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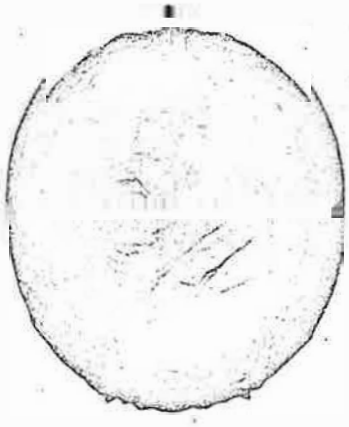

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RADIAL VELOCITIES AND SPECTRAL TYPES OF STARS IN GALACTIC STAR CLUSTERS

by

ROBERT JULIUS TRUMPLER

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Robert J. Trumpler's Work on the Radial Velocities of Galactic Star Clusters

by

Harold Weaver

Radio Astronomy Laboratory

University of California, Berkeley

1. Introduction. When R.J. Trumpler came to the Lick Observatory as Martin Kellogg Fellow in 1919, his major concern was the identification of the physical members of the Pleiades and the determination of accurate positions and proper motions of the members of the cluster. At Mount Hamilton, however, then the principle center for radial velocities, he was inevitably drawn to spectroscopy. He became interested in radial velocities as a means of identifying the physical members of star clusters, and in 1921 started spectroscopic observations of the Pleiades. This work was interrupted by his eclipse observations in 1922. The discovery of galactic rotation by Lindblad and by Oort in 1925-26 opened new fields of investigation in which radial velocities played a fundamental role. Radial velocities of galactic clusters, Trumpler realized, could provide an excellent determination of the galactic rotation parameters, and he therefore greatly expanded his radial velocity program to include 100 clusters. The results of his observations of these clusters for radial velocities during the years 1924 to 1947 are contained in the catalog that follows. This catalog contains radial velocities derived from 3782 observations of 773 stars in 73 clusters. It likewise contains data from 336 observations of 125 standard stars having accurately known radial velocities. Table 1 exhibits the statistics of the cluster observations. Table 2 provides data on the characteristics of the spectrographs used for the observations. A list of the standard stars will be found in Appendix II.

Table 1

List of clusters included in the catalog, and compilation of statistics relating to the radial velocity observations. In column (3) the first number specifies the total number of stars with radial velocities listed in the catalog for each cluster. The second number (in parentheses) specifies the number of these velocities determined by Trumpler. In column 5 the number given in parentheses specifies the number of plates used in the determination of the orbit or orbits.

Serial Number (1)	Cluster Designation (2)	Number of Stars with Measured R.V. (3)		Number of Plates Measured by Trumpler (4)	Number of Spectro. Binary Orbits (5)	
1	NGC 457	11	(10)	38	1	(25)
2	" 581	7	(7)	28		
3	Anon 1	4	(4)	17		
4	NGC 637	4	(4)	16		
5	" 663	7	(7)	24		
6	" 752	19	(19)	64		
7	" 869	20	(18)	85		
8	" 884	20	(17)	63	1	(18)
9	IC 1805	13	(13)	52	3	(98)
10	NGC 957	4	(4)	14		
11	" 1027	6	(6)	24		
12	" 1039	13	(13)	51		
13	IC 1848	7	(7)	23	1	(44)
14	Pleiades(M45)	82	(82)	365		

Serial Number	Cluster Designation	Number of Stars with Measured R.V.		Number of Plates Measured by Trumpler	Number of Spectro. Binary Orbits	
15	NGC 1444	2	(2)	9		
16	" 1502	10	(8)	39		
17	" 1528	8	(8)	23	1	(38)
18	" 1647	10	(9)	43		
19	" 1912	6	(6)	23		
20	" 1981	11	(11)	45		
21	" 1960	13	(13)	56	2	(60)
22	" 2129	7	(7)	32		
23	" 2169	10	(10)	43		
24	" 2168	11	(11)	38	1	(29)
25	" 2244	17	(16)	76	1	(19)
26	" 2251	7	(7)	30		
27	" 2264	19	(19)	81	1	(14)
28	" 2281	7	(7)	22		
29	" 2343	6	(6)	23		
30	" 2353	6	(6)	22	1	(26)
31	" 2362	8	(8)	33		
32	" 2367	4	(4)	14		
33	" 2384	5	(5)	21		
34	" 2414	3	(3)	10		
35	" 2422	21	(21)	82		
36	" 2439	6	(6)	27		
37	" 2548	11	(11)	46		
38	" 2632	54	(54)	203		
39	" 2682	8	(8)	24		

Serial Number	Cluster Designation	Number of Stars with Measured R.V.		Number of Plates Measured by Trumpler	Number of Spectro. Binary Orbits	
40	NGC 6231	11	(9)	26	2	(34)
41	" 6383	7	(7)	26		
42	" 6405	12	(12)	54		
43	IC 4665	20	(19)	81		
44	NGC 6475	17	(17)	73		
45	" 6520	7	(7)	25		
46	" 6531	10	(10)	52		
47	" 6530	13	(11)	56	1	(22)
48	" 6604	5	(5)	26		
49	" 6611	10	(10)	52		
50	" 6613	8	(7)	30		
51	" 6633	15	(15)	59		
52	IC 4725	13	(11)	56		
53	NGC 6664	4	(4)	16		
54	IC 4756	21	(21)	92		
55	NGC 6694	4	(4)	18		
56	" 6705	7	(7)	27		
57	" 6709	12	(12)	56		
58	" 6755	2	(2)	7		
59	" 6823	5	(5)	17		
60	" 6834	4	(4)	15		
61	" 6871	13	(11)	52		
62	" 6883	7	(5)	22		
63	" 6882	3	(3)	13		
64	IC 4996	7	(7)	25	2	(131)
65	NGC 6910	8	(8)	34		
66	" 6913	6	(6)	29		

Serial Number	Cluster Designation	Number of Stars with Measured R.V.		Number of Plates Measured by Trumpler	Number of Spectro. Binary Orbits	
67	NGC 7092	19	(19)	76		
68	" 7160	6	(6)	18	2	(36)
69	" 7243	14	(14)	55		
70	" 7380	6	(5)	21		
71	" 7510	4	(4)	16		
72	" 7654	6	(6)	24		
73	" 7788	3	(3)	10		
Totals:		796	(773)	3188	20	(594)

Table 2

Spectrographs Used in Observations
of Galactic Cluster Stars
(All used on the 36-inch refractor)

Spectrograph (Prism)	(Camera Focal Length in Inches)	Years Used	Dispersion (at Hγ)	Comparison Spectrum
I	12	1924-1932	76 A/mm	H, He, A
DI	6	1924-1932	101 A/mm	H, He, A
DI	16	1924-1932	38 A/mm	H, He, A
II	6	1932-1944	77 A/mm	Fe spark
II	3½	1932-1947	132 A/mm	Fe spark
II	6A	1944-1947	77 A/mm	Fe spark

The catalog of radial velocities presented here was incomplete at the time of Professor Trumpler's death on September 10, 1956. He had, however, completed all the reductions of the observations and had derived the radial velocities in form for publication. More specifically, he had:

1) derived the final tables of standard line positions from which radial velocities were derived;

2) determined radial velocities for all the stars on the basis of these tables;

3) derived personal equations for all those who had measured spectrograms, and determined flexure and other systematic corrections to reduce the measured velocities to the system of a standard radial velocity catalog, in this case the General Catalog of Stellar Radial Velocities (GCSRV) by R.E. Wilson;

4) determined all the final radial velocities published here for the cluster stars;

5) discussed the accuracy of the final velocities and determined the probable error of a measurement of unit weight.

Additionally, he had compiled the velocities in the form of tables essentially as given here and he had made nearly all of the identification charts. He had also completed the discussion of the 20 spectroscopic binaries included as Appendix I. All the numerical data contained in this catalog were determined by Professor Trumpler. He had, however, not written the introduction to the catalog; only the scantiest notes relating to this task had been prepared by the time of his death. Fortunately, all of his tables and calculations relating to the catalog are available. Moreover, the methods and procedures of reduction had been

discussed by Professor Trumpler and the present writer many times during the period 1951-1956, when the reductions were being made. It was possible, therefore, to reconstruct the steps in the reduction process. What remained to do to prepare the catalog for publication, then, was to check the numerical work, complete several charts, and write the introduction. Thanks are due to Dr. M.S. Roberts, now of the National Radio Astronomy Observatory, and to Mr. A.F. Setteducati who, together, did the numerical checking, final compiling of data, and completed the set of maps. The tables and charts were prepared under the careful supervision of Mr. Setteducati. In preparing this catalog we have deviated from Professor Trumpler's original plan in two minor ways. He had originally thought to include a number of clusters for which he had determined photographic magnitudes by polar comparisons, but for which he had not measured any radial velocities. We have omitted these clusters. Professor Trumpler had originally hoped to make these compilations in some sense definitive, and had therefore given magnitudes to two significant figures. He had also, in some instances, listed color indices, generally measured photographically. Investigation showed that the magnitudes he had determined were of lesser accuracy than he had originally hoped, and the stars for which color indices were available were rather too scattered among the various clusters and too irregular in system and accuracy to make them very valuable. We have therefore given magnitudes only to the nearest tenth, regarding them as star finding aids rather than definitive values, and we have omitted all references to color indices.

One feature of this introduction should perhaps be mentioned. It is written to provide a general insight into the nature and solution of the statistical problems involved in an extensive radial velocity program such as that completed by Professor Trumpler. This approach seemed more useful than providing primarily an extensive compilation of personal equations for 21 measurers for five

spectrographs, flexure errors, reductions to a standard catalog, and so forth. We have given such specific numerical data only where they seemed particularly called for by way of illustration and only to the extent needed for full utilization of the catalog.

Finally, we acknowledge for Professor Trumpler two debts that he would have acknowledged in the introduction he would have written. Especial thanks are due to Mrs. R.J. Trumpler who greatly assisted Professor Trumpler during the period 1951-1956 in the lengthy and tedious compilation and first typing of the extensive tables of this catalog. Thanks are due also to Dr. R.M. Petrie and the staff of the Dominion Astrophysical Observatory where Dr. Trumpler spent the summer of 1952 (a period he always spoke of with pleasure), working on cluster radial velocities and discussing cluster problems.

2. General Overview of the Problem. Effectively, to determine the radial velocity of a star we compare the measured position of a spectral line on a spectrogram of the star with a standard or normal position of that line. We transform the difference between the measured and standard positions into the required velocity. Only preselected lines meeting certain criteria are utilized in this process. The transformation to radial velocity is made through use of tables of standard line positions for different spectral types and luminosity classes (S,L classes) of stars. These tables must be established for each spectrograph by a series of approximations. To the velocity thus determined corrections must be added to compensate for a variety of scale changes and other systematic errors originating primarily in the spectrograph mainly through temperature and orientation effects. Steps in the establishment of the tables and in the procedures for establishing and applying systematic corrections are, in outline, as follows. (For the present we discuss results from a single spectrograph.)

1. Establishment of the mean plate; formation of the table of standard line positions.

    a) Select lines to be measured: comparison lines, star lines and stable blends of known wavelengths for specified spectral luminosity (S,L) classes.

    b) Measure plates; estimate line quality; measure spectrum width to allow for curvature correction and non-perpendicularity of measuring cross wire.

    c) Form mean plate by stacking; determine standard positions of comparison lines; derive the Hartmann formula and correction curve from the standard positions of the comparison lines on the mean plate.

    d) Determine standard positions of the selected star lines and blends of known wavelengths from the Hartmann formula; transform standard star line positions from system of comparison lines to that of star spectrum by application of mean curvature correction.

    e) Calculate rV_s values for star lines for the mean plate.

2. Radial velocity determination for a particular plate by means of tables of standard line positions.

    a) Transform scale of mean plate to that of particular plate by graphical method.

    b) Determine radial velocities from individual lines; form weighted mean velocity; allow for curvature correction of particular plate; allow for tilt of measuring wire; reduce to sun.

3. The internal homogeneity of the system of standard line positions of stars of each S,L class.
    a) Determine the degree of homogeneity of the system of standard line positions for each S,L class.
    b) Correct errors in standard line positions automatically removing effects of measuring screw errors.
    c) Recalculate radial velocities.
    d) Calculate mean errors of standard line positions; assign weights to standard line positions.
    e) Iterate a, b, c until a satisfactory degree of homogeneity for each S,L class is achieved.
4. The external homogeneity of the system of standard line positions; tests among S,L classes.
    a) Determine personal equations of all measurers; reduce to the mean observer.
    b) Derive systematic corrections for HA portion of flexure in the spectrograph; remove flexure effects from the observations; reduce results to one orientation of one spectrograph on the meridian.
    c) Derive systematic correction for declination portion of flexure in the spectrograph and reduce each S,L class to the velocity system of the GCSRV.
    d) Iterate a, b, c until convergence achieved.
5. Accuracy of the final velocities.
    a) Investigate agreement of final results with the GCSRV; estimate probable error of unit weight.

We now briefly consider these various topics.

3. Selection of Lines to be Measured. Comparison lines to be measured on plates of a given spectrograph consisted of a group of 35 lines selected on the basis of the following criteria: unblended, moderate intensity, accurately known wavelengths, unbunched, distributed uniformly over the maximum range in which measurements were contemplated. Normally, measurement was restricted to a subgroup of 15 of these lines. The larger group, infrequently used, was available if desired or if, through mishap, lines in the subgroup were unavailable for measurement. In spectra of the small dispersion employed for the velocity measurements reported here, blending among the star lines is a fundamental problem. Unblended lines are rare; the effective wavelength of any line is strongly correlated with the spectral class and luminosity type (S,L class) of a star, and may be correlated with other more subtle characteristics as well. To set up a satisfactory table of standard non-shifted spectral line positions, we divide the population of stars to be analysed into appropriate S,L groups or classes. We deal with each of the S,L classes separately, one after another, to build up a composite table of standard line positions that will finally encompass all S,L classes. For each S,L class we select, if possible, a few dozen lines of known effective wavelengths, normally well visible and, as far as experience can tell, blend stable on the plates available for measurement. For stars of the designated S,L class, we measure lines chosen from among this selected group. (One would now use Petrie's tabulations of standard lines to establish this population of acceptable lines of known wavelengths. At the time this program was started, no such list was available; one had to specify the population on the basis of earlier experience.)

4. Measurement of the Plates. To maximize the homogeneity of the velocities, the measuring procedure was rigidly standardized. All plates were measured on one of two single coordinate engines whose relative systematic errors were well determined. Each plate was measured first in the direct(wavelength, λ, and measured coordinate, r, increase together) then in the reverse direction. The plate was positioned so that a specific comparison line which served as the starting line always had the same reading on the engine, thus making it unnecessary to discuss screw errors as a separate problem.

Positions of upper and lower comparison lines were measured and recorded separately; this made it possible to allow for non-perpendicularity of the measuring cross wire and the dispersion axis, which was always adjusted to be parallel to the direction of motion of the plate in the measuring engine. In the measurement of any one plate, one would normally choose and measure from among the selected lines appropriate to the star's S,L class, 20-25 lines. The lines measured were so chosen that they (a) were uniformly distributed over the whole length; (b) were not bunched in groups; and, as experience grew, (c) were the most stable blends.

For all star lines measured, line quality was estimated:

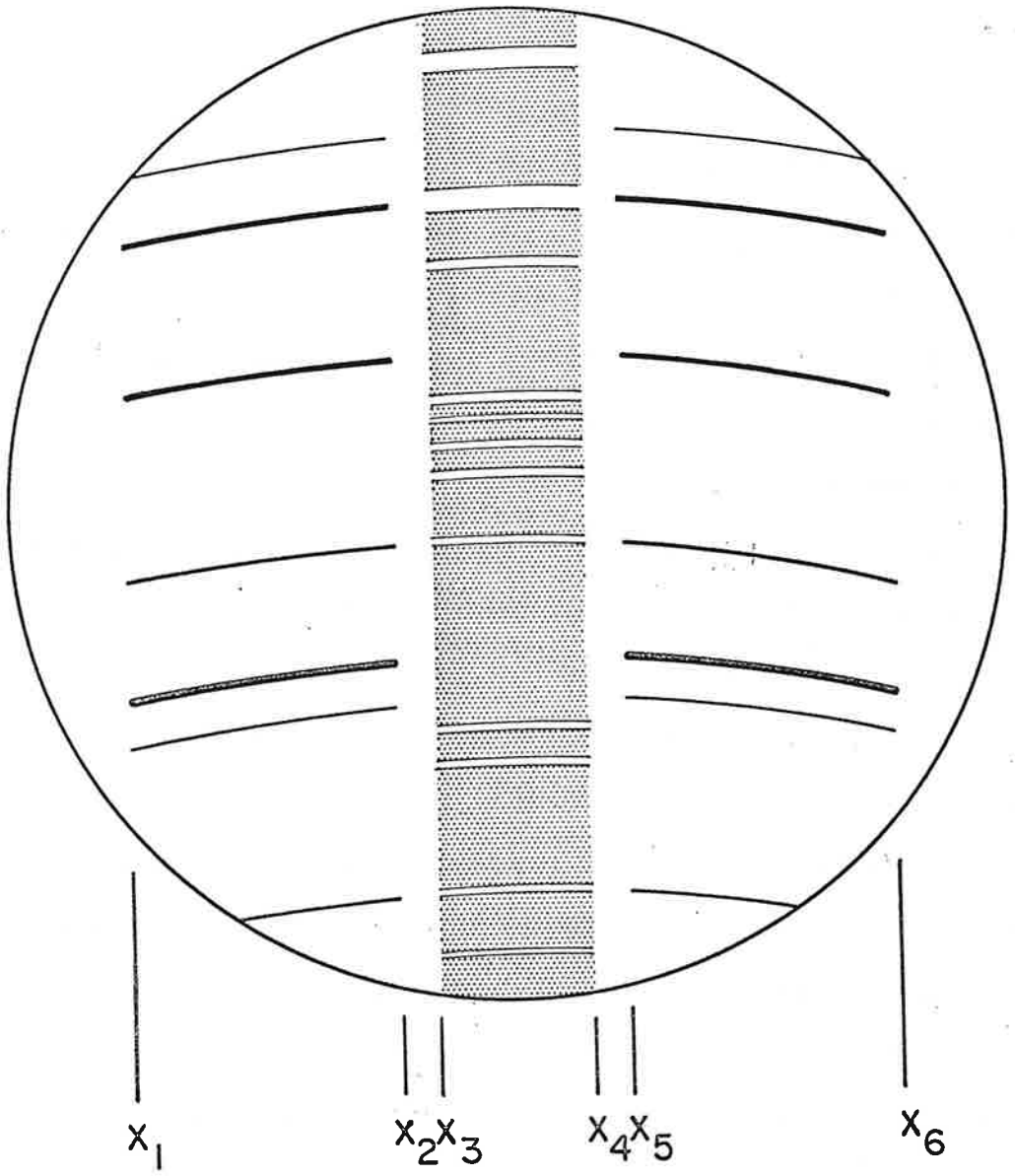
g = good: line sharp and rather symmetrical

f = fair

p = poor: line not well defined; faint or unsymmetrical; wide and diffuse

vp = very poor: line very faint, barely visible, very wide or very diffuse.

The quality estimate was used in the subsequent reduction to assign weights to the velocity found from an individual line. The quality estimate represents the measurer's confidence in the measured position of the line. The measurer frequently made additional notes on the character of a line measured: n (diffuse or nebulous),



$$X_1 = \frac{x_1 + x_2}{2} \qquad w = x_4 - x_3$$

$$X_2 = \frac{x_5 + x_6}{2} \qquad X_2 - X_1 = 2\Delta X$$

$$X_3 = \frac{x_3 + x_4}{2}$$

Fig 1. View through microscope showing measurements to be made of width of spectrum. (curvature of lines is exaggerated.)

s (sharp), m (median of two closely adjacent lines), ... to assist in identifying the line or the blend and hence in specifying the best wavelength to be used in the velocity determination.

Finally, the plate was rotated 90 degrees so that the direction of measurement was perpendicular to the axis of dispersion. Measurements of upper and lower comparison line end-point positions, x_1, x_2, x_5, and x_6 and of the limits of the star spectrum, x_3 and x_4, were made as shown in Figure 1. These measurements provide the data to correct for curvature of the prismatic spectral lines and for non-perpendicularity of the measuring wire to the direction of dispersion.

5. The Mean Plate. For a group of N (N = several hundred) plates we compile a table of measured positions of comparison lines as shown in Table 3. "Measured position of comparison line" here means, for each line, the average of the upper and lower comparison line measurements.

For simplicity in this discussion we consider only the subgroup of comparison lines presumably measured on every plate; the other lines may be included, but with slightly more effort required in the analysis. The averages, $\bar{r}_{ci}$, establish the mean plate. The $\bar{r}_{ci}$ values are the standard tabular positions of the comparison lines; they contain, and take account of, any irregularities in the measuring screw.

From the end comparison lines and an appropriately placed mid-line we evaluate the parameters λ_o, H, and r_o of the Hartmann formula

$$\lambda = \lambda_o + \frac{H}{r - r_o} \qquad (1)$$

for the mean plate, and determine the usual Hartmann correction curve to the formula.

Finally, for the N plates we find $\bar{X}_1$, $\bar{X}_2$, and $\bar{w}$ (see Figure 1) which serve to establish the mean curvature correction.

Table 3

Compilation of Measured Positions of Comparison Lines

and Calculation of mean positions: $\overline{r_{ci}} = \frac{1}{n} \sum_{j=1}^{n} r_{ci,j}$[1]

λ of Comparison Line	Plate 1	Plate 2	Plate 3	Plate j	Plate n	$\overline{P}$ (average)
λ_1	$r_{c1,1}$	$r_{c1,2}$	. . . . .	$r_{c1,j}$ . . .	$r_{c1,n}$	$\overline{r_{c1}}$
λ_2	$r_{c2,1}$	$r_{c2,2}$				$\overline{r_{c2}}$
.	.	.				.
.	.	.				.
.	.	.				.
.	.	.				.
λ_i	$r_{ci,1}$	$r_{ci,2}$		$r_{ci,j}$		$\overline{r_{ci}}$
.	.	.				.
.	.	.				.
.	.	.				.
.	.	.				.
λ_m	$r_{cm,1}$	$r_{cm,2}$			$r_{cm,n}$	$\overline{r_{cm}}$

6. Determination of Standard Positions for Star Lines. For the selected star lines and blends of known wavelengths we employ the Hartmann formula and correction curve to find positions, $r_{\ell,c}$ in the measuring system of the comparison lines. The spectrographs employed in this investigation utilize prismatic dispersing elements. The spectral lines are therefore curved. The measuring system of the comparison lines is not the same as that of the star lines. Transformation from the comparison-line system to the star-line system is made by applying the correction, $\overline{\delta r}$, for line curvature. If $\underline{a}$ represents the parameter in the expression for the parabolic form of a spectral line, $\delta r = a\,(x - X_3)^2$, then, with adequate accuracy, $\overline{\delta r} = a\left[(\Delta X)^2 - w^2/16\right]$; the standard star-line positions, $r_{\ell,*}$, on the star-line system are

$$r_{\ell *} = r_{\ell,c} + \overline{\delta r} \qquad (2)$$

We have here made no attempt to allow for the variation of $\underline{a}$ with wavelength.

7. Transformation from Line Displacement to Radial Velocity; the rV_s Factors. Transformation of the line displacement Δr_ℓ = measured position of line ℓ minus standard position of line $\ell = r_{\ell,m} - r_{\ell,*}$ to radial velocity, v_ℓ, is accomplished by multiplication:

$$v_\ell = \Delta r_\ell \left[\left(\frac{d\lambda}{dr} \right)_\ell \cdot \frac{c}{\lambda_\ell} \right]$$

$$= \Delta r_\ell \cdot rV_{s,\ell} \qquad (3)$$

or if $\left(\frac{d\lambda}{dr} \right)_\ell$ is expressed in terms of the parameters of the Hartmann formula

$$rV_s = \frac{(\lambda - \lambda_o)^2}{H} \frac{c}{\lambda} \cdot \qquad (4)$$

The multiplicative factor rV_s, which transforms from displacement on the scale of the mean plate to radial velocity, must be computed for each star line used in radial velocity determination.

8. Radial Velocity Determination from a Particular Plate; Scale transformations. Calculations described in sections 6 and 7 apply to the mean plate. In general, any particular plate will differ in scale from the mean plate because of small differences between the values of temperature, focus, plate tilt, etc., under which any particular exposure was made, and those conditions under which the mean plate was taken. For any particular plate the differences between the measured and standard star line positions are indicative not only of radial velocity , they are also (in fact primarily) indicative of scale differences between the particular plate and the mean plate. Before the differences in line position can be used as radial velocity indicators, the scale difference between the particular plate and mean plate must be removed. The comparison lines serve as the basis for making the transformation. Form the differences $r_{c,p} - r_c$ where $r_{c,p}$ represents the measured portion of comparison line i on some particular plate, j, and $\overline{r_c}$ (Table 3) represents the position of comparison line i on the mean plate. Plot $r_{c,p} - \overline{r_c}$ as a function of $r_{c,p}$, and draw a smooth curve through the points. From this curve we can transform the mean plate to the scale of the particular plate. It is readily shown that the difference between measured star-line position and transformed standard star-line position is on the scale of the mean plate, hence need only be multiplied by the rV_s to give radial velocity. On the other hand, if the difference $r_{c,p} - \overline{r_p}$ is plotted as a function of $\overline{r_p}$, one may readily show that the difference Δr_ℓ will be on the scale of the particular plate and that the velocity obtained by multiplication by rV_s requires correction by a scale factor.

9. The Radial Velocity Determined from a Particular Plate. The radial velocity assigned to the star is the weighted mean of the velocities determined for the individual lines. We assign to each line a weight proportional to the estimated line quality (g = wt 1.0, f = wt 0 .75, p = wt 0.50, vp = wt 0.30), and inversely proportional to rV_s. (In the final analysis, weights will also be assigned on the basis of the accuracy with which the unshifted position of the star line is established.) The mean velocity so derived requires correction for two effects.

