4	+11 23	6·18	Go	− 16·7	4	1·5	S	
7573	47·8	+24 44	5·67	F5–A2	+ 0·7	4	1·4	S	
7598	49·8	+ 6 53	5·97	Ao	− 17·5	4	2·0	S	
7607	51·1	+29 56	6·36	B9	− 11	5	4·9	S	
7656	57·5	+24 31	5·75	B8	− 15·0	4	2·6	S	
7662	58·8	+18 14	6·14	K2	+ 9·5	5	±1·2	S	
7677	20 0·6	+22 55	6·41	A3	− 19·5	4	4·9	A	
7690	2·9	− 0 58	6·04	G5	− 4·6	4	2·3	A	
7693	3·1	+ 9 6	6·38	F5	− 32·3	4	1·1	A	
7719	7·8	+26 11	5·91	B8	...	4	...	A	Sp. Bin. M.W., *Ap. J.*, 35, 178, 1912.
7723	9·3	+23 56	6·48	Ao	− 39·5	4	2·0	A	
7743	11·6	+33 26	5·78	G5	− 7·9	4	0·9	A	M.W. −10·6.
7769	14·8	+36 41	5·52	Ao	...	4	...	A	Sp. Bin. Range 26 km. M.W., *Ap. J.*, 35, 178, 1912.
7774	15·3	+13 14	5·96	A5	− 9·4	4	1·5	A	
7793	18·2	+14 13	6·22	F5	− 2·2	4	0·9	A	
7807	20·0	+37 10	5·68	B3	− 9	4	4·9	A	
7823	23·3	+34 0	6·41	Fo	− 14·5	4	0·6	A	
7836	25·5	+10 34	5·92	Ao	− 15·3	4	1·6	A	
7874	31·8	+25 34	6·29	A2	− 19·0	23	...	S	Sp. Bin. Range 116. Orbit, Pulkovo Obs. Circular No. 1, 1932.
7878	32·2	− 0 15	6·16	B8	− 23·3	4	1·9	S	
7885	33·4	+31 13	6·24	Ao	− 15	5	4·2	S	

