THE RADIAL VELOCITIES OF FAINT CLASS B STARS IN THE DECLINATION ZONE 0° TO −23°*

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ABSTRACT

The radial velocities of 433 stars of spectral classes Oe5–B5 have been determined at the Lick Observatory on a program of observation which includes all stars of this type in the declination zone 0° to −23° given in the *Henry Draper Catalogue*. For 397 faint stars of the present list no previous determinations of radial velocity have been published. The spectra have been classified on the Victoria system. The program was undertaken in co-operation with the Dominion Astrophysical Observatory.

The observations for the determination of the radial velocities of the fainter B-type stars described in the present paper were undertaken early in 1933 in co-operation with the Dominion Astrophysical Observatory, where stars of this spectral type fainter than magnitude 7.5 and north of the celestial equator were being observed. According to arrangement, the author agreed to secure these data for all stars whose spectra were listed as of classes Oe5–B5 in the *Henry Draper Catalogue* in the zone of declination 0° to −23° for which radial velocities had not been previously determined.

The program consisted of 407 stars within these limits of declination, for 389 of which no prior observations had been made. In addition, 26 stars north of the celestial equator were observed, of which 8 are faint stars without previous observations, 3 are spectroscopic binaries, and 15 are bright B stars with well-determined velocities taken here as a check upon the present measures.

The spectrograms were taken with spectrographs giving linear dispersions at $H\gamma$ of approximately 75 and 140 A per millimeter, used in conjunction with the 36-inch refractor. Two spectrographs of the greater dispersion were employed, one provided with one prism and a camera of 12 inches focal length, the other with two prisms and a 6-inch camera, the former combination being used for stars brighter than magnitude 8.4 and the latter for those between magnitudes 8.4 and 9.4. The lower dispersion was obtained by replacing the 6-inch camera with one of $3\frac{1}{2}$ inches and was used prior to the spring of 1941 for stars fainter than magnitude 9.4. At that time the surfaces of the two prisms and of the elements of the 6-inch camera lens were coated with thin films of lithium fluoride and magnesium fluoride, respectively, by Dr. John Strong, at the California Institute of Technology. The gain in light resulting from the decreased reflection at the coated surfaces permitted a 50 per cent reduction in the exposure times previously required for the two-prism and 6-inch camera. This instrument was therefore employed in subsequent observations of the fainter stars. In this connection it is of interest to note that an exposure time of 2 hours with this combination and an Eastman Spectroscopic Plate 103a0 gives a well-exposed spectrogram of a star of the eleventh photographic magnitude, which is near the limit of brightness for objects of the present program.

A total of 2990 measurable spectrograms was taken by the writer in the interval June, 1933—February, 1942. These have been measured in the usual way with a Toepfer engine by Miss Doris Roosen Raad and the author—1254 by the former and 2089 by the latter—the measures of 353 plates being by both observers. The number of stellar lines measured on each spectrogram in the region λλ 3900–4600 varied from 3 to 17, depending upon the spectral type and the quality of the lines. The wave lengths adopted for the stellar lines were those recommended by the Radial Velocity Commission of the International Astronomical Union.[1]

Spectrograms of seven brighter class B stars, whose radial velocities previously had

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[1] *Trans. I.A.U.*, **4**, 187, 1932.

been well determined at Mount Hamilton and elsewhere, were taken with the instruments used for the present program. The velocities given by the measures of 84 spectrograms by each observer, when compared with the values for these stars given in *A General Catalogue of the Radial Velocities of Stars, Nebulae and Clusters*,[2] yielded the following mean differences: Lick − Neubauer = +0.8 km/sec; Lick − Miss Roosen Raad = +0.4 km/sec. These differences have been applied to the measures by the respective observers in order to reduce all radial velocities to the Lick system. A comparison of the recent values for 19 stars whose velocities appear to be constant and which have also been measured at Victoria give the mean difference: Lick − Victoria = +0.04 km/sec. Since all available evidence indicates that the Victoria velocities are on the Lick system, this would appear to add further evidence that the radial velocities determined on the present program and entered in column 9 of Table 2 at the end of this article, also conform to the Lick system. The probable error of a radial velocity determination based upon an average of 6 plates per star is approximately ±2 km/sec, and for a single plate about ±5 km/sec.

The region of the K line is generally underexposed on most spectrograms that received normal exposure in the region λλ 4000–4600. For many of the stars, however, one or more spectrograms were given sufficient exposure to obtain the K line in measurable strength; and the author's values of the radial velocity derived from this, which in spectra of this type may be regarded as interstellar, are entered in column 11 of Table 2, followed by the number of spectrograms (in parenthesis) on which the line was measured.

The spectrograms of the 433 stars were utilized for a reclassification of the spectra of these stars on the Victoria system. Three independent estimates of the spectral class of each star were made by the writer by comparing the spectrograms with a standard B-type spectrum under a comparator microscope. The mean of the estimates are entered in column 7 of Table 2.

The class B stars for which the radial velocities are here presented are located in two comparatively limited regions of the sky, one centered at approximately 190° galactic longitude, and the other near 350°. Each of these areas extends about 30° in longitude and lies, for the most part, south of the galactic plane. A discussion of the galactic rotation based upon this material alone evidently would contribute little of value, and it is therefore deferred until the radial velocities for the fainter B stars now under observation at Victoria and Mount Hamilton are available. It is of interest, however, to compare the present radial velocity data with those computed for these stars on the basis of current values for the solar motion and the galactic rotation.

After excluding from the 393 stars those in galactic latitudes higher than ±30°, those for which the probable error of a velocity determination exceed ±6.0 km/sec, and those known to be spectroscopic binaries there remained 349. Two additional stars were excluded because their observed velocity differed more than 50 km/sec from that computed for the combined solar motion and galactic rotation. The 347 stars were then arranged in nine groups, the width of a group being taken as approximately 10° of longitude. Data relating to the nine groups are entered in Table 1, the first six columns of which contain, in order, the group identification, the number of stars in the group, galactic longitude, galactic latitude, the mean magnitude, and the mean radial velocity of the stars in the group.

The velocity due to the sun's motion and galactic rotation was computed from the well-known relation

$$V_c = V_0 \cos D + A\bar{r} \sin 2(l - l_0) \cos^2 b ,$$

in which the solar velocity V_0 was taken as 20 km/sec toward the apex $\alpha = 271°$; $\delta = +28°$; A is taken as equal to 0.015 km/sec per parsec; and l_0 as 325°. The mean distance $\bar{r}$ of the stars in a group was derived on the basis of Wilson's[3] absolute magnitudes for the class B stars and was computed by Trumpler's[4] method, in which allowance

[2] *Pub. Lick Obs.*, **18**, 1932. [3] *Ap. J.*, **94**, 12, 1941. [4] *Ap. J.*, **91**, 186, 1940.

is made for a galactic absorption of 0.7 mag. per kiloparsec. The component of the solar velocity $V_0 \cos D$ is given in column 7 and that of the galactic rotation in column 8 of Table 1, while the residual difference between the mean observed radial velocity of a group and the corresponding computed velocity V_c is entered in the final column. Introduction of a K term in the above expression for V_c, having a value of -5.1, would reduce the sum of the weighted residuals for the nine groups to zero. This value of K, although of the same sign, is larger than that found by Trumpler[5] and by Seyfert and Popper[6] for the fainter stars of class B. It will be noticed, however, that the residuals for the last five groups (the Ophiuchus-Serpens-Scutum region) indicate a smaller value of K (-2.3 km/sec) or one of the order obtained by other observers. There is thus, perhaps, some evidence that the large negative residuals given by the first four groups may be due to the presence of a drift motion of the stars in these groups, which lie in the Orion-Canis Major region.