1. Curvature. A mean curvature correction, which is a function of the width $2\overline{\Delta X}$ (see Figure 1), is included in the table of standard unshifted line positions to allow for the curvature of the prismatically formed lines. (See Section 6.) For a particular plate ΔX may not be identical with $\overline{\Delta X}$, hence a slightly modified curvature correction, easily computed and tabulated as a function of ΔX is required. This correction, which normally lies within the range $\pm$ 1.5 km/sec, was found to lie within the extreme limits +2 to -5 km/sec.

2. Tilt of measuring cross wire. The computed mean radial velocity may be slightly in error because of the tilt (non-perpendicularity) of the measuring cross wire to the direction of dispersion of the spectrogram. It is readily shown that the numerical value of the correction for such an effect is $-\overline{(rV_s)}\left[\Delta X - (X_3 - X_1)\right]\left[\Delta C/(2\Delta X)\right]$ where ΔC is the mean difference (upper comparison line position minus lower comparison line position) for the particular plate being reduced. This correction is normally less than a few tenths of a km/sec; only under the most extreme cases of maladjustment of the spectrograph and the measuring engine does it reach 1.0 to 1.5 km/sec.

Finally, the weighted mean velocity, corrected for individual curvature and measuring wire tilt, is reduced to the sun and corrected for diurnal rotation of the earth by standard procedure.

10. Determination of the Homogeneity of the Standard Star-Line Positions for an S,L Class. To investigate the homogeneity of the system of standard star-line positions for a specified S,L class, we analyse the residuals for individual lines for a large group of stars in that class. We have n plates of m stars of class S,L. The velocity residual for line i on plate j is Δv_{ij}, where

$$\Delta v_{ij} = v_{ij} - \overline{v_j}. \qquad (5)$$

In this expression v_{ij} represents the derived velocity for line i on plate j; $\overline{v_j}$ represents the weighted mean velocity for plate j. We compile a table of residuals and their weights; w_{ij} is the weight of line i on plate j used in computing the weighted mean velocity of plate j. (See Table 4.)

The manner of computing Δv_{ij} insures that the average residual of each plate will be zero, and that the average of all residuals will be zero. However, the average residual for line i, $\overline{\Delta v_i}$, need not be zero since the normal position of that line may be in error. The amount of the error in linear position is related to $\overline{\Delta v_i}$ by the expression

$$\Delta r_i = \frac{\overline{\Delta v_i}}{\overline{rV}_{s,i}} \qquad (6)$$

We correct the standard position of each line i by adding to the tabulated standard position the correction Δr_i as determined from equation (6). This procedure should reduce all lines to a homogeneous system of standard positions such that each $\overline{\Delta v}$ as well as the average residual for each plate becomes zero.

Table 4

Compilation of Velocity Residuals and Calculation of Mean Residual for Each Wavelength

Wavelength	Plate 1 Residual	Plate 1 Wt.	Plate 2 Residual	Plate 2 Wt.	Plate j Residual	Plate j Wt.	Plate n Residual	Plate n Wt.	Average Residual
λ_1	Δv_{11}	w_{11}	Δv_{12}	w_{12}	Δv_{1j}	w_{1j}	Δv_{1n}	w_{1n}	$\overline{\Delta v}_1$
λ_2	Δv_{21}	w_{21}	Δv_{22}	w_{22}			Δv_{2n}	w_{2n}	$\overline{\Delta v}_2$
λ_i	Δv_{i1}	w_{i1}	Δv_{i2}	w_{i2}	Δv_{ij}	w_{ij}			$\overline{\Delta v}_i$
λ_k	Δv_{k1}	w_{k1}	Δv_{k2}	w_{k2}	Δv_{kj}	w_{kj}	Δv_{kn}	w_{kn}	$\overline{\Delta v}_k$

11. Accuracy of Standard Position Estimates; Modification of Weights. Since the standard star lines even within a given S,L class will not all be of identical quality--some blends may be less stable than others and vary from one star to another, for example--we will normally find a substantial range in the accuracy with which the standard position is determined. We compute the variance of each of the $\overline{\Delta v_i}$ values of Table 4 by the usual expression

$$\frac{\sigma^2}{\Delta_{vi}} = \sum_{j=1}^{n} \left[w_{ij} \, (\Delta v_{ij} - \overline{\Delta v_i})^2 \right] / \sum_{j=1}^{n} w_{ij}(n-1). \qquad (7)$$

From equations (6) and (7) the variance of the standard position of any star line is readily found. We take this variance into account in what follows by modifying the weights used in computing the mean velocity of a star from the individual line velocities. The weight to be assigned to the determination of the standard position of a particular line i is proportional to $\left(rV_{s,i}\right)^2 / \frac{\sigma^2}{\Delta_{vi}}$. Rather than use individual precise values, we will find it adequately accurate to scale and divide these weights into four ranges: > 0.9, 0.9-0.7, 0.7-0.4, < 0.4, and to assign quality estimates, A, B, C, D, to lines whose accuracy of positions lie within the appropriate intervals. To each star line in our table of standard positions we then assign a quality estimate A, B, C, or D; to these quality estimates we assign weights 1.0, 0.85, 0.6, and 0.4. The weight to be assigned to any line in deriving the mean velocity of a star is thus a function of three quantities, quality of standard position determination, quality of the line on the particular plate as estimated by the measurer, and the value of rV_s, and may readily be displayed in the form of a table for purposes of calculation.

With these newly formed weights of individual lines we then recompute the weighted mean velocities determined from individual plates and iterate the steps

outlined in sections 10 and 11 until a satisfactory set of values for the standard positions is found. One or two iterations should suffice. A correction of this sort is made for each S,L class.

12. Tests for Homogeneity among S,L Classes. A table of standard positions of lines determined in accord with the procedures described in sections 10 and 11 will, statistically, provide from any spectrogram the same radial velocity regardless of the selection of spectral lines measured. The method of constructing the table of standard positions provides no assurance, however, that the velocities derived from spectrograms of different S,L classes will be on a homogeneous velocity system. To detect systematic velocity differences among different S,L classes, we must compare results derived from different plates, generally measured by different individuals. Different observers measure differently, particularly in measuring curved, prismatically formed spectral lines. Moreover, the effective position of a spectral line on a plate depends upon the light path through the spectrograph and hence upon flexure of the spectrograph. We must first remove systematic velocity differences arising from these effects before we can legitimately examine the velocities for consistency among different S,L classes. For simplicity in this discussion we shall assume that the cluster and standard stars we analyse are free from any strong correlations. We assume that in any cluster the data for any measurer are randomly spread over all hour angles at which the cluster was observed, and that all measurers and all spectrographs are randomly represented in all clusters. If these assumptions are not fulfilled, we can still determine all the required systematic corrections by procedures that differ somewhat in technique but not in principle from those discussed here. Fulfillment of these assumptions gives us the simplest case for purposes of illustration of method.

13. Determination of Personal Equations of Different Measurers. We here discuss the systematic error or personal equation, $\Delta v(X)$, of measurer X for a particular spectrograph. We assume $\Delta v(X)$ to be independent of spectral type and luminosity class of the star measured. Later we can remove this restriction and consider $\Delta v\ (X \mid S,L)$. Dependence of $\Delta v(X)$ upon S and L can arise because line characteristics are correlated with S and L and line characteristics may determine how measurer X sets the cross wire of the measuring engine on the line being measured.

To determine $\Delta v(X)$ we consider individual clusters. Find for each cluster the mean cluster velocity from all observations, omitting obvious binaries and variable stars, and early type stars for which there is danger of large red shift. If $\overline{v_i}$ represents the mean velocity of cluster 1, and measurer X has measured velocities $v_{X,1,i}$ in this cluster, i = 1, 2, ..., n,

$$\Delta v(X;1) = \frac{1}{n} \sum_{i=1}^{n} \left(\overline{v_1} - v_{X,1,i} \right), \tag{8}$$

and if measurer X is represented in N clusters

$$\Delta v(X) = \frac{1}{N} \sum_{j=1}^{N} \Delta v(X;j). \tag{9}$$

If the data warrant the refinement, weights may be applied in these calculations. It will be of interest to examine carefully values of $\Delta v;X;j)$ from cluster to cluster. Provided all measurers are well represented in all clusters and the observations are free from other correlations as we have assumed, there should be no large variation in $\Delta v(X;j)$ regardless of the value of j. If there is large

variation, undesirable correlations may be present and modifications of the technique of computing $\Delta v(X)$ may be required. We must, of course, derive $\Delta v(X)$ for each spectrograph.

14. The Determination of Flexure Corrections in Hour Angle. We next consider, for a particular spectrograph, that portion of the systematic error in measured velocity caused by flexure in the spectrograph and that is, in any cluster (more generally, at any declination), a function of hour angle.

The measured position of a spectral line depends upon the specific character of the line. The character or form of the line on a spectrogram depends on the imaging properties of the optical system, and these, in turn depend upon the effective adjustment of the system, upon the light path through the optical elements in the system, particularly the prism, upon the amount of filling of optical elements by the beam, and so forth. These later properties, in turn, depend upon the amount of flexure in the spectrograph. The amount of flexure depends upon the position in the sky to which the telescope is pointing and upon the orientation of the telescope (Tel E or Tel W of the pier). There will thus be a systematic error in measured radial velocity that can be expressed as a function of δ, Tel E or Tel W, and HA. We consider first that portion of the flexure effect that varies with HA; for a specific spectrograph we determine the systematic errors $\Delta v(\text{HA} \mid \delta, \text{Tel E})$ and $\Delta v(\text{HA} \mid \delta, \text{Tel W})$.

In each cluster we apply the corrections for personal equations of the various measurers. We consider clusters individually, deriving the HA flexure correction for a single declination. We deal with cluster k of declination δ_k, first putting each measured velocity into one of two classes: those derived from plates taken with Tel E, and those derived from plates taken with Tel W. The data in the Tel E group permit study of the flexure correction for Tel E, those in the Tel W group permit study of the flexure correction for Tel W. To find

the required systematic corrections, we plot for each group separately $v_{ik} - v_k$ as a function of HA

$$(\text{Tel E group:}\quad v_{ik} - v_k = \Delta v\ (\text{HA} \mid\ \delta_k,\ \text{Tel E}) \tag{10a}$$

$$(\text{Tel W group):}\quad v_{ik} - v_k = \Delta v\ (\text{HA} \mid\ \delta_k,\ \text{Tel W}) \tag{10b}$$

where v_{ik} represents the velocity derived from plate i in cluster k and v_k the mean velocity of cluster k determined from velocities corrected for personal equations. Through the plotted data we draw smooth simple curves representing Δv (HA $\mid$ δ_k, Tel E) and Δv (HA $\mid$ δ_k Tel W).

From equations (10a) and(10b) it is clear that the definition of the zero point of the observed velocities determined with a particular spectrograph in a given cluster is unsatisfactory. To illustrate the situation we consider the simple case in which all observations have been made with one spectrograph, A. The function Δv (HA $\mid$ δ_k, Tel E) has its zero when $\overline{v_{ik} - v_k = 0}$; this occurs at some weighted mean hour angle of the observations. The imprecise terms "some weighted mean" occur here because the value of v_k depends upon observations with Tel E and with Tel W, while v_{ik} refers to observations made on only one side of the pier. The appropriate procedure to avoid ambiguities and poorly defined zero points is to reduce all observations to the meridian, and to one orientation of the telescope. We therefore use the Δv (HA $\mid$ δ_k, Tel E) curve, adding to the observed velocities a constant such that we would make Δv (0 $\mid$ δ_k, Tel E) = 0, to reduce the velocities of all the Tel E group of stars to those values we would have determined if all stars had been observed on the meridian. We similarly use the Δv (HA $\mid$ δ_k, Tel W) curve plus an appropriate zero correction to reduce all the Tel W group of stars to the meridian. Since we are here dealing with the results of flexure within the spectrograph, there is no *a priori* reason to expect that the radial velocity

determined for a star of declination δ observed when it is on the meridian will be the same for Tel E and for Tel W; the orientation of the spectrograph is completely different for the two cases. To eliminate ambiguity in further analysis of the data, we reduce all observations to Tel E, HA = 0. To reduce all velocities to Tel E, we determine v_k (Tel E) and v_k (Tel W), both being derived from velocities reduced to the meridian. All velocities in a cluster are thus referred to a specific point on the sky (the meridian) and to a specific telescope orientation (Tel E).

If there are spectrographs A and B involved in the velocity measurements, we first deal with each spectrograph separately, reducing all velocities observed with spectrograph A, say, to the meridian and Tel E. We similarly deal with the observations made with spectrograph B, reducing both Tel E and Tel W to the meridian; then further, reducing Tel W to Tel E, and then, for homogeneity, reducing the spectrograph B velocities (all of which have been reduced to meridian, Tel E) to spectrograph A, meridian, Tel E.

Generalizing this procedure to any number of spectrographs, we finally arrive at the situation that all data are reduced to the meridian and to one orientation of the telescope, and refer to one spectrograph.

The HA flexure corrections and the E-W orientation effects are among the most significant so far discussed. They merit considerable care in their analysis. In the case of the I prism-12-inch camera spectrograph, the orientation difference Tel E-Tel W reaches 3.0 km/sec, and is for the II prism-6-inch camera spectrograph as great as 1.5 to 2.0 km/sec over a considerable range of declinations.

15. Determination of Flexure Corrections in Declination; Wavelength Scale Errors; Reduction to the GCSRV. Two systematic errors remain to be removed from the velocities. The first of them, represented by Δv (δ | Tel E), results from flexure in δ; the second, represented by Z (S,L), is the zero point which generally

depends upon S,L and arises from use of an erroneous mean system of wavelengths (or system of standard positions) for the star lines and blends. Such a scale error is not removed by correcting standard positions in the manner outlined in Section 10. That process adjusts the wavelengths (or positions) of lines or blends to the mean system of wavelengths (or positions); it does not alter the mean system.

To investigate Z(S,L) directly, we employ the clusters themselves. Stars of all S,L classes in a cluster should give the same radial velocity for the cluster. If such is not found statistically to be the case, a zero point correction must be made as a function of S and L. The Pleiades, Praesepe, and Coma Berenices provide the best start for such a test; stars of earlier types in other clusters may be added and tested for homogeneity by overlapping parts of main sequences in precisely the way a zero-age main sequence is built up. Tested for homogeneity in this manner, the present catalog showed a maximum irregularity in the velocities of the main sequence stars of +0.4 km/sec and -0.3 km/sec over the spectral range B5-K5. A weaker test in which velocities of giants were compared with the velocities of main sequence stars showed a difference in the sense g-d = + 1.1 km/sec, but the uncertainty of the comparison is rather large.

We can also investigate Z (S,L) and Δv (δ | Tel E) by reference to the standard stars. Here we reduce the present catalog to the system of the GCSRV by use of Z (S,L). Reduce the observed velocities of the standard stars to the mean observer, to the meridian, to the standard spectrograph, and to the selected telescope orientation. The resulting corrected mean velocity of standard star m (which is of class S,L) we designate by $\overline{v_m}'$. The difference between the GCSRV value of the velocity of star m, $v_{cat,m}$, and the observed value, $\overline{v_m}'$, can be represented by the equation

$$v_{cat,m} - \overline{v_m}' = \Delta v\ (\delta \mid \text{Tel E}) + Z(S,L). \qquad (11)$$

To find Δv (δ | Tel E) we plot on transparent paper, separately for each selected S,L group, $v_{cat,m} - \overline{v_m}'$ as a function of δ. We slide the plots along the velocity axis to find for each S,L group the value of Z (S,L), referred to one S,L group as standard, required to make all plots superimpose. Through the adjusted, stacked $v_{cat,m} - \overline{v_m}'$ plots we draw a smooth expirical curve which represents the best estimate of Δv (δ | Tel E). By determination of this pair of functions we can reduce the present cluster catalog to the velocity system of the GCSRV and determine the correction that compensates for flexure in the δ direction.

For the dwarf stars the observed partially corrected cluster velocities and the GCSRV were found to agree in system; for the giants we add to the observed partially corrected cluster velocities -1.5 km/sec for stars earlier than G4; -1.0 km/sec for stars G5 or later to reduce them to the system of the GCSRV. (This is in agreement with the findings of our tests of homogeneity from the clusters themselves.)

The velocity correction for flexure in declination, Δv (δ | Tel E), becomes quite large for low declinations, -4.5 km/sec at $\delta = 42^{\circ}$; it becomes 0 km/sec at $\delta = -19^{\circ}$, +1.2 km/sec at $\delta = 0^{\circ}$, +1.3 km/sec in the δ range 0° to $+38^{\circ}$, and decreases to +0.5 km/sec at $\delta > +60^{\circ}$.

16. Iteration to Determine Improved Values of the Systematic Corrections. As a final step we apply all systematic corrections to each cluster star, recompute the mean velocity of each star, recompute the mean velocity of each cluster, and reform the residuals of each observer. From these residuals we then: (1) Compute the mean probable error for each measurer in each S,L interval and derive the weight to be given to the measurements of each measurer in each S,L interval; (2) Proceed to the second iteration of the calculations described in Sections 13, 14, and 15 taking into account this second time a dependence of each observer's personal equation upon S, or upon S and L. Two iterations, or at most three, should, on the basis of experience, be sufficient to insure a well-determined set of systematic corrections.

17. The Probable Error of a Radial Velocity Determination of Unit Weight. We can determine the probable error of an observation of unit weight either from internal comparison of results or from external comparison. The latter procedure is likely to give the more realistic value. For the standard stars we take the differences between the final velocities derived in this catalog and the velocities given in the GCSRV. These differences, combined with the known weights of the standard stars in the cluster catalog and the stated probable errors in the GCSRV, provide estimates of the probable error of a velocity of unit weight in the cluster catalog. From the 150 standard stars listed in Appendix II we find:

Spectral Type	p.e. of Measurement of Velocity of Unit Weight in this Catalog	No. of Stars
O6 - B4	± 4.6 km/sec	35
B5 - A1	± 4.3 km/sec	35
A2 - dk	± 3.9 km/sec	52
gA5 - gM	± 3.3 km/sec	28

Since fainter stars tend to have slightly higher probable errors than the brighter ones, we take as a conservative and reasonable estimate of the probable error of a velocity measurement of unit weight in the cluster catalog:

Spectral Class O-A0 p.e. = ± 5.0 km/sec

Spectral Class A1 or later p.e. = ± 4.0 km/sec

The probable error of the mean velocity of a catalog star of total weight W (the sum of the weights of the plots averaged) is taken as

$$(\text{p.e. of unit weight})/\sqrt{\text{total weight, W}}.$$

18. Stars of Variable Radial Velocity. Stars marked variable ("var") or probably variable ("p.v." have been identified as such on the basis of the χ^2 test discussed in detail in Trumpler and Weaver, "Statistical Astronomy", Dover Publication, Inc., New York, p. 205. The text states that, at the level of significance, α,

we reject the hypothesis that the star in question has constant radial velocity whenever

$$\frac{1}{\sigma^2} \sum_{j=1}^{n} \left(v_j - \bar{v} \right)^2 \geq \chi^2 \, (\alpha, \, n-1). \tag{12}$$

Here, σ^2 represents the variance of a measurement of unit weight, v_j represents velocity measurement number j, $\bar{v}$ represents the mean velocity derived from the n observations, and χ^2 $(\alpha, n-1)$ represents the value of χ^2 for n - 1 degrees of freedom and probability α. Specifically, if

$$\chi^2 \, (0.001, \, n-1) \geq \frac{1}{\sigma^2} \sum_{j=1}^{n} \left(v_j - \bar{v} \right)^2 \geq \chi^2 \, (0.03, \, n-1), \tag{13}$$

the star is said to be probably variable. If

$$\frac{1}{\sigma^2} \sum_{j=1}^{n} \left(v_j - \bar{v} \right)^2 > \chi^2 \, (0.001, \, n-1), \tag{14}$$

the star is said to be variable.

19. Description of the Tables.

Descriptive Data for the Cluster

α, δ; Epoch 1950.0. In all but a few instances these coordinates have been determined by Trumpler. Occasionally, where noted, it was convenient to use already published coordinates of individually determined stars based on a cluster center different from the one customarily used by Trumpler.

ℓ^{II}, b^{II}: Values computed from the cluster center, α, δ.

Diameter: The values listed are in some instances revisions of Trumpler's earlier estimates published in L.O.B. No. 420.

Radial Velocity: Given here is the mean value for the cluster. In the calculation of this mean, unit weight was normally assigned to each non-variable star, weight 0.5 to a radial velocity noted as probably variable, weight 0.3 to a radial velocity noted as variable. A spectroscopic binary for which an orbit was available was normally assigned weight 2.0. No attempt has been made to compute a formal probable error for this velocity.

Limit of Completeness: The estimated magnitude to which there is a complete listing of stars in the cluster catalog.

The General Table of Stellar Data

All tables have been arranged to conform to one pattern in which there are six major columns with different headings, described below. In a few instances a seventh column has been added to allow for cluster membership designations. Remarks appended to the table for a given star are signified by the letter"R" after the star number in column 1. In the tabulation for the Pleiades, column 7 is headed "d.f.c." and lists the angular distances of stars in the outer parts of the cluster from the adopted center (Alcyone). Column 2 in the case of the Pleiades also departs from the general pattern; it carries H.D. numbers rather than x,y coordinates. Within some of the major columns, subcolumns have been formed to give, for example, the spectral-type classifications, or "other designations" in column 6.

Column 1. No. Unless the heading bears an initial, e.g., B, Z, Bo, ..., the number system is Trumpler's either original in this study or from an earlier paper. Where an initial is given, the author referred to is identified in the descriptive notes to the table for that cluster, together with the reference in which the numbering system appears.

Column 2. Coordinates. x and y in seconds of arc measured with respect to the adopted center. These coordinates are not to be considered astrometric; they are only to aid in identifying stars within a cluster.

Column 3. m_{pg}. The system of these photographic magnitudes closely resembles the B system. The values have been given to only one decimal place and serve primarily as aids in identifying stars and planning observing programs. The m_{pg} values, where not taken directly from some other source, as noted in each instance in which that is the case, were based chiefly on polar comparisons (comparisons of cluster stars with the North Polar Sequence) and/or cluster compsrisons (comparisons of cluster stars with stars of known magnitudes in other clusters on the same plate or on comparison plates). These various photographic comparisons were generally made with the 4-inch Crocker-Ross Camera at the Lick Observatory or, occasionally, with the 20-inch astrograph at the Lick Observatory.

Column 4. Spectral Type. If only one list of spectral types is given, it is entirely the work of Trumpler. If there is a multiple listing, those estimates appearing under "T" have been made by Trumpler. In either case, those estimates which were made by Trumpler and which are marked by an asterisk in column 4 were based on the radial velocity slit spectrograms. All other Trumpler estimates, with one or two minor exceptions, were based on slitless spectra taken with the Crossley Reflector. In all instances in which spectral types were taken from another source, the name of the author and the appropriate reference are given in the descriptive notes. If Henry Draper spectral types are involved, we have clearly identified the H.D. at the head of the list, but have not indicated the specific Harvard Annals volume in each case.

Column 5. Radial Velocity, p.e. In this column will be found for each star the mean radial velocity and its probable error. A precision of 0.1 km/sec is the maximum employed, and in cases where there is definite variability but no orbit,

or in those cases in which there is great scatter in the results, the radial velocity for that star has been rounded to the nearest km/sec. This column also carries an indication of variability of velocity if there is any such designation: "var" for definite variability, including those cases for which spectroscopic binary orbits have been determined, and "p.v." for the probably variable radial velocities. These designations have been assigned in accordance with the precepts discussed in Section 18.

The velocity quoted for each star is a weighted mean value; the weights for each velocity are generally specified beside the individual velocities in the subsequent table which lists each measured velocity. Occasionally the weight of a plate was modified on the basis of the weight assigned to the measurer. For nonvariable stars the probable errors have been computed in accord with the principles discussed in Section 17; for stars suspected of variability, and in a few cases where double lines were seen, the probable error of the weighted mean velocity was computed according to the standard formula

$$\text{p.e.} = 0.6745 \sqrt{\Sigma w_i (v_i - \bar{v})^2 / (n-1) \Sigma w_i}.$$

In the case of binary stars with computed orbits the probable error is normally that computed in the course of the orbit calculation. In a very few instances the probable error of the systemic velocity has been estimated from the sum of the weights of the individual plates.

When radial velocities from other sources are quoted, they are values reduced to the system of the cluster catalog. The probable errors quoted for them are taken from the original sources. In particular, when a probable error is quoted for a velocity from the GCSRV, it is in terms of a "quality" designated by a letter as explained in the GCSRV.

Column 6. Other Designations. Common headings here are H.D., BD, GCSRV, CPD, GC; these are not specifically further identified except in Section 21, List of Abbreviations. For any designation other than these common ones, a reference is always given in the descriptive notes referring to that column. Such other designations are usually number systems from other authors whose work was used in connection with the compilation of data on the cluster.

Column 7. Cluster Membership. Membership designation was given by Trumpler for five clusters. It has not been possible to assign precise quantitative probability significance to these designations. For each cluster in which membership criteria were included, a brief description and reference to the source of proper motions has been included in the descriptive notes to that cluster.

Compilation of Individual Radial Velocity Measurements

Following the main table summarizing all data for each cluster is a listing of the individual observations of radial velocity. Where a radial velocity has been taken from the GCSRV, the letter designation of quality has been listed under the p.e. column. A full explanation of the meaning of these designations will be found in GCSRV.

Appendix I Orbits of Spectroscopic Binary Stars

Trumpler was particularly interested in the nature of binary stars in galactic clusters and had planned a comparative investigation of cluster binary stars and field binary stars. He originally chose 25 cluster binaries for intensive observation. Of these 25 objects, 1 proved to be nonvariable, 1 was an irregular variable, for another no period could be found, 8 were double line binaries, 11 were regular single line binaries, and 3 were single line binaries with several periods. In Appendix I will be found the analyses that Trumpler had completed for 20 of the 25 stars.

Appendix II Standard Stars and Cluster Stars Used as Standard Stars

The standard stars in the GCSRV are generally bright, lying in the magnitude range 4 to 7. The normal procedure in observing these objects was to insert a neutral filter into the beam a short distance in front of the slit thus reducing the effective brightness to approximately magnitude 9, a value comparable with the average brightness of the cluster stars. The exposure times for the standard stars was thus generally comparable with that of the cluster star.

