

Trumpler’s Radial Velocities of Stars in Galactic Star Clusters*

GEOFFREY W. MARCY¹ AND DYLAN M. LYNN²

¹*Center for Space Laser Awareness, 3388 Petaluma Hill Rd, Santa Rosa, CA 95404*

²*Department of Astronomy, University of California, Berkeley, CA 94720*

(Received May 13, 2025; Revised; Accepted)

Submitted to PASP

ABSTRACT

We assess the accuracy of radial velocities of 671 stars located near Galactic clusters, measured by Robert Trumpler between 1924 and 1947 using the Lick Observatory 36-inch refractor equipped with prism spectrometers and photographic plates. We find that Trumpler’s velocities share the same zero-point and scale as modern IAU radial velocity standards. Their accuracy ranges from 2 to 7 km/s, depending on stellar brightness, based on comparisons with new Doppler measurements from the Keck telescope and data from SIMBAD. We also provide improved star identifications, B-band photometry, and notes. A link is provided to an online PDF—previously available only in print—containing all 3,782 of Trumpler’s stellar radial velocities and associated Julian dates. These historical data can be combined with modern measurements to form a unique century-long baseline for detecting long-period stellar companions, gravitational perturbations from passing massive objects, and accelerations due to cluster and Galactic dynamics.

Keywords: stars:individual — Galaxy: open clusters and associations — techniques: radial velocities

1. INTRODUCTION

From 1924 to 1947, Robert J. Trumpler obtained spectra and measured the Doppler shifts of 773 stars located near 73 Galactic open clusters, as reported in detail by Weaver (1966, 1967). The over-arching motivation was to measure the structure, kinematics, and stellar constituents of the Milky Way Galaxy, which were just being gleaned in the 1920’s. The goals of obtaining radial velocities of stars in open clusters included establishing the average velocities and distances of the clusters. The probability of the true membership of each star located apparently near a cluster could be assessed by how similar its radial velocity was relative to the other members. Additional goals of the spectroscopy were to determine the spectral type and luminosity class of each star and to discover binary stars by their changing Doppler shifts. The overall motion of each entire open cluster gave vital information about the large-scale differential rotation of the Galaxy.

However, Trumpler’s radial velocity measurements of the stars in open clusters, along with other fundamental properties, were published only in paper form, consisting of 392 pages in three spiral-bound volumes, in *Publications of the Lick Observatory, Volume XXI* (Weaver 1966). Paper copies presumably reside at a few observatories that were active in the 1960’s, but we don’t know of any besides the one we have. Trumpler’s measurements were assembled in this publication by Weaver (1966) due to the untimely death of Robert Trumpler on September 10, 1956.

Here, we determine the accuracy of these radial velocities compared to the modern IAU radial velocity standard stars. We selected 671 stars, of the 773 in total, that had unambiguous identifications, enabling careful cross-referencing with modern measurements. We provide an electronic tabulation of the average radial velocities of those 671 stars, along

with modern star identifications, B magnitudes, and notes. We also provide a link to an online PDF of the original 392-page document (Weaver 1966). Importantly, this PDF contains Trumpler’s individual radial velocities and their Julian Dates of observation between 1924 and 1947, providing a time stamp and time baseline for the velocities of those stars.

2. THE CATALOG AND STAR IDENTIFICATIONS

A paper copy of the *Publications of the Lick Observatory, Volume XXI* (Weaver 1966) was given to us in 2010 by Harold Weaver at U.C. Berkeley. He requested that we write this paper to assess the quality of Robert Trumpler’s radial velocity measurements and to provide an online, searchable portal to their existence and value. Weaver’s paper copy will henceforth reside at the Lick Observatory on Mount Hamilton along with the original photographic plates obtained by Robert Trumpler.

Figure 1 shows a representative page from that catalog, the first page for the open cluster, NGC2264. The left column gives Trumpler’s personal star number for each star, which is also marked next to its star image on a photograph of the host open cluster, creating a visual identification. In the next column, Trumpler provided his measured angular distance from the nominal cluster center (noted at the top of the page) in both the x and y axes in arcseconds (RA, DEC). The next two columns give Trumpler’s measured “photographic magnitude” (roughly similar to a modern B band) and spectral type. The next column gives Trumpler’s measured heliocentric radial velocity and its “probable error” in km s^{-1} .

The last column in Figure 1 from the catalog gives any “Other designations” of the star name, often the HD, BD, and GCSRV (Wilson 1953). For stars south of Declination -18, the CPD number from the Cape Photographic Durchmusterung (Gill & Kapteyn 1896) is often listed. Roughly 75% of the stars in the notebook have such an “Other designation”, allowing them to be investigated within online repositories of astronomical data, such as SIMBAD. For stars without an “Other designation” we identified them by using the Trumpler’s photographic image of its cluster and his annotated assigned number. Trumpler provided an image of all 73 open clusters, annotated with Trumpler’s assigned numbers for all the stars in the catalog (Weaver 1966). We matched each star in his images to the corresponding star in a sky image from SIMBAD’s Aladin Applet and SKY-MAP.

Further identification of stars was possible with the listed angular separation (column 2), in both RA and DEC in arcseconds, from the coordinates of the nominal center of the open cluster, specified at the top of the page. Trumpler used the forward-looking 1950 equinox for his coordinates. From those annotations in the photograph and the delta coordinates, we double-checked the identification of each star, including those without an “Other designation”. Further, Trumpler’s estimated magnitude on the “photographic magnitude scale” is given in column 3 and spectral type in column 4, allowing us to check the identification of all 671 stars in the SIMBAD database. We established a name that appears in SIMBAD for every star.

3. TRUMPLER’S RADIAL VELOCITY MEASUREMENT TECHNIQUE

The spectroscopic techniques and Doppler analyses employed by Trumpler were described carefully by Weaver (1966, 1967). In brief, Trumpler made all observations with the 36-inch refracting telescope at Lick Observatory from 1924 to 1947. During those years, six different spectrographs were used, each having a different prism or camera focal length, yielding spectral dispersions that ranged from 38 Å/mm to 132 Å/mm, measured at 4300 Å, implying a spectral resolution of 0.1 Å to 0.3 Å. The wavelengths along the spectrum were calibrated by using a lamp that shined its light through the entrance slit of the spectrograph, with its spectral lines landing above and below the stellar spectrum. Those emission lines, having known laboratory wavelengths, provided the wavelength scale with which to measure the Doppler shift of the spectral lines in the star’s spectrum. During the 23 years, both He lamps and Fe sparks were used to produce the series of comparison emission lines.

The photographic plates containing the spectra were taken to a “measuring engine” at Lick Observatory to measure the positions of both the stellar spectral lines and the comparison-lamp emission lines. In practice, a plate was attached to the stage of the measuring engine that could be moved slowly, in the direction of wavelength dispersion, by a screw that a person turned by hand to displace the spectrum along its length. An eyepiece allowed the user to see a cross-hair, composed of a strand of spider web, with the photographic spectrum visible behind it. While moving the spectrum, the person would notice when a spectral line was centered on the cross-hair and record manually on paper the displacement of the stage calibrated by the screw. In that way every spectral line had a measured position, analogous to a modern pixel location, along the dispersion direction of the spectrum. Trumpler employed assistants

NGC 2264

α $6^{\text{h}}38^{\text{m}}2$ δ $+9^{\circ}49'$ (1950.0) l^{II} $203^{\circ}.0$ b^{II} $+2^{\circ}.1$

Diameter 30' Class $\text{II}3\text{pN}; 1\text{o}7$ Radial velocity $+22.3$ km/sec

Limit of completeness: $m_{\text{pg}} = 12.5$, within a radius of 20' from the center.

Mem.

No.	Coordinates		m_{pg}	Spectral Type		Radial velocity p.e.		Other designations					Mem.
	x	y		T	WM	(km/sec)		HD, BD	GCSR	ADS	VM	W	
(1)	(2)		(3)	(4)		(5)		(6)					(7)
1R	+ 40"	+467"	4.4	O7*	O7	+32.2	±1.1	47839	4334	5322A	60	131	
2	+212	-1072	7.0	B2s*		+21.2	±1.8	47887	4341	5327A		178	
3	+466	+320	7.3	B3*	B2.5V	+22.6	±1.5	47961	4348	5334C	98	212	1
4	-196	-392	7.8	B3s*		+29.4	±2.4	47777	4327		83		
5	+ 38	+465	7.8	B7*		+23.9	±5.0		4335	5322B			
6R	-403	+188	8.0	B5n*	B3Vp	+21.0	±3.4	47732	4323		16	50	1
7R	-1180	- 51	8.2	F0				47554				25	
8R	-259	+ 78	8.3	B5*		+21.1 var	±2.1	47755		5316A	37	74	1
9R	+387	-123	8.6	B8n*		+22.9 p.v.	±4.4	47934		5333AB	76	206	1
10	- 74	+940	8.8	B8n*		+21.0	±2.9	10°1219	4330		52	107	1
11R	+800	-916	8.8	B9				48055				231	
12	+ 88	+410	8.9	B7n*		+24.3	±2.9	10°1223	4338	5325A	62	142	1
13	-185	+ 5	8.9	B6n*	B5V	+19.4 var	±3.7	10°1235	4328		40	88	1
14	- 64	+353	9.0	B7n*	B6V	+21 var	±6	9°1238	4331	5322F	49	109	1
15	+112	-1103	9.0					9°1241				152	
16R	+256	-600	9.1	B8*		+30.6 p.v.	±3.5	9°1246	4344			187	
17R	+508	+233	9.4		A0IV-V			9°1251		5334AB	100	215	1
18	-459	+ 10	9.4	A1n*	A5III	+19.9	±2.5	9°1230			15	46	1
19	-269	-611	9.7		K3 II-III			9°1233				69	
20	+700	+966	9.7		K2 II-III			48012			131	229	2
21	+680	+108	9.7		A3-4III			9°1255			112	226	1
22	+813	+949	9.8					10°1230			130	232	1
23	+ 61	+380	9.8	B9*		+16.0	±2.2	10°1222	4336	5325C	63	137	1
25	+213	+424	10.0	A0n*		+17 var	±8	10°1227	4339		81	179	1
26	+228	+422	10.0	B9n*	B9-A0 IV-V	+23.0	±2.9		4340		80	181	1
27	+574	+345	10.0		A3IV			10°1253			99	222	1
28	+292	-871	10.0		A7III			9°1247				193	
29	+128	-768	10.1					9°1242				157	
24	+ 90	+413	10.1							5325B	61	143	1
30	-103	+347	10.1	A0n*	A2IV	+25 var	±7	9°1236	4329	5322G	48	100	1

Figure 1. A representative page from the three-volume notebook of radial velocity measurements by Trumpler, assembled by Weaver (1966). The first column gives Trumpler's internal number for the star within its cluster, marked on a separate photograph. The 2nd and 3rd columns provide the displacement in x and y, in arcseconds, relative to the center of the open cluster, NGC 2264. The next two columns give Trumpler's measured "photographic magnitude" and spectral type. The next column gives Trumpler's measured radial velocity and probable error, "p.e.". The next column, "Other designations" give various names in catalogs, notably the HD, BD, and General Catalog of Stellar Radial Velocities, and others. The last column is a note about the likely membership in the cluster.

to perform these manual measurements of the spectral lines, and he established empirically the systematic biases of each assistant.

For each spectral type, only certain absorption lines were measured, and Trumpler determined and accounted for the systematic errors caused by blends of multiple stellar absorption lines as a function of star's spectral type and luminosity class. Trumpler corrected the resulting Doppler shifts for many other systematic effects such as from the mechanical flexure of the spectrograph toward different regions of the sky, the temperature and focus of the spectrometer, and the changing curvature of the spectral lines caused by the prism. Trumpler computed the weighted average of the Doppler

shifts from typically 15 to 20 stellar absorption lines to establish a final radial velocity, and he computed their variance to establish an internal uncertainty.

Trumpler corrected the radial velocities to account for the orbital motion of the Earth around the Sun and for the rotational motion of the telescope about the center of the Earth. The resulting radial velocities, listed in Table 1, are "heliocentric", i.e. they are the component of the relative velocity vector along the line-of-sight between the star and the Sun. The Sun changes velocity by ~ 0.013 kms due to the gravitational pull on the Sun by Jupiter and all the planets, an effect Trumpler properly ignored as less than the errors. Trumpler obtained multiple spectra of some of the stars within the open clusters, offering an opportunity to measure internal errors and to detect single-line and double-line spectroscopic binaries. Any such variation is noted in Table 1, described below.

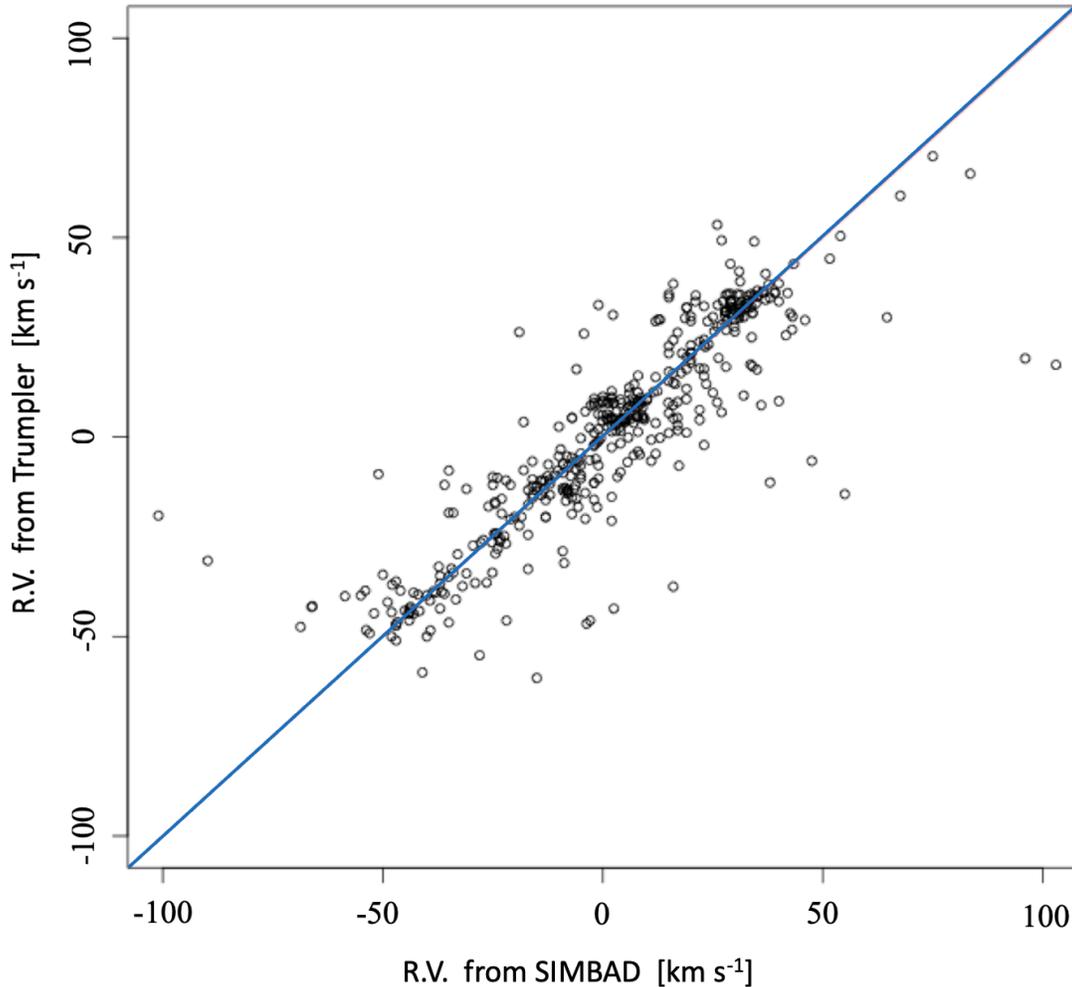


Figure 2. Radial velocities from Trumpler vs. radial velocities listed in SIMBAD, for those stars having measurements from both. Trumpler obtained all velocity measurements between 1924 to 1947 while the quoted radial velocities in SIMBAD are more recent. The diagonal blue line represents the locus at which both velocities are the same. The clustering around the diagonal line indicates that Trumpler’s radial velocities have the same scale and zero-point as those listed in SIMBAD. The points farthest from the diagonal may be errors in one radial velocity or the other, or they may be due to binary motion during the past ~ 80 yr. The standard deviation is 6 km s^{-1} , indicative of the quadrature sum of uncertainties and any motion in a binary star system.