TABLE 1

COMPARISON OF OBSERVED AND COMPUTED VELOCITIES

Group	Stars	l	b	Observed		Computed		(O−C)
				Mag.	Vel.	(V_0 Cos D	$A\bar{r}$ sin 2 ($l-325°$)	
1.....	11	175°7	−15°0	8.15	+17.6	+18.1	+ 7.0	− 7.5
2.....	31	185.1	− 5.8	8.35	+18.7	+18.6	+10.4	−10.3
3.....	47	194.6	− 2.6	7.83	+17.2	+18.9	+ 8.7	−10.4
4.....	48	203.5	+ .15	8.16	+19.0	+18.6	+ 8.5	− 8.1
5.....	3	321.3	+14.3	7.70	−15.3	−10.6	− 1.0	− 3.7
6.....	61	337.2	− 0.6	8.53	− 7.9	−13.2	+ 4.9	+ 0.4
7.....	107	343.5	− 3.2	8.97	−10.1	−14.4	+ 8.3	− 4.0
8.....	24	354.1	− 4.3	8.68	−10.2	−16.1	+10.0	− 4.1
9.....	15	365.6	− 3.5	8.11	− 6.7	−17.6	+ 8.6	+ 2.3

It is with sincere appreciation that the author acknowledges his indebtedness to Miss Doris Roosen Raad, who measured nearly half of the spectrograms taken on the present program and who rendered valuable assistance in the reduction of the observations.

The data contained in Table 2 are the following:

Col.

1. Number of star in the *Henry Draper Catalogue*
2– 3. Right ascension and declination for the epoch 1900.0
4– 5. Galactic longitude and latitude for the epoch 1900.0
6. Visual magnitude from the *Henry Draper Catalogue*
7. Spectral class on the Victoria system
8. Number of plates used for radial velocity determination. When followed by the letters "a," "b," the plates were taken with both dispersions of 75 A/mm and 150 A/mm. If no letter follows, the 75 A/mm was used

9–10. Radial velocity and its probable error

11. Radial velocity derived from the K line, and in parenthesis the number of plates on which it was measured
12. Remarks: Velocities previously published by Lick are designated by "L"; "V" indicates Victoria; "W," Mount Wilson; "A," Allegheny. The letter "M" refers to Merrill's *Catalogue of Bright Line Stars of Classes B and A*. Variable radial velocity is indicated by "var" and, when doubtful, by "var?" The letter "R" indicates that there is a note at the end of the table

[5] *Ibid.*

[6] *Ap. J.*, **93**, 461, 1941.

TABLE 2

RADIAL VELOCITIES OF 433 CLASS B STARS

HD	α (1900)	δ (1900)	l	b	Mag.	Spec.	Number of Plates	Vel.	P.E.	K Vel.	Remarks	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	
886	0h 8m1	+14° 38′	79°	−47°	2.87	B2ss	36a, b	+ 4.6	± 0.6	.....	L + 5.0	R
955	8.8	−18 06	52	−78	7.25	B5n	8	−33.6	1.6	.....		
20340	3 11.2	−17 12	171	−54	7.82	B3n	82	−24.7	1.4	.....	var	R
21996	27.6	−21 35	180	−52	8.8	B4s	9	+28.1	2.4	.....		
23338	39.3	+24 10	134	−22	4.37	B8	11	+ 6.5	0.9	.....	L + 5.4	R
24131	45.5	+34 03	128	−14	5.73	B2	5	+16.8	1.0	.....	V +18.8	
24431	48.1	+52 21	117	0	6.70	O8k	8	−11.2	1.8	.....	V − 8.6	
25539	58.3	+32 18	132	−14	6.70	B3k	6	+30.1	1.8	+ 6 (3)	V +29.6	
25631	59.0	−20 25	182	−44	6.39	B5n	6	+19.7	4.9	.....		
25638	59.1	+62 04	111	+ 8	7.04	B0nk	6	var.	.....	.....	V SB	R
25639	59.1	+62 04	111	+ 8	7.07	B0nk	35	−18	7	.....	V SB	R
28446	4 24.1	+53 42	120	+ 5	6.61	B0sk	10	− 1.6	1.2	+ 3 (3)	V − 0.7	
30614	44.1	+66 10	111	+15	4.38	O9sek	6	+ 3.3	1.3	− 4 (3)	V + 7.0	
30836	45.9	+ 5 26	161	−22	3.78	B2s	6	+41.5	0.5	.....	A SB	R
31726	53.1	−14 24	181	−30	5.87	B3s	4	+11.4	1.0	.....		
32612	59.3	−14 31	182	−29	6.35	B3s	4	+15.8	2.4	.....		
33203	5 3.5	+37 21	137	0	6.17	B2k	6	+ 8.4	1.1	+ 6 (5)	V + 8.9	
34078	9.7	+34 12	140	− 1	5.81	O9ssk	6	+60.2	1.9	+ 5 (2)	V +59.0	
34447	12.3	−17 15	186	−27	6.48	B2s	4	+11.9	2.6	.....		
35007	16.5	− 0 31	170	−19	5.65	B3	6	+ 6.8	0.9	.....	V + 7.8	
35468	19.8	+ 6 16	165	−14	1.70	B2s	6	+17.9	1.0	.....	L +18.0	R
36285	25.5	− 7 31	178	−20	6.24	B3	6	+ 9.0	0.9	.....	V +12.0	
36337	25.9	+14 51	158	− 9	6.62	B8s	6	+15.5	1.0	.....	V +18.7	
36629	28.0	− 4 38	176	−18	8.0	B3s	4	+21.2	0.8	.....		
36824	29.3	+ 5 35	166	−13	6.71	B5	6	+11.6	1.2	.....	V +11.0	
36827	29.3	− 2 57	174	−17	7.8	B8n	4	+ 4.6	1.3	.....		
36898	29.8	− 0 11	172	−16	7.9	B5s	4	+10.1	1.4	.....		
36954	30.1	− 0 48	172	−16	8.1	B3n	45	+ 0.9	0.7	.....	Orbit	R
36958	30.1	− 4 48	176	−18	8.0	B3	4	+23.3	2.8	.....		
36959	30.1	− 6 05	177	−18	5.58	B1k	8	+29.7	1.4	+31 (2)	V +27.6	
37000	30.3	− 6 00	177	−18	8.4	B7	36	+18.8	0.9	.....	Orbit	R
37025	30.4	− 6 06	177	−18	8.2	B5s	7	+21.7	3.2	.....		
37115	31.0	− 6 41	177	−18	8.2	B5ne	7	+ 9.0	2.4	.....	W	R
37128	31.0	− 1 16	173	−16	1.75	cB0k	6	+28.0	1.2	+20 (3)	L +25.8	R
37334	32.7	− 5 00	176	−17	7.30	B3	5	+28.4	2.0	.....		
37699	35.4	− 2 30	174	−15	9.1	B4n	4	+14.8	2.2	.....		
37776	35.9	− 1 32	174	−15	8.2	B3s	7	+25.5	2.6	.....		
37903	36.7	− 2 18	174	−15	8.6	B3n	6	+ 5.9	1.5	.....		
37971	37.2	−16 46	188	−21	6.10	B5s	6	+15.5	1.9	.....		
38426	40.6	−21 42	193	−23	6.68	B4s	4	+19.1	0.7	.....		
38622	42.0	+13 52	161	− 6	5.20	B3s	6	+26.9	2.3	.....	V +29.3	
39716	49.2	− 6 46	180	−14	8.6	B5s	4	+16.8	0.9	.....		
41541	6 00.7	+42 41	138	+12	6.88	B5	6	+ 4.9	1.7	.....	V + 4.2	
41756	01.9	− 3 20	178	−10	6.75	B5	5	+21.2	1.3	.....	V +17.6	
41814	02.2	−11 10	186	−14	6.38	B5s	8	+12.9	1.6	.....		
42050	03.5	− 5 19	180	−10	8.5	B3s	6	+13.3	2.4	.....		
42051	03.5	− 6 31	182	−11	8.9	B2n	5	+10.3	1.8	.....		
42204	04.3	− 3 46	179	−10	7.9	B5s	5	+13.1	1.0	.....		
42259	04.6	− 5 03	180	−10	8.35	B5ne	7	var.	.....	.....		R
42261	04.6	− 6 18	182	−11	9.1	B4	4	+10.3	2.0	.....		
42745	07.3	−14 25	189	−14	8.1	B3n	5	+12.4	2.4	.....		
42927	08.4	−17 44	192	−15	6.31	B4n	6	+ 8.4	1.6	.....		
43544	11.7	−16 35	192	−14	5.88	B5n	4	+13.6	1.7	.....		
43777	13.0	− 0 21	177	− 6	8.3	B3nk	4	+20.4	1.8	+ 6 (4)		
44081	14.7	−20 53	196	−15	5.66	B5	6	+30.9	0.8	.....		
44743	18.3	−17 54	194	−13	1.99	B1ss	16	+34.2	0.6	.....	L +34.4	R
45585	23.2	− 6 51	184	− 7	8.9	B5n	6	+ 7.2	1.4	.....		
46064	26.0	−13 05	190	− 9	6.09	B2sk	4	+ 2.3	0.5	+ 6 (3)		
46185	26.8	−12 30	190	− 9	6.76	B3	4	+ 6.9	1.3	.....		
46339	27.7	− 4 22	182	− 5	8.9	B3nk	7	+ 6.1	2.0	− 7 (3)		
46380	27.9	− 7 26	185	− 6	8.4	B5ne	5	+15.3	3.4	.....		R
46428	28.2	−12 00	189	− 8	8.5	B4n	6	+10.7	1.6	.....		
46446	28.3	−20 57	198	−12	7.13	B4	6	− 2.0	3.5	.....		
46519	28.8	− 8 06	186	− 6	9.1	B5n	6	+20.0	2.3	.....		
46738	29.9	− 8 32	186	− 6	8.9	B4	5	+ 8.8	± 6.4	.....	var?	