20. Measurers. The following individuals participated in the measurement of the plates on which this catalog is based.

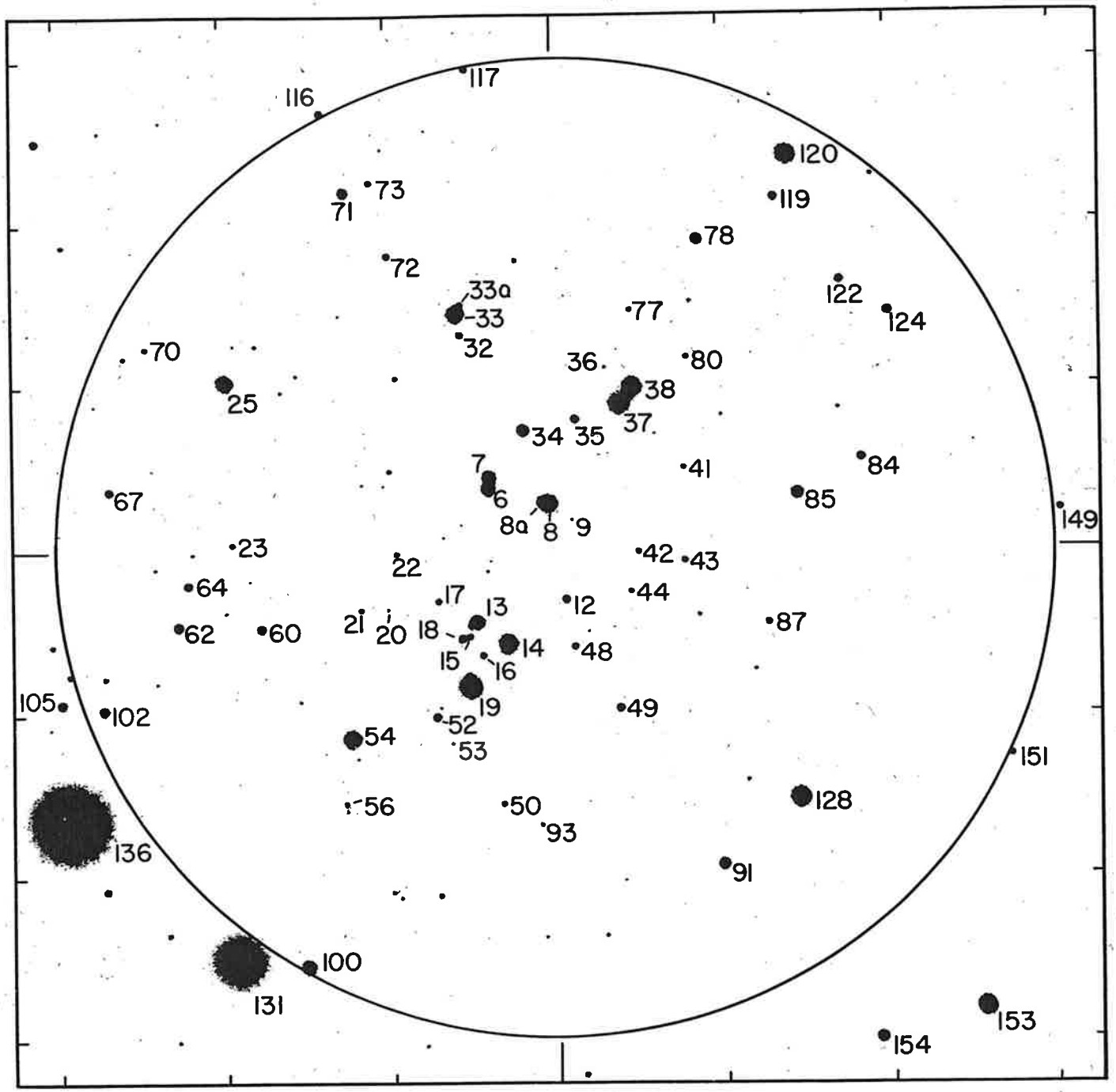
T.J. Bartlett	Barbara Peck Worcester
Cecile T. Weaver	Walter Stilwell
E. Pisani-Belserene	R.H. Stoy
Phyllis Hayford-Hutchings	H.F. Weaver
C.J. Krieger	R.F. Trumpler
A.K. Pierce	R.H. Weitbrecht
Katherine P. Kaster	Yvonne Howell
Natalie Ross Leonard	

21. Abbreviations Adopted in the Catalog.

A.J.	Astronomical Journal
Ap.J.	Astrophysical Journal
A.N.	Astronomische Nachrichten
H.A.	Harvard Annals (Annals of the Harvard College Observatory)
H.B.	Harvard Bulletin (Bulletin of the Harvard College Observatory)
J.O.	Journal des Observateurs
L.O.B.	Lick Observatory Bulletin
M.N.	Monthly Notices of the Royal Astronomical Society
Z.f.A.	Zeitschrift für Astrophysik

Abh. Bergedorf	Abhandlungen der Hamburger Sternwarte in Bergedorf
Ann. Bosscha	Annalen v.d. Bosscha-Sternwacht, Lembang (Java)
Ann. Leiden	Annalen van de Sterrenwacht te Leiden
Arkiv. för Math. Astr. Fys.	Arkiv for Mathematik Astronomi och Fysik, Stockholm
Beob. Sternw. Leipzig.	Beobachtungen auf der Sternwarte zo Leipzig
Contr. Mt. Wilson Obs.	Contributions from the Mt. Wilson Observatory
Izv. Pulkovo	Izvestya Glavnoi astronomicheskoi observatoriya v Pulkove
Med. Gent	Mededeelingen van het Sterrenkundig Instituut der Universiteit te Gent
Med. Lund	Meddeland fran Lunds Astronomiska Observatorium
Med. Uppsala	Meddelanden fran Astronomiska Observatorium Uppsala
Mitt. Hamb. Sternw. Bergedorf	Mitteilungen der Hamburger Sternwarte in Bergedorf
Pub. Groningen	Publications of the Kapteyn Astronomical Laboratory at Groningen
Publ. Kuffner'schen Sternw.	Publicationen der v. Kuffner'schen Sternwarte in Wien
Publ. Potsdam	Publikationen des Astrophysikalischen Observatoriums zu Potsdam
Sitzungsber. Wien	Sitzungsberichte der mathematisch-naturwissenschaftlichen Klasse der Kaiserlichen Akademie der Wissenschaften, Wien
Uppsala Ann.	Uppsala Astronomiska Observatoriums Annaler
Veröff. Bonn	Veröffentlichungen der Universitäts-Sternwarte zu Bonn
Veröff. Gottingen	Veröffentlichungen der Universitäts-Sternwarte zu Göttingen

Veröff. Karlsruhe	Veröffentlichungen der Sternwarte in Karlsruhe
Veröff. Leipzig	Veröffentlichungen der Universitäts-Sternwarte zu Leipzig
ADS	New General Catalogue of Double Stars within 120^{o} of the North Pole, by R.G. Aitken
BD	Bonner Durchmusterung
CPD	Cape Photographic Durchmusterung
GC	General Catalogue of 33342 Stars for the Epoch 1950, by Benjamin Boss
GCSRV	General Catalogue of Stellar Radial Velocities, by R.E. Wilson
HD	Henry Draper Catalog
SDA	Southern Double Star Catalogue, Union Observatory, Johannesburg, S. Africa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100
131
153
154

NGC 457

NGC 457

α $1^h 16^m.3$ δ +58° 01′ (1950.0) l^{II} 126°.6 b^{II} −4°.4

Diameter 12′ Class I3r; 1b2 Radial velocity −36.9 km/sec

Limit of completeness: m_{pg} = 13.5, within a radius of 5′ from the adopted center.

No. Bo	Coordinates x	y	m_{pg}	Spectral Type T	Bo	Radial velocity (km/sec)	p.e.	Other designations Al	HD, BD	ADS
(1)	(2)		(3)	(4)		(5)		(6)		
136R	+293″	−166″	5.8	cF7		−24.4	a	172	7927	1073A
131	+192	−250	7.5	cB4*		−36.6	±3.1	141	7902	1073B
19R	+ 54	− 78	9.7	B2*	B3	−39.7 var	±1.3	94	57° 252	
153R	−257	−283	9.8	B2e*		−36.7 p.v.	±4.1		57° 243	
128	−145	−156	9.9	B2*	B3	−34.8	±2.0	30	57° 246	
37	− 38	+ 90	10.0	B3*	B3	+30 var	±22	58	57° 249	
120	−139	+241	10.0	B1*	B3	−34.0	±2.5	27	57° 247	
14R	+ 31	− 56	10.1	B2e*	B3	−40.7	±2.2	82	57° 251	1069A
38	− 45	+ 99	10.3	B9	A0			54	57° 248	
8R	+ 6	+ 32	10.4	B2*		−39.5	±3.1	75		1069C
54	+122	−118	10.4	B3*	B3	−33 var	±6	119	57° 254	1073D
33	+ 65	+142	10.4	B2*	B3	−32.5	±3.1	92	57° 253	1063A
100	+151	−254	10.8	B4	B5			129		1073E
85	−143	+ 38	10.9	B5	B5			28		
13	+ 51	− 43	10.9	B6	B5			90		
25	+196	+102	11.1		gM			137	57° 258	
7	+ 47	+ 47	11.1					85		
34	+ 22	+ 76	11.3	B4	B5			78		
6	+ 44	+ 38	11.3					*85*		
154	−193	−302	11.4	B7	B8					
91	− 99	−193	11.5	B5	B5			42		
78	− 83	+191	11.5	B5	B5:			40		
71	+121	+219	11.7		B5			113		
102	+270	− 93	11.8					159		
62	+229	− 45	11.8	B7	B8:			146		
124	−199	+143	12.0	B6	B5			15		
60	+179	− 47	12.2	B7	B8			134		
122	−169	+169	12.2	B7	B8			23		
119	−131	+217	12.2	B6	B8			29		
84	−182	+ 59	12.3	B5	B8			21		

No. Bo	Coordinates x	y	m_{pg}	Spectral Type T	Bo	Radial velocity p.e. (km/sec)	Other designations Al	HD, BD	ADS
(1)	(2)		(3)	(4)		(5)	(6)		
35	- 11"	+ 81"	12.3	B8	B5		68		
67	+270	+ 37	12.4				156		
64	+222	- 24	12.4	B9	A0		144		
18	+ 59	- 55	12.4	B7					
49	- 37	- 98	12.4		B8		62		
52	+ 76	-100	12.5	B8:	B8:		100		
12	- 8	- 30	12.5	B8	B8		73		
116	+139	+269	12.6		B8				
149	+303	+ 22	12.6		A2				
117	+ 51	+294	12.8		B8:		83		
151	+273	-128	12.8		A0				
48	- 12	- 58	12.9	B9	B8:		72		
72	+ 98	+182	12.9		F5		103		
87	-126	- 42	13.0		A0		31		
43	- 75	- 9	13.0				46		
32	+ 60	+129	13.1						
17	+ 72	- 32	13.1						
16	+ 46	- 64	13.2						
73	+107	+224	13.3		A0				
42	- 47	0	13.3		A0:		56		
50	+ 33	-158	13.3				87		
21	+119	- 39	13.4	A0:	A0		116		
41	- 75	+ 47	13.4				45		
70	+247	+126	13.4		A0		149		
22	+ 99	- 8	13.4		A0		106		
23	+196	+ 5	13.4						
80	- 75	+116	13.4				43		
33a	+ 67	+148	13.5						1063B
44	- 47	- 28	13.5				57		
56	+128	-161	13.5				120		
77	- 43	+145	13.5				53		
15	+ 52	- 53	13.7						
93	+ 8	-171	13.9		A0		79		
53	+ 65	-119	14.1		A0:		98		
20	+103	- 37	14.2				110		
36	- 27	+111	14.3		A0:				
9	- 8	+ 18	14.4						
8aR	+ 9	+ 32		B5					1069D

NGC 457

Col. 1: Bo = E. Bodén (Uppsala Ann. 2, No. 1, 8, 10)

Remarks (R)

136, spectral type and radial velocity taken from GCSRV 762.

19, spectroscopic binary orbit.

153, H_β, H_γ emission; H_δ not visible.

14, H_β - H_6 emission. Companion of magnitude 12, separation 3", position angle 160°. Data refer to combined light.

8, 8a, m_{pg} refers to light of both components, other data to brighter component. Separation 3".5, position angle 90°.

Col. 3: Magnitudes based on a polar comparison and values published by
E. Bodén (see "Col. 1" above),
G. Alter (M.N. 104, 179, 1944).

Col. 4: Bo = E. Bodén (see "Col. 1" above)

Col. 5: In the calculation of the mean radial velocity of the cluster, star 19 received weight 2, stars 153 and 54 weight 1/2. Star 37 was omitted because of its large velocity variation, and star 136 because it is not considered a cluster member.

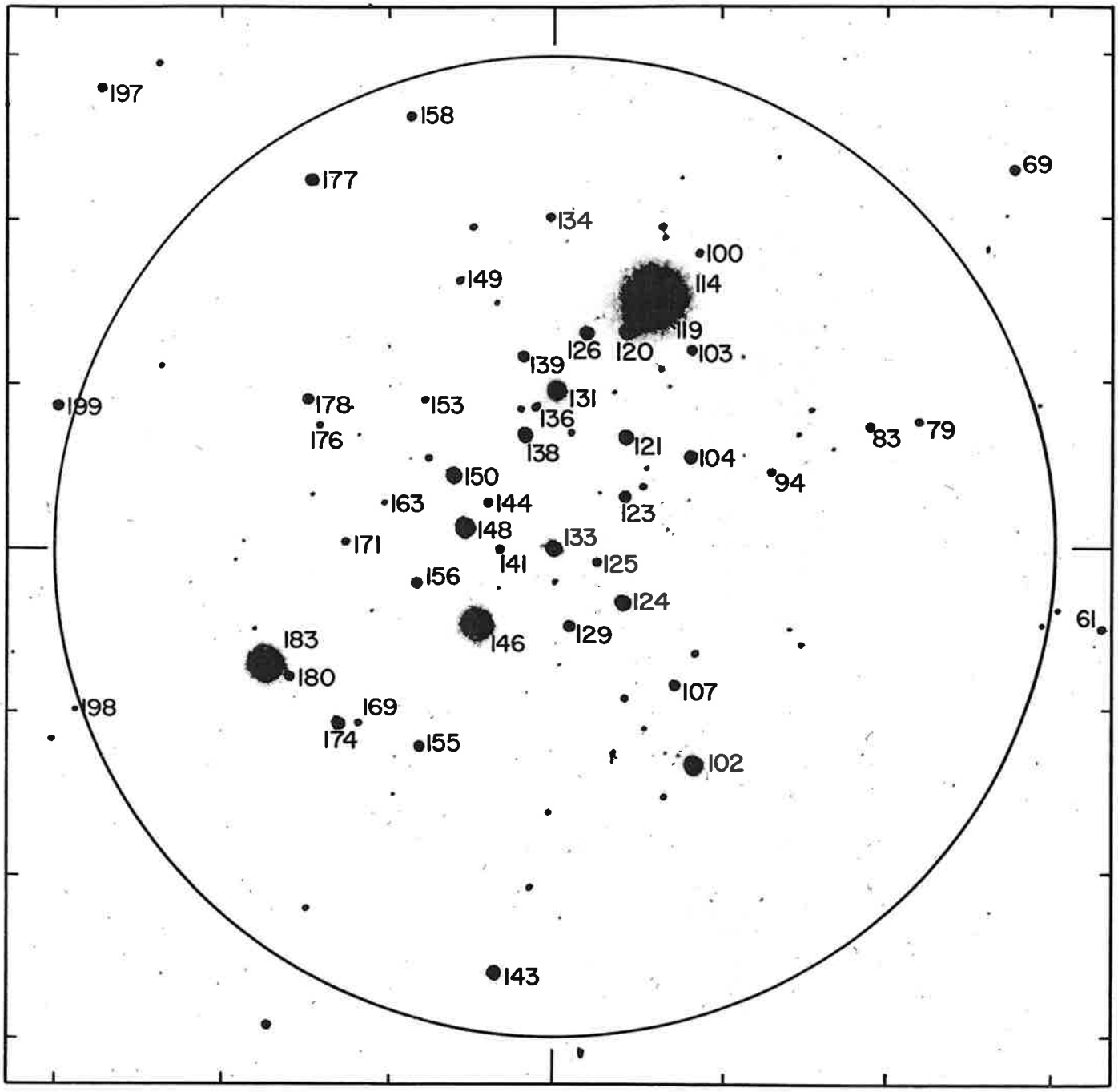
Col. 6: Al = G. Alter (see "Col. 3" above)

Radial Velocity Measurements

Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectrograph	p.e.
131	25266.597	-33.9		I 12	
	5807.989	-38.0		I 12	
	8897.664	-38.6	.6	II 6	
	Mean	-36.6	2.6		± 3.1
19	Spectroscopic Binary Orbit (See Appendix I)				
	Mean	-39.7			± 1.3
153	25815.926	-60.8		I 12	
	6578.875	-26.2		I 12	
	9165.920	-36.5		II 6	
	30670.773	-28.9		II 6	
		-38.1			
	GCSRV 747	-32	1.2		
	Mean	-36.7	5.2	8 pl.	± 4.1
128	25821.920	-20.1		I 12	
	6246.969	-39.2		I 12	
	7347.922	-24.1		II 6	
	9274.616	-36.2		II 6	
	30198.896	-34.0	.6	II 6	
	0636.867	-42.9		II 6	
		-32.7			
	GCSRV 752	-48	.9		
	Mean	-34.8	6.5	9 pl.	± 2.0
37	27355.954	+42.3		II 6	
	8080.935	+59.8		II 6	
	8404.835	-66.0		II 6	
	9900.727	+85.7		II 6	
	Mean	+30	4.0		±22
14	25888.955	-46.8	.5	I 12	
	6564.967	-47.6		I 12	
	6568.844	-36.0		I 12	
	30257.779	-26.7		II 6	
	1742.872	-43.7		II 6A	
		-39.4			
	GCSRV 757	-50	.6		
	Mean	-40.7	5.1	7 pl.	± 2.2
120	27362.923	-19.0		II 6	
	7412.743	-32.4		II 6	
	9138.810	-49.3		II 6	
	30671.772	-35.4		II 6	
	Mean	-34.0	4.0		± 2.5

Radial Velocity Measurements

Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectrograph	p.e.
8	27441.664	-38.5	.6	II 6	
	8029.939	-40.3	.6	II 6	
	8096.894	-48	.4	II 3-1/2	
	30553.979	-36.3		II 6	
	Mean	-39.5	2.6		± 3.1
54	27399.796	-40.0		II 6	
	7427.684	-12		II 3-1/2	
	7445.647	-63.9		II 6	
	30257.817	-35.2		II 6	
	0637.742	-14.7		II 6	
	Mean	-33	5.0		± 6
33	28020.945	-34.7		II 6	
	8465.881	-38.0	.6	II 6	
	9495.883	-27.0		II 6	
	Mean	-32.5	2.6		±3.1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NGC 581

Radial Velocity Measurements

Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectrograph	p.e.
114	24031.782	-44.4		I 12	
	4475.841	-51.9		I 12	
	5436.981	-47.1		I 12	
	7679.018	-35.2		II 6	
	8027.001	-51.1		II 6	
	30609.028	-32.8		II 6	
		-43.8			
	GCSRV 867	-38.9	8		
	Mean	-41.0	14	14 pl.	± 1.3
183	25433.970	+ 4.6		I 12	
	5439.932	+ 0.7		I 12	
	Mean	+ 2.6	2		± 2.8
146	24730.943	-28.6		I 12	
	5517.975	-41.0		I 12	
	6942.821	-53.2		I 12	
	7673.896	-28.9		II 6	
	9929.808	-33.6	.6	II 6	
		-37.4			
	GCSRV 869	-51.6	.6		
	Mean	-39.0	5.2	7 pl.	± 2.2
119	24036.969	-47	.1	I 6	
	5882.775	-43.2		I 12	
	5909.693	-39.2		I 12	
	7768.777	-42.3	.6	II 6	
		-41.7			
	GCSRV 868	-30.8	.6		
	Mean	-39.7	3.3	6 pl.	± 2.8
102	27399.634	-43.9		II 6	
	7455.647	-59.3		II 6	
	9138.897	-31.8	.6	II 6	
	30321.750	-44.0	.6	II 6	
	Mean	-46.5	3.2		± 2.8
131	27395.868	-61.7		II 6	
	7778.786	-39.0		II 6	
	8074.979	-27	.4	II 3-1/2	
	30198.945	-17.9		II 6	
	Mean	-38	3.4		± 6
148	27661.928	-35.8		II 6	
	7713.930	-38.1	.7	II 6	
	8026.931	-42.8	.7	II 6	
	Mean	-38.5	2.4		± 2.6

NGC 581
(M103)

α $1^h 30^m.1$ δ +60°23' (1950.0) l^{II} 128°.1 b^{II} -1°.8

Diameter 6'.5 Class II3m;1-2b Radial velocity -40.5 km/sec

Limit of completeness: m_{pg} = 14.0, within a radius of 7' from star 2.

No. F*	Coordinates x	y	m_{pg}	Spectral Type	Radial velocity (km/sec)	p.e.	Other designations Al	Z	HD, ADS
(1)	(2)		(3)	(4)	(5)		(6)		
114	-59"	+156"	7.4	cB4*	-41.0	±1.3	16	1	HD9311 ADS1209A
183	+171	- 70	8.4	F4*	+ 2.6	±2.8	92	2	HD9365
146	+ 46	- 46	9.2	B2*	-39.0	±2.2	43	3	
119	- 51	+145	10.2	B3*	-39.7	±2.8		5	ADS1209B
102	- 81	-134	10.5	B5*n	-46.5	±2.8	70	6	
131	- 1	+ 97	10.5	B3n*	-38 var	±6	32	7	
148	+ 54	+ 13	10.6	gM1*	-38.5	±2.6			
150	+ 60	+ 45	11.0	B4			46	8	
133	0	0	11.1				35		
177	+145	+226	11.2	B7:			90		
143	+ 35	-262	11.3	B6				9	
138	+ 17	+ 70	11.4	B8:			37	10	
124	- 41	- 34	11.5				24		
121	- 42	+ 68	11.6				21		
174	+130	-108	11.7	K0			88	11	
126	- 19	+132	11.8	B6			27	12	ADS1209C
120	- 43	+133	11.8	B5					
104	- 81	+ 56	12.0	B6			10		
199	+296	+ 88	12.0	B9					
123	- 42	+ 31	12.2				22		
156	+ 83	- 21	12.2	B8			50		
129	- 9	- 48	12.3	B8			29		
69	-276	+232	12.4	B6					
139	+ 18	+118	12.4				36		
178	+147	+ 92	12.4	B6			60		
107	- 71	- 85	12.5	B8			11		
197	+270	+282	12.6	A0					
155	+ 81	-122	12.6	B8			83		
158	+ 86	+265	12.9	M4					
61	-328	- 50	13.0	B9					

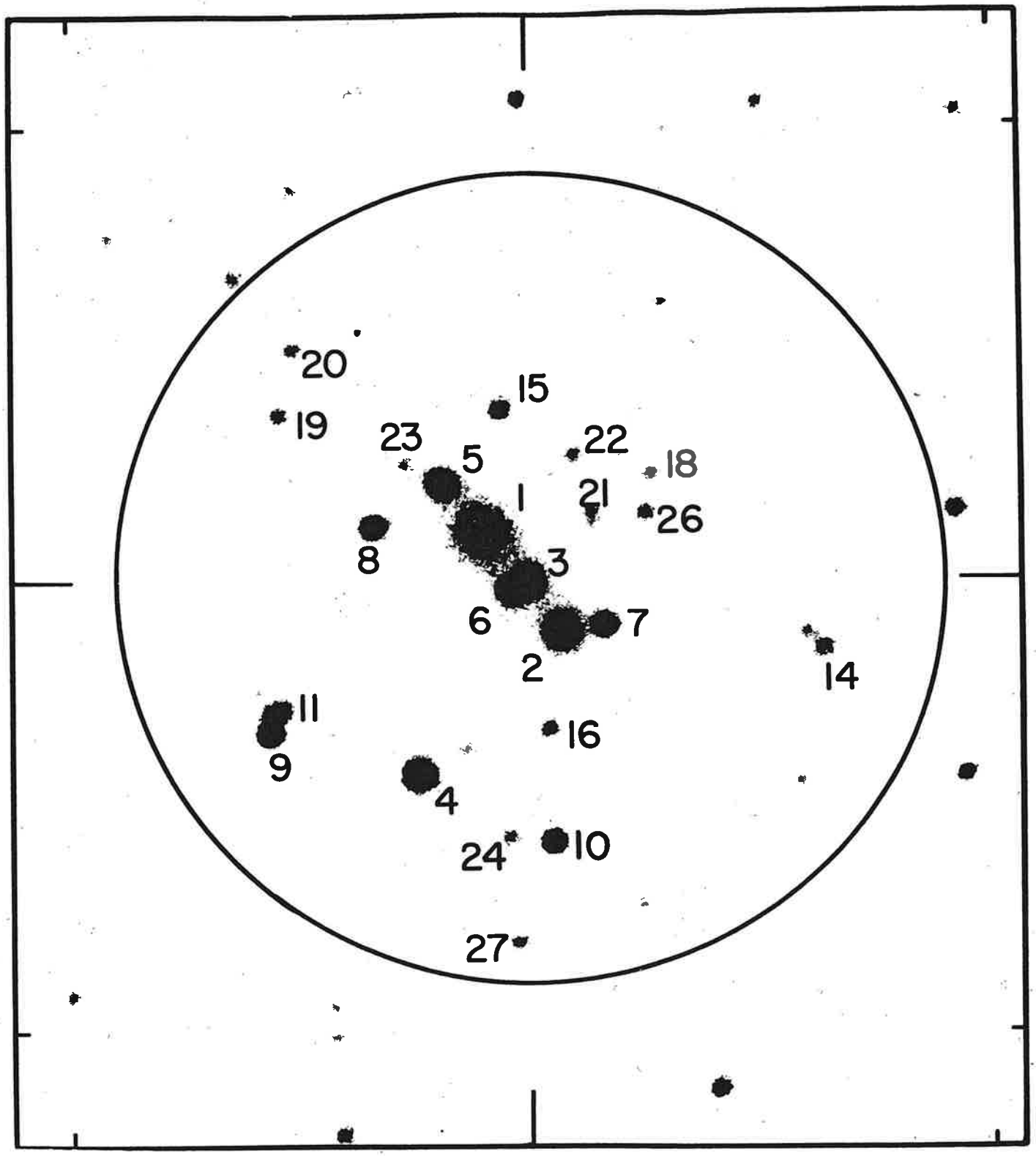
No. F	Coordinates x	y	m_{pg}	Spectral Type	Radial velocity p.e. (km/sec)	Other designations Al	Z	HD	ADS
(1)	(2)		(3)	(4)	(5)		(6)		
144	+ 40"	+ 28 "	13.0	B7					
141	+ 32	- 1	13.0	B8:					
134	+ 2	+204	13.1			33			
103	- 81	+122	13.1						
83	-188	+ 74	13.1	B9		62			
171	+125	+ 4	13.1	B9		57			
180	+158	- 79	13.3	B9					
125	- 26	- 9	13.3	B9		26			
100	- 86	+181	13.4						
79	-218	+ 77	13.4	B9		61			
149	+ 57	+165	13.4			44			
136	+ 11	+ 87	13.4	A1					
94	-129	+ 46	13.5	B9		3			
183	+ 88	+ 91	13.5			47			
169	+118	-108	13.6	B9					
176	+141	+ 76	13.6	A2:		58			
198	+286	- 98	13.9	G					
163	+102	+ 28	14.3	A1		53			

NGC 581

Col. 1: F = E. Fagerholm (Arkiv för Math. Astr. Fys. 5, No. 14, 1909)

Col. 3: Magnitudes based on two polar comparisons and a plate taken with the 20-inch Astrograph, together with values published by
R. Zug (L.O.B. 16, 119, 1933),
G. Alter (M.N. 100, 387, 1940),
E. Fagerholm (see "Col. 1" above).