4. THE MEASURED RADIAL VELOCITIES

Table 1 contains 14 columns of data following a format described below. Columns 1 through 5 list multiple standard star names including HD, BD, HIP, GCSRV from the *General Catalogue of Stellar Radial Velocities* (Wilson 1953), or "Other ID" such as from Cape Photographic Durchmusterung (CPD) (Gill & Kapteyn 1896). For the 25% of the stars, we established a modern star identification, as described above, often using the photographic images of the cluster provided in Weaver (1966) compared to SIMBAD’s Aladin Applet and SKY-MAP. Column 6 lists the name of the open cluster that each star was near. Column 7 contains the "photographic magnitude", accurate only to 0.1 mag, for each star measured by Trumpler from the photographic plates of the cluster, obtained by one of the small telescopes at Lick Observatory. Column 8 has the corresponding B magnitude provided by SIMBAD or SKY-MAP as a verification for positive identification of a given star.

Columns 9 and 10 are the average of the radial velocities measured by Trumpler with his associated calculation of the "probable error" (p.e.). Many stars had multiple radial velocities measurements, and we list here only the average given in Weaver (1966). Column 11 is the radial velocity provided by SIMBAD when available. Columns 12 and 13 are the Julian Dates (JD-2,400,000) that Trumpler first began taking measurements for a given star and when he last took measurements. The last column, 14, gives the number of the Note, if any, found for a star given by Robert Trumpler, Harold Weaver, SIMBAD’s star descriptions, and any other comments discovered while identifying the star names. The notes themselves are listed after Table 1.

5. THE UNCERTAINTIES OF THE RADIAL VELOCITIES

For stars brighter than ~ 8 th mag, Trumpler compared his radial velocities with those in the General Catalogue of Stellar Radial Velocities (Wilson 1953). Trumpler found a systematic difference between his raw radial velocities and those in that Catalogue, and the difference depended systematically on spectral type and luminosity class. He computed the average difference in radial velocity, for a given spectral type and luminosity class, and applied them to all of his raw measurements to yield final radial velocities that had the systematic difference removed between his velocities and those of the Catalogue. In that way, he ensured that his radial velocities had the same zero-point and scale as those in that General Catalogue.

Trumpler estimated the random errors in his radial velocities by comparing them to those velocities listed in the General Catalogue of Stellar Radial Velocities (Wilson 1953). He found the random errors of his radial velocities to be 2 to 6 km s^{-1} (RMS), depending on brightness, spectral type, luminosity class, and the widths of the absorption lines due to rotation, turbulence, and collisional broadening.

To test the zero-point and uncertainties of Trumpler’s velocities, we took Keck-HIRES spectra on July 1, 2010 of four stars that were measured by Trumpler. The four stars, all FGK giants and supergiants of roughly 6th magnitude, were HD 172365, HD 160371, HD 161622, and HD 162587. We measured the velocities from Keck-HIRES spectra using the algorithm written by Chubak et al. (2012) that determines radial velocities in the frame of the solar system barycenter with an accuracy of 0.1 km s^{-1} . The four velocities from Keck-HIRES are -20.21 km s^{-1} , -8.72 km s^{-1} , -6.80 km s^{-1} , -16.16 km s^{-1} , respectively. Trumpler’s velocities for those four stars were -20, -7.4, -7.1, -19.3 km s^{-1} , respectively.

The mean of the differences between Trumpler’s radial velocities and those from Keck-HIRES was -0.48 km s^{-1} with a standard deviation of 1.89 km s^{-1} . Apparently Trumpler’s radial velocity errors for the brightest stars are indeed ~ 2 km s^{-1} . The velocities from Chubak et al. (2012) are consistent with, and helped establish, the zero point and scale of the IAU radial velocity standard stars (Stefanik et al. 1999). Thus Trumpler’s radial velocities seem to have a zero-point consistent with the IAU standards, i.e. no systematic offset, within 1 km s^{-1} .

We also compared Trumpler’s measured radial velocities to those listed in the SIMBAD database. We found 450 stars in common. Figure 2 shows Trumpler’s radial velocities plotted against the radial velocities listed in SIMBAD. The diagonal blue line shows the locus of points at which Trumpler’s velocities would agree with those in SIMBAD. The points indeed scatter about the diagonal line, indicating that Trumpler’s velocities in Table 1 are on the same velocity scale as those in SIMBAD, with no significant zero-point difference. The standard deviation is 6 km s^{-1} , some of which is due to binary stars and to the errors and inhomogeneous sources of the SIMBAD velocities. Indeed, the listed radial velocities in SIMBAD change by many km s^{-1} over time, no doubt caused by newly injected radial velocities.

Finally, we compared Trumpler’s radial velocities with those from the Gaia DR3 RVS catalog of radial velocities. Unfortunately, Gaia measured radial velocities of mostly FGK stars while Trumpler tended to obtain spectra of the brightest members of Galactic clusters, which are B, A, and early F-type stars.

We found 20 stars in common, most being 9th mag F and early G stars. Among them, the median of the difference in their radial velocities was 0.19 km s^{-1} and the mean of the difference was 1.9 km s^{-1} . The standard deviation of the differences was 5.0 km s^{-1} , similar to that found for the comparison with SIMBAD. Thus, the zero point of Trumpler's radial velocities agrees with those of Gaia DR3, within 2 km s^{-1} , and the differences are consistent with the errors in both, along with some binary motion during the intervening 80 years.

Thus we conclude that Trumpler's listed radial velocities are consistent with the zero-point and the scale of the IAU radial velocity standard stars and with the radial velocities from Gaia DR3. The errors in Trumpler's velocities are apparently 2 to 6 km s^{-1} , making them useful to detect actual physical motion of the stars during the past 80+ years of more than those errors.

6. CONCLUSIONS

This paper provides the average radial velocities of 671 stars located near Galactic open clusters that were measured by Robert Trumpler from 1924 to 1947. These radial velocities had existed only in paper form, typed by hand (Weaver 1966), that will now reside at the Lick Observatory. A further key goal was to provide secure identifications of each of the 671 stars so that the radial velocities, spectral types, and magnitudes could be employed in further research of those stars.

We performed two checks of the accuracy of Trumpler's radial velocities by comparing them to new radial velocity measurements of four stars observed with the Keck-HIRES spectrometer and to 450 stars having radial velocities listed on SIMBAD. The tests show that Trumpler's radial velocities have a zero-point and a scale consistent with the IAU radial velocity standard stars (Stefanik et al. 1999). The uncertainties of Trumpler's radial velocities range from 2 km s^{-1} for the stars brighter than 8th mag up to 6 km s^{-1} for the fainter stars up to 13th mag. Thus, Trumpler's velocities offer information about membership in their respective Galactic open clusters, and offer a time baseline of nearly a century to search for accelerations caused by binary star companions, cluster dynamics, or exotic rare events such as passing compact objects.

Finally, we scanned the entire *Publications of the Lick Observatory, Volume XXI* (Weaver 1966) and placed a PDF of it online at a location to be specified in publication proofs. In addition a copy is here:

<https://www.dropbox.com/scl/fi/mqk4lc6pviuh9s8u7nfik/PubLickObsVolXXI1966.pdf?rlkey=2uktcyhl1pw5791pp8yedqhp9&st=lfh8y07g&dl=0>

This full copy makes all of its detailed information available online to the astronomical community and to the public. This public version contains the individual radial velocity measurements and associated Julian Dates of each observation, suitable for the detection and orbital analysis of long-period binary stars and for detecting accelerations from any gravitational dynamics.

7. ACKNOWLEDGMENTS

We thank Harold Weaver for requesting that this paper be written. We also thank him for his tireless work to organize all of Robert Trumpler's radial velocities and other stellar data. We are deeply appreciative of the careful and voluminous radial velocity measurements by Robert Trumpler, made during three decades, that provide fundamental information about the membership, properties, binary nature, and dynamics of stars in 73 open clusters in our Milky Way Galaxy. Carly Chubak wrote the computer code we used to compute radial velocities in the frame of the solar system barycenter from the Keck-HIRES spectra. We thank Nicholas Suntzeff, Peter McCullough, Merle Walker, Alex Filippenko, and Ben Reaves for helpful comments about the manuscript. This research made use of the SIMBAD database, operated at CDS, Strasbourg, France. SIMBAD provided coordinates and photometry enabling identification of roughly half of the stars listed here, along with radial velocity measurements. Some of the data presented herein were obtained at the W. M. Keck Observatory, which is operated as a scientific partnership among the California Institute of Technology, the University of California, and NASA; the observatory is made possible by the generous financial support of the W. M. Keck Foundation.

Facilities: 36-inch Refractor Telescope at Lick Observatory, Keck 1 Telescope and HIRES.

Table 1. Trumpler's Average Velocities of Stars in Galactic Clusters

HD	BD	HIP	GCSRV	Other ID	Cluster	Mag	Bmag	RV (km s^{-1})	p.e. (km s^{-1})	RV SIMBAD (km s^{-1})	JD-2400000 (Start)	JD (End)	Notes
7927		6242	762		NGC 457	5.8	5.599	-24.4	3.5	-18.9			1
7902		6229			NGC 457	7.5	7.3	-36.6	3.1	83.4	25266.597	28897.664	2
	+57 252		758		NGC 457	9.7	9.76	-39.7	1.3	-65			3
	+57 243		747		NGC 457	9.8	9.99	-36.7	4.1	-52	25815.926	30670.773	4
	+57 246	6170	752		NGC 457	9.9	9.99	-34.8	2	-13	25821.92	30636.867	5
	+57 249				NGC 457	10	10.25	30	22	64.6	27355.954	29900.727	6
	+57 247				NGC 457	10	10.06	-34	2.5	-55.1	27362.923	30671.772	7
	+57 248		757		NGC 457	10.1	10.16	-40.7	2.2	-35.7	25888.955	31742.872	8
	+57 251				NGC 457	10.4	10.379	-39.5	3.1	-59	27441.664	30553.979	9
	+57 254				NGC 457	10.4	10.47	-33	6	-34.4	27399.796	30637.742	10
	+57 253				NGC 457	10.4	10.51	-32.5	3.1	-21.6	28020.945	29495.883	11
9311		7232	867		NGC 581	7.4	7.482	-41	1.3	-43.4	24031.782	30609.028	12
9365		7280			NGC 581	8.4	8.48	2.6	2.8	2.9	25433.97	25439.932	13
	+59 273		869		NGC 581	9.2	9.22	-39	2.2	-43	24730.943	29929.808	14
			868		NGC 581	10.2	9.9	-39.7	2.8	-40	24036.969	27768.777	15
				Cl* NGC 581 ESY 19	NGC 581	10.5	10.7	-46.5	2.8		27399.634	30321.75	16
				Cl* NGC 581 ZUG 7	NGC 581	10.5	10.78	-38	6		27395.868	30198.945	17
	+59 274		51711		NGC 581	10.6	10.64	-38.5	2.6	-54	27661.928	28026.931	18
	+60 276			Cl* Trumpler 1 OJA 1158	Trumpler 1	10.2	10.29	-61.6	2.3		27358.904	31316.847	19
	+60 274			Cl* Trumpler 1 OJA 1143	Trumpler 1	10.9	10.99	-49.1	2.6		27342.968	31350.811	20
	+60 275A			Cl*Trumpler 1 OJA 1150	Trumpler 1	11.4	12.43	-53	2.7		28420.836	30371.637	21
				01 35 41.22 +61 17 25.6	Trumpler 1	11.6		-56.5	4.4		27368.908	29874.844	22
	+60 339	8260	986		NGC 637	10.6	10.787	-55	8		25809.964	30636.91	23
	+60 333			TYC 4040-330-1	NGC 637	10.6	10.536	-47.9	2.6		26954.913	28131.777	24
	+60 331		51969	TYC 4040-300-1	NGC 637	10.6	10.536	-47.9	2.6		26950.912	30189.944	25
	+60 343		990	TYC 4040-26-1	NGC 637	11.2	11.108	-45.8	3.4		26937.927	30636.892	26
	+60 347	8305	20135	ADS 1342 B	NGC 637	11.2		-39.7	2.8		26946.895	29145.815	27
	+60 344				NGC 663	10.4	10.74	-35.5	3.1		26979.977	29110.935	28
	+60 340				NGC 663	10.7	10.59	-38.9	2.9		30322.605	30637.805	29
11885	+36 370		52179		NGC 752	8.3	8.35	8.8	2.1	17	24403.817	30259.765	30
12027	+36 378		52437		NGC 752	8.5	8.49	9.5	2.3	19	25074.965	29166.046	31
11720	+37 415		52235		NGC 752	9	9.05	-22.2	2.8	-19	24101.635	24408.814	32

Table 1 continued on next page

Table 1 (continued)

HD	BD	HIP	GCSRV	Other ID	Cluster	Mag	Bmag	RV (km s^{-1})	p.e. (km s^{-1})	RV SIMBAD (km s^{-1})	JD-2400000 (Start)	JD (End)	Notes
	+37 440				NGC 752	9.5	9.44	3.6	2.3	7	24452.706	28136.828	
11812	+37 421		52163		NGC 752	9.6	9.57	-4.6	3.9	7	24414.799	30224.922	25
	+36 367		52270		NGC 752	9.7	9.8	1.3	3.1	8	25169.906	30259.788	
11811	+37 422		52162		NGC 752	9.8	9.75	2.6	5.3	-10	24490.814	30204.057	26
	+37 425		52292		NGC 752	9.9	9.84	-1.6	2.1	4	24443.737	30224.959	
	+37 418		52287		NGC 752	10	9.98	-0.7	2.3	11	25186.684	29260.617	27
	+37 444		52332		NGC 752	10	9.94	4.7	2.3	16	24818.734	29274.742	28
	+37 432		52285		NGC 752	10	9.98	-0.2	2.4	13	25113.891	28739.963	29
19427	+36 638	14616			NGC 752	10	9.76	4.5	2.4		27313.932	29644.718	30
	+37 488	9245			NGC 752	10.1	10.07	-0.1	2.6	5.79	24878.741	29900.836	
	+37 426		52279		NGC 752	10.2	10.17	3	12	17	25363.981	30203.972	31
	+36 372		52326		NGC 752	10.2	10.16	-13.5	2.4	-9	24795.781	29096.965	
	+37 441		52331		NGC 752	10.2	10.23	1.5	2.6	3	24758.932	31378.823	
	+37 431		52284		NGC 752	10.3	10.16	3	2.3	2	24758.841	29901.742	
	+37 439	9164	52325		NGC 752	10.4	10.32	8	14	36	24433.782	29856.912	32
	+37 420		52275		NGC 752	10.7	10.3	-12	24	-36	25146.813	29145.9	33
14134	+56 527	10805	1282		NGC 869	7	6.983	-42.6	1.2	-43.7	23977.999	31732.897	34
14143	+56 545	10816	1284		NGC 869	7.2	7.15	-43.6	1.2	-41.7	23981.002	32417.941	35
14052			1278		NGC 869	8.5	8.48	-59	11	-41	24825.927	29481.011	36
14053			1275		NGC 869	8.7	8.7	-46		-44			37
	+56 527		1283		NGC 869	8.8	8.818	-40.7	2.6	-33.4	23986.95	27662.009	
14259			1299		NGC 869	9.3	9.42	-50		-48			38
	+56 526				NGC 869	9.4	9.384	-44.2	2.8		24392.877	31878.669	
	+56 511				NGC 869	9.5	9.49	-37.4	2.9	-31.9	25136.809	31734.917	39
	+56 502				NGC 869	9.6	9.58	-43	2.9	2.5	25845.945	30258.849	40
	+56 510				NGC 869	9.6	9.604	-46	2.5	-2.9	25145.792	32114.721	
	+56 501				NGC 869	9.7	9.631	-41.3	3		25121.944	32417.968	41
	+56 525				NGC 869	9.7	9.63	-38.8	3	-36.6	25161.776	31827.714	
	+56 504				NGC 869	9.7	9.726	-47.6	2.5	-68.7	25110.95	31734.968	
	+56 535		1286		NGC 869	9.8	9.75	-43	3.4	-37	25107.952	28897.721	
14162	+56 515				NGC 869	9.9	9.836	-42.6	3.3	-66.2	24493.644	30615.853	42
	+56 519				NGC 869	10.1	9.998	-44.2	5.8	-52	25124.896	32114.753	43
	+56 634				NGC 869	10.1	10.05	-31.6	2.2	-8.8	25540.95	32422.914	44
	+56 524				NGC 869	10.1	10.114	-39.3	2.6	-36	25870.827	31827.741	
	+56 513				NGC 869	10.2	10.265	-36.5	2.4	-26.4	25539.95	32415.936	
	+56 520				NGC 869	10.2	10.243	-52.5	2.3		25124.896	32415.901	45
14433	+56 568	1319			NGC 884	7	6.97	-46.4	0.9	-46.7			46
14535	+56 591	1332			NGC 884	8.2	8.08	-49.2	1.4	-53	23980.963	30189.986	47
14443	+56 570	1320			NGC 884	8.4	8.39	-48.5	2.1	-39.2	24814.693	31744.915	48