TABLE 2—*Continued*

HD	α (1900)	δ (1900)	l	b	Mag.	Spec.	Number of Plates	Vel.	P.E.	K Vel.	Remarks	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	
47299	6h 32m8	− 8° 34′	187°	− 6°	8.5	B5n	4	+22.5	± 4.5	.....		
47300	32.8	− 9 18	187	− 6	8.6	B9	4	+24.9	3.0	.....		
47761	35.1	− 4 36	184	− 3	8.5	B0ek	6	+29.0	5.7	+25 (5)	var	R
48038	36.3	−12 05	190	− 6	6.78	B2k	4	−10.5	2.3	+ 6 (2)		
48282	37.5	−10 24	189	− 5	9.0	B5ne	4	+24.5	5.7	.....		R
48355	37.9	−22 20	200	−11	8.5	B5n	6	+16.6	2.1	.....		
49097	41.5	−13 44	192	− 6	8.9	B4n	5	+33.4	1.5	.....		
49233	42.3	−23 03	201	−10	8.3	B8	5	+19.5	2.0	.....		
49315	42.7	−15 58	194	− 7	7.54	B5	4	+ 8.6	1.1	.....		
49888	45.5	−12 29	192	− 5	7.4	B5se	4	+ 3.0	0.9	.....		R
49977	45.9	−14 00	193	− 5	7.9	B2ne	6	+15.5	2.7	.....	M	R
50091	46.5	−13 07	192	− 5	8.5	B3n	6	+ 5.6	7.1	.....	var	
50118	46.6	−20 48	199	− 8	7.09	B3n	5	+18.3	2.8	.....		
50230	47.2	− 0 33	181	+ 1	8.7	B3k	6	+17.1	1.9	+11 (5)		
50348	47.7	− 3 34	184	0	8.9	B4n	6	− 0.8	1.5	.....		
50463	48.3	−16 06	195	− 6	6.99	B3	6	+16.6	2.0	.....		
50562	48.7	−21 43	200	− 8	8.5	B3nk	5	+25.3	1.0	+ 8 (4)		
50846	49.8	− 1 15	182	+ 2	8.3	B5s	6	+15.8	4.2	.....		
50891	50.0	− 3 34	184	+ 1	9.2	O8k	5	+41.2	2.2	+10 (5)		
51193	51.3	− 3 40	185	+ 1	8.7	B3nek	6	+59.8	1.8	+16 (6)		R
51200	51.3	−21 54	200	− 8	6.81	B4	6	+10.4	4.3	.....	var?	
51452	52.3	− 4 04	185	+ 1	8.5	B3nk	5	+27.2	4.5	+26 (4)		R
51477	52.4	− 8 24	189	− 1	8.3	B5	6	−47.3	5.2	.....	var	
51549	52.6	−20 58	200	− 7	8.1	B5	5	+17.0	2.2	.....		
51756	53.5	− 2 53	184	+ 2	7.7	B3k	5	+25.1	4.4	+30 (4)		
51790	53.6	−21 47	201	− 7	9.2	B9	7	+ 0.7	7.3	.....	var	
51854	53.8	−22 44	202	− 8	9.2	B4n	6	+27.0	1.8	.....		
51898	54.0	−20 23	200	− 7	8.9	B5n	5a, b	+25.1	1.1	.....		
52162	55.0	−12 51	193	− 3	7.9	B3n	6	+21.3	1.6	.....		
52244	55.3	−16 03	196	− 4	9.0	B5e	5	− 1.2	1.2	.....	M	R
52437	56.1	−21 59	201	− 7	6.33	B4n	8	+ 9.0	3.1	.....		
52533	56.5	− 2 59	185	+ 2	7.9	B6	6	+ 5.5	1.4	.....		
52718	57.2	− 3 08	185	+ 2	9.2	B4s	6	+27.3	2.2	.....		
52721	57.2	−11 09	192	− 2	6.57	B3e	8	+21.8	3.7	.....	M	R
52942	58.0	−11 19	192	− 1	8.7	B3nk	11	var	.....	+36 (3)		R
53035	58.4	−11 03	192	− 1	8.1	B4s	6	+19.2	1.4	.....		
53179	59.0	−11 24	192	− 1	9.1	Beq	5	var	.....	.....	M	R
53339	59.6	−11 15	192	− 1	9.1	B5	5a, b	+16.8	2.3	.....		
53340	59.6	−15 11	196	− 3	8.35	B4s	5	+21.6	2.8	.....		
53456	7 00.0	−11 23	192	− 1	7.8	B3	6	+18.0	1.9	.....		
53667	00.8	− 8 34	190	+ 1	7.8	O8k	6	+36.2	5.2	.....	var	
53754	01.1	− 8 39	190	+ 1	8.4	B2k	6	+41.5	2.0	+16 (4)		
53756	01.1	−12 40	194	− 1	7.20	B4n	7	+19.1	15.8	.....	var	
53857A	01.5	−12 48	194	− 1	8.5	B5n	9	− 0.4	2.6	.....		R
53857B	01.5	−12 48	194	− 1	8.7	B4s	5	+27.1	4.2	.....		R
53948	01.9	−12 33	194	− 1	10.1	B9	6b	+15.5	1.9	.....		
53975	02.0	−12 14	193	− 1	6.40	B5	6	+33.7	2.5	.....		
54024	02.2	− 7 35	189	+ 1	8.9	B5s	5	+35.8	2.6	.....		
54025	02.2	−11 10	192	0	8.4	B4	6	+17.4	0.7	.....		
54081	02.4	− 5 08	187	+ 2	10.0	B4	6a, b	+38.4	1.1	.....		
54104	02.5	− 9 26	191	+ 1	8.0	B4n	6	+19.1	1.4	.....		
54306	03.2	−11 46	193	0	9.2	B5s	6	+18.7	0.9	.....		
54575	04.2	−15 46	197	− 2	8.3	B5s	6	−27.5	10.1	.....	var	R
54662	04.6	−10 11	192	+ 1	6.20	O7k	6	+56.7	0.6	+34 (6)	V +63.0	
54764	05.0	−16 04	197	− 2	6.03	B3	6	+ 6.4	0.8	.....		
54879	05.5	−11 39	193	0	7.9	B3k	7	+15.6	1.4	+ 8 (4)		
54911	05.6	−15 31	197	− 2	7.03	B4s	6	+15.9	0.6	.....		
54935	05.7	−19 25	200	− 4	7.5	B5	5	+20.2	1.4	.....		
55135	06.6	−10 16	192	+ 1	7.16	B5e	5	+16.5	3.0	.....	V +11.0 M	R
55394	07.6	−14 38	196	− 1	9.0	B5n(e	6	− 8.6	2.2	.....		R
55442	07.8	−12 00	194	0	9.3	B4	6b	+22.0	2.3	.....		
55538	08.2	−15 19	197	− 1	8.1	B4n	6	+17.3	1.3	.....		
55692	08.8	−20 24	201	− 3	8.1	B3n	6	+22.6	1.6	.....		
55753	09.1	− 7 08	190	+ 3	9.3	B5s	6a, b	+29.0	2.9	.....		
55856	09.6	−22 44	203	− 4	6.24	B3s	7	+17.4	± 0.6	.....		