Col. 6: Al = G. Alter (see "Col. 3" above)
Z = R. Zug " " "



Anon. 1

Anon 1

α $1^{h}32^{m}.3$ δ +61° 01' (1950.0) l^{II} 128°.2 b^{II} -1°.1

Diameter 4'.5 Class I3p; 1b2 Radial velocity -55.0 km/sec

Limit of completeness: m_{pg} = 14.5, within a radius of 90" from star 3.

No.	Coordinates x	Coordinates y	m_{pg}	Spectral Type	Radial velocity (km/sec)	p.e.	Other designations Al	Other designations ADS
(1)	(2)		(3)	(4)	(5)		(6)	
1	+ 10"	+ 12'	10.2	cB5*	-61.6	±2.3	28	1237E
2R	- 7	- 12	10.9	B2*	-49.1	±2.6	20	1237A
3	0	0	11.4	B2*	-53.0	±2.7	25	1237C
4	+ 24	- 42	11.5				31	
5	+ 18	+ 23	11.6	B3*	-56.5	±4.4	30	1237F
6	+ 4	- 2	12.1					1237D
7	- 17	- 11	12.7					1237B
8	+ 33	+ 12	12.8					
9	+ 57	- 35	12.9				38	1240A
10	+ 55	- 30	12.9				24	
11R	- 5	- 59	13.1					1240B
15	+ 5	+ 38	13.6					
14	- 64	- 16	13.7				10	
16	- 3	- 33	13.9					
18	- 27	+ 23	14.3					
19	+ 53	+ 37	14.3				36	
20	+ 52	+ 51	14.3				34	
22	- 9	+ 28	14.3					
26	- 26	+ 15	14.3					
21	- 13	+ 15	14.4					
27	+ 2	- 81	14.4					
24	+ 4	- 58	14.5					
23	+ 28	+ 26	14.6					

Anon 1

Col. 1: Remarks (R)

2, double star not noted in ADS, separation approximately 1". Radial velocity and magnitude refer to light of both components.

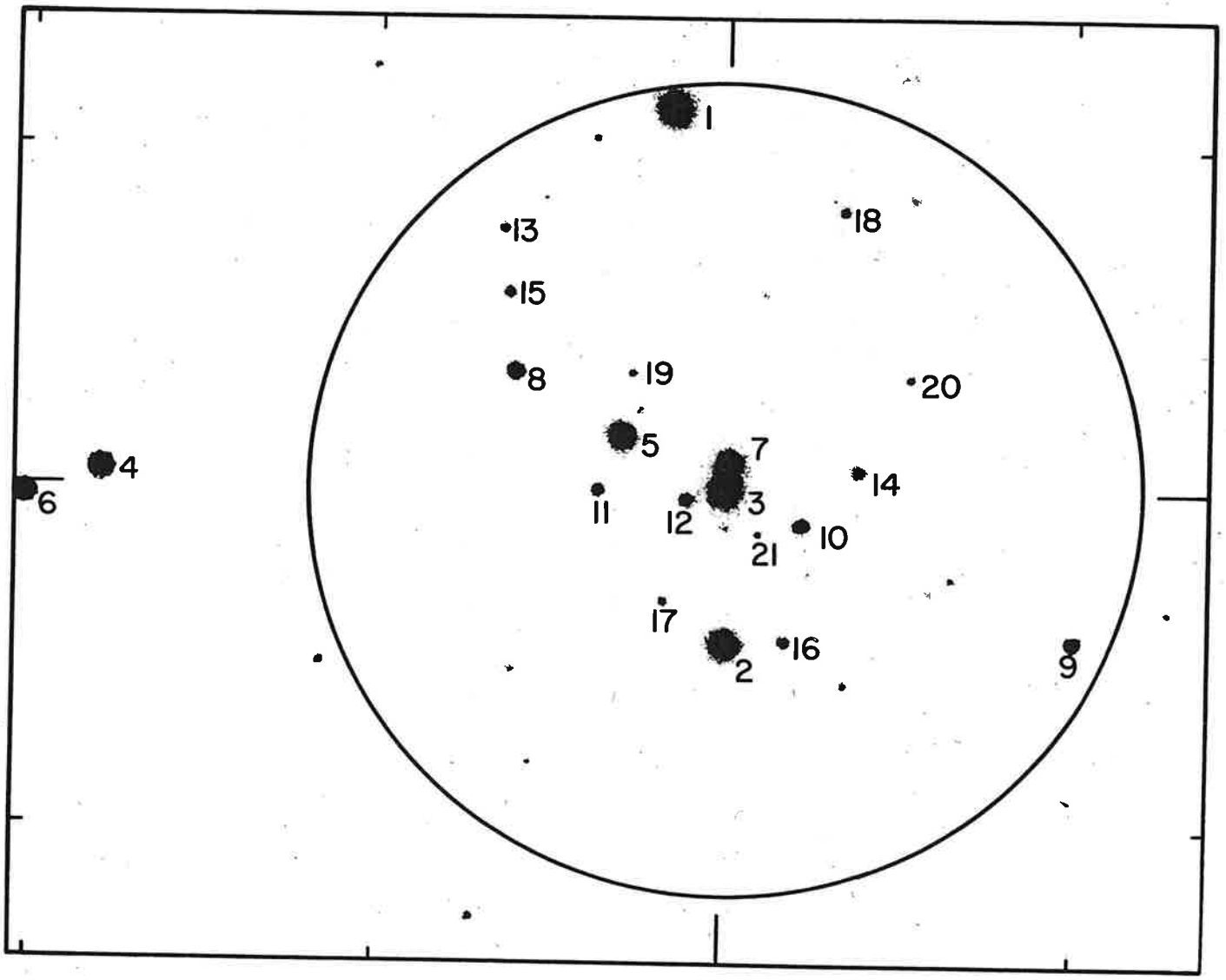
11, double star not noted in ADS. Magnitude of companion approximately 14, separation 1".5, position angle 100°.

Col. 3: Magnitudes based on a polar comparison and two comparisons with other clusters, as well as values published by G. Alter (M.N. 101, 100, 1941).

Col. 6: Al = G. Alter (see 'Col. 3" above)

Radial Velocity Measurements

Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectro-graph	p.e.
1	27358.904	-64.8		II 6	
	7796.723	-65.0	.6	II 6	
	9094.934	-65.4		II 6	
	30671.804	-63.7		II 6	
	31316.847	-50.6		II 6	
	Mean	-61.6	4.6		± 2.3
2	27342.968	-39	.4	II 3-1/2	
	7723.961	-34	.4	II 3-1/2	
	8081.968	-47.5		II 6	
	30938.932	-55.9		II 6	
	1350.811	-53.9		II 6	
	Mean	-49.1	3.8		± 2.6
3	28420.836	-50	.4	II 3-1/2	
	8781.861	-43.5		II 6	
	30285.706	-55.3		II 6	
	0371.637	-61.5		II 6	
	Mean	-53.0	3.4		± 2.7
5	27368.908	-62.0	.5	II 3-1/2	
	8782.866	-53	.4	II 3-1/2	
	9874.844	-53	.4	II 3-1/2	
	Mean	-56.5	1.3		± 4.4



NGC 637

NGC 637

α $1^h\,39^m.5$ δ +63°45' (1950.0) l^{II} 128°.6 b^{II} +1°.7

Diameter 3'.5 Class II3p; 1b0 Radial velocity −44.5 km/sec

Limit of completeness: m_{pg} = 14.0, within a radius of 2' from star 3.

No.	Coordinates x	Coordinates y	m_{pg}	Spectral Type	Radial velocity p.e. (km/sec)	Other designations Al
(1)	(2)		(3)	(4)	(5)	(6)
1	+ 12"	+116"	10.3	B		17
2R	− 1	− 45	10.6	B0n*	− 55 var ±8	15
3	0	0	10.6	B1*	− 47.9 ±2.6	16
4	+180	+ 5	10.8	B3		
5	+ 28	+ 17	11.2	B2*	−45.8 ±3.4	23
6	+202	− 2	11.2	B3		
7	− 3	+ 10	11.2	B2*	−39.7 ±2.8	14
8	+ 57	+ 36	12.4	B3		27
9	−105	− 43	12.6	B5		
10	− 27	− 9	13.1	B5		11
11	+ 36	+ 1	13.5	A3		26
12	+ 8	− 3	13.6	B8		
15	+ 59	+ 60	13.7			28
14	− 40	+ 7	13.8	B8		8
13	+ 61	+ 79	13.8			29
17	+ 13	− 32	14.0			19
16	− 23	− 43	14.0	A0		10
18	− 33	+ 82	14.1	B8		
19	+ 23	+ 37	14.3			
20	− 58	+ 35	14.4	B8:		7
21	− 15	− 10	14.5			

NGC 637

Col. 1: Remarks (R)
2, lines appear double on some of the spectrograms.

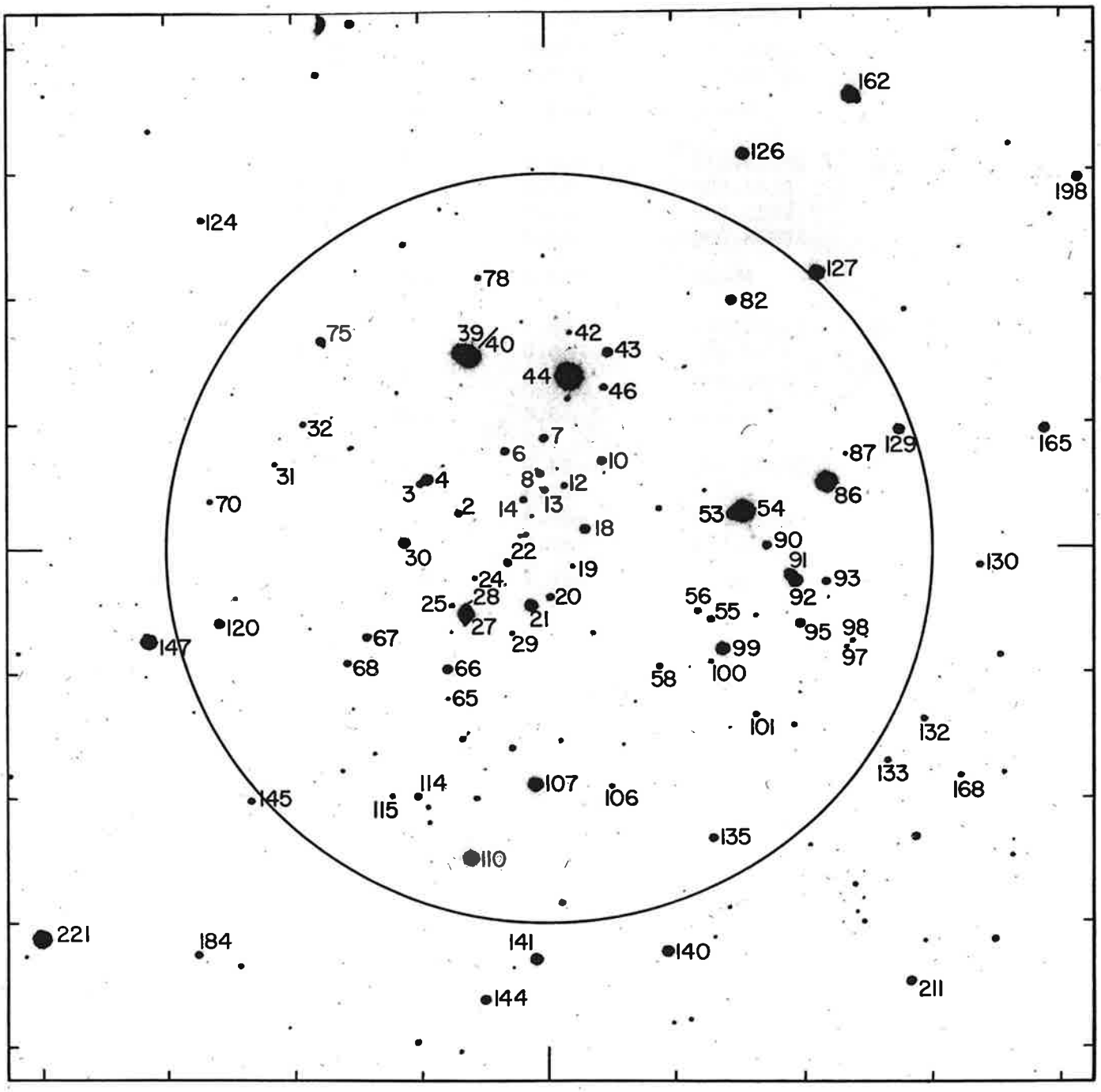
Col. 3: Magnitudes based on a comparison with other clusters and values published by
G. Alter (M.N. 104, 188, 1944).

Col. 5: Star 2 was not included in the mean radial velocity calculation because of its large velocity variation.

Col. 6: Al = G. Alter (see "Col. 3" above)

Radial Velocity Measurements

Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectrograph	p.e.
2	28430.985	-38.4		II 6	
	9100.942	-36.0		II 6	
	9470.933	-60.0		II 6	
	9900.948	-40.0		II 6	
	30616.872	-102.4		II 6	
	Mean	-55	5.0		± 8
3	28069.973	-57.4	.6	II 6	
	9144.856	-42.9		II 6	
	9873.838	-60.6		II 6	
	30608.976	-34.4		II 6	
	Mean	-47.9	3.6		± 2.6
5	28451.963	-49.7	.6	II 6	
	8758.929	-46.0		II 6	
	9485.946	-41.5	.6	II 6	
	Mean	-45.8	2.2		± 3.4
7	30258.789	-24.0	.5	II 6	
	0320.628	-57.2	.6	II 6	
	0670.844	-36.9		II 6	
	2033.903	-40.0		II 6	
	Mean	-39.7	3.1		± 2.8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NGC 663

NGC 663

α $1^h 42^m.6$ δ +60° 59' (1950.0) l^{II} 129°.5 b^{II} -0°.9

Diameter 14' Class IV2m; 1b1 Radial velocity -35.0 km/sec

Limit of completeness: m_{pg} = 13.0, within a radius of 5' from the center.

No. W	Coordinates x	y	m_{pg}	Spectral Type T	Bgd	Radial velocity p.e. (km/sec)		Other designations Al	Gu	Z, BG	BD, ADS
(1)	(2)		(3)	(4)		(5)			(6)		
44R	- 19"	+138"	9.0	B1*	B0	-33.1	±2.3	157	3	1	60°339
54R	-154	+ 29	9.5	cB5		-34.7	±2.9	101	2	2	60°333
221	+394	-312	9.6	B3	B0				84	3	60°351
86	-218	+ 52	9.6	cB8*		-37.5	±2.5	76	1	4	60°331
40R	+ 58	+154	9.8	B3*		-29.4	±2.3	189	4	5	60°343
147	+309	- 74	10.2	cB8*	B8	-36.2	±2.9	279	69	6	60°347
27R	+ 61	- 52	10.4	F0				199	44	12	60°342
162	-237	+361	10.4	B3	B0			54	143	7	60°329
110	+ 58	-248	10.4	B4*		-35.5	±3.1	204	64	8	60°344
127	-213	+220	10.6	F2	F0:			73	119	11	60°330
107	+ 8	-189	10.7	B3*		-38.9	±2.9	179	58	9	60°340
39	+ 65	+157	11.0	B4					5	14	1390B
99	-138	- 81	11.0	B3				108	12	13	60°334
21	+ 11	- 46	11.0	B5				173	42	15	
92R	-194	- 27	11.2	B4					8	16	60°332
126	-155	+315	11.2	B7	A8:			93	141	10	
140	- 95	-324	11.3	B5				139	93	87	
30	+110	+ 5	11.5	B4				224	128	18	
4	+ 92	+ 56	11.5	B3	A3			211	125	17	
91R	-189	- 22	11.6	B4					7	222a	60°332
129	-274	+ 94	11.7	B4	A0			49	115	20	
120	+253	- 60	11.7	gG0	G4			265	70	19	
198	-413	+295	11.8	F2	F4				149	132	
165	-386	+ 95	11.8	A1	A5			19	117	112	
144	+ 47	-362	11.8	B6				203	91	71	
82	-145	+198	12.0	B5				98	120	21	
53	-145	+ 27	12.1	B4					6	22	1384B
18	- 31	+ 16	12.2	B6				151	35	24	
66	+ 76	- 96	12.2	B6				207	49	23	
43	- 49	+157	12.2	B8				143	22	25	

No. W	Coordinates x	y	m_{pg}	Spectral Type T	Bgd	Radial velocity p.e. (km/sec)	Other designations Al	Gu	Z,BG	BD, ADS
(1)	(2)		(3)	(4)		(5)		(6)		
95	-197"	- 61"	12.3	A0			84	11	26	
75	+175	+167	12.4	B8			242	124	56	
135	-130	-233	12.4	B5			121	98	88	
184	+272	-325	12.5	A2			276	86	69	
90	-172	+ 2	12.5	B5			96	9	28	
10	- 44	+ 70	12.6	B8			148	26	29	
93	-217	- 28	12.6					10	30	
67	+139	- 71	12.6	B7			234	74	27	
22	+ 29	- 12	12.8	A0			182	39	31	
6	+ 31	+ 78	12.8	B8			181	28	32	
7	+ 1	+ 89	12.9	B8			163	27	33	
114	+100	-199	12.9					60	75	
8	+ 4	+ 60	12.9				165	30	36	
145	+230	-202	13.0	B5				67	68	
20	- 4	- 39	13.0	B6				41	35	
2	+ 67	+ 28	13.0				198	127	34	
68	+154	- 92	13.0	B8			239	73	37	
55	-130	- 57	13.1	B8				13	39	
56	-119	- 51	13.3	B8				14	38	
58	- 89	- 95	13.3	B5				15	40	
14	+ 17	+ 39	13.3	B8			172	32	41	
13	+ 1	+ 47	13.4				164	31	42	
12	- 15	+ 50	13.4				159	29	44	
46R	- 46	+129	13.5					24	43	1388BC
70	+262	+ 39	13.5	gF8				131	62	
78	+ 52	+217	13.6	B8:			185	122	45	
3	+ 98	+ 52	13.6					126	46	
115	+120	-198	13.8	B8				61	76	
98	-238	- 75	13.8	A0				17	95	
29	+ 26	- 69	13.8					47	47	
28	+ 61	- 48								1391B
25	+ 72	- 43	14.0					46	48	1391C
24	+ 53	- 27	14.1						49	
100	-129	- 89	14.1						50	
19	- 22	- 15	14.1						52	
42	- 19	+173	14.1						53	
87	-230	+ 76	14.3					116	51	
65	+ 74	-119	14.4						54	

NGC 663

Col. 1: W = A. Wallenquist (Med. Uppsala No. 42, 1929)

Remarks (R)

44, ADS 1388A.

54, ADS 1384A.

40, ADS 1390A.

27, ADS 1391A.

92, ADS 1381A.

91, ADS 1381B.

46, separation 2". Magnitude refers to combined light.

Col. 3: Magnitudes based on a polar comparison and the following published determinations:

G. Alter (M.N. 101, 89, 1941),

C. J. Anger (H.B. 883, 36, 1931),

W. Becker and S. Günther (A.N. 275, 145, 1947),

M. C. Clasen (A.N. 264, 33, 1937),

V. M. Gushee (A.J. 32, 117, 1919),

A. Wallenquist (Med. Uppsala No. 42, 1929),

R. Zug (L.O.B. 16, 119, 1933).

Col. 4: Spectral types listed under Bgd were determined at Bergedorf and published by Clasen (see "Col. 3" above).

Col. 6: Al = G. Alter (see "Col. 3" above)

Gu = V. Gushee " " "

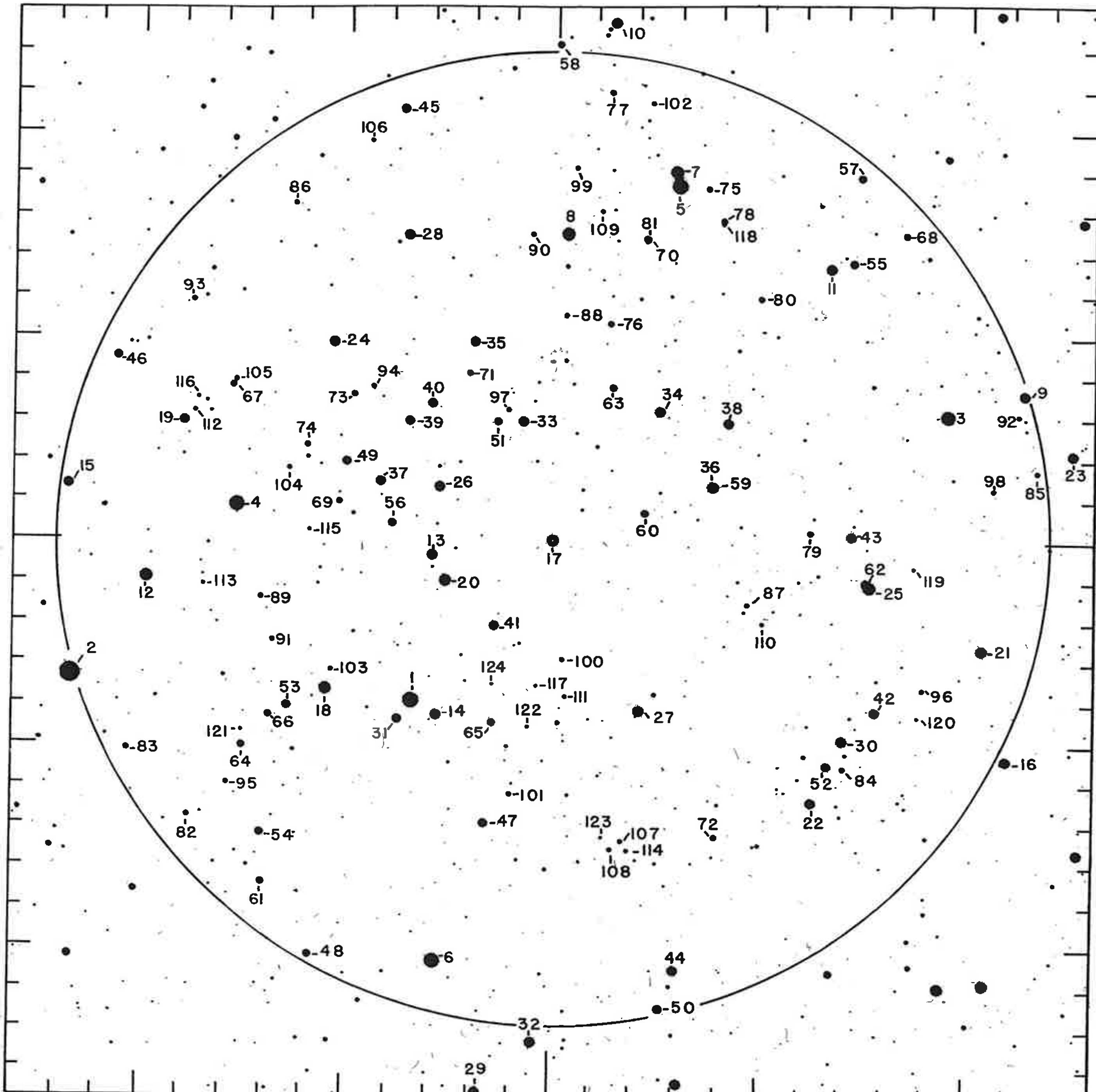
Z = R. Zug; BG = W. Becker and S. Günther (see 'Col. 3" above); star numbering 1-54 is that of Zug.

The three stars 54, 86, 147 appear to be intermediate supergiants. Their spectra are characterized by narrow hydrogen lines (similar to those of B2 stars) but faint He and strong Si II lines.

Accurate star positions for this cluster have been published by V. Gushee (see "Col. 3" above) and P. Pummerer (Publ. ~~Kiel~~ Kuffner'schen Sternw. 7, part 2, 1913).