Table 1 continued on next page

Table 1 (continued)

HD	BD	HIP	GCSRV	Other ID	Cluster	Mag	Bmag	RV (km s^{-1})	p.e. (km s^{-1})	RV SIMBAD (km s^{-1})	JD-2400000 (Start)	JD (End)	Notes
14476	+56 574				NGC 884	8.8	8.83	-50.1	2.2		23982.953	30592.889	
	+56 577				NGC 884	9.1	9.13	-48.4	3.1		25873.806	30292.892	
	+56 575				NGC 884	9.4	9.37	-39.9	2.4	-58.6	24416.794	32183.763	49
	+56 588				NGC 884	9.5	9.47	-46.8	2.5	-3.7	25540.788	30615.903	
	+56 578				NGC 884	9.6	9.02	-44	3.2				50
	+56 576				NGC 884	9.7	9.68	-24	8		24743.951	31318.908	51
	+56 571				NGC 884	9.7	9.69	-46.5	2.5		24754.912	32063.885	
	+56 584				NGC 884	9.7	9.824	-31	10	-89.8	25526.986	32205.615	52
	+56 553				NGC 884	9.8	10.213	-44	2.9		25945.668	30636.93	
	+56 563				NGC 884	9.8	9.77	-38.7	5.3	-38.5	24113.618	31742.789	53
	+56 573				NGC 884	10.1	10.06	-47	2.9		24767.865	31318.939	54
	+56 582				NGC 884	10.1	10.2	-37	5	-47.9	25937.875		55
	+56 572				NGC 884	10.2	10.22	-43.9	3		24745.906	31359.839	56
14330	+56 551		1304		NGC 884	10.2	10.232	-43.1	1.4	-44			57
	+56 566				NGC 884	10.3	10.26	-41.4	3.3	-48.9	24748.867	30615.88	58
	+56 595		1338		NGC 884	10.4	10.41	-47		-47			59
14488	+56 583		1325		NGC 884	10.6	10.572	-39	1.7	-38	25528.977	31413.82	60
15557	+61 424		1422		IC 1805	7.9	7.75	-12.3	3.5	-15	25439.98	25442.979	
15558	+60 502	11832	1424		IC 1805	8.3	8.35	-34.5	2	-50			61
15629	+60 507	11891	1431		IC 1805	8.6	8.78	-43.9	1.8	-48	25253.771	31675.873	
15570	+60 504	11837	1426		IC 1805	8.6	8.75	-60.4	3.1	-15	25249.709	32002.979	62
	+60 497		1414		IC 1805	9	9.25	-50.4	2.1				63
	+60 501		1421		IC 1805	9.7	9.94	-47.3	1.2	-47			64
	+60 513				IC 1805	9.7	9.79	-24.3	5.5		27363.019	28152.792	65
	+60 498	11792			IC 1805	10.2	10.32	-42.5	5.5		27429.791	32113.83	66
	+60 499	11807			IC 1805	10.6	10.7	-42.4	2.1	-66	28154.641	32414.983	67
					IC 1805	11.1	11.19	-50.7	2.5		28402.924	31675.928	68
	+60 506			Cl* IC 1805 HG 149	IC 1805	11.5	11.4	-46	3.2	-21.9	31317.944	31673.944	
				CCDM J02327+6128A	IC 1805	11.5	11.5	-51.4	4.4		31709.894	32477.766	69
					IC 1805	11.6	11.95	-48.4	3.2	-53.8	30588.97	31023.778	70
15690	11898		1436		NGC 957	8.6	8.54	-43.5	1.9	-45	26254.781	30637.891	71
15621	+56 652		53122		NGC 957	8.7	8.93	-20	4.5	-13	27673.971		
	+56 657	11902	1179 E		NGC 957	10.3	10.12	-54.7	2.8	-28	27782.804	32093.808	72
	+56 655				NGC 957	11	11.2	-51.2	3		28194.64	30637.862	
16626	+60 548	12656			NGC 1027	7.5	7.372	14.1	2.6	14.9	26227.01	28417.015	
	+61 465		53307		NGC 1027	9.6	9.89	-44.3	2.3	-44	27697.917	30292.936	
	+61 466		53312		NGC 1027	9.7	9.98	-51	6	-47	27794.791	30257.938	73
	+60 550		53308		NGC 1027	9.9	9.2	-44.3	2.8	-43	27739.784	31355.899	
	+60 547				NGC 1027	10.8		-41.6	2.5		30257.896	31358.862	74

Table 1 continued on next page

Table 1 (continued)

HD	BD	HIP	GCSRV	Other ID	Cluster	Mag	Bmag	RV (km s^{-1})	p.e. (km s^{-1})	RV SIMBAD (km s^{-1})	JD-2400000 (Start)	JD (End)	Notes
16728	+42 552	12695			NGC 1027	10.8	10.56	-38	5.7		28069.018	30616.919	75
16782	+42 598	12619			NGC 1039	8	8.14	-6.9	2.2	-12.4	24031.914	30937.993	76
16719	+42 607				NGC 1039	8.3	8.24	-6.1	2.2	-16	24498.665	30609.954	77
16705	+42 591	12606			NGC 1039	8.5	8.26	-7.7	2.2		24447.887	27080.599	78
16693	+42 589				NGC 1039	8.6	7.73	-13.7	2.2		24461.716	31360.776	79
	+42 588				NGC 1039	8.6	8.52	-7.8	2.4		24080.905	27109.66	80
	+42 601				NGC 1039	8.9	8.86	-8.3	2.9		24497.59	27057.831	
	+42 596	12621			NGC 1039	8.9	8.86	-5.5	2.5		24116.608	27049.802	
16679	+42 284				NGC 1039	9	9.04	-8.9	2.9		24418.894	27316.974	
	+42 602				NGC 1039	9.3	9.33	-4.5	2.3		24808.791	30609.924	
	+42 597				NGC 1039	9.4	9.3	-8.7	3.1		24775.862	28898.766	
	+42 590				NGC 1039	9.8	9.85	-3.6	2.9		25116.95	30736.698	
	+42 595				NGC 1039	10	9.88	-3.6	2.7		25171.966	30721.613	
	+42 594				NGC 1039	10.1	10.06	-5.2	2		25258.733	31055.7	
17505	+59 552	13296	1586		IC 1848	7.2	7.49	-24.5	1.3	-17			81
17520	+59 553	13308	5345.3		IC 1848	8.3	8.53	-38.5	2.5	-46	25875.904	31054.648	82
237007	+59 549	13255	1582		IC 1848	8.8	9.68	-30.3	2.9	-40	27753.89	31319.009	83
				ADS 2165 C	IC 1848	9.4	9.4	-50	10		30230.899	32422.957	84
				ADS 2165 D	IC 1848	11.4	(V: 11)	-44.7	3.2		28404.959	30321.824	85
				ADS 2161 C	IC 1848	11.6	(V: 11.5)	-44.7	3.7		27719.986	30322.687	86
23630	+23 541	17702	2135		IC 1848	12	11.5	-34.9	4.6		30592.967	32477.97	87
23850	+23 557	17847	2171		M45	2.8	2.806	9.7	1	10.1	22975.899	30320.86	88
23302	+23 507	17499	2079		M45	3.6	3.54	8.2	1	8.5	22979.074	30640.059	89
23408	+23 516	17573	2097		M45	3.6	3.612	11.5	1.1	12.4	22975.927	30735.593	90
23480	+23 522	17608	2108		M45	3.8	3.812	7.5	0.5	7.5	22976.069	31734.87	91
23338	+24 547	17531	2086		M45	4.1	4.113	7.8	1.1	6.2	22983.076	32113.966	92
23862	+23 558	17851	2172		M45	4.2	4.199	4.5	0.8	5.5	2297.066	30322.068	93
23753	+22 563	17776	2152		M45	5	4.967	4.6	0.5	4.4	22975.942	30259.869	94
23288	+23 505	17489	2077		M45	5.4	5.378	8.6	1.6	-2	22989.97	32205.734	95
23324	+24 546	17527	2085		M45	5.4	5.406	3.3	1	2.9	22986.944	30231.03	96
23432	+24 553	17579	2100		M45	5.6	5.585	9.6	1.9	-2	22986.931	31734.84	97
23923	+23 563	17900	2187		M45	5.7	5.727	4.0	1.8	-0.1	22976.062	30734.594	98
23629	+23 536		2130		M45	6.1	6.124	11.5	1.6	2	22986.881	32476.843	
23441	+24 556	17588	2103		M45	6.3	6.3	7.7	1.6		22967.831	31525.631	99
23873	+23 561	17862	2176		M45	6.4	6.415	5.6	1.7	0	22986.91	31877.741	100
23410	+22 545	17572	2098		M45	6.6	6.586	8.6	2.3	1.4	24054.94	29930.047	101
23964	+23 569	17923	2190		M45	6.9	6.916	8.6	2	2.6	22983.048	31370.995	102
23568	+24 562	17664	2124		M45	6.8	6.8	12.4	4.1	6	22989.925	30723.67	103
					M45	6.8	6.85	6.4	2.4	-4	24066.857	29931.014	

Table 1 continued on next page

Table 1 (continued)

HD	BD	HIP	GCSRV	Other ID	Cluster	Mag	Bmag	RV (km s^{-1})	p.e. (km s^{-1})	RV SIMBAD (km s^{-1})	JD-2400000 (Start)	JD (End)	Notes
23642	+23 540	17704	2137		M45	6.9	6.9	1	8	15	24066.878	31085.691	104
23632	+23 537	17692	2131		M45	7	7.04	8.5	2.6	2.4	24066.902	30721.65	
24076	+23 570	17999	2200		M45	7	7.02	4.1	2.9	5	24066.929	32063.952	105
23763	+23 553	17791	2154		M45	7.1	7.08	9.2	2.5	8	24096.715	30610.008	
23631	+23 538		2133		M45	7.3	7.34	4.4	2.6	3	24113.68	31373.048	106
23387	+23 512		2095		M45	7.3	7.33	9.4	2.2	4	24105.94	32205.7	
23489	+23 523		2110		M45	7.4	7.48	8.5	2	4.2	24100.951	21737.841	
24013	+24 578		23625		M45	7.6	7.57	4.5	2.2	6.3	22965.997	32034	107
23948	+23 567		2188		M45	7.6	7.61	6.2	1.4	5.1	24428.024	31362.862	
23872	+23 560		2175		M45	7.6	7.64	6.3	1.4	3	24067.053	32240.685	108
23628	+24 566		2132		M45	7.9	7.89	8.7	1.5	0	24113.724	32239.742	109
23643	+23 539		2136		M45	7.9	7.93	9.9	1.6	8.6	24037.968	30636.985	110
23409	+23 517		2099		M45	8	8.11	7.5	1.5	5.6	24128.835	32062.982	
23886	+23 562		2179		M45	8.2	8.15	7.4	1.7	9	24080.955	30640.045	
23479	+23 520		2107		M45	8.3	8.28	1.1	1.4	-2	24469.814	31469.624	111
23157	+23 496	17401	2055		M45	8.2	8.25	5.7	1.6	-1	24077.848	31826.733	
23361	+23 510		2091		M45	8.2	8.24	9.4	1.9	10	24116.838	30372.598	
23194	+24 540		2060		M45	8.3	8.28	4.3	1.6	1	24208.632	32476.826	112
23924	+22 573		2184		M45	8.3	8.32	7.5	1.7	6.7	24077.893	30720.823	
23863	+23 559		2173		M45	8.3	8.36	4.7	1.5	5	24083.877	32092.985	
23246	+23 504		2069		M45	8.4	8.44	4.6	1.5	1.9	24077.802	30638.866	
23512	+23 524		2117		M45	8.5	8.47	5.7	2.2	1	24105.993	31742.952	
23156	+23 495		2054		M45	8.5	8.49	5.0	1.5	7.9	22967.904	31412.775	113
23607	+23 534		2129		M45	8.5	8.51	5.9	1.9	5.9	24092.992	30640.031	114
23733	+23 549		2150		M45	8.6	8.73	8.9	3.7	7.8	24116.683	30258.936	
23567	+24 563		2125		M45	8.6	8.65	9.2	1.9	10	24475.789	30399.618	115
23791	+22 565		2163		M45	8.7	8.64	5.0	1.9	2	24116.735	30938.988	
23585	+23 528		2126		M45	8.7	8.67	4.1	1.9	4.7	24423.999	30257.966	
23325	+23 508		2082		M45	8.9	8.96	5.2	1.6	7.6	24117.767	30720.625	
23375	+24 550		2093		M45	9	8.94	13.6	1.3	16	24019	32183.685	116
23608	+23 531		23568		M45	9.2	9.15	5.8	2.3		24089.791	31056.68	
24132	+24 584	18050	2204		M45	9.2	9.24	8.6	1.4	8	24134.807	31744.939	
23289	+22 537	17497	2078		M45	9.3	9.33	3.7	1.6	5	24453.97	30399.633	
23326	+23 509		2083		M45	9.3	9.34	5.4	1.9	9	24427.896	30405.62	
23351	+24 548		2088		M45	9.4	9.46	10	7	2	24404.935	30609.981	117
23247	+23 503		23525		M45	9.5	9.49	13.2	1.7	7.1	24150.643	32422.993	
23912	+22 570		2180		M45	9.5	9.55	4.4	1.7	2	24413.925	30670.892	
23950	+21 535	17921	2189		M45	6.1	6.057	7.9	1.8	-2.8	22965.821	31733.932	118
24368	+25 641	18201	2228		M45	6.5	6.452	11.2	1.6	8	22967.795	31370.929	119

Table 1 continued on next page

Table 1 (continued)