TABLE 2—*Continued*

HD	α (1900)	δ (1900)	l	b	Mag.	Spec.	Number of Plates	Vel.	P.E.	K Vel.	Remarks	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	
55879.....	7h09m7	−10°08′	192°	+ 2°	5.99	O9sk	6	+33.7	± 1.2	+33 (4)	V +31.9	
56013.....	10.2	−19 48	201	− 3	7.29	B2n	6	+20.0	1.0	.....		
56310.....	11.4	−16 03	198	− 1	6.79	B4n	48	+24.4	0.5	.....	Orbit	R
56727.....	13.1	−18 33	200	− 2	8.9	B5n	6	+23.9	3.0	.....		
56827.....	13.5	−11 47	194	+ 2	10.0	B3s	6b	+23.1	3.0	.....		
56847.....	13.6	−15 27	198	0	8.7	B2n	6	+21.4	1.9	.....		
56952.....	14.0	−17 01	199	− 1	9.1	B4n	6a, b	+ 8.4	1.9	.....		
57236.....	15.2	−21 49	203	− 3	8.7	B3n	6	+19.4	2.5	.....		
57370.....	15.8	−21 42	203	− 3	9.1	B5n	6	+25.5	3.5	.....		R
57573.....	16.7	−22 40	204	− 3	6.45	B4n	6	+10.5	2.2	.....		
57907.....	18.2	−17 26	200	0	8.3	B5s	6	+28.6	2.2	.....		
57910.....	18.2	−22 50	204	− 3	9.2	B5n	6b	+ 9.5	2.1	.....		
58131.....	19.1	−20 02	202	− 1	7.33	B2nk	6	+32.2	1.2	+30 (4)		
58416.....	20.4	−20 31	203	− 1	9.5	B2n	6a, b	+16.3	2.8	.....		
58465.....	20.6	−20 49	203	− 1	8.7	B4	6	+27.1	3.0	.....		
58509.....	20.8	−20 49	203	− 1	8.5	B4n	6	+23.8	2.7	.....		
58510.....	20.8	−20 59	203	− 1	6.73	B2nk	7	+20.2	0.6	+19 (2)		
58529.....	20.9	−10 34	194	+ 4	9.0	B8	6	− 3.8	1.5	.....		
58973.....	22.8	− 2 52	188	+ 8	8.4	B5s	7	− 3.1	0.8	.....		
59094.....	23.3	−15 53	199	+ 2	9.0	B3nn	5	+14.7	1.3	.....		
59497.....	25.1	−21 38	204	− 1	8.4	B3ne	6	+14.6	3.3	.....	M	R
59543.....	25.3	−13 46	198	+ 3	6.94	B4n	57	+ 4.7	0.5	.....	Orbit	R
59773.....	26.4	−21 35	204	0	8.1	B4	6	+20.1	2.2	.....		
59813.....	26.6	−18 43	202	+ 1	9.1	B3n(k)	6	+16.0	7.4	.....	var	
59910.....	27.0	−21 01	204	0	9.1	B9	6a, b	+30.5	3.1	.....		
59934.....	27.1	−16 59	200	+ 2	7.8	B4s	6	+15.5	2.2	.....		
60260.....	28.5	−11 24	196	+ 5	8.9	B4ne	5	+19.2	5.0	.....	var?	R
60235.....	28.8	−14 07	198	+ 4	6.24	B5	7	+21.4	2.0	.....		
60553.....	29.9	−19 55	203	+ 1	6.81	B2s	10	+28.2	1.3	.....		
60855.....	31.4	−14 16	199	+ 4	5.57	B5n(e)	6	+21.1	1.2	.....		R
60859.....	31.4	−19 34	203	+ 2	9.1	B4n	6a, b	+24.6	2.1	.....		
60873.....	31.5	−10 03	195	+ 6	8.31	B5n	6	+ 4.2	13.6	.....	var	
60993.....	32.0	−12 50	197	+ 5	9.1	B3n	6a, b	+22.9	2.9	.....		
61022.....	32.1	−20 00	204	+ 2	9.6	B4s	6	+28.3	4.7	.....		
61068.....	32.3	−19 29	203	+ 2	5.66	B3s	6	+21.7	3.4	.....		
61207.....	33.0	−15 28	200	+ 4	7.9	B5	7	+14.7	3.1	.....		
61347.....	33.7	−13 38	198	+ 5	8.3	B3	7	+38.7	5.3	.....	var	
61407.....	34.0	−22 01	206	+ 1	9.0	B7	7a, b	+10.4	2.2	.....		
62053.....	37.0	−18 56	203	+ 3	9.1	B5	6a, b	+14.4	1.6	.....		
62391.....	38.6	−20 56	205	+ 2	9.4	B4n	7b	+12.5	2.3	.....		
62532.....	39.3	−17 42	203	+ 4	8.6	B3ne	5	+30.1	5.2	.....		R
62589.....	39.6	−16 41	202	+ 5	8.1	B5n	5	+16.2	1.8	.....		
62678.....	40.1	−21 15	206	+ 2	10.5	B4ne	8	+30.1	1.2	.....		R
62729.....	40.3	−15 52	201	+ 5	8.0	B5(e)	7	+14.8	2.3	.....		R
63271.....	42.9	−22 17	207	+ 2	5.84	B2sk	5	+ 7.4	3.2	+15 (4)		
64298.....	48.1	−21 45	207	+ 4	8.7	B3(e)	6	+ 5.3	2.6	.....		R
64418.....	48.7	−22 07	208	+ 4	9.6	B4	7b	+16.0	1.3	.....		
65307.....	53.0	− 8 34	196	+12	9.1	B4s	11a, b	+23.5	17.3	.....	var	R
66396.....	58.2	−21 55	208	+ 6	9.0	B5	7	+21.2	2.0	.....		
66594.....	59.2	− 4 32	194	+15	7.38	B5s	6	+10.2	1.0	.....		
66738.....	59.8	−12 51	201	+11	7.5	B3k	9	+12.8	3.6	+ 3 (7)		
66834.....	8 00.2	−19 26	207	+ 7	6.06	B4s	10	+13.8	1.5	.....		
67072.....	01.2	−16 04	204	+ 9	9.2	B5	6a, b	+29.7	2.3	.....		
67303.....	02.2	−17 33	205	+ 9	9.2	B5s	8a, b	+10.7	2.1	.....		
68444.....	07.3	−14 22	203	+12	9.2	B4n	7a, b	+15.2	2.9	.....		
68468.....	07.4	−13 52	203	+12	8.5	B4sek	7	+14.8	3.8	+11 (6)	W +12	R
69562.....	12.4	−21 34	210	+ 9	6.70	B4s	10	+11.8	1.7	.....		
71518.....	22.8	−14 36	206	+15	6.55	B5ss	7	+12.0	5.3	.....	var?	R
76510.....	51.5	−13 31	209	+21	8.2	B4n	6	+21.6	2.0	.....		
89884.....	10 17.2	−17 32	228	+33	6.99	B5n(e)	6	+22.2	2.8	.....		R
119608.....	13 39.1	−17 26	289	+42	7.32	B1sk	5	+19.9	0.7	+ 0 (4)		
123884.....	14 05.1	−17 31	297	+40	9.3	B4s	9	+ 6.1	1.6	.....		
127493.....	26.6	−22 13	300	+34	10.0	O9	6	+13.2	2.0	.....		
135485.....	15 10.2	−14 19	316	+34	8.3	B3sk	8	−15.8	2.2	−10 (5)		
140543.....	39.1	−21 30	315	+24	8.5	B1nk	6	− 5.9	± 4.9	− 9 (4)		