Radial Velocity Measurements

Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectrograph	p.e.
44	25809.964	-28.2		I 12	
	5898.676	-32.7		I 12	
	6965.977	-33.8		I 12	
	30636.910	-39.8		II 6	
		-33.6	4.0		
	GCSRV 986	-30	0.6		
	Mean	-33.1	4.6	6 pl.	± 2.3
86	26950.912	-25.2		I 12	
	6958.992	-44.3		I 12	
	8419.819	-42.6		II 6	
	30189.944	-37.8		II 6	
	Mean	-37.5	4.0		± 2.5
54	26954.913	-27.0		I 12	
	6962.983	-29.3		I 12	
	8131.777	-47.8		II 6	
	Mean	-34.7	3.0		± 2.9
40	26937.927	-37.7		I 12	
	6954.828	-24.7		I 12	
	8135.607	-26.2		II 6	
	30636.892	-27.1		II 6	
		-28.9	4.0		
	GCSRV 990	-33	0.6		
	Mean	-29.4	4.6	6 pl.	± 2.3
147	26946.895	-23.2		I 12	
	6974.983	-37.6		I 12	
	9145.815	-47.7		II 6	
	Mean	-36.2	3.0		± 2.9
110	26979.977	-31.7		I 12	
	7827.666	-38.5	.6	II 6	
	9110.935	-37.5		II 6	
	Mean	-35.5	2.6		± 3.1
107	30322.605	-37.0		II 6	
	0370.636	-43.7		II 6	
	0637.805	-36.0		II 6	
	Mean	-38.9	3.0		± 2.9



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NGC 752

NGC 752

α $1^h 54^m.2$ δ $+37° 32'$ (1950.0) l^{II} $137°.0$ b^{II} $-23°.3$

Diameter 45' Class III1m; 2f2 Radial velocity +0.9 km/sec

Limit of completeness: m_{pg} = 13.0, within a radius of 20' from star 17.

No.	Coordinates x	y	m_{pg}	Spectral Type T	R	Radial velocity (km/sec)	p.e.	Other designations HD, BD	H	V	Memb. pm	rv
(1)	(2)		(3)	(4)		(5)		(6)			(7)	
1	+340"	-397"	8.3	gK3*		+8.8	±2.1		215	74	3	2
2R	+1158	-336	8.5	A2*		+9.5	±2.3		309	105	3	2
3	-942	+307	9.0	gG9*		-22.2	±2.8		39	17	3	3
4	+766	+ 85	9.5	F2*		+3.6	±2.3	37°440	271	95	3	1
5	-293	+869	9.6	F3*	F5	-4.6 p.v.	±3.9		108	40	1	1
6	+280	-1042	9.7	A1*	A0	+1.3	±3.1	36°367	209	70	1	1
7	-285	+906	9.8	gG2*	G7III	+2.6 var	±5.3		110	41	1	2
8	- 28	+754	9.9	F4*		-1.6	±2.1	37°425	159	52	2	1
9	-1125	+359	9.9	gK2*				37°412	24	11	2	
10	-137	+1271	10.0	gK0				37°424	137	50	1	
11	-658	+668	10.0	gK0*	K0III	-0.7	±2.3	37°418	75	28	1	1
12	+980	- 94	10.0	F2*	F3	+4.7	±2.3	37°444	300	100	1	1
13	+293	- 37	10.0	gG9*	K0III	-0.2	±2.4	37°432	213	72	1	1
14	+279	-432	10.0	gG9*	K1IV	+4.5	±2.4	36°638	208	71	1	1
15	+1168	+134	10.1	gG8*	K0III	-0.1	±2.6	37°448	311	107	1	1
16	-1089	-539	10.2	gK0				36°350	27	12	3	
17	0	0	10.2	F2*		+3 var	±12	37°426	166	55	2	2
18	+545	-368	10.2	F6*		-13.5	±2.4	36°372	240	87	3	3
19	+894	+292	10.2	gK0*	G9III	+1.5	±2.6	37°441	295	99	1	1
20	+261	-100	10.3	F2*	F4	+3.0	±2.3	37°431	205	68	1	1
21	-1029	-267	10.3	F4				36°351	34	15	2	
22	-622	-645	10.4	gG9	K0III			36°358	77	31	1	
23	-1244	+212	10.4	F3	F5			37°410	12	10	1	
24	+532	+485	10.4	F2*	F4	+8 var	±14	37°439	238	86	1	2
25	-758	-113	10.4	F3	F3				61	21	1	
26	+277	+131	10.5	F4	F5			37°433	206	69	1	
27	-211	-420	10.5	F3	F3			36°361	126	46	1	
28	+357	+750	10.5	F4	F5			37°434	218	76	1	
29	+174	-1368	10.5	A5	F2			36°365	193	64	1	
30	-695	-492	10.5	F5	F5				69	27	1	

No.	Coordinates x	y	m_{pg}	Spectral Type T	R	Radial velocity p.e. (km/sec)	Other designations HD, BD	H	V	Memb. pm	rv
(1)	(2)		(3)	(4)		(5)		(6)		(7)	
31	+ 371"	- 442"	10.6	gK0				220	77	3	
32	+ 39	-1242	10.6	F2	F4		36°353	171	56	1	
33	+ 75	+ 292	10.6	F4	F5		37°427	177	58	1	
34	- 252	+ 318	10.7	F2	F5		37°423	117	43	1	
35	+ 195	+ 488	10.7	F4	F2		37°430	196	65	1	
36R	- 380	+ 132	10.7	F3*		-12 var ±24	37°420	102	36	3	2
37	+ 419	+ 144	10.7	F6				225	81	3	
38	- 416	+ 289	10.7	F2	F2		37°419	96	34	1	
39	+ 350	+ 293	10.8	F2	F4			217	75	1	
40	+ 297	+ 336	10.8	F1	F4			214	73	1	
41	+ 140	- 211	10.8	F3	F4		36°364	187	59	1	
42	- 773	- 420	10.8	F2	F4		36°356	58	20	1	
43	- 715	+ 11	10.9	F2	F4		37°414	64	24	1	
44	- 300	-1062	10.9	F0			36°359	106	39	1	
45	+ 371	+1059	10.9	F2	F3		36°435	219	78	1	
46	+1055	+ 450	11.1	F0			37°445	306	102	3	
47	+ 160	- 700	11.1	F4				192	62	1	
48	+ 578	-1026	11.1	F3			36°374	246	88	3	
49	+ 499	+ 192	11.1	F3	F5		37°438	234	83	1	
50	- 266	-1156	11.1	F3			36°360	114	42	3	
51	+ 137	+ 292	11.1	gG9	K0III-IV		37°428	186	60	1	
52	- 658	- 554	11.2	F3	F3			74	30	1	
53	+ 636	- 410	11.3	F2	F2		36°373	254	90	1	
54	+ 698	- 727	11.3	F5	F2			263	93	1	
55	- 712	+ 681	11.3	F4	F5			66	25	1	
56	+ 390	+ 41	11.3	F2	F2			222	80	1	
57	- 729	+ 890	11.4	F4				63	23	1	
58	- 4	+1218	11.4	F8				165	54	3	
59R	- 384	+ 130	11.6	F8						3	
60	- 219	+ 67	11.6	A8				123	45	1	
61	+ 694	- 849	11.6	F	F6			261	92	1	
62	- 748	- 101	11.6	F4	F4			62	22	1	
63	- 141	+ 376	11.6	F1	F4			135	49	1	
64	+ 746	- 511	11.6	F4	F4			266	94	1	
65	+ 143	- 450	11.7	F1	F3			189	61	1	
66	+ 681	- 434	11.8	F5	F5			259	91	1	
67	+ 777	+ 379	11.8	F5				273	97	3	
68	- 837	+ 749	11.8	F3	F5			55	19	1	
69	+ 515	+ 94	11.9	F7	F5			235	85	1	
70R	- 218	+ 737	12.0	F8	F8			124	47	3	
71	+ 206	+ 410	12.0	F2	F5			197	66	1	
72	- 396	- 731	12.0					101		3	
73	+ 483	+ 358	12.1	F4				232	82	2	
74	+ 594	+ 233	12.1	F0				250	89	3	
75	- 363	+ 862	12.1	gK0				103	37	3	

No.	Coordinates x	Coordinates y	m_{pg}	Spectral Type T	Spectral Type R	Radial velocity p.e. (km/sec)	Other designations HD, BD	Other designations H	Other designations V	Memb. pm
(1)	(2)		(3)	(4)		(5)	(6)			(7)
76	- 133"	+ 533'	12.2	F3	F5			139	51	1
77	- 131	+1100	12.2	K				140		1
78R	- 399	+ 785	12.2	A1				99	35	3
79	- 613	+ 22	12.2	G0				78	32	3
80	- 491	+ 595	12.2	F4	F5			88	33	1
81R	- 217	+ 740	12.3							3
82	+ 874	- 684	12.3					293	98	2
83	+1021	- 520	12.3					304		1
84	- 698	- 560	12.3					68	26	3
85	-1157	+ 171	12.4	G0				21		3
86	+ 629	+ 829	12.5					253		3
87	- 466	- 157	12.5	G7				91		3
88	- 27	+ 554	12.5					161	53	2
89	+ 703	- 143	12.5	F4				264		2
90	+ 58	+ 753	12.5	F9				176	57	
91	+ 673	- 249	12.6	F8				258		2
92	-1111	+ 308	12.7					26		
93	+ 874	+ 589	12.7	F2:				292		
94	+ 437	+ 377	12.7	G5				226		3
95	+ 782	- 603	12.7	F3				275		2
96	- 886	- 365	12.8	G0				48		
97	+ 112	+ 322	12.8					185		2
98R	-1054	+ 126	12.8	G0				30		
99	- 49	+ 915	12.8	G0:				151		
100	- 26	- 295	12.8					163		2
101	+ 98	- 628	12.8	F9				182		
102	- 227	+1073	12.9					121		
103	+ 531	- 321	12.9		F8			237		1
104	+ 636	+ 176	13.0	G0				255		3
105	+ 769	+ 393	13.0	K2				272		3
106	+ 449	+ 981	13.0					228		
107	- 171	- 744	13.0					132		3
108	- 147	- 764	13.0					134		
109	- 110	+ 809	13.1	F8				145		
110	- 502	- 204	13.1	G0				86		
112	+ 868	+ 316	13.1	G5:				291		
111	+ 34	- 386	13.2		G0			157		
113	+ 844	- 112	13.4	K0				287		
114	- 187	- 767	13.4					130		
115	+ 587	+ 23	13.5	K0				248		
116	+ 861	+ 349	13.6	G0				290		
117	+ 37	- 360	13.6					170		
118R	- 399	+ 776	13.6	A5:				100		
119	- 865	- 66	13.6	G				50		
120	- 875	- 434	13.7	G				49		

No.	Coordinates x	Coordinates y	m_{pg}	Spectral Type T	Spectral Type R	Radial velocity p.e. (km/sec)	Other designations HD, BD	Other designations H	Other designations V	Memb. pm
(1)	(2)		(3)	(4)		(5)		(6)		(7)
121	+ 748"	- 473"	13.7					267		
122	+ 56	- 461	13.9					175		
123	- 126	- 735	14.1					141		
124	+ 145	- 355	14.2					190		

Col. 1: Remarks (R)

2, ADS 1573A; companion of magnitude 12, separation 2".7, position angle 197°.

36, ADS 1541A. Data refer to the brighter (n.f.) component. For the combined light, $m_{pg} = 10.3$.

59, ADS 1541B.

70, ADS 1546A. Data refer to the brighter (s.p.) component. For the combined light, $m_{pg} = 11.4$.

78, double star not in ADS. Data refer to brighter (n.p.) component.

81, ADS 1546B.

98, brightness probably variable.

118, companion of star 78, separation 8", position angle 170°.

Col. 3: Magnitudes based on two polar comparisons and two comparisons with other clusters, together with values published by
H. L. Johnson (Ap.J. 117, 356, 1953),
K. Heinemann (A.N. 227, 193, 1926).

Col. 4: Spectral types listed under R were determined by
N. G. Roman (Ap.J. 121, 454, 1955).

Col. 5: For the calculation of the mean radial velocity of the cluster, stars 1, 2, 3, 4, 18 were omitted because they are probably not physical members. Stars 17, 24, 36 were omitted because of their large velocity variation. Star 7 received weight 1/2.

Col. 6: H = K. Heinemann (see "Col. 3" above)
V = H. Vogt (A.N. 221, 41, 1924)

Col. 7: Cluster membership designations have the following significance:

1 -- reasonably high probability of membership;

2 -- doubtful members, not definitely assignable to either 1 or 3;

3 -- definite indications of nonmembership.

These numbers are based on proper motions measured by E. G. Ebbighausen (Ap.J. 89, 431, 1939), and, for the brighter stars, on radial velocities.

Radial Velocity Measurements

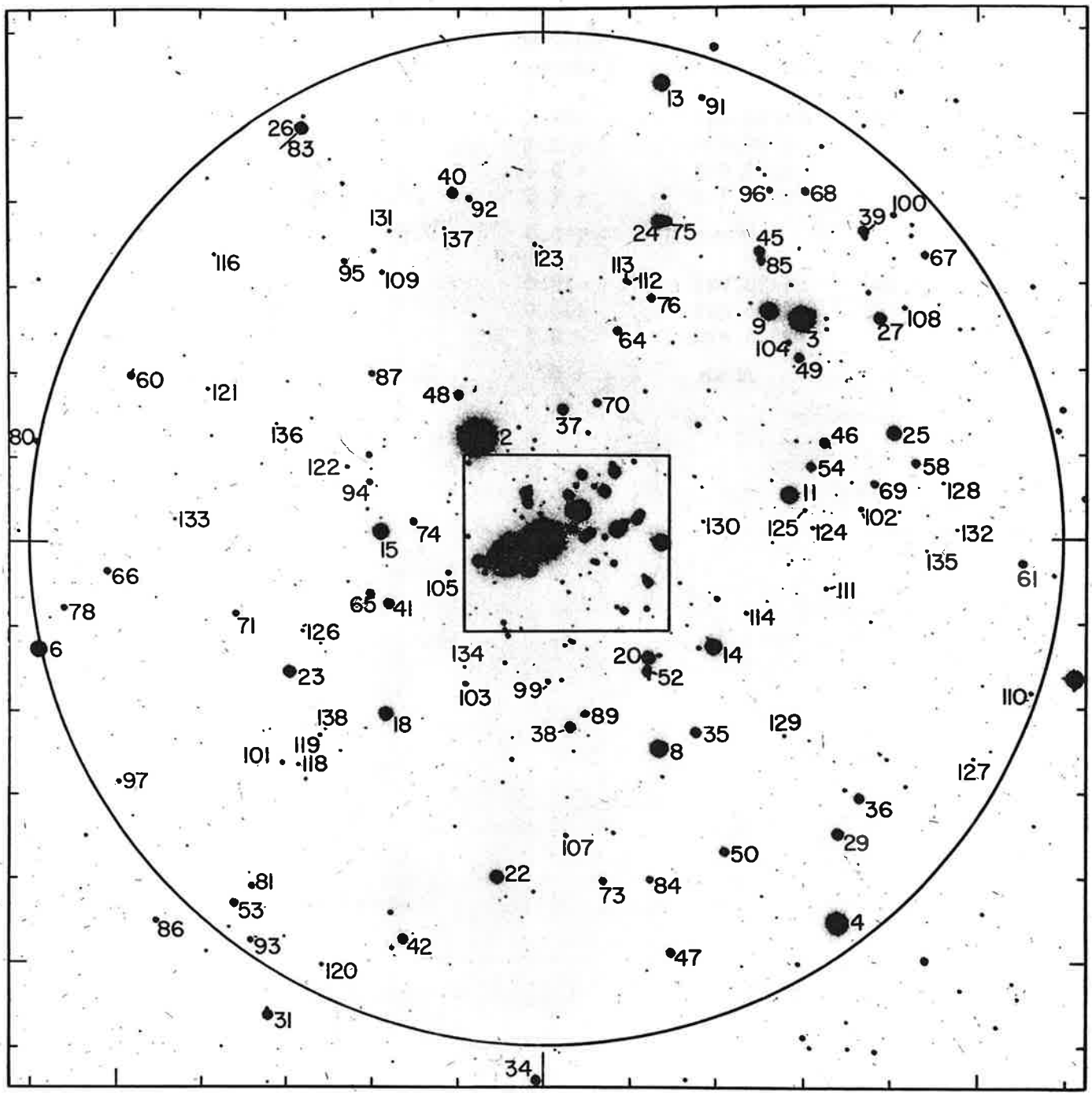
Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectrograph	p.e.
1	24403.817	+ 4.6		I 12	
	4498.728	+ 6.8		I 12	
	7311.954	+ 7.6		II 6	
	30259.765	+19.2	.7	II 6	
	Mean	+ 8.8	3.7		± 2.1
2	25074.965	+14.0		I 12	
	5129.903	+ 4.9		I 12	
	9166.046	+ 9.5		II 6	
	Mean	+ 9.5	3.0		± 2.3
3	24101.635	-22.1		I 12	
	4408.814	-22.2		I 12	
	Mean	-22.2	2.0		± 2.8
4	24452.706	- 0.6		I 12	
	4859.643	- 1.8		I 12	
	8136.828	+13.3		II 6	
	Mean	+ 3.6	3.0		± 2.3
5	24414.799	-13.5		I 12	
	5084.954	-19.2		I 12	
	8922.621	+10.5		II 6	
	9900.783	+ 3.4	.5	II 6	
	30224.922	+ 1.4	.7	II 6	
	Mean	- 4.6	4.2		± 3.9
6	25169.906	+ 6.1		I 12	
	9261.596	+ 1.9	.6	II 6	
	30259.788	- 3.9		II 6	
	Mean	+ 1.3	2.6		± 3.1
7	24490.814	+12.1		I 12	
	8922.669	+11.2		II 6	
	9258.619	-25.3		II 6	
	9856.986	- 4.0	.5	II 6	
	30204.057	+19.0	.7	II 6	
	Mean	+ 2.6	4.2		± 5.3
8	24443.737	+ 0.8		I 12	
	5495.877	- 4.3		I 12	
	9274.680	- 3.6		II 6	
	30224.959	+ 1.5	.7	II 6	
	Mean	- 1.6	3.7		± 2.1

Radial Velocity Measurements

Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectrograph	p.e.
12	24818.734	+ 7.5		I 12	
	5922.689	+ 3.7		I 12	
	9274.742	+ 3.0		II 6	
	Mean	+ 4.7	3.0		± 2.3
14	27313.932	+10.2		II 6	
	8383.931	+ 0.8	.7	II 6	
	9644.718	+ 1.3		II 6	
	Mean	+ 4.5	2.7		± 2.4
13	25113.891	- 4.4		I 12	
	7835.633	- 4.1		II 6	
	8739.963	+11.4	.7	II 6	
	Mean	- 0.2	2.7		± 2.4
11	25186.684	- 2.3		I 12	
	5600.754	+ 3.1		I 12	
	9260.617	- 3.0		II 6	
	Mean	- 0.7	3.0		± 2.3
15	24878.741	- 4.8		I 12	
	9250.756	+ 5.8	.7	II 6	
	9900.836	+ 0.7	.7	II 6	
	Mean	- 0.1	2.4		± 2.6
18	24795.781	-21.1		I 12	
	8132.827	-13.8	.7	II 6	
	9096.965	- 5.7		II 6	
	Mean	-13.5	2.7		± 2.4
36	25146.813	+23.0		I 12	
	9145.900	-47.6		II 6	
	Mean	-12	2.0		±24
17	25363.981	-34.4		D I 6	
	8809.767	+49.3		II 6	
	9165.997	- 7.8		II 6	
	30203.972	+ 4.3		II 6	
	Mean	+ 3	4.0		±12
19	24758.932	- 3.2	.3	D I 6	
	5938.670	+10.4		I 12	
	9929.907	- 6.1	.7	II 6	
	31378.823	- 3.9	.4	II 3-1/2	
	Mean	+ 1.5	2.4		± 2.6

Radial Velocity Measurements

Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectrograph	p.e.
20	24758.841	-26.6	.3	D I 6	
	8753.956	+ 2.4		II 6	
	8920.653	+ 9.4		II 6	
	9901.742	+ 7.5	.7	II 6	
	Mean	+ 3.0	3.0		± 2.3
24	24433.782	-16.0		I 12	
	5855.882	+49.0		I 12	
	9856.912	- 9.5		II 6	
	Mean	+ 8	3.0		±14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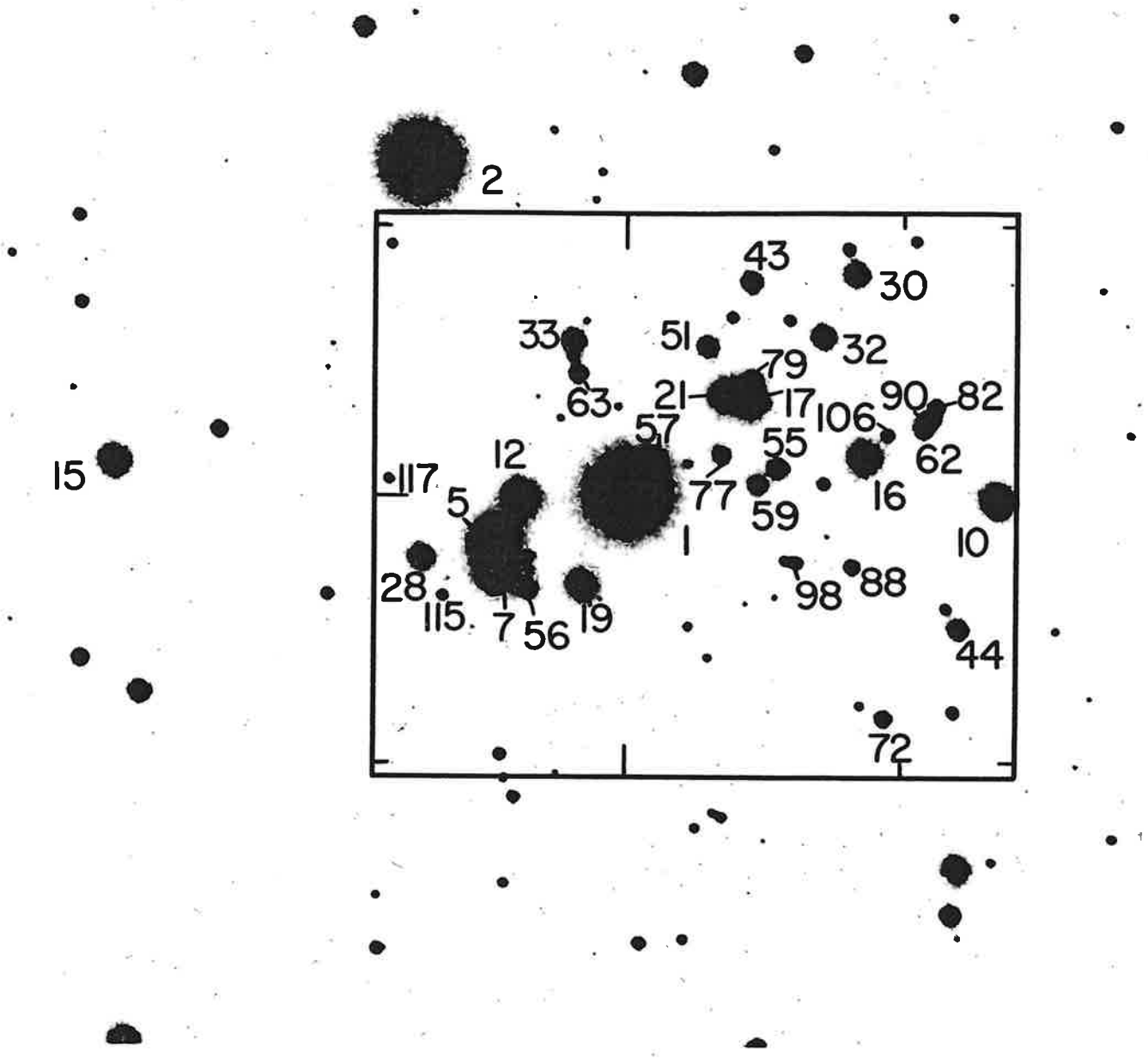
NGC 869



NGC 869 (inner)

NGC 869

(h Persei)

α $2^h\ 15^m.5$ δ +56° 54' (1950.0) l^{II} 134°.6 b^{II} -3°.7

Diameter 30' Class IV 3 r; 1 b 1 Radial velocity -43.0 km/sec

Limit of completeness: m_{pg} = 12.0, within a radius of 10' from star 1. All fainter stars for which spectral types have been determined are also listed.