HD	BD	HIP	GCSRV	Other ID	Cluster	Mag	Bmag	RV (km s^{-1})	p.e. (km s^{-1})	RV SIMBAD (km s^{-1})	JD-2400000 (Start)	JD (End)	Notes
22578	+22 523	17000	2013		M45	6.7	6.702	9.1	2.5	0	22986.854	31054.677	
22615	+20 602	17026	2015		M45	6.7	6.647	-6.1	1.9	-5.4	22979.049	23029.707	120
23913	+22 572	17892	2183		M45	7	7.03	4.8	1.7	-7	22979.023	32240.703	
22614	+24 527	17034	2016		M45	7.1	7.13	8.3	2.1	-1	22966.044	32093.002	
24899	+23 594	18559	2273		M45	7.2	7.228	7.7	2	8	22976.036	32418.001	
22637	+21 492	17043	2017		M45	7.3	7.34	17.6	2.4	28	22987.985	32093.02	121
23155	+24 537	17403	2052		M45	7.7	7.67	4.6	3	1	22982.927	31746.817	
24178	+25 631		2210		M45	7.8	7.82	2.5	2.3	4	22990.013	31826.753	
23852	+22 569		2174		M45	7.9	7.9	9.6	1.5	2	22978.969	31358.938	
23402	+22 544		2096		M45	8	8	4.8	1.7	9	22982.995	31022.985	122
23388	+20 624	17552	2094		M45	7.9	7.92	10.1	1.6	0	22968	31525.648	
23430	+24 554	17583	2101		M45	8.2	8.25	8.5	1.7	7	22979.791	31054.701	
23610	+22 556	17694	23570		M45	8.4	8.41	11.3	2.3	11.5	24096.762	31023.986	
23664	+24 568	17729	2144		M45	8.6	8.55	10.9	1.9	6	24096.821	31819.769	
23792	+21 530		2162		M45	8.8	8.78	7.9	1.5	-2	22965.893	32093.92	
24711	+22 601	18431	2259		M45	8.6	8.59	8.0	1.9	16	24028.007	31355.987	
23133	+22 535		2048		M45	9	9.22	2.3	2	-3	24423.915	30594.986	123
23488	+25 615	17625	2113		M45	9.1	9.03	4.3	1.6	4	24083.004	31373.025	
22146	+23 477				M45	9.2	9.19	4.5	2.3		24152.794	30721.699	
22702	+24 528		2006		M45	8.2	8.15	10.3	2		24066.995	32476.809	124
22491	+23 483		2217		M45	9.1	9.06	50.4	2.4	54	24493.748	24498.806	
24302	+24 589	18154	2217		M45	9.9	9.9	4.8	2.2	8	24150.784	30286.838	
22308	+24 512	16805			M45	9.6	9.65	14.4	1.8		24117.89	32239.986	125
24655	+21 556				M45	9.5	9.5	7.0	2.1	1	24148.647	31707.997	
	+23 472	16639			M45	10.1	10.07	8.6	2.4		24077.995	30616.99	126
23675	+52 714	17877	2160		NGC 1444	6.7	7.12	1.4	1.5	2	26286.018	28453.043	127
	+52 714B				NGC 1444	10.3	(V 9.1)	1.2	2.6		28044.979	30285.997	128
25639	+61 676A	19272	2344		NGC 1502	7.5	7.4	-17		-17			129
25638	+61 676B	19270	2345		NGC 1502	7.6	7.26	-9		-9			130
	+61 678		2351		NGC 1502	10	9.79	-19.2	3.2	-23	26254.894	31735.9	131
			2339		NGC 1502	10.2	10.23	-9.3	2.8	-51	27012.008	30258.913	
	+61 675		2342		NGC 1502	10.2	10.22	-13.3	2.6	-8	26595.91	32114.794	132
			2341		NGC 1502	10.2	10.2	-4.8	2.3	-10	26596.005	32204.704	133
	+61 675B		2340		NGC 1502	10.4	(V 11.1)	-14.9	2.5		26610.893	31025.775	134
				CCDM J04078+6220I	NGC 1502	10.6	10.7	-17.7	2.3		27386.952	31735.996	135
				CCDM J04078+6220K	NGC 1502	10.7	10.5	-10	6		27032.939	30322.773	136
				TYC 4068-1042-1	NGC 1502	11.1	11	1.5	4.3	3.3	27369.024	31359.944	137
26603	+50 940	19813			NGC 1528	9.1	8.95	-11.5	0.8				138
232923	+50 942	19833			NGC 1528	9.3	9.78	-8.7	2.8		28081.023	31373.985	139

Table 1 continued on next page

Table 1 (continued)

HD	BD	HIP	GCSRV	Other ID	Cluster	Mag	Bmag	RV (km s^{-1})	p.e. (km s^{-1})	RV SIMBAD (km s^{-1})	JD-2400000 (Start)	JD (End)	Notes
	+50 948	19852			NGC 1528	10.2	10.11	-7.6	2.8		29166.95	31357.977	
	+50 935			ICRS: 4 15 22.07 +51 12 49.3	NGC 1528	10.7	10.6	-14.7	2.8		28780.978	29193.994	
	+50 943				NGC 1528	10.7		-14.5	2.8		28466.011	30736.736	140
					NGC 1528	10.9	10.89	-28.6	2.8	-9.13	30286.035	30723.64	
				NGC 1526 10	NGC 1528	11.1	11.03	-11.7	2.5		30615.976	31352.924	
				TYC 3340-1091-1	NGC 1528	11.1	11	-7.2	4.8		31351.977		141
30197	+18 719	22176	2793		NGC 1647	6	7.212	38.3		37.7			142
30123	+19 774	22112			NGC 1647	8.8	8.97	3.5	4.5		25511.009	30372.619	143
30170	+18 713				NGC 1647	8.9	9.163	-8.7	2.7		25611.686	29613.704	143
30263	+18 725				NGC 1647	9	9.22	-10.4	2.6		25506.934	31350.958	
285996	+18 714				NGC 1647	9.2	9.5	-5.9	2.7		25614.783	28498.848	
284841	+19 775				NGC 1647	9.4	9.59	-3.1	5.3		25938.812	29628.761	144
286016	+18 712				NGC 1647	9.6	9.878	-1.4	5.4		26954.999	30259.893	145
284839	+18 720	22185			NGC 1647	9.6	9.89	5.3	3.4		25945.798	31054.857	146
285995	+18 715				NGC 1647	9.8	9.911	-3.9	2.7		26983.941	28096.952	
286006	+18 705				NGC 1647	10	10.34	-7.9	2.9		27365.927	30286.897	
	+35 1129				NGC 1912	9.3	9.8	-4.6	3.1		27349.906	30322.966	147
	+35 1122				NGC 1912	9.6		-6	7		28059.996	30736.804	148
	+35 1120				NGC 1912	10.2	10.43	-4	2.9		28525.884	30721.742	
	+35 1123				NGC 1912	10.3		-5.9	5.1		28236.683	30322.937	149
				CCDM J05285+3549A	NGC 1912	10.5	(V: 9)	-1.6	2.9		27451.866	30710.743	150
	+35 1126				NGC 1912	10.5		-2.2	3.5		28097.812	30258.992	151
37016	-04 1184	26234	3420		NGC 1981	6	6.098	29.8	1.7	31	26306.844	28208.649	
37040	-04 1186	26257	3428		NGC 1981	6.1	6.24	29.4	1.8	30	25937.974	28500.866	152
37017	-04 1183	26233	3419		NGC 1981	6.4	6.413	35.9	4.5	29	26338.923	27107.623	153
37129	-04 1190		3453		NGC 1981	7	6.99	26.8	1.6	28	26311.006	32113.994	154
36883	-04 1172				NGC 1981	7.1	7.14	15	8		26637.837	32184.83	155
36865	-04 1171				NGC 1981	7.3	7.4	34.6	2.7		25934.981	30319.905	156
36936	-04 1176		56359		NGC 1981	7.4	7.44	29.8	4.4	18.7	25931.899	30761.643	157
36842	-04 1168				NGC 1981	8	8.03	26.4	4.4		26970.038	32184.848	158
	-04 1186B				NGC 1981	8.5	8.32	33.8	3.2		26338.87	28500.849	159
36957	-04 1178				NGC 1981	8.8	8.96	28.3	2.9		27022.933	27441.777	
36998	-04 1180				NGC 1981	8.9	9.02	27.6	5.7		27047.863	32478.936	160
	+34 1103		3429		NGC 1960	8.9	8.82	-3.6	1.1				161
	+34 1108		3432		NGC 1960	9	8.97	-10.4	3.7	-1	24783.018	29931.032	162
245239	+33 1098		3444		NGC 1960	9.1	9	-15.1	2.8		25136.983	32476.873	163
	+34 1107		3433		NGC 1960	9.1	9.13	-6	0.8	11			164
	+34 1111	26337	3443		NGC 1960	9.2	9.1	-8.3	2.1	-18	24768.004	31362.927	165
	+34 1113	26354	3445		NGC 1960	9.3	9.14	-3.6	2.2	8	25129.98	30720.706	166

Table 1 continued on next page

Table 1 (continued)

HD	BD	HIP	GCSRV	Other ID	Cluster	Mag	Bmag	RV (km s^{-1})	p.e. (km s^{-1})	RV SIMBAD (km s^{-1})	JD-2400000 (Start)	JD (End)	Notes
	+34 1106		3431		NGC 1960	9.4	9.38	9	7	40	24775.984	31746.844	167
	+34 1099		3416		NGC 1960	9.6	9.43	-4.1	2.5	-5	25142.96	30319.785	168
	+34 1110		3439		NGC 1960	9.6	9.6	-11	6	-14	24826.003	30616.023	169
	+34 1103s		3430		NGC 1960	9.8	9.63	-6.3	2.4	5.6	24818.89	31024.038	
	+34 1108		3434		NGC 1960	10	9.97	-10	7	-25	24859.735	30259.971	170
	+34 1098		3408		NGC 1960	10	10.03	-9.8	2.1	-7.3	24921.768	32205.918	
	+34 1101		3417		NGC 1960	10.4	10.41	-4.2	2	12	25293.757	31054.762	171
250290	+23 1149	28513	3759		NGC 2129	8	7.9	13.3	1.6	16.5	26392.841	31359.033	
250289	+23 1148	28510	3758		NGC 2129	8.6	8.71	9.7	2.9	6.7	26401.828	31356.035	172
250241	+23 1145		3754		NGC 2129	10.4	10.35	22.8	2.5	15	28102.948	31877.809	
				CI*NGC 2129 PP37	NGC 2129	10.8	11.02	6	7		27429.925	31358.986	173
				CI*NGC 2129 PP23	NGC 2129	11.8	11.72	3.8	2.6		28097.914	31056.843	
	+23 1148B			CI*NGC 2129 CCF7	NGC 2129	12.1	(V 11.9)	15.5	3.2		30735.7	31737.938	
					NGC 2129	12.2	(V 11.794)	59	6		30638.978		
41943	+13 1124	29126	3862		NGC 2169	6.6	6.85	16.4	1.4	15	26390.824	31353.036	174
	+13 1124B		3836		NGC 2169	7.1	7.3	15.3	2.3	23	26449.674	30426.758	
252214	+13 1120	29106	3855		NGC 2169	7.9	8.09	2	9	-1	26255.012	30011.766	175
	+13 1124D	29127	3864		NGC 2169	8.3	8.239	16.1	2.5	17.8	26407.784	31372.999	176
252248	+13 1123	29121	3860		NGC 2169	8.5	8.74	10.4	2.9	32	26611.003	30320.947	177
252266	+13 1124E		57082		NGC 2169	9	9.16	18.1	2.5	103	26394.811	30399.701	178
41909	+14 1160		3856		NGC 2169	9.3	9.37	43.4	3.4	29	26414.771	26417.736	179
				CCDM J06084+1358J	NGC 2169	10.6	10.82	20.8	2.9		27533.658	30723.726	180
				V* V1356 Ori	NGC 2169	10.6	10	19.3	2.6		28498.933	31819.952	181
				V* V1154 Ori	NGC 2169	10.9	10.882	22.4	3.1		27455.804	30427.687	182
41940	+24 1123	29148	57079	CI*NGC 2168 KUST 278	NGC 2168	7.7	8.19	-9.5	0.9	-5			183
41996	+24 1126			CI*NGC 2168 KUST 426	NGC 2168	8.3	8.519	-9.6	1.4	-11	24111.037	28236.749	184
252405	+24 1131		57089	CI*NGC 2168 KUST 524	NGC 2168	8.8	8.82	-12.3	1.9	-16	24181.816	29930.063	
	+24 1126B			CI*NGC 2168 KUST 422	NGC 2168	9	9.7	-6.6	2.6		24230.696	31054.808	185
252373	+24 1129			CI*NGC 2168 KUST 501	NGC 2168	9	9.32	-2.1	4		24208.75	30733.948	186
252199	+24 1120			CI*NGC 2168 KUST 224	NGC 2168	9.1	9.43	-6.4	5		24225.709	30427.785	187
252319				CI*NGC 2168 KUST 436	NGC 2168	9.3	9.55	-3.9	2.7		24205.769	30351.012	
252404	+24 1130			CI*NGC 2168 KUST 515	NGC 2168	9.4	9.76	-3.4	2.8		24504.94	28074.025	
252318				CI*NGC 2168 KUST 446	NGC 2168	9.4	9.94	1.9	3		29272.757	30720.792	
252260	+24 1124			CI*NGC 2168 KUST 319	NGC 2168	9.6	9.833	-4.8	1.9	-8.15	28922.893	29901.964	
				CI*NGC 2168 KUST 409	NGC 2168	9.9	(V: 10.04)	-3.9	3.1		26991.92	30258.036	188
46241	+04 1304	31159	4194		NGC 2244	6.8	6.83	18.6	1.6	19.96	25249.848	25655.844	189
46150	+05 1283	31130	4181		NGC 2244	7	6.87	36.5	1	36.3	24869.886	32239.78	190
46223	+04 1302	31149	4191		NGC 2244	7.5	6.72	43.4	1.4	43.4	24826.071	31738.049	191
46149	+05 1282	31128	4180		NGC 2244	7.8	7.747	36.2	1.3	36.5	25240.831	32114.057	

Table 1 continued on next page

Table 1 (continued)

HD	BD	HIP	GCSRV	Other ID	Cluster	Mag	Bmag	RV (km s^{-1})	p.e. (km s^{-1})	RV SIMBAD (km s^{-1})	JD-2400000 (Start)	JD (End)	Notes
46056	+04 1291		4167		NGC 2244	8.5	8.36	34	6	21	25249.785	31826.939	192
46106	+05 1279	31106	4173		NGC 2244	8	8.06	23.9	3.5	22	25253.823	31374.03	193
259135	+04 1299		4183		NGC 2244	8.6	8.707	29	1.9	12			
46202	+05 1286		4192		NGC 2244	8.3	8.366	35.8	1.9	28.4	25162.044	31826.958	
46107	+05 1278		4172		NGC 2244	9	8.839	26.4	2.8	30	25229.85	25507.016	
259012	+04 1295		4171		NGC 2244	9.6	9.59	-1.4		-1.4			194
46180	+05 1285		57655		NGC 2244	9.1	8.923	-1	12	-1	25201.883	25670.652	195
259105	+05 1281		4179		NGC 2244	9.6	9.57	24.4	2.1	23	25283.796	31632.984	196
36258	+79 182	26877	4189		NGC 2244	9.9	10.2	31.2	2.4		25620.79	31360.02	197
	+05 1281B		4182		NGC 2244	10.6	10.77	31.2	2.3	34	25292.737	30322.038	198
					NGC 2244	11.6		25.4	2.7		30371.776	32476.966	
					NGC 2244	11.9		33.5	2.9		32114.959	32205.829	
				ADS 5165	NGC 2244	11.5		7	7		30761.712	31524.675	199
259954	+08 1399	31365	4235		NGC 2251	9.2	9.19	14.4	2.4		27004.021	32183.972	200
259989	+08 1401				NGC 2251	10.5	9.5	13.3	4.9		27072.875	31636.025	
260022					NGC 2251	11	11.11	13.0	2.5		27074.745	32094.01	
					NGC 2251	11	11.04	20.7	3		28098.03	31826.868	
				TYC 733-1068-1	NGC 2251	11.3	11.013	39.4	2.8		28499.036	31469.714	201
				TYC 733-1371-1	NGC 2251	11.4	11.49	14.5	2.9		31791.819	31853.825	
				TYC 733-1825-1	NGC 2251	11.5	11.6	26.5	2.5	25.32	27366.009	31375.998	
259990	+08 1404			TYC 733-2052-1	NGC 2264	4.4	4.41	32.3	1.1	33.2	24510.913	31374.047	202
47839	+10 1220	31978	4334		NGC 2264	7	6.97	21.2	1.8	20.2	23012.064	30320.081	203
47887	+09 1344		4341		NGC 2264	7.3	7.34	22.6	1.5	23.3	23030.06	32142.027	204
47961	+09 1350	32030	4348		NGC 2264	7.8	7.78	29.4	2.4	13	23030.014	31746.897	205
47777	+09 1334	31955	4327		NGC 2264	7.8	7.6	23.9	5		27754.073	28500.928	206
	+10 1220B		4335		NGC 2264	8	7.98	21	3.4	18	27136.799	31791.051	207
47732	+09 1331	31939	4323		NGC 2264	8.3	8.3	21.1	2.1				208
47755	+09 1332				NGC 2264	8.6	8.73	22.9	4.4		24511.849	30074.666	209
47934	+09 1349				NGC 2264	8.8	8.75	21	2.9	20	25265.91	27827.838	
48012	+10 1219		4330		NGC 2264	8.9	8.9	24.3	2.9	16	27125.831	27754.044	210
261938	+10 1223		4338		NGC 2264	8.9	9.02	19.4	3.7	20	25257.914	31358.033	211
261810	+09 1335		4328		NGC 2264	9	9.02	21	6	15	27108.815	30075.673	212
261878	+09 1338		4331		NGC 2264	9.1	9.22	30.6	3.5	2.3	27350.031	32184.933	213
262013	+09 1346		4344		NGC 2264	9.4	9.39	19.9	2.5		27108.771	31057.006	
261736	+09 1230				NGC 2264	9.8	8.9	16	2.2	16	27118.79	21448.967	
261969	+10 1222		4339		NGC 2264	10	9.95	17	8	19	27531.679	30701.038	214
	+10 1227		4340		NGC 2264	10	9.98	23	2.9	20	27162.712	32478.969	215
261841	+09 1336				NGC 2264	10.1	10.11	25	7		27479.787	30406.839	216
	+10 1220C			ADS 5322C	NGC 2264	11	(V: 9.9)	20.8	2.8		27891.683	30761.877	217