TABLE 2—*Continued*

HD	α (1900)	δ (1900)	l	b	Mag.	Spec.	Number of Plates	Vel.	P.E.	K Vel.	Remarks	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	
147888.....	16h19m4	−23°14′	322°	+16°	6.56	B4	7	− 9.5	± 2.0	.....		
149363.....	29.1	− 5 56	338	+25	8.0	Bonk	7	+96.6	4.3	+26 (4)		R
149382.....	29.2	− 3 48	340	+26	9.0	B5n	7	+ 3.3	4.9	.....	var?	
152516.....	48.7	−21 43	327	+12	8.08	B3s	9	−30.4	2.1	.....		
156779.....	17 14.4	−18 43	333	+ 9	9.0	B4s	7	−15.4	1.2	.....		
157857.....	20.7	−10 55	341	+12	7.43	O7	5	+59.5	1.0	.....	V +57.6	
158319.....	23.5	−16 31	336	+ 8	8.7	B5ne	6	−14.2	1.1	.....	M	R
158659.....	25.4	−11 06	341	+11	10.3	B4s	6a, b	+38.6	19.1	.....	var	
159864.....	31.8	−17 46	336	+ 6	8.8	B1nk	6	+ 6.9	1.2	−10 (4)		
160186.....	33.4	−18 21	336	+ 5	8.8	B4	6	+ 5.8	1.3	.....		
160233.....	33.7	+ 4 24	356	+17	8.6	B5	5	−24.3	1.9	.....		
160762.....	36.6	+46 04	39	+30	3.79	B3s	9a, b	−18.6	0.5	.....	L −18.1	R
160886.....	37.3	−18 16	336	+ 5	10.0	B8	6b	−19.5	4.3	.....		
161306.....	39.7	− 9 46	344	+ 8	8.31	B0ne	6	−21.6	7.2	.....	M var?	
161961.....	43.4	− 2 09	351	+11	8.2	B1sk	6	−13.0	1.1	− 8 (6)	W −3E	R
162365.....	45.6	+15 32	8	+19	7.7	B4s	6	−22.1	2.9	.....		
163535.....	51.5	−18 03	338	+ 2	9.2	B8	5b	−14.8	4.1	.....		
163800.....	52.9	−22 30	335	− 1	6.92	B0	10	+ 5.2	4.2	.....	var	
163892.....	53.4	−22 27	335	− 1	7.14	B2nk	8	−14.5	2.4	−15 (4)		
164002.....	53.9	−22 33	335	− 1	7.15	B2k	10	−17.1	3.7	−25 (9)	var	
164103.....	54.5	−14 47	342	+ 3	8.04	B5	8	−30.6	4.9	.....	var	
164188.....	54.9	−15 48	341	+ 2	9.0	B3k	7	+ 6.3	1.9	−12 (7)		
164359.....	55.6	−22 07	335	− 1	8.2	B1nk	7	−14.2	2.2	−14 (4)		
164438.....	56.0	−19 06	338	0	7.28	B1nk	8	−26.9	4.9	−24 (4)		
164492.....	56.3	−23 01	335	− 2	6.91	O9	5	.....	.....	.....		
164536.....	56.5	−24 15	334	− 2	6.87	B4n	5	−11.1	3.2	.....		
164581.....	56.7	−20 44	337	− 1	6.85	B4	8	− 5.5	4.2	.....		
164637.....	57.0	−22 43	335	− 2	6.57	B0sk	6	−10.4	1.6	−11 (5)		
164700.....	57.3	−17 24	340	+ 1	8.0	B4s	6	+ 2.0	4.0	.....	var?	
164703.....	57.3	−22 18	335	− 2	9.8	B5n	6a, b	− 9.7	5.8	.....	var	
164704.....	57.3	−22 53	335	− 2	7.65	B4	7	− 4.9	3.3	.....	var?	
164717.....	57.4	−22 36	335	− 2	8.6	B4n	6	−19.4	1.5	.....		
164738.....	57.5	−17 36	340	+ 1	7.10	B5n	5	+ 5.9	3.8	.....		
164833.....	57.9	−22 50	335	− 2	6.86	B0	5	−22.6	2.6	.....		
164844.....	58.0	−22 34	335	− 2	8.9	B5	6	−16.9	0.9	.....		
164863.....	58.1	−22 30	335	− 2	7.8	B7	6	+12.2	8.9	.....	var	
164883.....	58.2	−22 30	335	− 2	7.8	B0nk	5	−11.2	1.6	−16 (4)		
164992.....	58.7	−22 27	336	− 2	10.7	B4	6b	−25.2	2.7	.....		
165049.....	59.0	−15 22	342	+ 2	8.07	B1sk	5	−17.1	1.2	−10 (1)		
165285.....	18 00.1	−19 58	338	− 1	8.73	B2ne	6	−11.4	2.5	.....	M	
165287.....	00.1	−22 07	336	− 2	8.9	B5n	6	+ 4.7	6.4	.....	var	
165288.....	00.1	−22 28	336	− 2	9.9	B4s	6a, b	− 6.6	2.5	.....		
165516.....	01.2	−21 27	337	− 2	6.22	B2sk	8	−13.9	1.0	−21 (6)	W − 5.8	
165612.....	01.7	−22 54	335	− 3	8.9	B3n	5	−15.9	4.4	.....		
165689.....	02.1	−22 17	336	− 2	8.6	B5	5	−11.6	2.4	.....		
165765.....	02.5	−22 44	336	− 3	9.9	B4	6a, b	−19.8	3.2	.....		
165808.....	02.7	−16 26	341	0	8.1	B5	5	−15.5	2.5	.....		
165812.....	02.7	−22 10	336	− 3	7.89	B2sk	5	−24.4	3.3	−11 (3)	var	
165857.....	02.9	−22 11	336	− 3	9.4	B4	6a, b	−34.4	6.5	.....	var	
166054.....	03.8	−22 04	336	− 3	9.9	B3	5b	−20.5	3.6	.....		
166125.....	04.1	−14 12	343–	+ 1–	9.1	B3	6a, b	−19.3	2.2	.....		
166182.....	04.4	+20 48	15	+17	4.32	B2sk	18a, b	−14.6	1.2	−21 (8)	L −13.3	R
166188.....	04.4	−18 13	340	− 1	9.4	B2e(k)	6b	−23.4	2.4	.....	M	R
166287.....	04.8	−16 50	341	0	7.6	B3k	6	−17.0	2.1	−17 (6)		
166291.....	04.8	−19 12	339	− 2	9.1	B4	6a, b	−22.8	1.5	.....		
166304.....	04.9	−16 44	341	0	9.7	B4	6b	−23.0	3.2	.....		
166418.....	05.4	−16 44	341	0	8.7	B1sk	6	+ 6.4	1.6	−20 (5)		
166443.....	05.5	−20 44	338	− 2	8.7	B0e	6	− 1.1	2.1	.....		R
166539.....	06.0	−15 37	342	0	8.9	B1nk	6	− 0.5	2.5	− 8 (5)		
166540.....	06.0	−16 55	341	− 1	8.3	B1sk	5	− 1.6	1.6	−16 (5)		
166546.....	06.0	−20 27	338	− 2	7.17	B1k	6	+ 1.3	0.7	−10 (6)		
166566.....	06.1	−15 42	342	0	8.1	B2sek	6	−11.0	4.3	− 9 (6)	M	R
166568.....	06.1	−18 45	340	− 2	10.3	B2(e)k	6b	−18.9	2.4	−25 (6)		R
166628.....	06.4	−19 28	339	− 2	7.14	B3sk	6	+ 3.1	2.0	−11 (6)		
166666.....	06.6	−15 36	342	0	9.4	B3(e)	6b	− 3.7	± 6.0	.....	var? M	R