No.	Coordinates x	y	m_{pg}	Spectral Type T	M	Radial velocity (km/sec)	p.e.	Other designations HD, BD	GCSRV	O
(1)	(2)		(3)	(4)		(5)		(6)		
1	0"	0"	7.0	cB2*	B3Ia	-42.6	±1.2	14134	1282	1057
2R	+76	+122	7.2	cB1*	B2Ia	-43.6	±1.2	14143	1284	1162
3	-297	+261	8.5	B2*	B1Ib	-59 var	±11	14052	1278	662
4R	-336	-453	8.7	B2	B1II	-46	d	14053	1275	612
5	+ 49	- 16	8.8	B2*		-40.7	±2.6	56°527	1283	1132
6R	+587	-127	9.3	B3	B1III	-50	c	14250	1299	1586
7	+ 48	- 30	9.4	B2*		-44.2	±2.8	56°526	1133	1133
8	-134	-246	9.5	B2*		-37.4	±2.9	56°511		847
9	-259	+270	9.6	B1n*		-43.0	±2.9	56°502		717
10	-136	- 2	9.6	B2*		-46.0	±2.5	56°510		843
11	-282	+ 54	9.7	B2*		-41.3	±3.0	56°501		692
12	+ 39	- 1	9.7	B3*		-38.8	±3.0	56°525		1116
13	-137	+539	9.7	B6				56°508		839
14	-196	-126	9.7	B2*		-47.6	±2.5	56°504		782
15	+187	+ 11	9.8	B3*		-43.0	±3.4	14162	1268	1268
16	- 86	+ 14	9.9	B3n*		-42.6	±3.3	56°515		922
17	- 45	+ 34	10.1	B2*		-44.2 var	±5.8	56°519		980
18R	+182	-205	10.1	B2e*		-31.6	±2.2	56°534		1261
19	+ 16	- 34	10.1	B3*	B1V	-39.3	±2.6	56°524		1078
20	-121	-138	10.2	B3*	B1V	-36.5	±2.4	56°513		864
21R	- 35	+ 36	10.2	B3*		-52.5	±2.3	56°520		992
22	+ 53	-398	10.3	B4				56°528		1141
23	+292	-154	10.3	B3				56°538		1364
24	-133	+376	10.3					56°509		846
25	-403	+126	10.4	B4				56°489		517
26R	+280	+487	10.5	B4				56°537		1352
27	-387	+261	10.5	B5:				56°491		530
29	-337	-347	10.5					56°497		604
28	+ 75	- 24	10.6	B2e*				56°529		1161
30	- 83	+ 81	10.7					56°516		929

No.	Coordinates x	Coordinates y	m_{pg}	Spectral Type T	Spectral Type M	Radial velocity p.e. (km/sec)	Other designations HD, BD	Other designations GCSRV	Other designations O
(1)	(2)		(3)	(4)		(5)	(6)		
31	+319"	-560"	10.7	B4					1391
32	- 72	+ 58	10.7	B4				56°517	936
33	+ 20	+ 56	10.7	B5*					1085
34	+ 7	-637	10.8	B5					1067
35	-176	-227	10.8	B				56°505	803
36	-363	-306	10.8	B3				56°495	572
37	- 24	+155	10.8	B8				56°521	1015
38	- 32	-221	10.9	B5n*					1001
39	-367	+364	10.9	B3				56°492	551
40	+104	+410	10.9	B6				56°531	1196
41	+177	- 74	10.9	B5				56°533	1257
42	+162	-472	10.9	A8				56°532	1242
43	- 45	+ 79	11.0	B2*	B1.5V			56°518	978
44	-122	- 51	11.1	B5:*					859
45	-248	+341	11.1	B5					731
46	-323	+115	11.1	B3					622
52	-120	-156	11.1					56°514	867
47	-148	-490	11.2	B5					834
48	+ 98	+172	11.2	B4	B2IV				1187
49	-294	+214	11.2						670
50	-208	-368	11.2	B5					769
51	- 29	+ 54	11.2	B7					1004
53	+357	-429	11.2	B5					1439
54	-307	+ 87	11.3	B5					649
55	- 55	+ 10	11.3	B4					963
56	+ 36	- 35	11.4	B3*					1109
57	- 10	+ 13	11.4	B4					1041
58	-427	+ 91	11.4	B4					491
59	- 48	+ 4	11.4						977
60	+477	+193	11.5	B5					1516
61	-549	- 30	11.5	B5					380
62	-108	+ 22	11.5	B8:					892
63	+ 18	+ 45	11.5	B5:*					1080
64	- 86	+247	11.6						919
65	+199	- 63	11.6	B:					1282
66	+505	- 36	11.6	B4					1539
67	-438	+335	11.6	B8					475
68	-302	+411	11.6						658
75	-146	+379	11.6	G0					829
70	- 63	+163	11.6	B5	B2V				950
73	- 70	-403	11.6	F0					943
69	-379	+ 65	11.7	B5:					538
71	+356	- 86	11.7	B5					1438
72	- 94	- 83	11.7	B5					911
74	+149	+ 23	11.7	B5					1232

No.	Coordinates x	Coordinates y	m_{pg}	Spectral Type T	Spectral Type M	Radial velocity p.e. (km/sec)	Other designations HD, BD GCSRV	Other designations O
(1)	(2)		(3)	(4)		(5)	(6)	
76	-126"	+285"	11.7	K0				851
77	- 36	+ 14	11.7					991
78	+558	- 79	11.8	B6				1566
79	- 47	+ 41	11.8					976
80	+596	+117	11.8	B8				1590
81	+337	-411	11.8	B8				1412
82	-113	+ 33	11.8	B8				879
83R	+276	+486	11.8	B8:				1345
84	-123	-401	11.8	F3				860
85R	-251	+329	11.9	B8				725
86	+450	-449	11.9	B8				1499
87	+198	+198	11.9					1278
88	- 83	- 27	12.0					926
89R	- 50	-207	12.0	B8				972
90	-108	+ 27	12.1					893
91	-184	+522	12.1	B8				789
92	+ 84	+405	12.1	B8				1174
93	+338	-473	12.1					1414
94	+199	+ 68	12.2					1283
95	+228	+330	12.2	B8				1298
96	-261	+411	12.2					714
97	+492	-285	12.3	A2				1525
98	- 63	- 27	12.4	B8				952
99	- 6	-168	12.4	B8				1047
100	-403	+383	12.4	B6				515
101	+300	-263	12.4	B5				1378
102	-365	+ 37	12.6	B8				563
103R	+ 90	-170	12.6	B9				1184
104	-286	+232	12.6	B6				695
105	+108	- 38	12.6	B7				1202
106	- 95	+ 22	12.7	B8				907
107	- 27	-349	12.7	B8				1012
108	-417	+272	12.8	B5				505
109	+187	+317	12.8	A				1266
110	-560	-182	12.9	A0				376
111	-324	- 58	12.9	B9				623
112	-100	+303	12.9	A				900
113	- 97	+304	12.9	A				904
114	-234	- 87	13.0	B9				746
115	+ 67	- 38	13.0	A0				1155
117	+ 86	+ 5	13.0	A				1181
116	+382	+337	13.1	B9				1460
118	+283	-265	13.1	B5				1358
119	+256	-230	13.1	B8				1333
120	+255	-502	13.2	B8:				1331

No.	Coordinates x	Coordinates y	m_{pg}	Spectral Type T	Spectral Type M	Radial velocity p.e. (km/sec)	Other designations HD, BD	Other designations GCSRV	Other designations O
(1)	(2)		(3)	(4)		(5)	(6)		
121	+389"	+179"	13.2	A					1465
122	+225	+ 88	13.2	B8					1296
123	+ 8	+349	13.2	A0:					1062
124	-310	+ 13	13.2	B8					647
125	-300	+ 35	13.4	B7					659
126	+278	-106	13.4	B9					1350
127	-496	-255	13.4	A					431
128	-459	+ 68	13.4	B8					455
129	-278	-233	13.5	A					700
130	-185	+ 23	13.6	A0:					790
131	+178	+367	13.6	A					1253
132	-476	+ 10	13.7	B3					444
133	+427	+ 25	13.7	B9					1489
134	+ 89	-149	13.7	B9:					1185
135	-443	- 14	13.8	B8					472
136	+308	+137	13.8	A					1384
137	+114	+370	13.8	A					1204
138	+251	-223	14.3	B9					1324

NGC 869

Col. 1: O = P. Oosterhoff (Ann. Leiden 17, No. 1, 1937)

Remarks (R)

2, ADS 1766A. No companion at the position given in the ADS is seen on the photographs.

4, 6, radial velocity from GCSRV.

18, H_β, H_γ in emission; all absorption lines faint.

21, some lines appear double on one spectrogram.

26, ADS 1771A.

83, ADS 1771B.

85, double star. Data refer to combined light.

89, double; bright component n.p.

103, double; bright component s.f.

Col. 3: Magnitudes based on values published by H. L. Johnson and W. W. Morgan (Ap.J. 122, 429, 1955), P. Oosterhoff (see "Col. 1" above).

Col. 4: Spectral types listed under T with asterisks were determined, for stars 1-21, from slit spectrograms used for radial velocity measurement, and for stars 28-63, from slit spectrograms taken with a one-prism spectrograph with six-inch camera (these low-dispersion spectra were not measured for radial velocity). Those without asterisks were, as usual, estimated from slitless spectrograms. Spectral types listed under M were published by Johnson and Morgan (see "Col. 3" above).

Since the cluster has much the same radial velocity as the stars in the surrounding star cloud, it is difficult to decide whether any particular star should be considered a cluster member. Stars more distant from the center than 7'.5 were therefore omitted from the mean radial velocity of the cluster.

Radial Velocity Measurements

Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectrograph	p.e.
1	23977.999	-37.7	.3	I 12	
	4381.847	-45.0	.6	I 12	
	5229.716	-40.8	.5	I 12	
	8030.013	-34.9	.6	II 6	
	31732.897	-33.5		II 6A	
		-37.7	3.0		
	GCSRV 1282	-43.7	13.4		
	Mean	-42.6	16.4	18 pl.	± 1.2
2	23981.002	-53.9	.3	I 12	
	4811.682	-52.3	.6	I 12	
	5446.992	-48.5	.5	I 12	
	9622.710	-55.2	.6	II 6	
	31642.986	-44.1		II 6A	
	2417.941	-33.5		II 6A	
		-45.6	4.0		
	GCSRV 1284	-41.8	8.0		
	Victoria*	-45.2	4.0		
	Mean	-43.6	16.0	18 pl.	± 1.2
3	24825.927	-79.9	.5	I 12	
	5116.850	-107.5	.5	I 12	
	7382.896	-11.5		II 6	
	9481.011	-88.2	.6	II 6	
		-72	2.6		±14
	GCSRV 1278	-41	1.9		
	Mean	-59	4.5	7 pl.	±11
5	23986.950	-46.9	.5	I 12	
	4482.766	-39.2	.5	I 12	
	7002.901	-40.6	.5	I 12	
	7662.009	-47.1		II 6	
		-44.2	2.5		
	GCSRV 1283	-33.4	1.2		
	Mean	-40.7	3.7	8 pl.	±2.6
7	24392.877	-33.9	.5	I 12	
	5454.965	-56.0	.5	I 12	
	7002.954	-47.5	.5	I 12	
	30198.995	-26.1	.6	II 6	
	1878.669	-52.5		II 6A	
	Mean	-44.2	3.1		±2.8

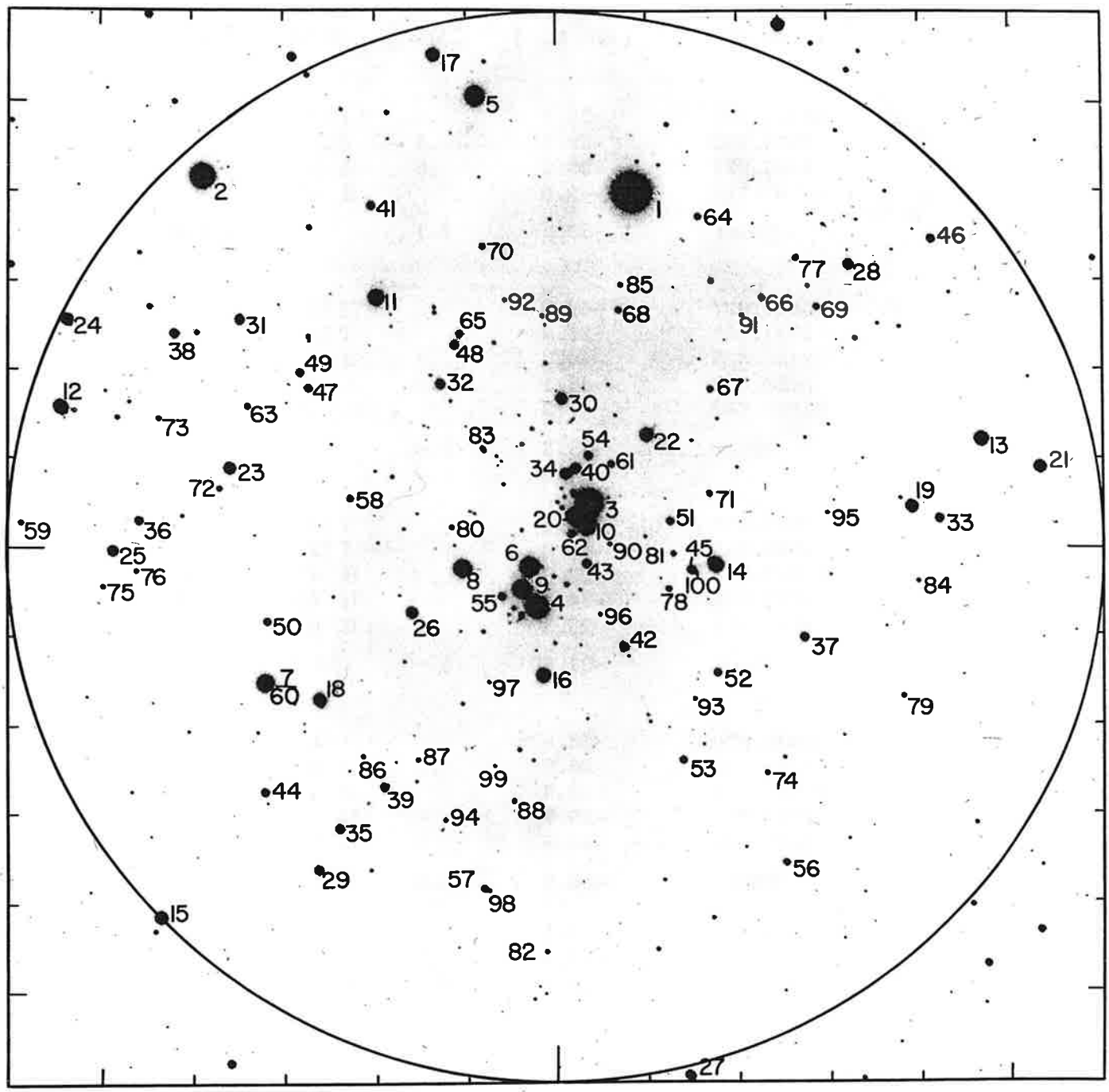
Radial Velocity Measurements

Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectro-graph	p.e.
8	25136.809	-32.2	.5	I 12	
	5518.957	-28.5	.5	I 12	
	9103.990	-54.7	.3	II 6	
	9858.995	-42.4	.6	II 6	
	31734.917	-36.3		II 6A	
	Mean	-37.4	2.9		± 2.9
11	25121.944	-24.0	.3	I 12	
	5827.954	-26.7	.5	I 12	
	9901.034	-54.8	.3	II 6	
	9929.846	-47.1	.6	II 6	
	32417.968	-46.1		II 6A	
	Mean	-41.3	2.7		± 3.0
14	25110.950	-45.5		I 12	
	5521.969	-50.3	.5	I 12	
	9166.878	-54.0		II 6	
	30258.872	-54.2	.6	II 6	
	1734.968	-38.0		II 6A	
	Mean	-47.6	4.1		± 2.5
9	25845.945	-39.8	.5	I 12	
	5900.936	-48.2	.5	I 12	
	9480.985	-36.8		II 6	
	30258.849	-48.3		II 6	
	Mean	-43.0	3.0		± 2.5
15	25107.952	-46.2	.5	I 12	
	5864.910	-41.9	.5	I 12	
	8897.721	-47.1	.6	II 6	
		-45.2	1.6		
	GCSRV 1286	-37	.6		
	Mean	-43.0	2.2	5 pl.	± 3.4
10	25145.792	-56.6	.5	I 12	
	5919.933	-53.9		I 12	
	9858.955	-39.9	.6	II 6	
	31735.857	-46.7		II 6A	
	2114.721	-35.6		II 6A	
	Mean	-46.0	4.1		± 2.5
16	24493.644	-60.5	.5	I 12	
	5532.827	-30.9	.5	I 12	
	9227.776	-50.6	.3	II 6	
	30615.853	-37.0		II 6	
	Mean	-42.6	2.3		± 3.3

Radial Velocity Measurements

Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectro-graph	p.e.
12	25161.776	-38.5	.5	I 12	
	5898.892	-39.1	.6	I 12	
	9496.888	-33.2	.6	II 6	
	31827.714	-42.0		II 6A	
	Mean	-38.8	2.7		± 3.0
19	25870.827	-42.8	.6	I 12	
	5921.945	-25.4		I 12	
	9166.828	-45.0	.6	II 6	
	9496.842	-43.4	.6	II 6	
	31827.741	-45.3		II 6A	
	Mean	-39.3	3.8		± 2.6
18	25540.950	-33.4		I 12	
	5915.695	-45.2		I 12	
	31317.859	-22.3		II 6	
	1742.919	-32.0		II 6A	
	2422.914	-25.3		II 6A	
	Mean	-31.6	5		± 2.2
20	25539.950	-28.9		I 12	
	5908.959	-26.9	.5	I 12	
	30202.970	-43.3		II 6	
	2093.764	-29.7		II 6A	
	2415.936	-48.9		II 6A	
	Mean	-36.5	4.5		± 2.4
21	25124.896	-68.3	.5	I 12	
	5894.968	-54.1	.3	I 12	
	30202.944	-62.9		II 6	
	0371.714	-43.5		II 6	
	2142.694	-41.2		II 6A	
	2415.901	-54.2		II 6A	
	Mean	-52.5	4.8		± 2.3
17	25124.896	-16.1		I 12	
	5894.968	-58.1		I 12	
	30198.979	-65.2		II 6	
	0371.693	-38.2		II 6	
	2114.753	-43.3		II 6A	
	Mean	-44.2	5.0		± 5.8

* Dominion Astrophysical Observatory, Victoria—unpublished observations (1952).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NGC 884

NGC 884
(χ Persei)

α $2^h 18^m.5$ δ +56° 54' (1950.0) l^{II} 135°.0 b^{II} -3°.6

Diameter 30' Class IV3r; 1b1 Radial velocity -44.4 km/sec

Limit of completeness: m_{pg} = 12.0, within a radius of 10' from the center.

No.	Coordinates x	y	m_{pg}	Spectral Type T	M	Radial velocity p.e. (km/sec)		Other designations HD, BD	GCSRV	O
(1)	(2)		(3)	(4)		(5)		(6)		
1R	- 83"	+402"	7.0	cA2	A1Ia	-46.4	±0.9	14433	1319	2178
2	+388	+419	8.2	cA1*	A2Ia	-49.2	±1.4	14535	1332	2589
3	- 35	+ 50	8.4	cB1*	B2Ib	-48.5	±2.1	14443	1320	2227
4	+ 23	- 69	8.8	B1*		-50.1	±2.2	56°574		2296
5	+ 90	+509	9.1	B1*		-48.4	±3.1			2361
6	+ 32	- 22	9.4	B1*		-39.9	±2.4	56°575		2299
7R	+319	-153	9.5	B1*	B2II	-46.8	±2.5	56°588		2541
8R	+106	- 25	9.6	B2*		-44.0 var	±3.2			2371
9	+ 41	- 49	9.7	B1s*		-24 var	±8	56°576		2311
10	- 31	+ 22	9.7	B2*		-46.5	±2.5	56°571		2235
11	+199	+281	9.7	B1n*		-31 var	±10	56°584		2444
12	+541	+159	9.8	B3				56°596		2694
13	-466	+122	9.8	B1s*		-44.0	±2.9			1870
14R	-174	- 22	9.8	B1e*		-38.7 var	±5.3	56°563		2088
15	+431	-415	10.0	B3				56°592		2605
16R	+ 16	-146	10.1	B1e*		-47.0	±2.9	56°573		2284
17R	+136	+556	10.1	B0e*		-37	±5	56°582		2402
18	+260	-172	10.2	B3:				56°586		2488
19	-389	+ 43	10.2	B3						1924
20	- 17	+ 33	10.2	B2*	B2III	-43.9	±3.0	56°572		2246
21R	-531	+ 90	10.2	cM2		-43.1	±1.4	14330	1304	1818
22R	- 98	+126	10.3	B2e*		-41.4	±3.3	56°566		2165
23	+358	+ 89	10.4	B3				56°590		2572
24R	+534	+257	10.4	cM1		-47		56°595	1338	2691
25	+484	- 4	10.6	B2						2649
26R	+160	- 75	10.6	cM6*		-39.0	±1.7	14448	1325	2417
27R	-144	-597	10.8	B2						2112
28	-322	+320	10.8	B3						1983
30	- 4	+168	10.8	B4e*						2262
29	+260	-364	10.9	B3:						2485

No.	Coordinates x	y	m_{pg}	Spectral Type T	M	Radial velocity p.e. (km/sec)	Other designations HD, BD	GCSRV	O
(1)	(2)		(3)	(4)		(5)	(6)		
31	+348"	+256"	10.9	B4					2566
33	-420	+ 32	10.9	A1					1903
32	+129	+184	11.0	B4					2392
34	- 8	+ 82	11.0	B5*					2255
35	+237	-317	11.0	A0					2468
36	+456	+ 30	11.1	A0					2628
37	-271	-104	11.1	B4					2024
38	+418	+240	11.1	B5					2601
39	+190	-271	11.2	B5					2433
40	- 20	+ 89	11.2	B4:					2242
41	+204	+383	11.2	B6					2452
42	- 73	-114	11.2	B6	B3V				2185
44	+320	-272	11.3						2539
45	-146	- 27	11.3	B4					2114
43	- 32	- 20	11.4	B5p*	B2V				2232
46	-413	+348	11.4	B4					1908
47	+273	+179	11.4	B4					2505
48	+114	+226	11.4	B5					2377
49	+282	+197	11.4	B4					2513
50	+318	- 84	11.4						2540
51	-123	+ 28	11.6	B6:	B2V				2139
52	-175	-143	11.6	B5:					2085
53	-138	-242	11.6	B4					2119
54	- 34	+103	11.7						2229
55	+ 62	- 57	11.7	B7*					2330
56	-250	-357	11.7	B4					2033
57	+ 81	-383	11.8	B5					2347
58	+227	+ 54	11.8	B4					2462
59	+582	+ 28	11.9	B7					2716
60R	+321	-154	11.9						2542
61	- 59	+ 93	11.9	B5					2196
62	- 14	+ 13	11.9		B3V				2251
63	+339	+159	11.9	B6					2555
64	-156	+370	11.9	A3					2105
65	+108	+239	11.9	B8:					2372
66	-226	+279	12.0	B5					2057
67	-168	+178	12.0	B8:					2091
68	- 68	+265	12.1	B6:					2191
69	-286	+270	12.1	B7					2014
70	+ 82	+338	12.1	B8:					2351
71	-169	+ 60		B8:					2094
72	+369	+ 66	12.2	B5					2579
73	+434	+145	12.2	B5					2612
76	+458	- 26	12.3	A3					2633
74	-229	-254	12.4	B5					2053

No.	Coordinates x	Coordinates y	m_{pg}	Spectral Type T	Spectral Type M	Radial velocity p.e. (km/sec)	Other designations HD, BD	Other designations GCSRV	Other designations O
(1)	(2)		(3)	(4)		(5)	(6)		
75	+497"	- 40"	12.4	B8					2656
77R	-263	+325	12.4	F2					2026
78	-122	- 50	12.4	B8:					2140
79	-379	-170	12.4	B8					1928
80	+117	+ 22	12.5	B7					2379
81	-127	- 9	12.5	B8					2133
82	+ 12	-454	12.5	B5					2271
83	+ 83	+111	12.6	B8:					2352
84	-396	- 40	12.6	B8					1917
85	- 70	+294	12.7	B8:					2189
87	+154	-240	12.8	B8					2411
86	+213	-235	12.9	B8					2455
88R	+ 48	-286	12.9	B8					2318
94	+125	-309	13.0	K0					2382
89	+ 16	+260	13.0	B8:					2285
90	- 56	+ 3	13.0	B9					2200
91	-204	+260	13.0	B8					2070
92	+ 57	+277	13.0	B9:					2328
93	-148	-172	13.1	B8					2110
95	-295	+ 40	13.2	B8:					2006
96	- 46	- 78	13.3	B9					2211
97	+ 75	-151	13.4	B9					2345
98	+ 75	-386	13.5	B9					2342
99	+ 70	-248	13.7	A0					2337
100	-152	- 30	13.8	A0					2111

Col. 1: Remarks (R)

1, 21, spectral type and radial velocity from GCSRV; the latter was revised in accordance with additional observations communicated by R. M. Petrie.

8, double line spectroscopic binary orbit.

14, H_β faint emission; H_γ weak absorption.

16, H_β - H_ζ emission on broad absorption; H_ϵ not visible; poor lines.

17, H_β emission; H_γ, H_ζ not visible; poor lines.

22, H_β - H_ϵ emission.

24, spectral type and radial velocity from GCSRV.

27, double star, brighter component.

60, ADS 1810BC; close double, separation 1". Data refer to combined light.

77, double, observed as one star.

88, double, observed as one star.

Col. 3: Magnitudes based on values published by H. L. Johnson and W. W. Morgan (Ap.J. 122, 429, 1955), P. Oosterhoff (Ann. Leiden 17, No. 1, 1937)

Col. 4: Spectral types listed under M were published by Johnson and Morgan (see "Col. 3" above).

Col. 5: In the calculation of the mean radial velocity of the cluster, stars 1, 2, 5, 13, 17, 21, 24 were omitted because of their distance from the center. Stars 9 and 11 were omitted because of their large velocity variation. Star 14 was given weight 1/2.

Col. 6: O = P. Oosterhoff (see "Col. 3" above).