Table 1 continued on next page

Table 1 (continued)

HD	BD	HIP	GCSRV	Other ID	Cluster	Mag	Bmag	RV (km s^{-1})	p.e. (km s^{-1})	RV SIMBAD (km s^{-1})	JD-2400000 (Start)	JD (End)	Notes
49098	+41 1522	32654			NGC 2281	8.9	8.8	4.8	2.8	9.3	27806.008	30027.922	
49010	+41 1514				NGC 2281	9	8.91	21.3	2.7		28153.047	30027.898	218
	+41 1512				NGC 2281	9.5	9.47	22.1	3.4		28160.019	29317.857	
	+41 1511				NGC 2281	9.9	9.82	20.1	2.4	19.11	28236.809	29930.881	
	+41 1520				NGC 2281	10.3	10.19	18.1	2.9		30322.832	30639.044	
	+41 1532C			ADS 5482C	NGC 2281	10.4	(V: 10)	-11.2	2.4		28499.804	29616.018	219
	+41 1514C				NGC 2281	10.8	10.93	23.4	2.3		30285.954	30733.983	
54360	-10 1884				NGC 2343	9.5	9.41	22.1	3.8		28103.034	31379.026	220
54387	-10 1885			ADS 5817A	NGC 2343	9.8	9.72	8.6	2.1	14.89	28136.03	31448.874	221
54304	-10 1882				NGC 2343	10.1	9.96	10.6	2.6		28135.032	30405.666	
	-10 1883			CI* NGC 2343 S 3	NGC 2343	10.5	10.38	8.2	3.4		28500.02	29316.716	
	-10 1885B				NGC 2343	10.5	10.19	6	3.1		28237.697	30319.954	222
55879	-10 1933	34999	4783	ADS 5817B	NGC 2343	10.9	10.88	9.9	3.4		28157.876	30405.716	223
55901	-10 1934		4785		NGC 2353	5.8	5.829	33.3	0.7	32.6			224
55930	-09 1929	35023			NGC 2353	8.8	9.01	15	2.3	12	27136.765	30011.911	225
	-10 1935				NGC 2353	9.2	9.13	17.4	2.5		27125.688	27792.978	
55853	-09 1923				NGC 2353	9.6	9.28	13.6	2.4		27119.712	31056.981	226
					NGC 2353	9.8	9.74	24.8	2.2		27124.8	31448.838	
					NGC 2353	10.7	10.61	13.8	5.8		27844.696	31056.946	227
57192		35461	4843	TYC 5398-527-1	NGC 2362	6.6	6.63	31.5	10	28	25938.006	30426.655	228
			4845	CPD -24 2248	NGC 2362	8	8.04	35.8	2.4	15	26292.001	27873.636	
			4844	CPD -24 2213	NGC 2362	8.6	8.58	36.1	2.5	42	26390.736	27383.025	229
				CPD -24 2231	NGC 2362	9.2	9.2	34	2.7	27.3	26627.033	30426.667	230
				CPD -24 2205	NGC 2362	9.4	9.43	31	2.9	42.6	27079.868	28920.744	231
				CPD -24 2207	NGC 2362	9.5	9.43	30.2	3.1	43.1	27080.813	28928.767	232
				TYC 6541-4221-1	NGC 2362	9.7	9.69	31.3	2.7	27.8	27134.708	30733.824	233
				CPD -24 2203	NGC 2362	9.8	9.76	33.6	2.5		27423.938	20407.768	
57370	-21 1880			ADS 5997A	NGC 2367	9.2	9.36	27.7	3.9	26	27792.924	28920.85	234
	-21 1880B			ADS 5997B	NGC 2367	10	9.76	27.7	3.9		27792.924	28920.85	235
	-21 1881		20258	CPD -21 2037	NGC 2367	10	8.84	26.9	3.7	43	28153.963	28894.853	
	-21 1882			CPD -21 2038	NGC 2367	10.5	10.37	25.5	3.8		28131.999	29317.672	
				CPD -21 2039	NGC 2367	11	10.89	27.7	2.9		28489.95	30733.882	236
58509	-20 1920		4938		NGC 2384	8.7	8.56	53.2	2.5	26	26400.788	31490.716	
58465	-20 1915		4931	ADS 6062A	NGC 2384	9.3	9.07	49.3	2.4	27	26652.99	31526.688	237
	-20 1915B			ADS 6062B	NGC 2384	9.9	9.59	40.4	2.8		27163.683	29317.724	238
58440	-20 1914				NGC 2384	10.2	9.74	47.5	3		27771.959	31792.014	
	-20 1918				NGC 2384	10.4	10.25	44.7	3.4	51.6	27396.005	29615.853	239
60308	-15 1892	36727	58899	ALS 518	NGC 2414	8.5	8.52	70.4	2.6	75	27855.796	31826.783	
				ALS 516	NGC 2414	11.1	11.08	66	3.2	83.5	28490.081	30735.89	240

Table 1 continued on next page

Table 1 (continued)

HD	BD	HIP	GCSRV	Other ID	Cluster	Mag	Bmag	RV (km s^{-1})	p.e. (km s^{-1})	RV SIMBAD (km s^{-1})	JD-2400000 (Start)	JD (End)	Notes
60855	-14 1999	36981	5068	ALS 513	NGC 2414	11.7	11.2	76.4	2.9		30723.843	31827.847	241
61224	-14 2053	37119	58957	ADS 6208A	NGC 2422	5.3	5.589	35.5	3.9	21.1	24460.021	30399.841	242
61017	-14 2025	37037			NGC 2422	6.5	6.505	38.4	2.5	16	24460.071	31525.752	243
60969	-14 2016	37015			NGC 2422	6.8	6.628	27.6	2.5	29.9	24460.046	30399.809	244
60998	-14 2021			ADS 6216A	NGC 2422	7	6.94	33.7	2.9	29.4	24473.028	25667.746	
60997	-14 2020			ADS 6216B	NGC 2422	7.2	(V: 7.4)	29.5	2.9	12.6	24470.062	27109.871	245
61045	-14 2029	37047		ADS 6216G	NGC 2422	7.5	7.9	25.4	2.3		24470.037	30699.014	246
60856	-14 1994	36967			NGC 2422	7.9	7.75	33.1	5	-1	24470.003	30074.673	247
60999	-14 2018	37018			NGC 2422	8	7.92	32.5	3.1	19.1	24489.002	29622.949	
60940	-14 2012				NGC 2422	8	7.89	28.2	2.5	27	25184.05	30698.999	
60996	-14 2019				NGC 2422	8.8	8.81	28.3	5.7		24877.916	29196.052	248
60941	-14 2052				NGC 2422	8.8	8.69	33.6	2.9	32.8	24499.93	25610.926	
60898	-14 2002				NGC 2422	8.9	8.72	33.1	2.9	26.1	24488.943	28928.821	249
60942	-14 2014				NGC 2422	8.9	8.89	29	2.5	23.8	25905.025	31525.732	250
60968	-14 2017			USNOA2 0750-04690445	NGC 2422	9.1	9.31	27	7		25281.807	30399.825	251
62058	-14 2000	37415 37418	59015		NGC 2422	9.1	9.18	19.8	2	26.3	25236.927	31526.727	
68669	-05 2419	40254		CPD -31 1782	NGC 2422	9.2	9.9	36	6		25555.012	30672.044	252
68685	-05 2420			CPD -31 1785	NGC 2422	9.5	9.5	25.9	2.4	-4.3	25187.01	30405.791	
68778	-05 2436	40302		CPD -31 1773	NGC 2422	9.8	9.57	26.4	2.9		25685.701	30026.755	253
68779	-05 2435			CPD -31 1777	NGC 2422	9.9	(V: 9.583)	46	8		25657.765	30405.765	254
68878	-05 2446			CPD -31 1786	NGC 2422	9.9	9.88	-3.2	3		25201.986	29273.902	
68646	-05 2414	40238		CPD -31 1774	NGC 2422	10	10.67	17.7	5.6		24951.667	32479.039	255
68794	-05 2438				NGC 2439	8.1	7.68	60.5	1.9	67.6	27047.933	30735.773	256
68617	-05 2413				NGC 2439	8.8	8.98	63.3	2.3		27125.76	31448.92	257
	-05 2424				NGC 2439	10.1	10.67	65.3	3		28193.795	30734.837	258
					NGC 2439	10.2	10.63	32	10		27132.733	30735.813	259
					NGC 2439	10.4	10.67	53	10		28600.68	31413.959	260
					NGC 2439	10.6	10.98	61.5	2.9		30761.803	32004.814	261
					NGC 2548	8.8	8.76	-3	6		25599.984	30011.948	262
					NGC 2548	8.9	8.8	10.6	2.2		25251.84	30028.918	263
					NGC 2548	9	8.93	5	6		25237.013	29622.992	264
					NGC 2548	9	9.26	9.3	2.4		25667.812	27855.828	265
					NGC 2548	9.1	9.16	12.5	2.6		25674.819	29316.843	
					NGC 2548	9.2	9.23	8.5	2.8		27108.925	28928.905	
					NGC 2548	9.2	9.27	12.3	2.6		28501.064	30735.983	
					NGC 2548	9.4	9.47	4.4	1.8	9.46	25659.83	30735.958	266
					NGC 2548	9.4	9.56	7.3	2.6		25670.821	29272.975	267
					NGC 2548	9.4	9.51	2.6	2.2		27109.922	30699.085	
					NGC 2548	9.5	9.62	11	12		27079.984	30699.071	268

Table 1 continued on next page

Table 1 (continued)

HD	BD	HIP	GCSRV	Other ID	Cluster	Mag	Bmag	RV (km s^{-1})	p.e. (km s^{-1})	RV SIMBAD (km s^{-1})	JD-2400000 (Start)	JD (End)	Notes
73731	+20 2171	42556	5713		NGC 2632	6.5	6.47	31.5	2	30	24216.831	25336.811	269
73666	+20 2159	42523	5706		NGC 2632	6.6	6.62	32.6	1.3	33.8	24212.897	27462.948	270
73575	+20 2149	42485	5692		NGC 2632	6.9	6.88	30.5	1.2	31	24250.731	32477.057	271
73712	+19 2069	42542	5710		NGC 2632	7	7.04	35.7	1.4	31.2	24511.95	32115.059	272
73210	+19 2053	42327	5668		NGC 2632	6.9	6.91	31.3	1.5	27.9	24964.057	30398.898	273
73785	+20 2172	42578	5720		NGC 2632	7.1	7.03	32.3	2	31	24270.671	27462.985	
73819	+20 2175	42600	5722		NGC 2632	6.9	6.91	29	1.3	28.1	24488.876	32204.998	274
73710	+20 2166	42549	5711		NGC 2632	7.5	7.44	35.5	1.1	34.35	24489.071	30724.062	275
73665	+20 2158	42516	5704		NGC 2632	7.4	7.35	35.8	1.2	33.67	24208.844	30027.966	276
73618	+20 2152		5699		NGC 2632	7.5	7.49	34	2.7	40	24511.98	31055.084	277
73598	+20 2150	42497	5696		NGC 2632	7.5	7.53	33.5	1.7	34.81	24270.702	30072.986	278
73711	+20 2163		5707		NGC 2632	7.7	7.67	36.1	1.5	39	24870.029	31057.079	279
73619	+20 2153		5700		NGC 2632	7.8	7.76	32.6		32.6	24500.005	30371.056	280
73974	+20 2185	42673	5737		NGC 2632	7.9	7.88	29.3	1.5	45.95	24473.067	30723.064	281
73449	+20 2143		5686		NGC 2632	7.7	7.7	31.8	1.6	30	24489.04	30075.817	282
73709	+20 2165		5709		NGC 2632	7.9	7.87	26.2	4.6	17	24171.923	30133.693	283
73730	+20 2168		5715		NGC 2632	8.2	8.2	30.4	1.6	27.8	24171.961	31820.024	284
73576	+19 2064		5693		NGC 2632	7.9	7.84	35.4	1.7	33	24500.038	32240.806	285
73574	+20 2148		5691		NGC 2632	7.9	7.93	34.4	1.7	37	24984.736	32185.042	
73174	+20 2132		5665		NGC 2632	8	7.95	49	4	34.4	24984.783	32142.047	286
73890	+19 2078		5728		NGC 2632	8.2	8.24	38.5	4	40	24999.69	31469.973	287
74028	+19 2083		5741		NGC 2632	8.2	8.17	35.8	2	30.5	25004.681	29755.737	288
74050	+19 2084	42705	60004		NGC 2632	8.1	8.09	39	2.6	31.2	25303.827	30134.701	289
73345	+20 2138		5680		NGC 2632	8.3	8.34	35.4	1.8	35.3	24977.792	31819.992	290
73175	+20 2133	42319	5667		NGC 2632	8.5	8.48	33.9	1.7	31.5	25257.99	32239.862	291
73872	+20 2179		5727		NGC 2632	8.5	8.55	31.3	1.5	31	24172.006	32205.992	
73763	+19 2073		5719		NGC 2632	8	8.01	34.9	2.4	38	24500.067	30133.676	292
73993	+20 2186		59990		NGC 2632	8.8	8.84	33.8	5.4	29	24990.757	30399.976	293
73450	+20 2144		5687		NGC 2632	8.8	8.78	32.9	1.6	32	24256.723	30724.062	294
73161	+21 2131		5664		NGC 2632	9	8.99	35.1	1.9	35	24267.724	29643.008	
73729	+20 2169		5714		NGC 2632	8.5	8.47	17	5	-6	25010.703	32185.071	295
73430	+20 2141		5685		NGC 2632	8.5	8.51	32.7	1.7	28.9	24999.743	31468.962	296
73798	+20 2173		59949		NGC 2632	8.7	8.74	33.1	2.2	31	24990.689	32239.803	297
73746	+19 2072		59935		NGC 2632	8.9	8.98	35	1.9	15	24276.69	27546.774	298
73818	+20 2174		59953		NGC 2632	9	8.99	34.2	2.3	29	24225.826	27135.889	
73397	+20 2139		59825		NGC 2632	9.3	9.34	30.2	2.3	20	24250.778	27172.76	
	+20 2161		59910		NGC 2632	9.1	9.11	40.9	1.9	37	25249.027	32204.972	299
73616	+20 2154		59881		NGC 2632	9.2	9.21	41.5	3.2	31	24975.763	32185.018	300
73854	+20 2177		59959		NGC 2632	9.4	9.37	34.3	2.3	33	25265.993	27873.807	