Star HR	α 1900	δ 1900	Vis. Mag.	Spec.	Rad. Vel. km./sec.	No. of Plates	P.E.	Obs.	
	h m	° ′							
7890	20 34·0	− 2 46	6·26	B9	...	5	...	S	Possibly Sp. Bin. Range 52 km.
7917	36·5	+29 27	6·09	Ao	...	4	...	S	Sp. Bin. Range 39 km.
7974	44·9	+ 7 30	6·23	Ao	− 29	28	...	S	Sp. Bin. Range 82 km. Period 1·1021.
8005	49·8	+33 3	5·68	K2	− 8·5	4	1·5	S	
8030	53·6	+10 28	5·61	Ko	− 2·1	4	0·8	S	
8051	57·3	+35 38	6·08	Ko	− 7·4	5	0·8	S	
8056	58·0	+ 1 8	6·50	F5	+ 7·3	4	1·0	S	
8059	58·7	− 6 13	5·89	F5	− 3·8	4	1·4	S	M.W. +0·6.
8095	21 5·0	+ 2 32	6·47	F2	− 45·0	4	1·7	A	
8116	8·8	+15 34	6·20	A5	− 27·0	4	4·5	A	
8157	15·4	+37 49	5·83	F2	− 15·2	4	0·9	A	
8189	19·3	+36 58	6·58	F8	− 27·2	4	2·4	A	
8250	30·1	+22 19	6·37	F8	+ 13·7	8	0·9	A, S	
8265	32·7	+ 6 10	6·05	Ao	− 8·0	4	2·5	S	
8274	34·2	+25 4	6·30	G5	− 13·5	4	0·5	S	
8292	37·6	+10 21	5·95	B8	+ 6·3	4	1·2	S	
8314	39·8	+14 19	6·10	Go	− 18·4	4	1·1	S	
8349	47·0	+39 5	6·19	B9	+ 0·3	4	1·5	S	
8354	48·0	+28 20	5·62	F5	+ 18·0	3	1·3	S	
8363	49·4	− 3 46	6·18	F8	− 15·5	4	2·1	S	
8364	49·6	+19 15	6·33	Ko	+ 4·5	4	0·9	S	
8376	53·0	− 5 54	6·21	F2	+ 0·6	4	1·2	S	
8401	58·0	− 7 1	5·60	G5	+ 30·2	4	1·8	S	
8441	22 3·7	+25 3	6·03	F8	...	4	...	A	Sp. Bin. Range 6 km. Young, *D.A.O.*, 1, 175, 1920.
8455	5·5	+19 8	6·07	Go	+ 40·2	4	1·4	A	
8459	5·8	+20 29	6·40	A2	+ 7·8	4	2·5	A	
8491	11·0	+ 8 3	6·03	Ao	...	4	...	A	Sp. Bin. Range 89 km.
8584	27·0	+29 2	6·32	A5	...	26	...	A	Sp. Bin. Range 167 km.
8586	27·7	+19 43	6·31	Fo	− 19·9	5	1·8	A	
8604	31·6	+35 4	6·20	Ko	− 15·4	5	0·8	S	
8653	38·7	+10 26	6·43	F5	− 2	4	3·4	S	
8681	44·5	+ 9 58	6·46	Fo	− 15	4	4·1	S	
8706	48·6	+39 37	6·24	B8	+ 6·5	4	1·3	S	
8715	49·9	+ 0 32	6·05	A3	+ 12·2	4	0·7	S	
8723	51·1	+35 50	5·63	B9	+ 0·9	4	0·6	S	
8735	53·3	− 1 57	6·40	F2	− 14·9	4	1·0	S	
8738	53·7	+ 6 48	6·28	Ao	− 2·4	4	2·0	S	
8776	59·0	+ 6 4	6·34	F2	+ 3·0	4	1·2	S	
8782	59·9	− 8 14	5·56	Fo	− 19	4	2·7	S	
8838	23 9·6	+29 13	6·42	F5	+ 9·6	4	2·0	A	
8840	10·4	− 4 3	5·55	A2	...	4	...	A	Sp. Bin. Range 57 km.
8845	11·0	+24 15	6·52	F2	+ 4·9	3	2·2	A	
8868	14·2	− 5 40	5·70	F2	...	11	...	A	Sp. Bin. Range 74 km. Adams, Joy, Sanford, *P.A.S.P.*, 36, 138, 1924.
8873	14·6	+34 15	6·14	B9	− 6·5	3	1·3	A	
8891	17·7	+20 16	6·22	Ao	...	4	...	A	Sp. Bin. Range 43 km. Adams, Joy, Sanford, *P.A.S.P.*, 36, 138, 1924.
8944	29·0	− 1 48	5·98	Ao	− 2·8	4	1·8	A	
8962	32·7	+43 52	5·86	B9	− 11	4	4·6	S	
8977	35·6	+36 9	6·30	F5	− 0·2	4	1·0	S	
9015	43·7	+ 1 39	6·42	F2	...	4	...	S	Sp. Bin. Range 32 km.

Star HR	α 1900	δ 1900	Vis. Mag.	Spec.	Rad. Vel. km./sec.	No. of Plates	P.E.	Obs.
	h m	° ′						
9024	23 44·6	+35 53	5·91	G5	+ 0·8	6	1·0	S
9048	50·0	+ 6 31	6·12	B9	+ 15·4	4	1·2	S
9086	56·6	+41 49	6·13	B9	− 15	4	3·4	S
9093	57·4	+ 7 56	5·78	Fo	+ 8·2	5	1·5	S

TABLE II

(*List* 2)