Radial Velocity Measurements

Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectrograph	p.e.
3	24814.693	-49.9		I 12	
	5492.901	-50.7		I 12	
	7316.875	-51.2		II 6	
	8898.703	-50.2	.6	II 6	
	31744.915	-52.1		II 6A	
		-50.9	4.6		
	GCSRV 1320	-39.5	1.2		
	Mean	-48.5	5.8	9 pl.	± 2.1
2	23980.963	-48.3		I 12	
	30189.986	-52.1		II 6	
		-50.2	2.0		
	GCSRV 1332	-53	.4		
	Victoria*	-47.1	7.0		
	Mean	-49.2	9.4	13 pl.	± 1.4
5	25873.806	-41.5		I 12	
	7399.711	-52.3		II 6	
	30292.892	-53.5	.6	II 6	
	Mean	-48.4	2.6		± 3.1
4	23982.953	-49.1		I 12	
	5283.689	-56.6		I 12	
	7316.915	-44.0		II 6	
	30592.889	-44.2		II 6	
		-48.5	4.0		
	Victoria*	-61.7			
	Mean	-50.1	5.0	5 pl.	± 2.2
6	24416.794	-46.5		I 12	
	5518.835	-32.8	.5	I 12	
	7385.828	-35.4		II 6	
	7711.035	-40.8		II 6	
	32183.763	-40.3		II 6A	
	Mean	-39.9	4.5		± 2.4
10	24754.912	-49.9		I 12	
	5480.929	-57.2	.5	I 12	
	7348.016	-51.5		II 6	
	9496.934	-42.6	.6	II 6	
	32063.885	-35.1		II 6A	
	Mean	-46.5	4.1		± 2.5

Radial Velocity Measurements

Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectrograph	p.e.
9	24743.951	- 7.0		I 12	
	5469.945	-45.6		I 12	
	7324.995	- 1.2		II 6	
	8420.932	-12.8		II 6	
	30 89.965	- 3.5		II 6	
	1318.908	-73.3		II 6	
	Mean	-24	5.0		± 8
8	Spectroscopic binary orbit (See Appendix I)				
	Mean	-44.0			± 3.2
13	25945.668	-49.6		I 12	
	30592.911	-44.9		II 6	
	0636.930	-37.4		II 6	
	Mean	-44.0	3.0		± 2.9
11	25526.986	+23.9		I 12	
	6267.766	-53		II 6	
	30292.911	-50.7		II 6	
	1672.947	-40.8		II 6A	
	2205.615	-32.7		II 6A	
	Mean	-31	5.0		±10
14	24113.618	-44.3		I 6	
	4785.806	-46.6		I 12	
	5475.946	-18.8		I 12	
	7710.981	-23.1		II 6	
	31742.789	-60.8		II 6A	
	Mean	-38.7	5.0		± 5.3
17	25937.875	-37.2	1.0	I 12	± 5
7	25540.788	-48.3		I 12	
	5865.808	-48.4		I 12	
	9262.693	-47.6		II 6	
	30615.903	-43.0		II 6	
	Mean	-46.8	4.0		± 2.5
16	24767.865	-49.3	.5	I 12	
	5487.911	-41.0	.5	I 12	
	9193.910	-61.0		II 6	
	31318.939	-34.9		II 6	
	Mean	-47.0	3.0		± 2.9

Radial Velocity Measurements

Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectro-graph	p.e.
20	24745.906	-50.3	.3	I 6	
	5532.966	-45.9		I 12	
	5862.880	-39.4		I 12	
	31359.839	-44.8	.5	II 6A	
	Mean	-43.9	2.8		± 3.0
22	24748.867	-43.3	.3	I 6	
	5544.953	-42.3		I 12	
	30615.880	-40.0		II 6	
	Mean	-41.4	2.3		± 3.3
26	25528.977	-41.7		I 12	
	5929.690	-39.8	.5	I 12	
	9930.685	-39.5		II 6	
	31413.820	-37.6		II 6	
		-39.6	3.5		
	GCSRV 1325	-38	2.1		
	Mean	-39.0	5.6	7 pl.	± 1.7

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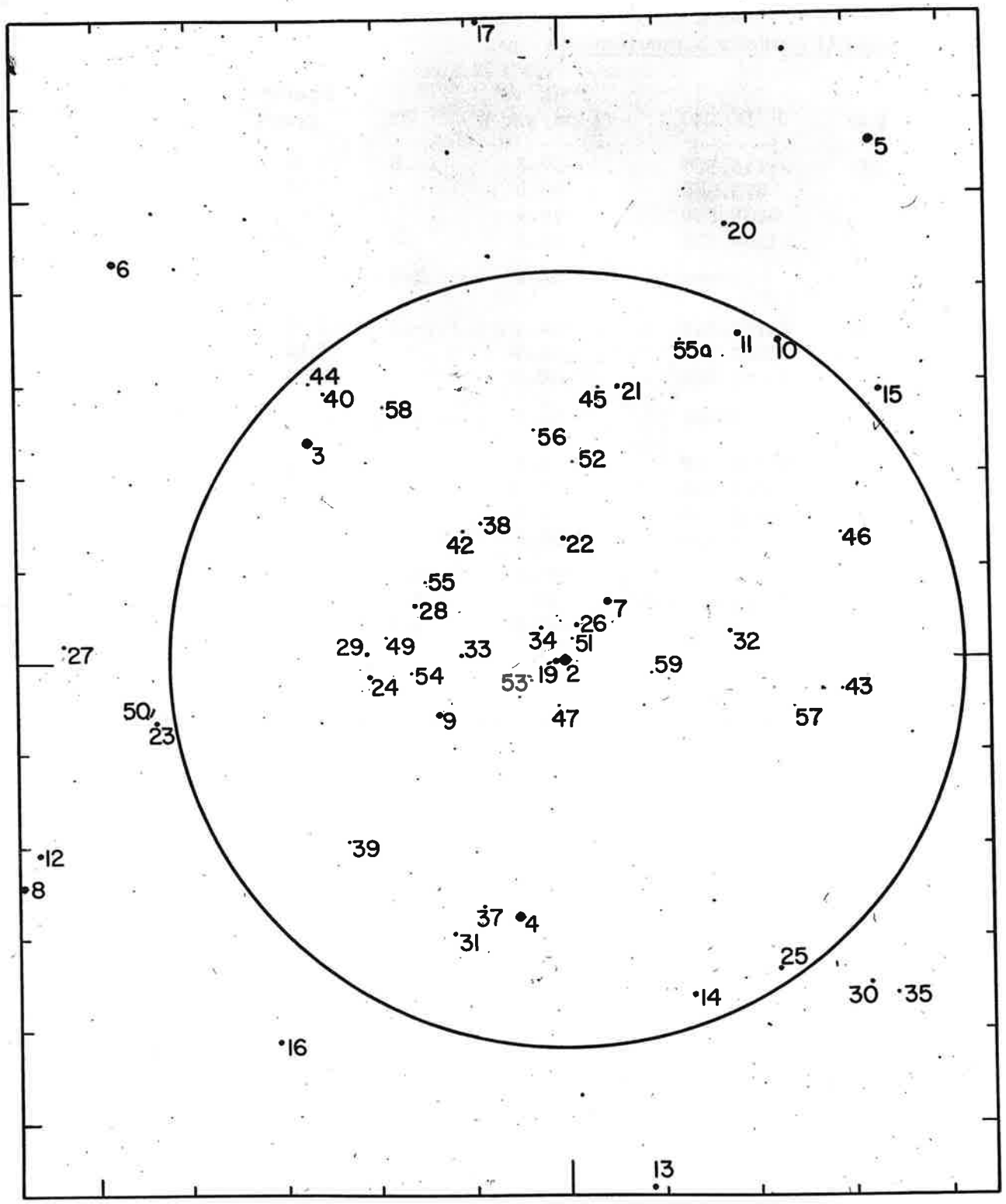
* Dominion Astrophysical Observatory, Victoria—unpublished observations (1952).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IC 1805

IC 1805

α $2^h\,28^m.9$ δ +61°14' (1950.0) l^{II} 134°.7 b^{II} +0°.9

Diameter 20' Class IV3mN; 1o7 Radial velocity -47.0 km/sec

Limit of completeness: m_{pg} = 14.0 within a radius of 7' from star 2.

No.	Coordinates x	Coordinates y	m_{pg}	Spectral Type T	Spectral Type Bgd	Radial velocity (km/sec)	p.e.	Other designations Cl	Other designations HD, BD	Other designations GCSRV
(1)	(2)		(3)	(4)		(5)		(6)		
1	- 20"	+1001"	7.9	F2*	F1	-12.3	±3.5	18	15557	
2R	0	0	8.3	O7*	O5	-34.5 var	±2.0	20	15558	1424
3	+271	+ 238	8.6	O7+	Oe5	-43.9	±1.8	32	15629	1431
4R	+ 51	- 279	8.6	O7e*	BO	-60.4 var	±3.1	23	15570	1426
5R	-326	+ 560	9.0	O8*	B2	-50.4 var	±2.1	5		1414
6	+476	+ 435	9.5	gF8	dG2			35	60°509	
7R	- 45	+ 64	9.7	O9*	B1	-47.3 var	±1.2	17		1421
8R	+576	- 247	9.7	BO*nn	B4	-24.3 p.v.	±5.5	38		
9	+134	- 59	10.2	AO	AO			28		
10	-228	+ 345	10.2	BO*n	B2	-42.5 var	±5.5	8		
11	-187	+ 352	10.6	BO*n	F3	-42.4	±2.1	10		
12	+559	- 211	10.8	dF5	F9			37	60°513	
15	-333	+ 290	10.9	B3	B5			4	60°496	
14	-131	- 363	11.0	gKO	gG5			14	60°500	
13	- 85	- 573	11.1	F3	F4			15		
17	+ 87	+ 695	11.1		B6p			24		
19R	+ 11	0	11.1	B2*		-50.7	±2.5			
16	+306	- 414	11.2	dF8	F8			33	60°508	
20	-174	+ 472	11.3	A2	A3			11		
18	+664	- 157	11.4	B5:	F3			39		
21	- 59	+ 297	11.4	B3	B7:			16		
23	+433	- 68	11.4	B2					60°511	
22	+ 1	+ 133	11.5	B2*	A0	-46.0	±3.2	21		
24	+208	- 18	11.5	B2*	A8:	-51.4 p.v.	±4.4	30		
26	- 12	+ 38	11.6	B3*	-	-48.4	±3.2	19		
25	-221	- 336	11.7	Be:	F4			9		
28	+159	+ 60	11.8	B4	A5			29		
27	+538	+ 18	11.9	gKO	G5			36		
29	+210	+ 8	11.9	B5				31		
30	-316	- 354	12.0	B5	A5			6		

No.	Coordinates		m_{pg}	Spectral Type		Radial velocity p.e. (km/sec)	Other designations		
	x	y		T	Bgd		Cl	HD, BD	GCSRV
(1)	(2)		(3)	(4)		(5)		(6)	
32	-173"	+ 30"	12.1	B4	F3			12	
31	+120	-298	12.2	B4	F0			27	
35	-343	-364	12.2		A0			3	
33	+110	+ 5	12.3	B5	A8			26	
34	+ 25	+ 35	12.4	B5	F:			22	
37	+ 89	-268	12.6	B6	A8:			25	
38	+ 87	+150	12.8	B9					
39	+232	-198	13.0	B9					
40	+253	+143	13.0	B7:					
42	+107	+143	13.2						
43	-289	- 35	13.3						
44	+270	+302	13.4						
45	- 37	+299	13.4						
47	+ 8	- 49	13.5						
49	+188	+ 27	13.5	B8					
50	+442	- 63	13.6	B9					
54	+162	- 10	13.6	A0					
52	- 10	+215	13.7						
53	+ 35	- 19	13.7	A0:					
51	- 5	+ 25	13.8	A0					
58	+189	+279	13.8						
55	+146	+ 87	13.9	B9:					
55a	-124	+342	13.9						
56	+ 31	+250	13.9						
57	-239	- 53	13.9						
59	- 90	- 12	14.0						

Col. 1: Remarks (R)

2, ADS 1920A. Spectroscopic binary orbit.

4, strong, broad emission at 4686 A and faint emission at 4640 A.

5, spectroscopic binary orbit.

7, spectroscopic binary orbit.

8, double lines noted on one spectrogram.

19, ADS 1920B.

Col. 3: Magnitudes based on a polar comparison and a cluster comparison, as well as values published by M. C. Clasen (A.N. 264, 33, 1937).

Col. 4: Spectral types listed under Bgd were determined by A. Wachmann on objective prism plates taken at Bergedorf and published by Clasen (see "Col. 3" above). While the Bergedorf spectral types agree reasonably well with ours for stars brighter than $m_{pg} = 11.0$, most of the fainter stars listed by Wachmann as types A-F have been classified by us as B2-B5. For two of these stars slit spectrograms are available which plainly show the B characteristics. In this connection, we draw attention to the fact that on objective prism plates the spectra of faint B stars that are weak in the ultraviolet because of interstellar extinction are difficult to distinguish from those of F stars. The spectrograms of the slitless quartz spectrograph of the Crossley reflector are relatively strong in the region of the He line 4026 and the K line, so that the distinction between B and F stars can be made even for faint stars.

Col. 5: In the calculation of the mean radial velocity of the cluster, the following stars were omitted: stars 1 and 8 because they are probably not physical members of the cluster, stars 2 and 3 because of possible relativity redshift, star 4 because its radial velocity seems to be abnormal, and star 5 because the velocity of the system may be seriously affected by the blending of double lines near velocity maximum.

redshif

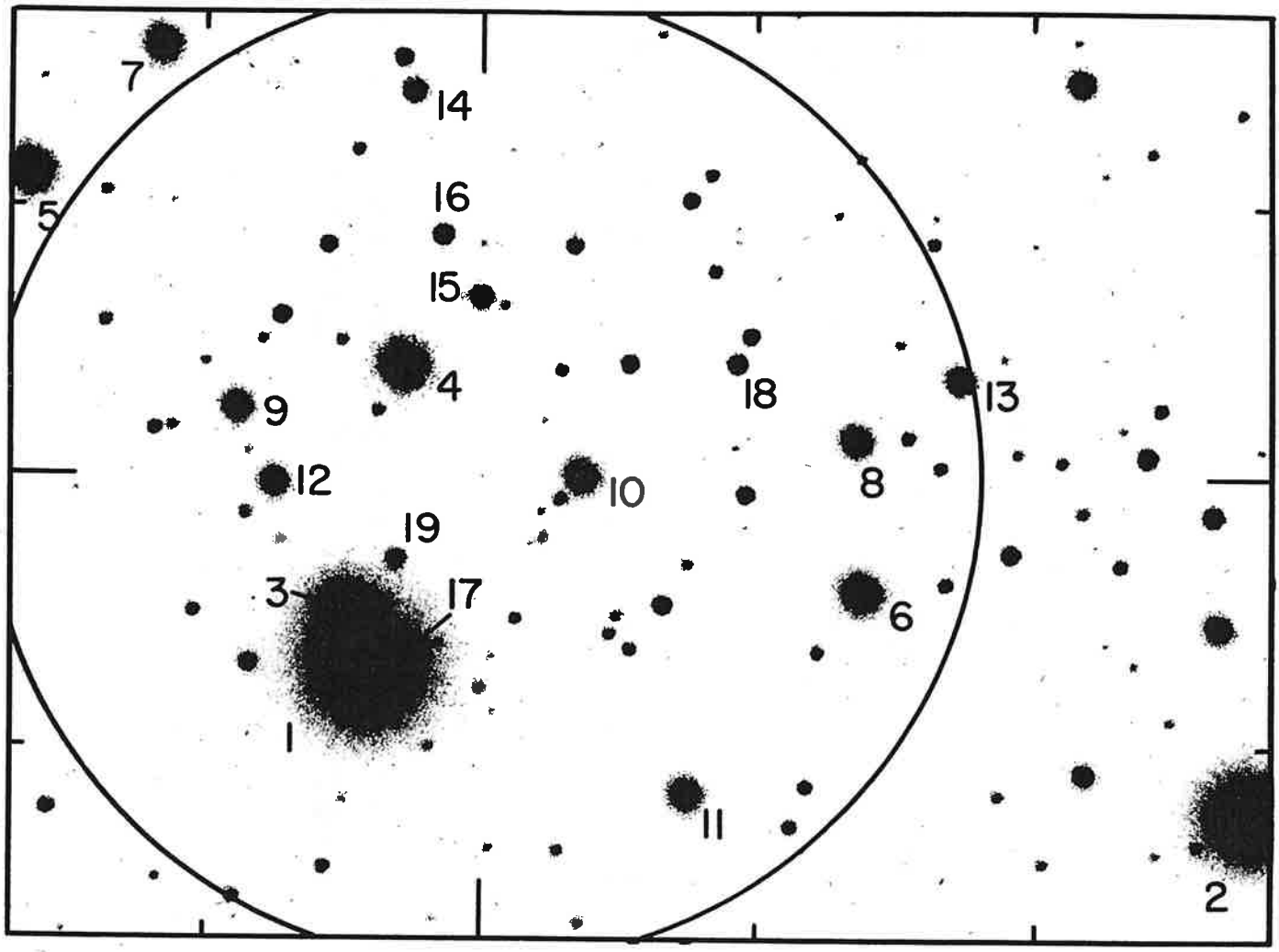
Col. 6: Cl = M. C. Clasen (see "Col. 3" above)

Radial Velocity Measurements

Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectrograph	p.e.
1	25439.980	-20.5	.3	I 12	
	5442.979	- 9.9		I 12	
	Mean	-12.3	1.3		± 3.5
2	Variable velocity (See Appendix I)				
	Mean	-34.5			± 2.0
3	25253.771	-29.0	.5	I 12	
	5492.964	-37.2	.5	I 12	
	6306.793	-34.6		I 12	
	7382.971	-56.6		II 6	
	8081.799	-44.6		II 6	
	31316.883	-37.6		II 6	
	1468.678	-41.4		II 6A	
	1675.873	-52.0		II 6A	
		-42.8	7.0		
	GCSRV 1431	-57	.6		
	Mean	-43.9	7.6	10 pl.	± 1.8
4	25249.709	-61.1		I 12	
	5506.842	-48.9	.5	I 12	
	7382.930	-64.2		II 6	
	8383.990	-58.7		II 6	
	30594.941	-48.1		II 6	
	1358.788	-82.1	.5	II 6	
	1639.975	-40.5		II 6A	
	1708.837	-56.0		II 6A	
	1734.781	-68.6		II 6A	
	1745.746	-98.7	.5	II 6A	
	1746.776	-52.5		II 6A	
	1771.750	-81.0		II 6A	
	1791.652	-49.6		II 6A	
	2002.979	-71.4		II 6A	
		-63.0	12.5		
	GCSRV 1426	-24	.9		
	Mean	-60.4	13.4	15 pl.	± 3.1
5	Spectroscopic binary orbit (See Appendix I)				
	Mean	-50.4			± 2.1
7	Spectroscopic binary orbit (See Appendix I)				
	Mean	-47.3			± 1.2
8	27363.019	-26.1		II 6	
	7755.718	-37.5		II 6	
	8152.792	- 9.2		II 6	
	Mean	-24.3	3.0		± 5.5

Radial Velocity Measurements

Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectrograph	p.e.
10	27429.791	-35.4		II 6	
	8073.821	-28.5		II 6	
	9262.618	-63.3		II 6	
	30671.851	-24.7		II 6	
	2113.830	-60.6		II 6A	
	Mean	-42.5	5.0		± 5.5
11	28154.641	-37.2	.6	II 6	
	30285.829	-36.1		II 6	
	0370.764	-28.5		II 6	
	1022.900	-56.1		II 6	
	2240.640	-42.8		II 6A	
	2414.983	-51.4		II 6A	
	Mean	-42.4	5.6		± 2.1
19	28402.924	-62.7		II 6	
	8895.786	-47.3		II 6	
	30285.778	-47.2		II 6	
	1675.928	-45.5		II 6A	
	Mean	-50.7	4.0		± 2.5
22	31317.944	-52.7		II 6	
	1360.980	-24.3	.5	II 6A	
	1673.944	-50.0		II 6A	
	Mean	-46.0	2.5		± 3.2
24	31709.894	-59.1		II 6A	
	1732.975	-39.3		II 6A	
	2062.865	-66.1		II 6A	
	2477.766	-41.3		II 6A	
	Mean	-51.4	4.0		± 4.4
26	30588.970	-54.7		II 6	
	0637.959	-50.0		II 6	
	1023.778	-32.5	.5	II 6	
	Mean	-48.4	2.5		± 3.2



NGC 957

NGC 957

α $2^h 29^m.8$ δ +57°20' (1950.0) l^{II} 136°.3 b^{II} -2°.6

Diameter 9' Class II3mU; 1b1 Radial velocity -49.8 km/sec

Limit of completeness: m_{pg} = 14.0, within a radius of 3' from the center.

No.	Coordinates x	Coordinates y	m_{pg}	Spectral Type	Radial velocity (km/sec)	p.e.	Other designations HD, BD	GCSRV	ADS
(1)	(2)		(3)	(4)	(5)		(6)		
1	+ 42"	- 72"	8.6	B1s*	-43.5	±1.9	15690	1436	1937A
2	-278	-125	8.7	dF8*	-20	±4.5	56°652		
3	+ 50	- 50	10.3	B2*	-54.7	±2.8	56°657		1937B
4	+ 28	+ 40	11.0	B3*	-51.2	±3.0	56°655		
5	+164	+111	11.0	gF5*			56°658		
6	-138	- 42	11.5						
7	+115	+158	11.8						
8	-136	+ 12	12.2						
10	- 37	0	12.2						
9	+ 88	+ 25	12.3						
11	- 75	-118	12.3						
12	+ 74	- 2	12.7						
13	-172	+ 35	12.8						
14	+ 25	+142	13.3						
16	0	+ 65	13.5						
15	+ 13	+ 90	13.6						
17	+ 23	- 62	14.1						
18	+ 31	- 31	14.1						
19	- 93	+ 40	14.3						

Col. 3: Magnitudes based on two polar comparisons and a cluster comparison.

Col. 5: Stars 2 and 5 apparently are not physical members of the cluster, and were therefore omitted from the calculation of the mean radial velocity.

Radial Velocity Measurements

Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectro-graph	p.e.
1	26254.781	-43.4	.3	I 12	
	6285.944	-45.7		I 12	
	7673.942	-50.0	.6	II 6	
	9622.733	-44.6	.6	II 6	
	30637.891	-45.5		II 6	
		-46.0	3.5		
	Victoria*	-44.1	2.0		
	GCSRV 1436	-35	1.2		
	Mean	-43.5	6.7	10 pl.	± 1.9
2	27673.971	-19.9	.7	II 6	± 4.5
3	27782.804	-55.2	.6	II 6	
	8101.932	-49.0	.6	II 6	
	31056.647	-55.1		II 6	
	2093.808	-57.4		II 6A	
	Mean	-54.7	3.2		± 2.8
4	28194.640	-53	.4	II 3-1/2	
	8466.936	-65.7		II 6	
	9874.949	-47	.4	II 3-1/2	
	30637.862	-37.6		II 6	
	Mean	-51.2	2.8		± 3.0

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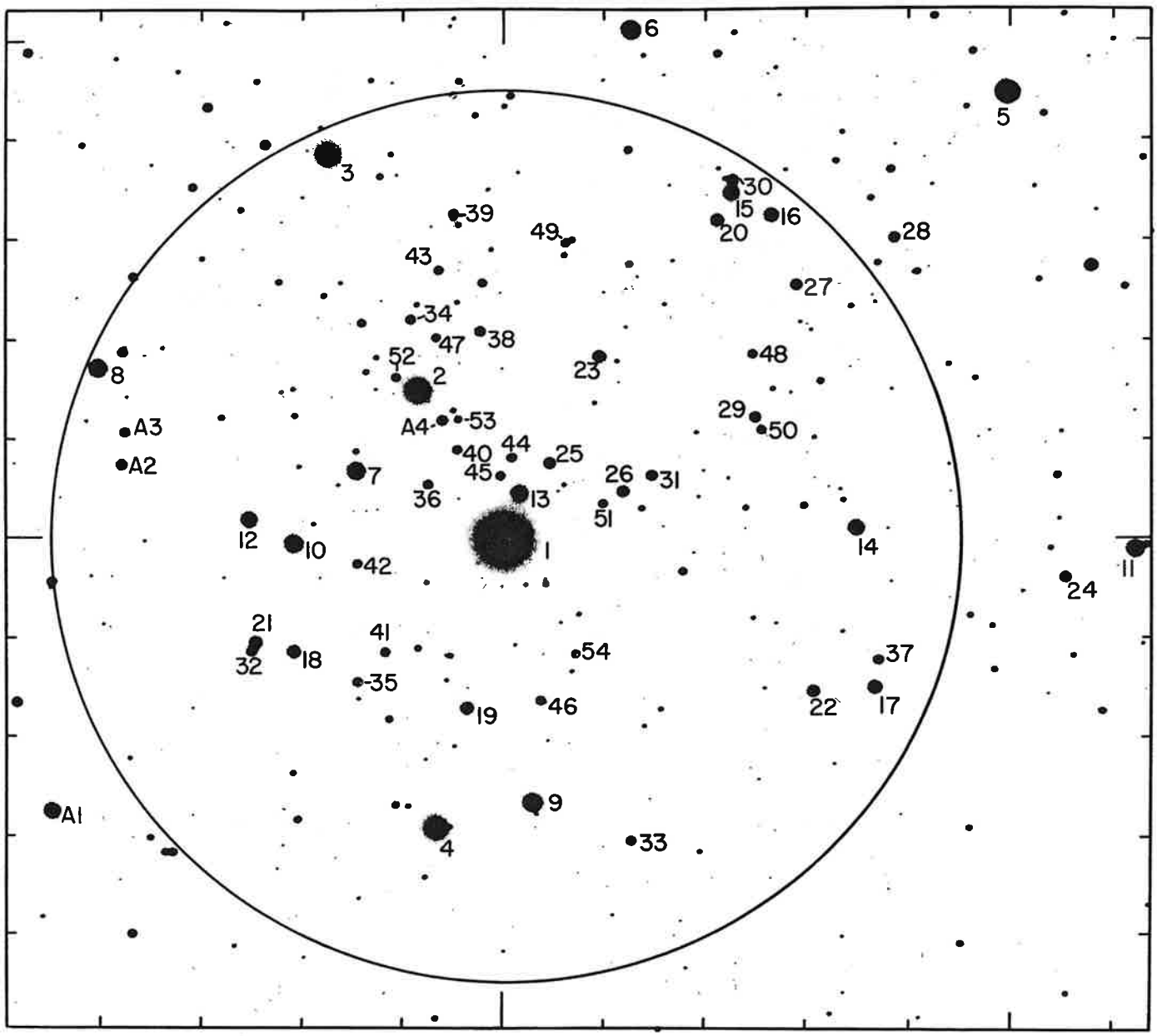
* Dominion Astrophysical Observatory, Victoria — unpublished observations (1952).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A2
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A1
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NGC 1027

NGC 1027

α $2^h38^m.7$ δ +61°23' (1950.0) l^{II} 135°.8 b^{II} +1°.5

Diameter 21' Class IV3m; 1b7 Radial velocity −43.7 km/sec

Limit of completeness: m_{pg} = 13.5, within a radius of 7'.5 from star 1.