Table 1 continued on next page

Table 1 (continued)

HD	BD	HIP	GCSRV	Other ID	Cluster	Mag	Bmag	RV (km s^{-1})	p.e. (km s^{-1})	RV SIMBAD (km s^{-1})	JD-2400000 (Start)	JD (End)	Notes
74058	+20 2191		60007		NGC 2632	9.6	9.59	32.8	2.2	23	25324.79	32477.043	
73597	+21 1882		59875		NGC 2632	9.8	9.75	30.1	2.1	25	25726.727	31932.7	301
	+20 2170		59931		NGC 2632	9.8	9.79	36.2	2.4	39.2	25325.781	29274.036	302
73937	+19 2080		59982		NGC 2632	9.7	9.71	31	1.7	29	25352.731	32205.955	
73429	+20 2142		59835		NGC 2632	9.8	9.81	31	2.6	34	25345.74	30135.691	
73081	+20 2128		59778		NGC 2632	9.8	9.59	31.7	2.4	28	25700.784	30761.953	
73617	+20 2155		59884		NGC 2632	9.6	9.58	32.4	2.3	19	24963.984	29259.065	303
73994	+19 2082		59993		NGC 2632	9.8	9.84	36.7	2.2	35.1	26339.022	32239.831	
	+20 2140		59839		NGC 2632	9.8	9.79	31.2	2.3	31.3	27174.787	30761.975	304
	+20 2143B		59842		NGC 2632	9.8	9.83	30.9	2.4		27136.799	30373.025	305
73641	+19 2066		59892		NGC 2632	9.9	9.92	29.1	1.7	20	27184.752	32204.938	
	+19 2074		59945		NGC 2632	10	9.94	32.4	2.3	29	27546.721	30497.702	
	+20 2157		59896		NGC 2632	10.3	10.26	35.7	2.9	28	27531.77	30761.917	
	+20 2176		59961		NGC 2632	10.6	10.61	34	2.6	29	27424.051	31469.942	
	+20 2151		59883		NGC 2632	10.6	11.59	30.1	2.6	32	27430.045	30734.996	
		43465	60196		NGC 2682	10	9.88	25.5	2.9	41.6	27511.797	30736.022	
	+12 1926	43491	60199		NGC 2682	11	16	4.8	2.9	-7	27503.786	30407.92	306
				TYC 814-2331-1	NGC 2682	11.1	10.91	18.2	3	33.59	27456.957	30426.851	307
				TYC 814-1205-1	NGC 2682	11.1	11.084	16.9	3.4	35.03	27533.755	30370.991	308
				TYC 814-2047-1	NGC 2682	11.1	10.94	18.2	2.9		28193.95	30405.924	
			60201		NGC 2682	11.2	11.01	20.4	3		28600.814	30427.825	
				TYC 814-1531-1	NGC 2682	11.3	11.206	17.7	3	34	27545.729	30406.921	309
152234		82676	9706		NGC 2682	11.6	11.59	25	3	33.83	27538.737	30371.987	310
152248		82691	9709		NGC 6231	5.5	5.58	-8.2	2.7	-6	27205.922	31672.677	311
152249			9710		NGC 6231	6	6.25	-35	7	-35	26482.876	28377.678	312
152233			9707		NGC 6231	6.5	6.65	-24.2	1.1	-24.1	27995.749	28383.677	
152270			9713		NGC 6231	6.5	6.72	-15.3	1.6	-16	26482.9	28383.694	313
326331		82706			NGC 6231	6.6	6.83	-44		-44	27205.898	20174.784	314
152218			9701	Cl Trumpler 24 48	NGC 6231	7.5	7.678	-36.6	4.5	-44	27610.785	31675.677	315
152314			9716	Cl Trumpler 24 102	NGC 6231	7.4	7.76	-44		-44			316
			9711		NGC 6231	7.8	7.974	-34		-34			317
			9712		NGC 6231	7.8	8.08	23.1	1.3	23			318
					NGC 6231	8.3	8.421	-19.7	2.7	-101			319
				CPD -41 7721	NGC 6231	8.1	8.848	-29	11		28366.724	29762.903	320
317846				CPD-32 4611	NGC 6383	9.8	9.96	-1	6		27243.815	30224.675	321
317847				CPD-32 4610	NGC 6383	10	10.43	0.9	3.5		27280.713	30189.735	
317857				CPD-32 4608	NGC 6383	10.2	10.59	14	8		27277.729		
				TYC 7380-605-1	NGC 6383	10.4	10.97	-6.8	3.2		27246.83	30518.794	
159176C					NGC 6383	10.4	(V: 10.5)	0.2	3		28367.711	30198.712	322

Table 1 continued on next page

Table 1 (continued)

HD	BD	HIP	GCSRV	Other ID	Cluster	Mag	Bmag	RV (km s^{-1})	p.e. (km s^{-1})	RV SIMBAD (km s^{-1})	JD-2400000 (Start)	JD (End)	Notes
160202				CPD-32 4615	NGC 6383	10.6	10.98	-7.2	6		27252.777	30497.855	323
160124		86468	67237	NGC 6383 FJL 24	NGC 6383	11.2	11.59	-2.6	3.8		30903.78	31649.771	
160221		86432	23014		NGC 6405	7	6.79	-13.5	5.6	-15	24017.674	29496.677	324
160335		86508			NGC 6405	7.2	7.13	-13.6	5	-8	23966.806	30176.707	325
160371		86527			NGC 6405	7.2	7.22	-17.2	2.8		23952.846	28027.738	
160189					NGC 6405	7.4	7.21	-14.2	2.8		23958.824	28364.691	
160260					NGC 6405	7.7	7.75	-7.4	2.1	-7.99	25802.775	30525.746	326
318101					NGC 6405	8	8.11	-7	7		25802.718	29084.699	327
160222					NGC 6405	8.1	8.41	-14.7	2.8		26152.776	29465.698	
160167					NGC 6405	8.2	8.24	-13.9	2.4		24701.775	29762.85	
160259					NGC 6405	8.3	8.52	-9.2	2.2		24678.845	30189.765	
160298					NGC 6405	8.5	8.69	-16.4	2.6		28329.815	30176.726	
161573	+05 3483	86954	10271		NGC 6405	8.6	9.02	-12.3	2.9		24711.741	29496.708	328
161677	+05 3490	87002	10281		NGC 6405	8.7	8.8	-10	2.8		28688.818	30519.763	
161603	+05 3484	86960	10272		IC 4665	6.9	6.834	-15.2	1.3	-7	23960.684	29761.783	329
162028	+05 3504	87184	10307		IC 4665	7.2	7.118	-17.4	1.8	-26	23925.938	31267.983	
161542	+05 3481		10269		IC 4665	7.4	7.27	-14.1	1.7	-8	23932.743	31268.945	
161572	+05 3482	86944	10270		IC 4665	7.5	7.496	-6		-6			330
161480	+05 3478		23030		IC 4665	7.6	7.63	-27.2	1.2	-29.5	23952.911	29763.964	
161660	+06 3525	86993	23036		IC 4665	7.7	7.71	-21	8	2	23932.778	31266.711	
161733	+05 3494A		23039		IC 4665	7.8	7.74	-13.5	2.5	-13.5	24020.667	30175.69	332
161698	+05 3491		23038		IC 4665	8.1	8.048	-20.1	2	-13	23958.861	32421.695	334
161261	+05 3471	86805	23027		IC 4665	8.3	8.34	-16	6	-8.4	23660.743	29756.807	335
161622	+05 3488				IC 4665	8.4	8.37	-7.2	2.6	-5.1	24223.055	30175.708	336
161734	+05 3493	87032	23040		IC 4665	8.4	8.35	-7.1	1.8	-1	25042.872	29756.825	
161621	+05 3487A			ADS 10779 A	IC 4665	9	8.96	-5.5	5.6	-1.6	24312.831	31742.615	337
161426	+05 3476		23029	ADS 10779 B	IC 4665	9	9.3	-16.8	3.4	-24.5	26171.751	31616.97	338
161481	+05 3479		67340		IC 4665	9	9.6	-16.3	4.2	-24.5	29761.807	30639.624	339
161370	+05 3473		23028		IC 4665	9.2	9.25	-17.5	1.9	-5.6	24748.698	30134.801	340
161820	+05 3498				IC 4665	9.3	9.33	-17.6	3	-1.3	24342.696	31268.925	341
162374	+05 3494B		67359		IC 4665	9.7	9.71	-15.4	4.6	-6	25001.883	30518.729	342
162724		87460	10328		IC 4665	10.1	10.11	12.8	3.4		25101.712	25124.682	
162586		87616	67470		IC 4665	10.5	10.34	-13.3	2.3	-8.2	30520.725	31353.696	343
162678		87567	67454		NGC 6475	5.7	5.77	-11	3	-13.2	24273.945	30203.732	344
162725		87624	67471		NGC 6475	5.9	5.95	-0.3	2	-5	24273.974	30581.671	345
					NGC 6475	6	6.14	-10.7	2.8	-12	24308.829	29465.769	346
					NGC 6475	6.4	6.38	-15.7	2.8	-2	24308.874	29442.796	
					NGC 6475	6.4	6.43	-13.3	2.8	-17	24333.822	29442.816	347

Table 1 continued on next page

Table 1 (continued)

HD	BD	HIP	GCSRV	Other ID	Cluster	Mag	Bmag	RV (km s^{-1})	p.e. (km s^{-1})	RV SIMBAD (km s^{-1})	JD-2400000 (Start)	JD (End)	Notes
162515		87529	67447		NGC 6475	6.5	6.57	-2	9	-2	24372.671	30518.871	348
162587		87569	67455		NGC 6475	6.7	6.69	-19.3	2	-7	24342.747	30581.684	349
162780		87656	67478		NGC 6475	6.9	6.94	-12.8	2.9	-9.1	24342.795	28383.729	350
162576		87560	67452		NGC 6475	6.9	7.01	-12.1	3.1	-6.2	24342.772	27991.782	351
162804			67480		NGC 6475	7	7.04	-10.4	3.1	-5	24333.783	28383.742	
162679			67465		NGC 6475	7.2	7.19	-5.2	2.3	-7	24300.864	30518.874	352
162588			67456		NGC 6475	7.2	7.25	-13	7	-6.5	24376.69	29761.962	353
162631			67459		NGC 6475	7.4	7.43	-14.5	3.1	-12	25404.847	28385.7	
162630					NGC 6475	7.5	7.61	-8	2.3		24381.672	30203.722	354
162781			67479		NGC 6475	7.6	7.59	-20.6	2.2	-21	24729.694	30581.7	
162680			67466		NGC 6475	7.7	7.82	-15.8	5.6	-13	25433.771	29761.944	355
162656			67462		NGC 6475	8.2	8.25	-9.8	2.4	-12.6	25364.975	30203.747	356
164654					NGC 6520	9.7	12.912	-26.2	2.1	-23.41	27237.894	30882.915	357
316951					NGC 6520	10.5	10.93	-27.4	2.1		27217.908	30588.676	
				CPD-37 6030	NGC 6520	10.6	10.91	-37.6	2.7		28370.729	31316.717	
			10481		NGC 6520	10.7	(V: 10.5)	-26.7	3.2	-22	27239.84	30553.768	
			10478		NGC 6520	10.8	(V: 10.8)	-12	17	-25	27254.799	31616.717	358
			10474		NGC 6520	10.9	(V: 10.8)	-34.2	3.2	-31	28365.783	30519.821	359
				TYC 6850-2783-1	NGC 6520	11.3	11.271	-22.7	3.4		27219.917	30520.823	360
164883	-22 4533		10489		NGC 6531	7.2	7.11	-10.9	1.9	-14	24717.699	30589.664	361
164844	-22 4535	88484	10493		NGC 6531	8.2	8.25	-6.9	3.4	-9	25371.927	30134.832	362
					NGC 6531	8.7		-14.5	2.2		26513.866	31641.711	363
164883	-22 4543		10500		NGC 6531	8.8	8.77	-3.1	3.9	-9.6	24743.708	30552.701	364
	-22 4540		10501		NGC 6531	9.2	9.27	-10.6	2.4	-16	25830.73	29044.936	
313692	-22 4534				NGC 6531	9.6	9.6	-14.2	2.5		27543.99	31353.644	
313694	-22 4536		10497		NGC 6531	9.7	9.75	-10.2	2.8	-24	25742.932	30196.769	
313695	-22 4537		10496		NGC 6531	9.7	9.77	-11.5	2.7	-2	26542.768	31647.798	
	-22 4544				NGC 6531	9.9	9.74	-105	2.9		27947.896	30229.67	
				USNOA2 0600-30237686	NGC 6531	10		-18.7	2.6		27212.936	28713.801	365
164794		88469	10488		NGC 6530	5.9	5.933	9		9			366
165052		88581	10523		NGC 6530	6.9	6.91	3		3			367
164906			10511		NGC 6530	7.6	7.66	-4.4	5.9	8.4	25399.821	31647.694	368
315031			10510		NGC 6530	8.4	8.4	-14.3	2.4	55			369
315021			10514		NGC 6530	8.6	8.64	-14.6	2.1	-14	25343.009	30189.806	
315033		88506	10512		NGC 6530	9	9.02	-2.2	2.3	-2	25736.947	31285.802	
			10505		NGC 6530	9.2	9.2	-8.4	6.3	-35	25446.746	31266.767	370
315032		88496	10503		NGC 6530	9.2	9.23	-19	2.3	-35	25385.943	30525.776	371
			10513		NGC 6530	9.5	9.46	-10.9	4.4	-22	25823.748	31268.788	372
164947					NGC 6530	9.6	8.94	6.1	2.8		27658.698	30581.727	373

Table 1 continued on next page

Table 1 (continued)