TABLE 2—*Continued*

HD	α (1900)	δ (1900)	l	b	Mag.	Spec.	Number of Plates	Vel.	P.E.	K Vel.	Remarks	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	
166689	18h06m7	−16°24′	342°	− 1°	7.34	B1sk	5	− 4.6	± 1.7	−10 (5)		
166716	06.8	−15 25	343	0	7.95	B1sk	6	− 6.1	2.6	− 7 (6)		
166734	06.9	−10 46	347	+ 2	8.3	B1n	5	−10.6	3.1	.....		
166787	07.1	−19 47	339	− 2	8.9	B2k	6	− 7.6	2.5	−10 (4)		
166803	07.2	−15 13	343	0	8.1	B2nk	6	− 3.2	1.5	−12 (6)		
166826	07.3	−20 26	338	− 3	9.9	B5	5a, b	−12.0	4.1	.....		
166852	07.4	−22 45	336	− 4	8.50	B1	5	−17.4	2.1	.....		
166920	07.7	−17 19	341	− 1	11.0	B5n	5b	−22.1	2.5	.....		
166934	07.8	−18 51	340	− 2	8.7	B9	6	+15.5	7.1	.....	var	R
166963	07.9	−16 36	342	− 1	10.1	B4n	5b	−19.8	2.4	.....		
166964	07.9	−17 10	341	− 1	9.4	B5	5b	−26.5	4.0	.....		
166965	07.9	−19 02	340	− 2	9.7	B3n	6a, b	−13.0	5.7	.....		
166999	08.1	−19 09	339	− 2	10.1	B5	6b	− 6.2	5.8	.....		
167000	08.1	−20 41	338	− 3	9.7	B5	6b	−20.1	3.2	.....		
167088	08.6	−19 06	340	− 2	9.1	B3k	6	− 9.6	2.6	−23 (5)		
167090	08.6	−20 30	338	− 3	10.3	B5s	5a, b	−10.5	3.0	.....		
167200	09.0	−22 28	337	− 4	9.4	B4n	6a, b	− 8.4	1.0	.....		
167224	09.1	−18 59	340	− 2	8.9	B4	6	−12.4	1.4	.....		
167263	09.3	−20 25	338	− 3	6.02	B1nk	6	−10.4	1.4	− 6 (5)		
167287	09.4	−19 01	340	− 2	8.3	B0k	7	+ 0.1	7.7	+ 1 (6)	var	R
167311	09.5	−12 32	346	+ 1	8.3	B2n(k)	6	− 4.1	2.8	− 2 (5)		R
167313	09.5	−15 01	343	− 1	10.7	B5	6a, b	−25.7	2.7	.....		
167330	09.6	−12 34	345	+ 1	8.1	B0n	8	−35.5	8.4	.....	var	R
167332	09.6	−16 00	342	− 1	10.1	B8	6a, b	−24.2	1.4	.....		
167336	09.8	−18 24	340	− 2	9.4	B5	6a, b	− 2.9	4.2	.....		
167372	09.8	−14 37	344	0	11.0	B4s	6b	−23.9	1.7	.....		
167397	09.9	−17 00	342	− 2	9.2	B0k	6a, b	+ 3.6	2.4	− 4 (4)		
167409	10.0	−14 46	344	− 1	10.1	B4s	6a, b	−19.7	1.5	.....		
167411	10.0	−18 17	340	− 2	8.6	B3k	6	− 8.1	1.5	− 8 (4)		
167412	10.0	−18 29	340	− 2	9.4	B5	6b	−17.9	2.9	.....		
167432	10.1	−17 09	341	− 2	10.6	B8s	6b	−33.7	1.1	.....		
167436	10.1	−20 03	339	− 3	9.9	B4	8	−28.4	2.3	.....		
167451	10.2	−13 36	344	0	7.9	B4	6	−15.4	4.5	.....	var?	R
167478	10.3	−18 28	340	− 2	10.3	B5	6b	−26.4	2.3	.....		
167479	10.3	−18 49	340	− 2	8.8	B3k	6	−10.6	1.8	− 5 (6)		
167497	10.4	−14 20	344	0	9.4	B4n	6a, b	−22.4	1.8	.....		
167771	11.6	−18 30	340	− 3	6.37	O8k	2	−11.	.....	.....	V +13.5	SB
167785	11.7	+10 48	6	+11	7.9	B5s	6	−18.8	2.5	.....		
167815	11.8	−19 42	339	− 3	7.59	B2nk	9	− 6.9	1.3	−25 (8)		
167838	11.9	−15 28	343	− 1	6.64	B0k	9	− 6.6	1.1	−11 (9)		
167863	12.0	−18 51	340	− 3	6.57	B8s	6	−14.7	0.5	.....		
167902	12.2	−18 00	341	− 2	9.7	B5	6b	−19.0	2.9	.....		
167971	12.5	−12 17	346	0	7.34	B1nk	7	− 4.1	4.8	−19 (3)		
167999	12.6	−16 41	342	− 2	9.7	B4	6b	− 7.3	1.9	.....		
168021	12.7	−18 39	340	− 3	6.38	B0sk	9	− 8.2	2.8	−21 (6)		
168078	12.9	−17 06	342	− 2	10.6	B5	6b	−36.5	4.8	.....	var?	
168080	12.9	−18 12	341	− 3	8.3	B3nk	7	+ 4.8	3.9	− 5 (7)	var?	
168112	13.1	−12 08	346	0	8.7	B4	7	− 8.3	4.3	.....		
168138	13.2	−19 29	340	− 3	9.4	B4n	9a, b	− 7.9	1.7	.....		
168162	13.3	−15 31	343	− 2	9.7	B2(k)	6b	−33.1	1.9	.....		
168163	13.3	−16 20	342	− 2	9.1	B5q	6	−15.4	2.8	.....		
168183	13.4	−14 02	345	− 1	8.3	B0nk	6	− 4.0	13.8	.....	var	R
168207	13.5	−14 12	344	− 1	10.1	B0n	6b	− 5.0	4.3	.....		
168230	13.6	−18 54	340	− 3	10.6	B3s	6b	− 2.2	7.3	.....	var?	
168279	13.8	−18 11	341	− 3	10.6	B8	6b	−26.5	3.4	.....		
168302	13.9	−16 03	343	− 2	9.9	B5n	8	−41.1	1.9	.....		
168352	14.1	−17 07	342	− 2	9.4	B2nk	6	−27.8	1.8	−30 (3)		
168368	14.2	−17 06	342	− 2	10.1	B3	6b	− 1.3	3.5	.....		
168418	14.4	−17 02	342	− 2	9.7	B3	6b	−20.5	5.2	.....		
168444	14.6	−14 53	344	− 2	8.86	B0k	6	−16.3	2.5	−23 (4)		
168449	14.6	−18 31	341	− 3	11.0	B5n	6b	−16.3	2.5	.....		
168489	14.8	−17 48	341	− 3	8.9	B1k	6	− 8.0	1.7	−31 (5)		
168552	15.2	−17 11	342	− 3	8.7	B3sk	6	− 7.4	1.4	−21 (6)		
168571	15.3	−17 26	342	− 3	8.3	B2k	7	− 4.8	0.7	− 9 (6)		
168675	15.9	−17 57	341	− 3	9.4	B4	6a, b	− 5.7	± 5.2	.....	var?	