Star HR	α 1900	δ 1900	Vis. Mag.	Spec.	Rad. Vel. km./sec.	No. of Plates.	Probable Errors		Obs.	Lick Velocity km./sec.
							Mean	Plate		
	h m	° ′								
β Cas	0 3·8	+58 36	2·42	F5	+14·7	6	±0·9	±2·3	S	+11·8
ε And	33·3	+28 46	4·52	G5	−81·5	4	1·0	2·1	A	−83·4
β And	1 4·1	+35 5	2·37	M*a*	+ 0·6	7	1·3	3·5	S	+ 0·5
η Psc	26·1	+14 50	3·72	G5	+15·9	11	0·5	1·8	A, S	+15·3
α Ari	2 1·5	+22 59	2·23	K2	−12·6	13	0·6	2·1	A, S	−14·1
α Cet	57·1	+ 3 42	2·82	M*a*	−29·0	4	0·7	1·4	S	−25·3
α Tau	4 30·2	+16 18	1·06	K5	+56·5	18	0·4	1·6	A, S	+54·9
π^3 Ori	44·4	+ 6 47	3·31	F8	+22·4	8	0·5	1·6	A, S	+25·0
χ^1 Ori	5 48·5	+20 16	4·62	F8	−11·0	3	1·5	2·6	A	−14·1
α CMi	7 34·1	+ 5 29	0·48	F5	− 3·4	8	1·0	2·8	S	− 3·0
β Gem	39·2	+28 16	1·21	Ko	+ 7·2	8	0·4	1·7	A, S	+ 3·6
ε Leo	9 40·2	+24 14	3·12	G0*p*	+ 3·2	3	1·3	2·2	S	+ 4·5
η Leo	10 1·9	+17 15	3·58	A0*p*	− 0·7	3	0·4	0·7	A	+ 2·1
40 Leo	14·3	+19 59	4·97	F5	+11·2	4	0·9	1·8	A	+ 5·8
ι Leo	11 18·7	+11 5	4·03	F5	− 9·8	7	1·0	2·6	A, S	−10·0
β Vir	45·5	+ 2 20	3·80	F8	+ 3·7	10	0·4	1·5	A, S	+ 4·9
42 Com	13 5·1	+18 4	4·47	F5	−17·5	8	1·2	3·5	A, S	−17·5
β Com	7·2	+28 23	4·32	Go	+ 8·2	4	0·5	1·0	S	+ 5·4
τ Boo	42·5	+17 57	4·51	F5	−13·8	10	0·6	2·2	A, S	−15·7
α Boo	14 11·1	+19 42	0·24	Ko	− 2·3	33	0·4	2·6	A, S	− 5·4
σ Boo	30·3	+30 11	4·48	Fo	+ 1·0	10	0·7	2·7	A, S	+ 0·2
η CrB	15 19·1	+30 39	5·05	Go	− 3·9	4	1·9	3·9	A	− 6·6
ε Ser	45·8	+ 4 47	3·75	A2	− 9·1	10	0·8	2·6	S	− 9·8
γ Ser	51·8	+15 59	3·86	F5	+ 7·8	17	0·6	2·1	A, S	+ 6·9
δ Oph	16 9·1	− 3 26	3·03	M*a*	−19·8	10	0·9	3·8	A, S	−19·9
α Her	17 10·1	+14 30	3·48	M*b*	−34·0	16	0·5	2·0	A, S	−32·6
β Oph	38·5	+ 4 37	2·94	Ko	−13·3	3	1·5	2·6	S	−12·2
μ^1 Her	42·5	+27 47	3·48	G5	−14·4	4	0·9	1·7	S	−16·1
ν Her	54·7	+30 12	4·48	Fo	−21·9	12	0·8	3·0	A, S	−22·1
110 Her	18 41·4	+20 27	4·26	F5	+22·8	15	0·5	2·4	A, S	+22·2
α Sge	19 35·6	+17 47	4·37	Go	+ 1·5	3	1·1	1·9	S	+ 1·6
γ Aql	41·5	+10 22	2·80	K2	− 2·8	19	0·5	2·4	A, S	− 2·4
γ Cyg	20 18·6	+39 56	2·32	F8	− 4·8	6	0·9	2·2	S	− 5·4
41 Cyg	25·3	+30 2	4·09	F5*p*	−18·1	11	0·6	2·0	A, S	−18·6
δ Del	38·8	+14 43	4·53	A5	+ 6·3	11	0·5	1·6	A, S	+ 8·3
β Aqr	21 26·3	− 6 1	3·07	Go	+ 4·0	7	0·3	0·8	A, S	+ 6·8
μ^1 Cyg	39·6	+28 17	4·73	F5	+18·1	5	0·5	1·2	A	+18·5
ε Peg	39·3	+ 9 25	2·54	Ko	+ 3·1	16	0·5	2·0	A, S	+ 4·7
α Aqr	22 0·6	− 0 48	3·19	Go	+ 6·6	4	1·5	2·9	A	+ 7·6
ξ Peg	41·6	+11 40	4·31	F5	− 5·6	11	0·9	3·2	A, S	− 4·5
β Peg	58·9	+27 32	2·61	M*a*	+ 9·6	4	1·5	3·0	S	+ 8·7
ι Psc	23 34·8	+ 5 5	4·28	F8	+ 3·3	20	0·3	1·5	A, S	+ 5·6

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