HD	BD	HIP	GCSRV	Other ID	Cluster	Mag	Bmag	RV (km s^{-1})	p.e. (km s^{-1})	RV SIMBAD (km s^{-1})	JD-2400000 (Start)	JD (End)	Notes
315024			10508		NGC 6530	9.6	9.6	-19	2.3	-34	25745.922	30525.81	
			10509		NGC 6530	9.8	9.75	4.3	4.1	22	25448.765	31286.78	374
				CPD-24 6168	NGC 6530	10.3	10.29	-12	2.9		30874.876	31288.79	375
167971	-12 4980	89681	10754		NGC 6604	7.9	8.05	8.7	3.8	1	26158.88	31267.798	376
	-12 4982				NGC 6604	10	9.79	17.1	2.4	23	27658.776	28329.938	
	-12 4979				NGC 6604	10.4	10.47	3.2	4.9		27636.754	29411.924	377
	-12 4981				NGC 6604	10.8	10.16	-5	8		27629.866	30608.663	378
	-12 4978				NGC 6604	11.1	11.1	-5	2.7		27687.684	31287.764	
168076	-13 4926		10763		NGC 6611	8.6	8.61	11.1	1.9	25	25854.675	31266.803	379
168075	-13 4925		10762		NGC 6611	9.1	9.18	6.2	3.6	27	25857.685	31616.917	380
168137	-13 4932	89750	10775		NGC 6611	9.3	9.349	12.1	2.1	19	25865.699	31616.94	381
	-13 4930	89743	10776		NGC 6611	9.6	9.711	4.8	4.2	17	26506.841	31638.829	382
	-13 4929				NGC 6611	10.4	10.509	1.7	3.8	17	27303.72	31317.719	383
	-13 4927				NGC 6611	10.4	10.28	6	2.5	15	27603.85	31268.865	
	-13 4928				NGC 6611	10.6	10.604	-2	11	23	27638.792	30203.797	384
				TYC 5689-998-1	NGC 6611	10.9	11.024	1.1	2.7	19	28362.836	30202.814	
168352	-17 5136	89831	10791		NGC 6611	11.2	11.27	3.8	3	-18	27308.717	30229.734	
168418	-17 5141		10801		NGC 6611	11.6	11.678	-2.9	3.2		31617.895	31674.749	385
168368	-17 5139	89842	10796		NGC 6613	9	8.91	-15.5	2	-23	27638.699	30609.659	
	-17 5137				NGC 6613	9.8	9.7	-20		-20			386
	-17 5138		10797		NGC 6613	9.8	9.58	-20.5	2.6	-4	28005.796	30168.871	
170657	-18 4986	90790	10974		NGC 6613	9.9	9.67	-6.4	4.8		27653.722		
170764	-19 5047	90836	10989		NGC 6613	10.3	9.6	-25.6	2.5		28372.81	30904.824	387
170719	-19 5042		10986		NGC 6613	10.5	10.05	-20.2	2.9		28377.794	31285.857	
170682	-19 5036	90801	10976	TYC 6269-2171-1	NGC 6613	10.6	10.57	-29.2	2.5		28747.747	30552.736	
170886	-19 5059	90900	10996	TYC 6269-1611-1	NGC 6613	10.6	10.61	-4	6		28752.739	30615.666	388
170835	-19 5055		10993	TYC 6269-731-1	NGC 6613	10.6	10.61	-4					389
170820	-19 5053	90870	10992		IC 4725	7.8	7.66	-46.5		-35			
170836	-19 5052				IC 4725	8.2	7.248	-2.6	1.9	2	25392.978	29763.994	390
	-19 5044		68275		IC 4725	8.2	8.34	-5.8	5.4	-3	24717.82	30133.987	391
	-19 5045				IC 4725	8.2	8.2	1.5	2	4	24785.685	30589.736	392
	-19 5037		68260		IC 4725	8.4	8.34	-14		-4			393
	-19 5046p		68287		IC 4725	9	9.02	-11.4	4	38	25780.928	30589.705	394
	-19 5044F				IC 4725	9	8.89	-11.5	4	-2	25481.701	30259.625	395
					IC 4725	9	9.06	-5	4.9		27285.712	30188.859	396
					IC 4725	9.2	9.15	-6	3.5	47.5	26153.885	30589.719	397
					IC 4725	9.3	9.45	-10	11		26951.705	30259.643	398
					IC 4725	9.5	9.57	-7.2	2.5	17.3	26949.703	30134.987	399
					IC 4725	9.5	9.72	-0.3	2.4	-0.5	26930.751	30517.957	400
					IC 4725	9.8	9.99	-4.2	2.7		28386.719	30552.809	401

Table 1 continued on next page

Table 1 (continued)

HD	BD	HIP	GCSRV	Other ID	Cluster	Mag	Bmag	RV (km s^{-1})	p.e. (km s^{-1})	RV SIMBAD (km s^{-1})	JD-2400000 (Start)	JD (End)	Notes
	-08 4654				NGC 6664	10.9	11.17	-1.7	3		28047.698	31266.875	
	-08 4646				NGC 6664	11.3	11.45	4.5	3.2		28420.705	30585.762	
	-08 4655				NGC 6664	11.4	11.42	-3.9	3.5		29756.946	30525.882	
	-08 4652	91239	68383		NGC 6664	11.4	11.3	13.3	2.6	23.5	28419.705	20588.746	402
172365	+05 3891	91499	11110		IC 4756	7.3	7.15	-2.0	1.2	-18.5	24255.026	28713.971	
172190	+04 3823	91418			IC 4756	7.7	7.8	-0.6	2.8				403
172248	+05 3878				IC 4756	9	9.04	-24.2	2.2		24345.924	28717.966	
172189	+05 3864				IC 4756	9	9.09	-23.8	5.3		24044.665	29754.984	404
172271	+05 3879				IC 4756	9.1	9.12	-22.4	2		24357.863	28653.993	
171931	+05 3830				IC 4756	9.3	9.34	-21.8	3		24372.816	29066.896	
172012	+05 3843				IC 4756	9.4	9.34	-18.5	3.6		24330.944	30195.873	405
	+05 3840				IC 4756	9.4	9.43	-26.4	2.3	-25.21	24414.672	27523.983	
172102	+05 3853				IC 4756	9.6	9.6	-19.5	4.6		24342.877	30133.831	406
	+05 3869				IC 4756	9.9	9.87	-21.3	2.2		24363.853	29053.808	
	+05 3889				IC 4756	9.9	9.95	-23.1	2.1		27513.038	28753.847	
	+05 3870				IC 4756	9.9	10	-30	3.3		27986.95	32001.726	407
	+05 3877				IC 4756	10	9.96	-25.2	2.2		24706.834	29414.783	
	+05 3837	91312			IC 4756	10	10.13	-24.8	2.2	-22.4	24654.775	30222.784	
	+05 3873	91437			IC 4756	10.1	10.1	-28	2.3	-23.9	24376.784	28270.99	
	+05 3852				IC 4756	10.2	10.21	-24.4	2.2		25029.895	29439.944	
	+05 3850				IC 4756	10.3	10.26	-26.5	2.5	-27.7	24754.691	31289.774	408
	+05 3868				IC 4756	10.3	10.38	-24.2	2.3	-24.7	25029.895	30195.895	
	+05 3858				IC 4756	10.4	10.46	-25.5	2.3	-23.25	24702.912	28741.875	
	+05 3857				IC 4756	10.5	10.56	-25.8	2.4	-27.15	24758.709	31646.966	
	+05 3839				IC 4756	10.6	10.5	-29.2	1.9	-24.4	25110.757	29782.806	
173348	-09 4819	92009	11189		NGC 6694	9.3	9.53	-8.8	3	4	26526.836	29056.953	409
				TYC 5696-26-1	NGC 6694	11.3	11.3	-15.8	3		27252.912	31642.859	
	-09 4821				NGC 6694	11.3	11.61	-8.4	2.5	-10.27	27243.939	31615.85	
	-09 4823				NGC 6694	11.6	11.79	-12.7	2.7	-8.51	28395.742	30497.95	
174512	-06 4929	92507	11305		NGC 6705	8.5	7.9	23.2	3	24	23926.982	29094.863	410
			11303		NGC 6705	10.7	10.3	17.2	3	22	27246.929	31267.872	
			11306		NGC 6705	11.6	11.56	8.7	2.6	26	27223.908	31673.765	
			11302		NGC 6705	11.7	11.72	19.7	3.1	96	27241.9	31287.842	
				NGC 6705 KUST 425	NGC 6705	11.8	11.78	23	3.7		27298.746	30520.939	
			11296		NGC 6705	11.8	11.89	15.4	3.7	8	27627.858	30903.898	
			11297		NGC 6705	11.9	11.822	26.3	3.7	-19	27281.779	30904.904	411
229684	+10 3682				NGC 6709	10	9.97	6.8	2.8	22	25506.718	29427.964	412
174715	+10 3698				NGC 6709	10	10.14	-11.7	4	-12	25423.918	2954.847	413
174734	+10 3699				NGC 6709	10	9.5	-15	9	2	25446.893	31268.724	414

Table 1 continued on next page

Table 1 (continued)

HD	BD	HIP	GCSRV	Other ID	Cluster	Mag	Bmag	RV (km s^{-1})	p.e. (km s^{-1})	RV SIMBAD (km s^{-1})	JD-2400000 (Start)	JD (End)	Notes
229706	+10 3690		11311		NGC 6709	10.1	10.13	3.5	2.1	12	25837.733	29087.809	415
229716	+10 3694		11316		NGC 6709	10.4	10.3	-6.7	3.7	-9	25172.639	30259.727	416
229700	+10 3689		11310		NGC 6709	10.5	10.5	-12	3.6	-21	25759.873	30636.631	417
229714	+10 3693				NGC 6709	10.6	10.64	13.8	3.4		27183.954	29425.943	418
	+10 3697		11318		NGC 6709	10.8	10.7	-13	2.3	-31	25388.858	27301.802	419
229715	+10 3691				NGC 6709	10.8	10.77	-15.8	2.3		27324.756	30526.746	
				TYC 1030-2848-1	NGC 6709	11	10.9	-25	8		28395.843	31286.846	420
				TYC 1030-366-1	NGC 6709	11.2	11.042	-14.1	3.4		28418.677	29144.714	
				TYC 1030-590-1	NGC 6709	11.3	11.1	-11.4	3.2		30883.912	31267.746	
	+03 3907	93932		TYC 471-2299-1	NGC 6755	10.9	10.79	15.1	2.8		27277.812	30176.953	
	+10 3691			NGC 6755 6	NGC 6755	12.5	13.35	24.3	4.6		28398.785	31648.868	

8. NOTES FROM WEAVER (1966) AND SIMBAD

Below are the notes found for each star, numerically identified in the last column of Table 1.

- 1 Star in double system, spectral type and radial velocity taken from GCSRV (Wilson 1953).
- 2 Emission line star.
- 3 Star in Cluster. Spectroscopic binary orbit. Var.
- 4 Be star. H-beta, H-gamma emission H-delta not visible. Prob.Var.
- 5 Emission-line Star.
- 6 Star in double system. Var.
- 7 H-beta - H-delta emission. Companion of magnitude 12, separation 3", position angle 160 degrees. Data refer to combined light.
- 8 Emission-line Star. Magnitude refers to light from both components, other data to brighter component. Separation 3".5, position angle 90 degrees.
- 9 Star in double system. Var.
- 10 Star in double system.
- 11 Variable star.
- 12 Variable Star of gamma Dor type .
- 13 Star in double system.
- 14 Var.
- 15 Star in double system.
- 16 Be star. Double star not noted in ADS, separation approximately 1". Radial velocity and magnitude refers to light of both components.
- 17 No standard name, Oja 1966 star No.1164.
- 18 No standard name. Lines appear double on some spectrograms. Var.
- 19 Star in double system.
- 20 Star in double system.
- 21 Emission-line star.
- 22 Emission-line star.
- 23 Be star.
- 24 Companion of magnitude 12, separation 2".7, position angle 197 degrees.
- 25 Prob.Var.
- 26 Spectroscopic binary. Var.
- 27 Spectroscopic binary.
- 28 Spectroscopic binary.
- 29 Spectroscopic binary.
- 30 Variable Star.
- 31 Var.
- 32 Var.
- 33 Data refer to the brighter component, for the combined light magnitude = 10.3.
- 34 Variable Star of irregular type.
- 35 Star in double system. No companion at the position given in the ADS is seen on the photograph.
- 36 Var.
- 37 Cepheid variable Star. Radial velocity taken from GCSRV.
- 38 Variable Star of beta Cep type. Radial velocity taken from GCSRV.
- 39 Be star.
- 40 Be star.
- 41 Variable Star of beta Cep type.
- 42 Be star.
- 43 Var.
- 44 Be star. H-beta, H-gamma in emission; all absorption lines faint.
- 45 Variable Star of beta Cep type. Some lines appear double on one spectrogram.
- 46 Spectral type and radial velocity from GCSRV.
- 47 Semi-regular pulsating star.

- 48 Variable star.
- 49 Variable star of beta Cep type.
- 50 Double line spectroscopic binary orbit. Var.
- 51 Eclipsing binary Algol type. Var.
- 52 Var.
- 53 H-beta faint emission; H-gamma weak absorption. Be star. Var.
- 54 H-beta and H-gamma emission on broad absorption, Be star.
- 55 H-beta emission; H-gamma, H-delta not visible; poor lines. Be star.
- 56 Variable star of beta Cep type.
- 57 Spectral type and radial velocity from GCSRV, revised in accordance with additional observations communicated by R.M. Petrie. Semi-regular pulsating star.
- 58 H-beta H-epsilon emission
- 59 Spectral type and radial velocity from GCSRV. Pulsating variable star.
- 60 Semi-regular pulsating star.
- 61 Spectroscopic binary orbit. Var.
- 62 Strong broad emission at 4684 Ang. and faint emission at 4640 Ang., Emission-line star. Var.
- 63 Spectroscopic binary orbit. Var.
- 64 Spectroscopic binary orbit. Var.
- 65 Double lines noted on one spectrogram. Prob.Var.
- 66 Prob.Var.
- 67 Star in association.
- 68 Star in double system, ADS 1920B
- 69 Prob.Var.
- 70 Star in double system.
- 71 Star in double system.
- 72 Star in double system.
- 73 Var.
- 74 Same spectral type.
- 75 Var.
- 76 Separation 1".3, data refer to combined light. Double or multiple star.
- 77 Star in double system.
- 78 Star in double system.
- 79 Star in double system.
- 80 Star in double system.
- 81 Orbit determination of triple system. Var.
- 82 Visual double, equal magnitudes; separation 0".3, data refers to combined light. Variable star.
- 83 Trumpler: ADS 2161B, SIMBAD:ADS 2161 Double or multiple star.
- 84 Var.
- 85 Star in double system.
- 86 Star in double system.
- 87 Star in double system. Prob.Var.
- 88 Be star. name Alcyone. Trace of H-beta emission on some spectrograms.
- 89 Spectroscopic binary, name Atlas. Doubtful if close double.
- 90 Be star, name Electra.
- 91 Variable star, name Maia.
- 92 Be star, "Merope".
- 93 Variable star, name Taygeta.
- 94 Be star, name Pleione. Variable spectral class; photoelectric variable.
- 95 Variable star, HR 1172.
- 96 Variable star, name Celeno.
- 97 18 Tau.
- 98 Variable star, name Asterope.

- 99** Star in double system, 24 Tau.
100 22 Tau.
101 Star in double system.
102 Variable star with rapid variations. Data refer to brighter component.
103 Spectroscopic binary. Data refer to brightest component only. Var.
104 Eclipsing binary of Algol type, V* V1229 Tau.
105 Prob.Var.
106 Spectroscopic binary.
107 Physical membership doubtful on the basis of proper motion. But from magnitude-spectral type relation and radial velocity it appears to be a member.
108 Star in double system. Our 6 radial velocity observations alone would indicate variable velocity; if GCSRV observations are included, however, variability becomes doubtful.
109 Variable star of delta Sct type, V* V1228 Tau.
110 Variable star of delta Sct type, V* V650 Tau.
111 Close double, data refer to combined light.
112 V*V1187 Tau, Variable star of delta Sct type.
113 V*V624 Tau, Variable star of delta Sct type.
114 V*V647 Tau, Variable star of delta Sct type.
115 V*V534 Tau, Variable star of delta Sct type. Close double, data refer to combined light.
116 Variable star of delta Sct type.
117 Var.
118 HR 1185.
119 Variable star.
120 HR 1103, Variable star.
121 Spectroscopic binary. Radial velocity seems to indicate this star is not a member.
122 Star in double system. Wide double, Boss GC 1852; data refer to brighter component.
123 Data refer to brighter component.
124 V*V1225 Tau, Variable star of gamma Dor type.
125 Membership somewhat doubtful; neither proper motion nor radial velocity agree very closely with the motion of the cluster.
126 [Wilson \(1953\)](#) apparently does not refer to this star.
127 Variable star.
128 Star in double system.
129 Spectroscopic binary, radial velocity from GCSRV. Var.
130 V*SZ Cam, Eclipsing binary of beta Lyr type. Eclipsing and spectroscopic binary, radial velocity from GCSRV. Var.
131 Star in double system. Prob.Var.
132 Variable star. Designations confused in ADS.
133 Variable star. Designations confused in ADS.
134 Star in double system.
135 Designations confused in ADS.
136 Star in double system. Designations confused in ADS. Prob.Var.
137 Prob.Var.
138 Spectroscopic binary orbit. Var.
139 ADS 3074, separation 0".3; data refer to combined light.
140 No standard name, spectral type B9.
141 HR 1517 Spectroscopic binary. Radial velocity from GCSRV.
142 Emission line star. H lines broad and diffuse; H-beta, H-gamma show faint emission at center. Var.
143 Star in double system
144 Prob.Var.
145 Var.
146 Prob.Var.