TABLE 2—*Continued*

HD (1)	α (1900) (2)	δ (1900) (3)	*l* (4)	*b* (5)	Mag. (6)	Spec. (7)	Number of Plates (8)	Vel. (9)	P.E. (10)	K Vel. (11)	Remarks (12)	
168726	18h16m1	−16° 39′	342°	− 3°	9.7	B7	6b	− 7.0	± 3.7	.....		
168748	16.2	−17 09	342	− 3	10.6	B5s	6b	−31.6	2.6	.....		
168765	16.3	−17 28	342	− 3	9.9	B4	8	−17.7	2.0	.....		
168917	17.1	−14 25	345	− 2	8.6	B5s	6	−15.7	2.1	.....		
169014	17.5	−16 46	343	− 3	9.4	B5s	6a, b	− 7.6	2.9	.....		
169034.....	17.6	−13 39	345	− 2	8.3	B3	6	− 6.9	3.6	.....		
169271.....	18.8	−18 20	341	− 4	9.4	B4	6a, b	−10.6	5.5	.....		
169419.....	19.4	−17 35	342	− 4	9.4	B0n	6	+ 2.6	1.2	.....		
169454.....	19.6	−14 02	345	− 2	6.84	O8	10	−25.2	1.5	.....		
169673.....	20.7	−15 41	344	− 3	7.17	B1nk	8	−16.8	1.4	−16 (7)		
169695.....	20.8	−16 43	343	− 4	10.6	B8	6b	−25.7	2.0	.....		
169704.....	20.9	−21 35	339	− 6	9.9	B4	6a, b	−16.1	2.1	.....		
169727.....	21.0	−13 43	346	− 2	9.4	B0n	6a, b	−13.1	3.8	.....		
169753.....	21.1	− 9 15	350	0	var	B2k	21	−29.0	6.0	.....	var	R
169754.....	21.1	−11 25	348	− 1	8.1	B1nk	7	+35.	16.	.....	var	R
169755.....	21.1	−14 34	345	− 3	9.7	B3n(k)	6b	− 0.8	2.5	.....		R
169827.....	21.4	−17 21	342	− 4	9.1	B6	8	−11.1	2.2	.....		
170061.....	22.4	−14 47	345	− 3	10.6	B0ne	7b	+ 9.4	2.7	.....	M	R
170097.....	22.6	−16 46	343	− 4	8.5	B0n	10	+13.9	6.1	.....	var	
170159.....	22.9	−13 04	346	− 2	8.7	B2n	6	− 8.8	0.9	.....		
170177.....	23.0	−13 34	346	− 3	9.4	B1k	6	+12.6	7.4	.....	var?	
170452.....	24.4	−13 01	347	− 3	8.5	B5	7	−13.9	2.9	.....	var	R
170453.....	24.4	−14 17	346	− 3	9.9	B2nk	6a, b	+ 5.0	2.8	− 2 (4)		
170581.....	25.1	−13 43	346	− 3	9.4	B3k	6a, b	+18.6	2.9	+15 (6)		
170604.....	25.2	−16 39	344	− 5	8.7	B1k	6	− 5.0	3.6	+ 3 (5)		
170700.....	25.7	−14 11	346	− 4	9.1	B0k	6	+ 0.5	3.1	− 1 (4)		
170714.....	25.8	− 5 51	353	0	7.31	B5n	9	−16.7	3.1	.....	V −24.3	
170716.....	25.8	−12 24	347	− 3	8.9	B1	6	+ 1.9	3.5	.....		
170783.....	26.1	+ 4 34	2	+ 5	7.70	B5	5	−18.6	2.9	.....		
170796.....	26.2	−15 44	344	− 4	9.7	B5	6a, b	+ 2.2	5.7	.....	var?	
170938.....	26.9	−15 46	344	− 4	8.7	B0k	6	+26.9	5.1	− 9 (3)	var?	
171012.....	27.3	−18 26	342	− 6	6.98	B0sek	8	−17.5	1.8	− 3 (6)	var M	R
171054.....	27.5	−13 59	346	− 4	9.4	B4s(k)	6a, b	+ 2.5	2.9	.....		
171198.....	28.3	−12 20	348	− 3	9.2	B0nk	9	+54.	30.	.....	var	R
171293.....	28.9	−14 29	346	− 4	10.1	B4	7b	−25.6	0.9	.....		
171348.....	29.3	−22 10	339	− 8	8.1	B3e	7	− 8.7	4.8	.....	M	R
171392.....	29.5	−14 23	346	− 5	10.3	B5	6	− 3.2	3.5	.....		
171432	29.7	−18 38	342	− 6	8.1	B3k	6	+12.8	0.7	− 9 (6)		
171469.....	29.9	−15 48	345	− 5	9.4	B4n	6a, b	+ 2.8	3.6	.....		
171491.....	30.0	− 0 02	359	+ 2	8.28	B5	6	−19.5	3.5	.....		
171589.....	30.6	−14 12	346	− 5	8.8	B3nk	6	+14.7	3.4	+ 7 (6)		
171611.....	30.7	−20 24	341	− 8	7.37	B4	6	−22.8	1.9	.....		
172028.....	32.8	− 0 29	359	+ 1	8.1	B3k	6	−12.8	1.6	−18 (3)		
172175.....	33.6	− 7 57	352	− 2	9.4	B0n(e)	8a, b	− 8.0	8.4	.....	var	R
172176.....	33.6	−14 47	346	− 6	9.9	B5	7b	−36.5	3.8	.....		
172252.....	34.1	−11 58	349	− 4	8.7	B0n	6	−10.8	3.5	.....		
172256.....	34.1	−22 45	339	− 9	8.9	B5(e)	6	+ 3.3	6.0	.....	var?	R
172275.....	34.2	− 7 27	353	− 2	9.4	B4	6a, b	+22.7	4.1	.....		
172293.....	34.3	−15 24	346	− 6	10.3	B5	6b	−23.7	1.6	.....		
172367.....	34.7	− 7 20	353	− 2	9.7	B5n	7	−10.6	2.9	.....		R
172427.....	35.0	−10 48	350	− 4	8.9	B2nk	11	−13.9	3.3	+ 3 (4)		
172510.....	35.5	−14 51	346	− 6	8.81	B2k	6	− 6.0	1.3	− 2 (3)		
172637.....	36.2	− 8 10	352	− 3	9.7	B4s	8	− 9.1	1.8	.....		
172694.....	36.5	−15 57	345	− 7	8.3	B3e	6	−29.0	3.3	−15 (5)	M	R
173003.....	38.1	− 1 44	358	0	7.7	B4s	6	−11.2	5.3	.....	var?	
173006.....	38.1	− 5 53	355	− 2	9.9	B3nk	7	−35.1	1.9	−11 (3)		
173011.....	38.1	−11 36	350	− 5	8.9	B5	6	− 4.2	3.3	.....		
173198.....	39.0	− 1 39	358	− 1	8.1	B3n	6	−21.7	2.7	.....		R
173219.....	39.1	− 7 13	354	− 3	8.3	B1ek	6	+ 5.6	14.6	.....	var M	R
173251.....	39.2	−14 28	347	− 7	8.8	B3n	5	−45.8	7.8	.....	var	
173375.....	39.8	−17 39	344	− 8	7.06	B4	9	−11.6	3.0	.....		
173438.....	40.2	− 4 42	356	− 2	8.1	B0	7	− 3.6	10.1	.....	var	R
173637.....	41.2	− 8 02	353	− 4	9.2	B0e	5a, b	−46.	7.	.....		R
173850.....	42.4	− 7 09	354	− 4	9.2	B8	7a, b	−17.4	5.2	.....	var?	
173987.....	43.2	− 6 34	354	− 4	9.1	B1k	5a, b	+39.8	± 6.2	+20 (4)	var?	