- 147 Spectral type not in SIMBAD (Trumpler: B4*).
- 148 Spectral type not in SIMBAD (Trumpler: B7*). Var.
- 149 Prob.Var.
- 150 Star in double system, Spectral type not in SIMBAD (Trumpler: B9*).
- 151 Spectral type not in simbad (Trumpler: A0*).
- 152 ADS 4192A; separation 4".3; brighter component. Star in double system.
- 153 V*V1046 Ori, Spectroscopic binary. Var.
- 154 Variable star.
- 155 ADS 4176AB; separation 1".9; components nearly equal in magnitude. Data refer to combined light. Var.
- 156 ADS 4172A; separation 1".2. Radial velocity and spectral type (T) refer to brighter component, magnitude to combined light.
- 157 Variable star. Prob.Var.
- 158 Some lines appear double on one spectrogram. Prob. Var.
- 159 ADS 4192B.
- 160 Variable star. Prob.Var.
- 161 Spectroscopic binary orbit. Var.
- 162 Prob.Var.
- 163 Star in double system. Prob.Var.
- 164 Star in double system. Spectroscopic binary orbit. Var.
- 165 Some lines appear double on one spectrogram.
- 166 Emission line star. H-beta ñ H-epsilon emission on broad absorption.
- 167 Star in double system. Var.
- 168 Has faint companion (magnitude 14.6); separation 5".8, position angle 82 degrees.
- 169 Emission line star. Var.
- 170 Var.
- 171 Double lines on some plates.
- 172 Be Star. Prob.Var.
- 173 Var.
- 174 Double or multiple star.
- 175 Variable star of beta Cep type. Var.
- 176 Star in double system.
- 177 Perhaps a double line spectroscopic binary. Variable star of beta Cep type.
- 178 Star in double system.
- 179 Star in double system.
- 180 Star in double system.
- 181 Variable star of alpha2 Cvn type.
- 182 Variable star RR Lyr.
- 183 Spectroscopic binary orbit.
- 184 Star in double system.
- 185 Possibly: HD252353 BD+24 1125
- 186 Prob.Var.
- 187 Prob.Var.
- 188 NGC 2168 307.
- 189 Variable star.
- 190 Emission-line star.
- 191 Emission-line star.
- 192 Emission-line star. Var.
- 193 Eclipsing binary. spectroscopic binary orbit Listed twice in GCSRV as 4183 and 4186. Var.
- 194 Radial velocity from GCSRV.
- 195 Star in double system. Var.
- 196 Star in double system.
- 197 Star in double system.

- 198 Star in double system.
- 199 Prob.Var.
- 200 Prob.Var.
- 201 With a change in position angle of 180 degrees' the measurement fits the pair 7-16 quite well. The position given in ADS is off by 5', but there is no double star at the ADS position. Star 16 was also on the slit during the exposure.
- 202 Pre-main sequence Star. S Monocerotis.
- 203 Pre-main sequence Star
- 204 Pre-main sequence Star
- 205 Pre-main sequence Star
- 206 Star in double system
- 207 Possible ellipsoidal variable star. Some lines appear double on two spectrograms.
- 208 Eclipsing binary of Algol type. Double line spectroscopic binary, involved in bright nebulosity. Var.
- 209 Pre-main sequence star. Close visual binary (0".8), not separated. Prob.Var.
- 210 Variable star
- 211 Pre-main sequence star. Trumpler's BD name conflicts with GCSRV. The GCSRV seems to be the star (BD+10 1235). Var.
- 212 Young stellar object. Var.
- 213 Some lines appear double on one spectrogram. Prob.Var.
- 214 Young stellar object. Var.
- 215 Young stellar object.
- 216 Young stellar object, Trumpler's BD ADS, and GCSRV were wrong (BD+09 1236 ADS 5322G GCSRV4329). Var.
- 217 Star in double system.
- 218 Has close companion; separation 1".8, position angle 241 degrees. Data refer to combined light. This star is also listed as ADS 5482A but with an error in position.
- 219 Star in double system
- 220 Prob.Var.
- 221 Star in double system
- 222 Double star not noted in ADS; separation 2", position angle 27 degrees. Star 8, which is 1 magnitude fainter than star 5, was also on the slit during exposures for star 5.
- 223 Star in double system
- 224 Spectroscopic binary orbit. Var.
- 225 Star in double system.
- 226 Star in double system.
- 227 Prob.Var.
- 228 Eclipsing binary of beta Lyr type. Has companion of magnitude 14 at position angle 99 degrees, separation 4".6. Var.
- 229 Young stellar object.
- 230 Young stellar object.
- 231 Young stellar object.
- 232 Young stellar object.
- 233 Young stellar object.
- 234 Star in double system. Stars 1 and 2 were both on the slit during the exposures.
- 235 Star in double system.
- 236 Lines appear double on two spectrograms, probably double line spectroscopic binary.
- 237 Emission-line star.
- 238 Star in double system.
- 239 Emission-line star.
- 240 Trumpler's BD was a different star
- 241 Trumpler's BD was a different star
- 242 Be star. H-beta, H-gamma emission. Prob.Var.

- 243 Be star.
- 244 Star in double system.
- 245 Star in double system.
- 246 Star in double system.
- 247 Star in double system. Lines appear double on one spectrogram. Prob.Var.
- 248 Prob.Var.
- 249 Star in double system.
- 250 Star in double system.
- 251 Eclipsing binary of Algol type. Var.
- 252 Var.
- 253 CI* NGC 2422 PMS 1156 has a B of 9.72 and it's coordinates are closer to the star than the BD Trumpler lists.
- 254 Var.
- 255 Star in double system. Double star measurements indicate that this star has the same proper motion as star 1 and is therefore probably a cluster member; the relatively large deviation of the radial velocity may be due to velocity variation, since it is less than 2.5 times the probable error. Var.
- 256 Semi-regular pulsating star.
- 257 Star in double system.
- 258 Emission-line star. H-beta emission on broad absorption; H-gamma faint.
- 259 Perhaps double line binary. Var.
- 260 Star in double system. Var.
- 261 USNOA2 0525-05946134
- 262 Var.
- 263 Double star, brighter component.
- 264 Var.
- 265 Has companion of magnitude 10 at position angle 81 deg, separation 3". Magnitude refers to combined-light radial velocity and spectral type to brighter component.
- 266 Spectral type peculiar: metallic lines strong while CaII H&K lines resemble those of an A2 star; may be composite.
- 267 Some lines appear double; perhaps a double line spectroscopic binary.
- 268 Var.
- 269 Spectroscopic binary. Var.
- 270 Star in double system.
- 271 Variable star of delta Sct type.
- 272 Spectroscopic binary.
- 273 Spectroscopic binary.
- 274 Variable star of delta Sct type.
- 275 Star in double system.
- 276 Variable star.
- 277 Prob.Var.
- 278 Variable star.
- 279 Star in double system.
- 280 Spectroscopic binary. Radial velocity from GCSRV, spectroscopic binary orbit by R.F Sanford. Var.
- 281 Spectroscopic binary.
- 282 Variable star.
- 283 Spectroscopic binary. Var.
- 284 Variable star.
- 285 Variable star of delta Sct type.
- 286 Spectroscopic binary. Var.
- 287 Variable star of delta Sct type. [Wilson \(1953\)](#) lists this as a double line spectroscopic binary; Trumpler's spectra confirm variability.
- 288 Variable star of delta Sct type.

- 289** Variable star.
- 290** Variable star.
- 291** Variable star of delta Sct type.
- 292** Variable star of delta Sct type.
- 293** Variable star. Var.
- 294** Variable star of delta Sct type.
- 295** Variable star. [Wilson \(1953\)](#) lists this as a double line spectroscopic binary; our observations confirm velocity variability, but do not show double lines. Var.
- 296** Variable star.
- 297** Variable star of delta Sct type.
- 298** Variable star.
- 299** Star in double system.
- 300** Prob.Var.
- 301** Northern component of double star.
- 302** Star in double system.
- 303** Star in double system.
- 304** Star in double system.
- 305** Star in double system.
- 306** Close double star, according to van Maanen; data refer to combined light.
- 307** Red giant star.
- 308** Red giant star.
- 309** Variable star of delta Sct type.
- 310** Red Giant branch star.
- 311** Spectroscopic binary. Has two faint companions at $21''$, position angle 282 degrees and $18''$, position angle 128 degrees. Prob.Var.
- 312** Eclipsing binary of beta Lyr type. Brownlee and Cox find some variability indicated; double line binary orbit determined by O. Struve. Two of Trumpler's plates show normal (single) lines, two show very broad lines not clearly separated. Var.
- 313** Spectroscopic binary. Data refer to brighter component.
- 314** Wolf-Rayet star. Spectroscopic binary orbit determined by O. Struve. The spectrum shows an emission band at 4686 A and several other broad emissions. Var.
- 315** Var.
- 316** Eclipsing binary of Algol type.
- 317** Radial velocity from [Wilson \(1953\)](#).
- 318** Spectroscopic binary orbit. Var.
- 319** Eclipsing binary of Algol type. Double line spectroscopic binary orbit. Var.
- 320** Double star given in SDS; data refer to brighter (s.p.) component. Var.
- 321** Var.
- 322** Star in double system.
- 323** Prob.Var.
- 324** Be star. H-beta faint emission. Var.
- 325** Prob.Var.
- 326** Semi-regular pulsating star. Irregular variable; its physical membership is doubtful.
- 327** Var.
- 328** Visual double star, SDS I 608, companion of magnitude 12.3, separation $2''.0$, position angle 304 degrees. The magnitude refers to combined light, radial velocity and spectral type to the brighter component.
- 329** Spectroscopic binary.
- 330** Spectroscopic binary. Radial velocity from GCSRV.
- 331** Spectroscopic binary. Var.
- 332** Spectroscopic binary.
- 334** Star in double system.
- 335** Var. Close double (separation $0''.7$). Data refer to combined light.

- 336** Be star.
- 337** Prob.Var.
- 338** Star in double system. Radial velocity observations were made for each component separately; magnitudes refer to combined light. According to ADS 67a is 0.3 magnitude brighter than 67b, which would make the photographic magnitudes of the two stars 9.6 and 9.9. Prob.Var.
- 339** Star in double system.
- 340** Prob.Var.
- 341** Spectroscopic binary. Var.
- 342** Prob.Var.
- 343** Star in double system.
- 344** Rotationally variable star. Prob.Var.
- 345** Spectroscopic binary.
- 346** Close double star of $0''.4$ separation, observed as one star.
- 347** Variable star of alpha2 Cvn type.
- 348** Spectroscopic binary. Var.
- 349** Close double star $0''.45$ separation, observed as one star. The exceptional spectral type and rather large deviation in radial velocity make it doubtful that this star is a physical member of the cluster.
- 350** Spectroscopic binary.
- 351** Variable star of alpha2 Cvn type.
- 352** Spectroscopic binary.
- 353** Variable star of alpha2 Cvn type. Var.
- 354** Spectroscopic binary.
- 355** Prob.Var.
- 356** Spectroscopic binary.
- 357** Sky-map B is 9.998.
- 358** Prob.Var. Double star, n.f. Component.
- 359** Double star, n.f. Component.
- 360** Not found in SIMBAD, B from sky-map.
- 361** Star in double system.
- 362** Var.
- 363** Boss GC 24590.
- 364** Var.
- 365** Not found in SIMBAD.
- 366** Emission-line star. Lies outside the limiting circle adopted for the cluster and is probably not a cluster member. In nearly all O-type stars, the two or three brightest stars are in the central part of the cluster. Radial velocity from [Wilson \(1953\)](#).
- 367** Spectroscopic binary. Lies outside the limiting circle adopted for the cluster and is probably not a cluster member. In nearly all O-type stars, the two or three brightest stars are in the central part of the cluster. Radial velocity from [Wilson \(1953\)](#).
- 368** Be star. Lines appear double; probably double line binary. H-beta, H- gamma emission. Var.
- 369** Double line spectroscopic binary orbit. Var.
- 370** H-beta, H-gamma faint emission on broad absorption; perhaps double lines on some plates. Var.
- 371** H-beta, H-gamma faint emission on broad absorption.
- 372** Line width variable; perhaps double lines. Var.
- 373** Visual double star, ADS 11024, SDS h5010; for combined light, magnitude 8.9. The large deviation of the radial velocity makes it probable that this star is not a cluster member.
- 374** H-beta, H- gamma faint emission on broad absorption; perhaps double lines on some plates. Prob.Var.
- 375** H-beta, H- gamma faint emission on broad absorption.
- 376** Eclipsing binary of beta Lyr type. Var.
- 377** Emission-line star. Prob.Var.
- 378** Var.
- 379** Emission-line star.

- 380** Si IV lines faint. Prob.Var.
381 Si IV lines faint.
382 Var.
383 Some lines appear double in one spectrogram. Prob.Var.
384 Be star. Var.
385 H-beta, H-gamma, H-delta emission on broad absorption.
386 Star in nebula. Radial velocity from [Wilson \(1953\)](#).
387 Sky-map component B is mag 10.2.
388 Var.
389 Variable star. Radial velocity from GCSR.V.
390 Classical Cepheid (delta Cep type). U Sgr. Spectral type variable from gF8-gG2 Prob.Var.
391 Star in double system. Var.
392 Be star.
393 Radial velocity from GCSR.V.
394 Double lines observed on one spectrogram. Prob.Var.
395 Prob.Var.
396 Prob.Var.
397 Emission-line star. H-beta faint emission; perhaps double lines on some plates. Prob.Var.
398 Star in double system. H lines narrow. Northern component of double star. Var.
399 Star in double system.
400 Emission-line star. Close double separation $0''.7$; data refer to combined light. H-beta faint emission on some plates.
401 Star in double system.
402 Classical Cepheid (delta Cep type).
403 Outside the limits of our chart. ADS 11526A, has companion of magnitude 10 at separation $1''.2$. The radial velocity leaves no doubt that this star is not a cluster member.
404 Eclipsing binary. Var.
405 Prob.Var.
406 Prob.Var.
407 Var.
408 Spectroscopic binary.
409 Si II lines strong.
410 Star in double system. Listed as double line spectroscopic binary, spectral type cA3. Double lines on some plates. Prob.Var.
411 B magnitude from sky-map.
412 Probably not cluster member, radial velocity differs considerably, and is also outside the limiting circle.
413 Prob.Var.
414 Var.
415 Probably not a cluster member; Radial velocity differs considerably and is also outside the limiting circle.
416 Prob.Var.
417 Prob.Var.
418 Probably not a cluster member; the radial velocity differs considerably.
419 Star in double system.
420 Var.

REFERENCES

- Chubak, C., Marcy, G., Fischer, D. A., et al. 2012, arXiv e-prints, arXiv:1207.6212, doi: [10.48550/arXiv.1207.6212](https://doi.org/10.48550/arXiv.1207.6212)
- Gill, D., & Kapteyn, J. C. 1896, *Annals of the Cape Observatory*, 3, 1
- Stefanik, R. P., Latham, D. W., & Torres, G. 1999, in *Astronomical Society of the Pacific Conference Series*, Vol. 185, IAU Colloq. 170: Precise Stellar Radial Velocities, ed. J. B. Hearnshaw & C. D. Scarfe, 354
- Weaver, H. F. 1966, *Publications of the Lick Observatory*, XXI, 1
- Weaver, H. F. 1967, in *IAU Symposium*, Vol. 30, *Determination of Radial Velocities and their Applications*, ed. A. H. Batten & J. F. Heard, 153
- Wilson, R. E. 1953, *General Catalogue of Stellar Radial Velocities,"GCSRV"*, Mount Wilson and Palomar Observatories, Carnegie Institution of Washington D.C., Caltech