TABLE 2—*Continued*

HD	α (1900)	δ (1900)	l	b	Mag.	Spec.	Number of Plates	Vel.	P.E.	K Vel.	Remarks	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	
173991.....	18h43m2	−12° 40′	349°	− 7°	8.7	B4	5	−16.2	± 3.1	.....		
174069.....	43.6	− 8 34	353	− 5	7.64	B2sk	7	+ 6.0	1.4	−21)6)		
174070.....	43.6	−12 42	349	− 7	9.1	B4	9a, b	− 5.4	6.4	.....		R
174083.....	43.7	− 8 16	353	− 5	10.3	B4n	6b	−24.6	2.5	.....		
174182.....	44.2	− 0 30	0	− 1	8.3	B3n	6	−15.8	5.0	.....		
174243.....	44.5	− 7 46	354	− 5	10.1	B3k	6b	−16.0	3.3	−13 (6)		
174513.....	45.7	− 7 54	354	− 5	8.9	B1ek	5	− 7.2	2.1	− 7 (5)		R
174705.....	46.7	−11 45	350	− 7	7.9	B3nk	6	− 5.6	1.8	−20 (2)		
174902.....	47.8	− 7 12	354	− 5	9.7	B4s	6	− 6.1	2.2	.....		
175141.....	48.9	−19 59	343	−11	8.88	B9	5	+ 5.5	6.3	.....	var?	
175544.....	50.7	+ 0 08	1	− 2	7.73	B5	6	− 4.1	1.3	.....		
175754.....	51.7	−19 17	344	−11	7.03	B0n(e)k	7	−11.4	1.2	− 3 (6)		R
175876.....	52.3	−20 33	343	−12	6.73	O8nk	8	+ 3.9	4.4	.....	V +23.9 SB	R
176630.....	56.1	− 6 20	356	− 6	7.69	B4n	8	− 7.1	3.2	.....		
177014.....	57.7	−19 34	344	−13	9.7	B8	8	− 8.3	1.8	.....		
177015.....	57.7	−20 16	344	−13	7.57	B3e	6	+ 6.1	2.4	.....	M	R
177284.....	58.9	− 2 10	0	− 5	8.7	B3nk	6	− 6.2	4.2	− 5 (4)		
177559.....	19 00.1	−19 38	345	−13	8.1	B5n	6	−27.	29.	.....	var	R
177752.....	00.9	− 0 59	2	− 5	8.5	B4	5	+ 6.8	2.2	.....		
177989.....	01.8	−18 53	346	−13	9.6	B4	6a, b	+ 0.1	1.8	.....		
178487.....	03.7	−10 22	354	−10	8.7	B0k	6	−49.8	1.7	−31 (6)		
178861.....	05.1	−12 38	352	−11	8.3	B5	6	− 9.2	5.3	.....	var?	
179405.....	07.3	− 6 38	357	− 9	8.6	B5e	6	−23.8	6.6	.....		R
179407.....	07.3	−12 45	352	−12	9.3	B2n(k)	7a, b	−89.8	5.8	.....	var?	
180126.....	10.2	+ 9 37	12	− 2	7.9	B4	5	−15.9	5.3	.....		R
180587.....	12.0	+10 49	13	− 2	8.1	B4s	5	− 9.9	3.7	.....		
180629.....	12.1	−17 07	348	−15	7.9	B5	6	−10.9	2.2	.....		
182975.....	22.2	− 2 13	3	−10	8.22	B3	5	− 1.4	2.2	.....		
183129.....	22.9	− 1 18	4	−10	8.3	B8	5	− 1.9	0.9	.....		
183133.....	22.9	−15 18	351	−16	6.73	B3n	8	−24.0	9.0	.....	var	R
183570.....	25.1	−16 23	350	−17	7.25	B6	6	− 4.4	4.3	.....		
185534.....	34.4	−21 32	346	−21	8.1	B5	8	−12.0	1.7	.....		
185842.....	36.0	− 2 33	4	−14	7.12	B5s	6	−16.4	4.5	.....	var V −1.0	
186182.....	37.8	+15 02	20	− 5	8.04	B5	5	− 8.7	1.7	.....		
186272.....	38.3	+17 44	22	− 4	7.9	B4	5	−19.8	4.5	.....		
186610.....	40.3	− 3 24	4	−15	9.1	B3n(k)	6	+21.5	1.2	.....		
187350.....	44.4	− 1 21	6	−15	8.7	B0ek	6	+15.0	1.9	−12 (6)		R
188618.....	50.9	−18 11	351	−24	9.2	B4	6a, b	−14.8	2.8	.....		
206144.....	21 35.0	−18 03	3	−47	9.1	B3n	6	+75.6	3.2	.....		
210191.....	22 03.5	−19 01	6	−53	5.74	B2sk	6	− 5.2	0.4	−10 (5)		
212044.....	16.4	+51 21	68	− 5	7.08	B2ek	4	−14.4	1.9	−15 (4)	V −15.2	
214080.....	30.7	−16 54	14	−58	6.69	B2ssk	6	0.0	4.1	+ 5 (5)	var	
220172.....	23 16.6	−10 18	38	−64	7.54	B3s	7	+12.6	± 0.9	.....		

NOTES TO TABLE 2

HD 886 γ Pegasi, standard-velocity star

20340 The 82 spectrograms taken on 52 nights show a range of 100 km/sec. From 6 to 11 lines are available for radial velocity measurement. These lines change in appearance. Type ranges from B3n to B8(e). The plates were measured by both observers with the following results:

−23.8± 1.7 km/sec	Miss Roosen Raad	82 plates
−25.6± 1.3	Neubauer	82 plates

The weighted mean for the measures reduced to the Lick system is undoubtedly close to the velocity of the system. Attempts to derive a period are thus far without success

23338 q Tauri

25638, 25639 +61°676, np and sf respectively; taken by request for Dr. Hertzsprung

30836 π^4 Orionis, standard-type star. SB orbit by Baker, *Pub. Allegheny Obs.*, **1**, 107, 1909. Our measures fit Baker's curve satisfactorily

35468 γ Orionis

36954 Orbit by Neubauer, *Lick Obs. Bull.*, **17**, 185–191, 1936

37000 Orbit by Neubauer, *Pub. A.S.P.*, **49**, 126, 1937

37115 Merrill's No. 114. Emission extends to $H\delta$

37128 ε Orionis

42259 Range 120 km/sec from poor absorption lines, chiefly 4026, 4471. The spectrum is not suitable for radial velocity measures. Emission lines are about equal in density to that of the continuous spectrum

44743 β Canis Majoris

46380 Distinct emission lines. Sharp interstellar K line
47761 Distinct emission lines. Velocity range 70 km/sec. Good lines
48282 Distinct emission lines. Absorption lines fuzzy
49888 Bandlike emission
49977 Merrill's No. 154
50891 Lines faint and difficult to measure
51193 Distinct emission lines. K line sharp
51452 Faint emission suspected. Lines difficult to measure
52244 Merrill's No. 163
52721 Merrill's No. 164
52942 Two spectra. Range nearly 40 km/sec
53179 Merrill's No. 165 (Z CMa)
53857 A and B, Hussey 48. Visual double star
54575 Distinct emission lines. Variable velocity based upon fairly sharp absorption lines
55135 Merrill's No. 168
55394 Distinct emission lines on two plates
56310 Orbit by Neubauer and Miss Roosen Raad, *Lick Obs. Bull.*, **19**, 95, 1940
57370 Visual double star, GC 5997
59497 Merrill's No. 181
59543 Orbit by Neubauer and Miss Roosen Raad, *Lick Obs. Bull.*, **19**, 97, 1940
60260 Distinct emission
60855 Faint emission lines on several plates
62532 Emissions on a nearly continuous background
62678 Distinct emission. Good spectrum
62729 Distinct emission on four plates
64298 Distinct emission. The difference between the violet and red components of the hydrogen absorption lines is nearly 300 km/sec
65307 Range 220 km/sec
68468 *Mt. W. Contr.* No. 591 classifies this star Ape; velocity +12 km/sec from one plate
71518 Traces of a secondary spectrum
89884 $H\beta$ faintly emission-like on three plates
149363 High velocity ranges from 80 to 120 km/sec. Numerous good lines
158319 Merrill's No. 260
160762 ι Herculis. Standard-velocity star
161961 *Mt. W. Contr.* No. 591. Good lines
166182 102 Herculis. Standard-velocity star
166188 Merrill's No. 282
166443 Faint emission. Unusually wide 4471
166566 Merrill's No. 284
166568 Distinct emission
166666 Merrill's No. 285
166934 Double lines
167287 Range 80 km/sec
167311 Distinct emission on two plates
167330 Double lines
167451 Double lines on two plates
168183 Range 150 km/sec
169753 RZ Scuti. Range 170 km/sec. This star is still under observation here for radial velocity
169754 Range 140 km/sec
169755 A visual double star on slit of spectrograph
170061 Merrill's No. 298
170452 Composite spectrum
171012 Merrill's No. 301
171198 Emission spectrum?
171348 Merrill's No. 302
172175 Traces of emission. Range 100 km/sec
172256 Poor spectrum. Emission? "Washed out" hydrogen lines
172367 Poor spectrum, shallow lines
172694 Merrill's No. 303. In appearance a good deal like the two preceding stars
173198 Secondary spectrum on two plates
173219 Merrill's No. 304
173438 Two spectra
173637 Almost continuous
174070 Poor spectrum. Range 70 km/sec. $H\gamma$ appears double
174513 Distinct emission
175754 Traces of emission on all plates
175876 Victoria binary
177015 Merrill's No. 309
177559 Wide shallow lines. Range of 200 km/sec in our measures. Spectrum not suitable for radial velocity determination
179405 Distinct emission
180126 Poor lines
183133 Range 110 km/sec
187350 Distinct emission