No.	Coordinates x	y	m_{pg}	Spectral Type T	Bgd	Radial velocity p.e. (km/sec)		Other designations Cl	HD, BD
(1)	(2)		(3)	(4)		(5)		(6)	
1	0"	0"	7.5	gF2*	F5	+ 14.1	±2.6	29	16626
2	+ 86	+150	9.6	cB8	B9	− 44.3	±2.3	32	61°465
3	+175	+388	9.7	B7*	B9	− 51 var	±6	34	61°466
4	+ 65	−294	9.9	cB9*	B9	− 44.3	±2.8	31	60°550
5	−494	+447	10.0	B7	B9			10	61°556
6	−125	+512	10.7	K2	K0			23	61°463
8	+403	+171	10.7	B8	B8			43	61°469
9	− 29	−269	10.8	cB9*	A3	− 41.6	±2.5	27	60°547
10	+207	− 6	10.8	cB9*	B9	− 38 var	±5.7	36	60°552
7	+145	+ 68	10.9	F8	G5			33	60°555
11	−620	− 11	10.9	B7	B9			6	
A1	+447	−277	11.1	A0	A0				
12	+252	+ 18	11.1	B8	A0			39	
13	− 16	+ 46	11.2	B8	A7			28	
14	−346	+ 11	11.4	B8	B9			14	
15	−226	+348	11.5	B8	B8:			20	61°461
16	−268	−323	11.7	K5					61°459
17	−367	−150	11.8	B9	A2			13	
18	+208	−116	11.8		A0:			35	
19	+ 35	−172	12.0	B9	A7			30	
20	−212	+320	12.0	B9	A8			21	
21	+245	−106	12.0	F8	A			37	
22	−307	−154	12.1	A0	A0			16	
23	− 95	+182	12.3	K2	K5			25	
24	−554	− 39	12.3		A3			9	
25	− 46	+ 75	12.3	B9	A1			26	
26	−118	+ 48	12.4	A	A3			24	
A2	+378	+ 73	12.4		F5:			42	
27	−289	+255	12.5	B9	A0			17	
28	−385	+301	12.5	A	A2			12	

No.	Coordinates x	Coordinates y	m_{pg}	Spectral Type T	Spectral Type Bgd	Radial velocity p.e. (km/sec)	Other designations Cl	Other designations HD, BD
(1)	(2)		(3)	(4)		(5)	(6)	
30	-227"	+361"	12.6				19	
31	-148	+ 64	12.6	A0	A6		22	
29	-249	+122	12.7	A0	A3		18	
A3	+376	+107	12.7	A				
A4	+ 60	+120	12.8	A0				
32	+250	-114	12.9				38	
38	+ 23	+209	12.9	A0				
39R	+ 50	+325	12.9	A0				
34	+ 92	+220	12.9	F0:				
35	+145	-146	12.9					
36	+ 74	+ 53	12.9	A0				
37	-370	-122	12.9					
41	+118	-115	13.0	A0				
33	-127	-307	13.1					
42	+145	- 26	13.1					
40	+ 46	+ 89	13.2	A2				
43	+ 63	+270	13.3	A0				
44	- 9	+ 80	13.4	A0				
48	-248	+182	13.4					
47	+ 66	+200	13.4					
46	- 38	-163	13.4	A				
49	- 62	+296	13.5					
45	+ 3	+ 62	13.5					
51	- 99	+ 35	13.5	A3				
50	-258	+110	13.6	A2:				
52	+109	+162	13.7	A				
53	+ 45	+120	13.9					
54	- 71	-118	13.9					

NGC 1027

Col. 1: Remarks (R)

39, double star; separation 3", position angle 170°. Data refer to combined light.

Col. 3: Magnitudes based on a polar comparison and a cluster comparison, as well as values published by

M. C. Clasen (A.N. 264, 33, 1937).

Col. 4: Spectral types listed under Bgd were determined by A. Wachmann from objective prism plates taken at Bergedorf, and were published by Clasen (see "Col. 3" above). The Bergedorf spectral types are generally a few subdivisions later than our own, particularly for stars fainter than $m_{pg} = 11.0$.

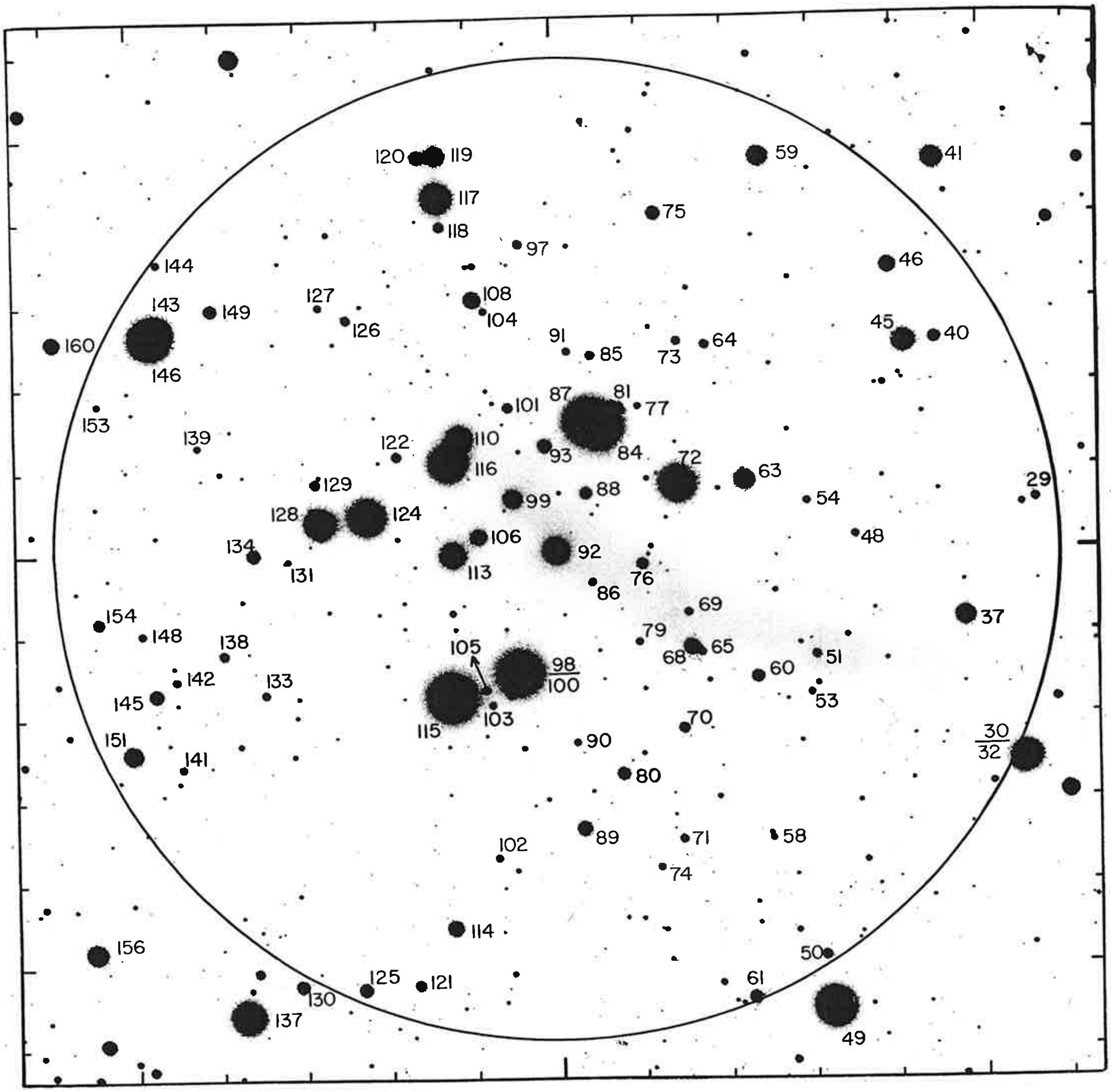
Col. 5: In the calculation of the mean radial velocity of the cluster, star 1 was omitted as a nonmember, and stars 3 and 10 received weight 1/2 because of variable velocity.

Col. 6: Cl = M. C. Clasen (see "Col. 3" above)

Stars 2, 4, 9, 10 appear to be intermediate supergiants with relatively narrow hydrogen lines.

Radial Velocity Measurements

Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectrograph	p.e.
1	26227.010	+17.8		I 12	
	8059.933	+ 9.3	.7	II 6	
	8417.015	+13.5	.7	II 6	
	Mean	+14.1	2.4		± 2.6
2	27697.917	-59.5		II 6	
	7714.025	-33.6		II 6	
	8044.906	-39.5	.6	II 6	
	30202.994	-40.3		II 6	
	0292.936	-46.8		II 6	
	Mean	-44.3	4.6		± 2.3
3	27794.791	-37.1		II 6	
	8453.816	-59.7		II 6	
	9262.742	-72.6		II 6	
	30257.938	-35.2		II 6	
	Mean	-51	4.0		± 6
4	27739.784	-48.6	.6	II 6	
	8059.878	-41.4		II 6	
	8903.740	-57.9	.6	II 6	
	31355.899	-36.6		II 6	
	Mean	-44.3	3.2		± 2.8
9	30257.896	-35.0		II 6	
	0319.679	-43.0		II 6	
	0733.711	-36.1		II 6	
	1358.862	-52.2		II 6	
	Mean	-41.6	4.0		± 2.5
10	28069.018	-28.6		II 3-1/2	
	8467.744	-55.9		II 6	
	9227.871	-48.7		II 6	
	30616.919	-20.2		II 6	
	Mean	-38.2	4.0		± 5.7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121
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130
137
49

NGC 1039

NGC 1039

(M34)

α $2^h 38^m.9$ δ +42° 32' (1950.0) l^{II} 143°.7 b^{II} -15°.6

Diameter 30' Class I3m; 1b9 Radial velocity -7.0 km/sec

Limit of completeness: m_{pg} = 13.0., within a radius of 10' from star 92.

No. Ch	Coordinates x	y	m_{pg}	Spectral Type T	Bgd	Radial velocity p.e. (km/sec)		Other designations Br	Gr	Z	HD, BD
(1)	(2)		(3)	(4)		(5)		(6)			
115R	+127"	-176"	8.0	A0*	A0	- 6.9	±2.2	112	83		16728
146R	+482	+263	8.3	B9*	A0	- 6.1	±2.2	143	104		16782
137	+376	-562	8.3	G8	G5			134	99		16771
98R	+ 45	-147	8.5	A0*	B8	- 7.7	±2.2	101	71		16719
87R	- 37	+156	8.6	B9*	A0	-13.7	±2.2	93	62	2	16705
49	-326	-557	8.6	A0	B8			62	32		16655
84R	- 56	+149	8.6	A0*	A0	- 7.8	±2.4	90	59	1	16693
124R	+224	+ 44	8.9	A0*	A0	- 8.3	±2.9	123	90	5	42°601
116	+128	+107	8.9	A1*	A0	- 5.5	±2.5	114	84	3	42°596
72	-147	+ 79	9.0	A0*	A0	- 8.9	±2.9	82	49	4	16679
128	+281	+ 37	9.3	A0*	A0	- 4.5	±2.3	126	93	6	42°602
117	+137	+426	9.4	A0*	B8	- 8.7	±3.1	117	86	7	42°597
30R	-559	-255	9.6	A0	A0			45	24	8	16627
92	0	0	9.8	A1*	A2	- 3.6	±2.9	96	67	9	42°590
96	+ 29	-724	9.9	A1	A0			99	70		41°516
113	+123	- 4	10.0	A1*		- 3.6	±2.7	111	80	11	42°595
110	+113	+138	10.1	A2*	A0	- 5.2	±2.0	109	79	10	42°594
45	-417	+246	10.3	A1	A2			58	27	12	42°581
156	+557	-484	10.4	A3	A2			150	109	17	41°522
143R	+472	+276	10.4	A3	A2			140	102	16	42°605
119	+137	+477	10.6					116	87	19	42°599
63	-225	+ 83	10.6	A3	A2			74	43	15	42°585
59	-245	+469	10.6	A2	A2			70	39	13	42°583
37	-487	- 85	10.6	A4	A3			51	25	14	42°579
151	+510	-242	10.7	A3	A2			147	106	20	42°608
99	+ 51	+ 63	10.9	A4	A2			102	72	23	
108	+ 96	+303	10.9	K5	K2			107	78	22	42°593
160	+597	+258	11.0	A3	A2			152	110	24	42°609
32R	-552	-263	11.0	A5				46			
46	-399	+337	11.0	G5	G5			59	28	18	42°582

No. Ch	Coordinates x	y	m_{pg}	Spectral Type T	Bgd	Radial velocity p.e. (km/sec)	Other designations Br	Gr	Z	HD,BD
(1)	(2)		(3)	(4)		(5)	(6)			
114	+127"	-456"	11.3		A5		113	85	25	
106	+ 92	+ 18	11.4	A5	A5		105	77	27	42° 592
68	-161	-119	11.4	A6	A7		78	45	26	
145	+481	-170	11.6	A7	A8		142	103	28	
89	- 30	-337	11.6	A6	A5		94	64		
75	-123	+403	11.6	A6	A5		83			
134	+362	- 1	11.7	F0	F0		132	98	33	
149	+409	+296	11.7	F0	A8		137	101	29	
120	+159	+475	11.7	A5	A5		118		32	
93	+ 12	+126	11.8	A5	A8		97	68	35	
125	+234	-531	11.8	G5	G5		124	92	31	
130	+310	-526	11.8	G8	G5		129	95	30	41° 519
80	- 79	-271	12.0	G8	G5		89	58		
154	+548	- 81	12.0	F2	F0		149	107		
40	-453	+250	12.1	F3			53		38	
60	-239	-155	12.1	G8	G5		71	41	34	
88	- 37	+ 69	12.1				92	63	39	
61	-231	-544	12.2	F0	F5		73	42		
121	+170	-526	12.3	G0	G0		119	88	37	
76	-104	- 17	12.4	F7	G0		84	52	40	
138	+399	-122	12.5	F7	F5		136			
70	-151	-217	12.6	G0			80	48		
100R	+ 54	-162	12.6	F5			103		45	
81	- 79	+170	12.6	F5			88	57	42	
101	+ 56	+173	12.6	F4			104	73	44	
129	+286	+ 84	12.7	F5			127	94	43	
50	-317	-494	12.7	G0			63	33		
118	+133	+392	12.7				115		41	
126	+245	+282	12.8	K0			125			
97	+ 41	+369	12.8	F8	G0		100		36	
122	+188	+116	12.9	F8			120	89	48	
64	-180	+245	12.9	F8			75	44		
85	- 44	+234	13.0				91	61	46	
29	-571	+ 58	13.0							
133	+348	-170	13.0	F7			131			
73	-147	+250	13.0				81	47		
142	+455	-153	13.0	F5						
71	-150	-350	13.1	G				50	49	
148	+497	- 96	13.2	F8			146			
127	+279	+298	13.2	F8						
51	-309	-128	13.2	G8				34	47	
141	+451	-259	13.2	F5			139			
48	-356	+ 17	13.3	F8				30		
91	- 15	+239	13.3	G0				66	50	
102	+ 73	-371	13.3	G0				75		

No. Ch	Coordinates x	y	m_{pg}	Spectral Type T	Bgd	Radial velocity p.e. (km/sec)	Other designations Br	Gr	Z	HD,BD
(1)	(2)		(3)	(4)		(5)	(6)			
54	-298"	+58"	13.4	G0				36	51	
69	-158	- 75	13.4	G0				46		
153	+544	+182	13.4	G						
139	+426	+130	13.5	F8						
79	- 99	-111	13.6	F5				54		
90	- 22	-231	13.7	F8				65		
74	-122	-383	13.7	K				51		
104	+ 82	+290	13.8						53	
65	-173	-123	13.8	G0					55	
86	- 43	- 38	13.9	G0				60		
53	-303	-174	13.9	G0				35	57	
131	+320	- 9	14.0	F8				96	56	
103	+ 77	-185	14.0	G0				74	52	
77	-101	+173	14.1					53	58	
105	+ 85	-168	14.1	G5				76	54	

NGC 1039

Col. 1: Ch = R. Cherubim (Veröff. Göttingen 9, 1929)

Remarks (R)

115, ADS 2052AB; separation 1".3. Data refer to combined light.
146, ADS 2060A.
98, ADS 2049A and 2052C.
87, ADS 2048A.
84, ADS 2048B.
124, ADS 2055A.
30, ADS 2038A.
143, ADS 2060B.
32, ADS 2038B.
100, ADS 2049B.

Col. 3: Magnitudes based on a polar comparison and a cluster comparison, as well as values published by

H. Brüggemann (Abh. Bergedorf 4, No. 7, 1935),
R. Cherubim (Veröff. Göttingen 9, 1929),
M. C. Clasen (A.N. 264, 33, 1937),
R. Zug (L.O.B. 16, 119, 1933).

Col. 4: Spectral types listed under Bgd were determined by Brüggemann from two objective prism plates taken at Bergedorf (see "Col. 3" above).

Col. 6: Br = H. Brüggemann (see "Col. 3" above)
Gr = K. Graff (A.N. 219, 297, 1923)
Z = R. Zug (see "Col. 3" above)

Accurate star positions in this cluster have been published by Brüggemann (see "Col. 3" above) and by O. A. L. Pihl, Micrometric Examination of Stellar Cluster in Perseus, Christiania, 1869.

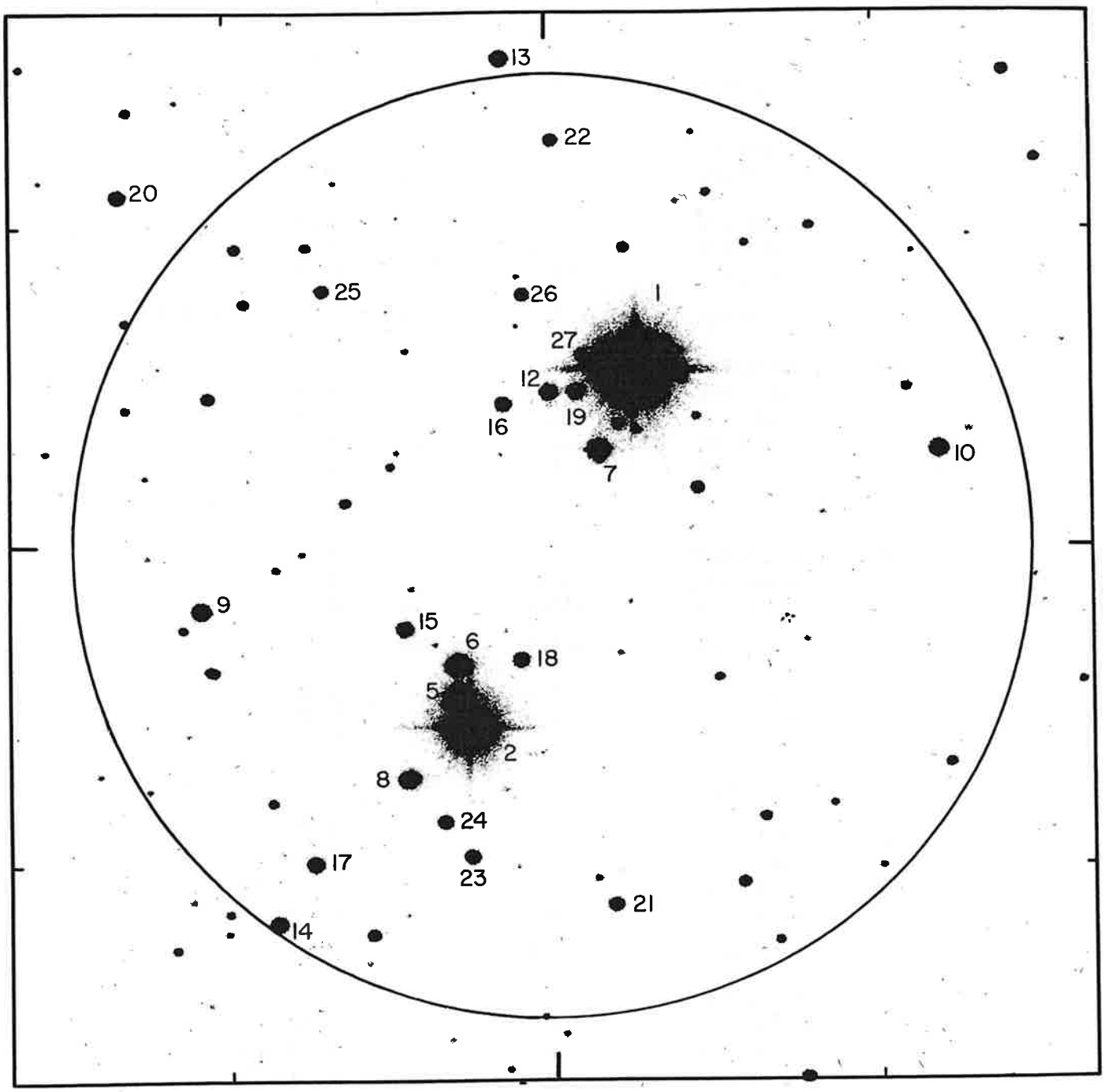
Radial Velocity Measurements

Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectro-graph	p.e.
115	24031.914	- 2.6	.5	I 12	
	4439.898	- 3.0		I 12	
	5114.003	-10.5		I 12	
	6966.033	+ 2.5	.5	II 6	
	30937.993	+ 3.7		II 6	
		- 2.5	4.0		
	Victoria*	-24.3			
	Mean	- 6.9	5.0	6 pl.	± 2.2
146	24498.665	-10.9		I 12	
	4511.591	- 7.6		I 12	
	6969.979	+ 8.1		I 12	
	30609.954	-14.6		II 6	
		- 6.3	4.0		
	Victoria*	- 5.2			
	Mean	- 6.1	5.0	5 pl.	± 2.2
98	24447.887	- 6.2		I 12	
	4453.894	-15.0		I 12	
	7057.864	-18.3		II 6	
	7080.599	- 4.9		II 6	
		-11.1	4.0		
	Victoria*	+ 6.0			
	Mean	- 7.7	5.0	5 pl.	± 2.2
87	24461.716	-14.4		I 12	
	4879.629	-12.9		I 12	
	6946.996	-13.9		I 12	
	30736.669	-15.5		II 6	
	1360.776	-11.8		II 6 A	
	Mean	-13.7	5.0		± 2.2
84	24080.905	-20.1	.3	I 12	
	4475.716	- 7.6		I 12	
	5136.911	- 5.6		I 12	
	7109.660	-10.0		II 6	
		- 8.9	3.3		
	Victoria*	- 4.0			
	Mean	- 7.8	4.3	5 pl.	± 2.4
124	24497.590	- 3.1		I 12	
	4504.803	- 8.3		I 12	
	7057.831	-13.5		II 6	
	Mean	- 8.3	3.0		± 2.9

Radial Velocity Measurements

Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectrograph	p.e.
116	24116.608	-10.3		I 12	
	4921.634	-18.5		I 12	
	7049.802	+ 3.3		II 6	
		- 8.5	3.0		
	Victoria*	+ 3.5			
	Mean	- 5.5	4.0	4 pl.	± 2.5
72	24418.894	- 8.0		I 12	
	5170.011	- 7.2		I 12	
	7316.974	-11.4		II 6	
	Mean	- 8.9	3.0		± 2.9
128	24808.791	- 1.1		I 12	
	5183.966	- 4.6		I 12	
	7328.008	- 0.7		II 6	
	9260.661	-30.3	.6	II 6	
	30609.924	+ 3.9		II 6	
	Mean	- 4.5	4.6		± 2.3
117	24775.862	- 4.7		I 12	
	5226.673	-11.8		I 12	
	8898.766	-10.1	.6	II 6	
	Mean	- 8.7	2.6		± 3.1
92	25116.950	- 5.4		I 12	
	5476.932	- 4.1		I 12	
	30736.698	- 1.2		II 6	
	Mean	- 3.6	3.0		± 2.9
113	25171.966	+ 1.1		I 12	
	5266.719	- 6.3		I 12	
	7417.795	- 6.9	.5	II 3-1/2	
	30721.613	- 4.0		II 6	
	Mean	- 3.6	3.5		± 2.7
110	25258.733	-14.4		I 12	
	5481.931	- 4.2		I 12	
	7343.025	-12.5	.5	II 3-1/2	
	7417.830	- 8.5	.5	II 3-1/2	
	31055.700	+ 8.2		II 6	
	Mean	- 5.2	4.0		± 2.0

* Dominion Astrophysical Observatory, Victoria—unpublished observations (1952).



IC 1848

IC 1848

α $2^h 47^m.3$ δ +60°12' (1950.0) l^{II} 137°.2 b^{II} +0°.9

Diameter 22' Class IV3mN; 1o7 Radial velocity -43.2 km/sec

Limit of completeness: m_{pg} = 14.0, within a radius of 2'.5 from the center.

No.	Coordinates x	Coordinates y	m_{pg}	Spectral Type	Radial velocity p.e. (km/sec)	Other designations HD, BD	ADS	GCSRV
(1)	(2)		(3)	(4)	(5)	(6)		
1R	- 25"	+ 56"	7.2	O7*	-24.5 var ±1.3	17505	2161A	1586
2R	+ 25	- 57	8.3	O9*	-38.5 ±2.5	17520	2165AB 2161G	
1a	- 23	+ 56	8.8	O8*	-30.3 ±2.9		2161B	
3	-270	- 7	9.4	B1*	-50 var ±10	59°549		1582
4	+361	+ 97	10.2			59°556		
5	+ 29	- 47	11.4	B3*	-44.7 ±3.2		2165C	
6	+ 29	- 37	11.6	B3*	-44.7 ±3.7		2165D	
7	- 14	+ 31	12.0	B3n*	-34.9 p.v. ±4.6		2161C	
8	+ 42	- 72	12.6					
9	+107	- 18	12.9					
10	-118	+ 33	13.0					
12	+ 1	+ 49	13.0				2161F	
13	+ 14	+156	13.1					
14	+ 83	-115	13.4					
15	+ 44	- 24	13.5					
16	+ 13	+ 45	13.6					
17	+ 72	- 98	13.6					
18	+ 10	- 35	13.6					
19	- 7	+ 49	13.8				2161E	
20	+129	+117	13.8					
21	- 18	-109	14.0					
22	- 2	+131	14.1					
23	+ 24	- 94	14.1					
24	+ 32	- 84	14.3					
27	- 9	+ 61	14.3				2161D	
25	+ 68	+ 78	14.4					
26	+ 8	+ 78	14.4					

Col. 1: Remarks (R)

1, orbit determination of triple system.

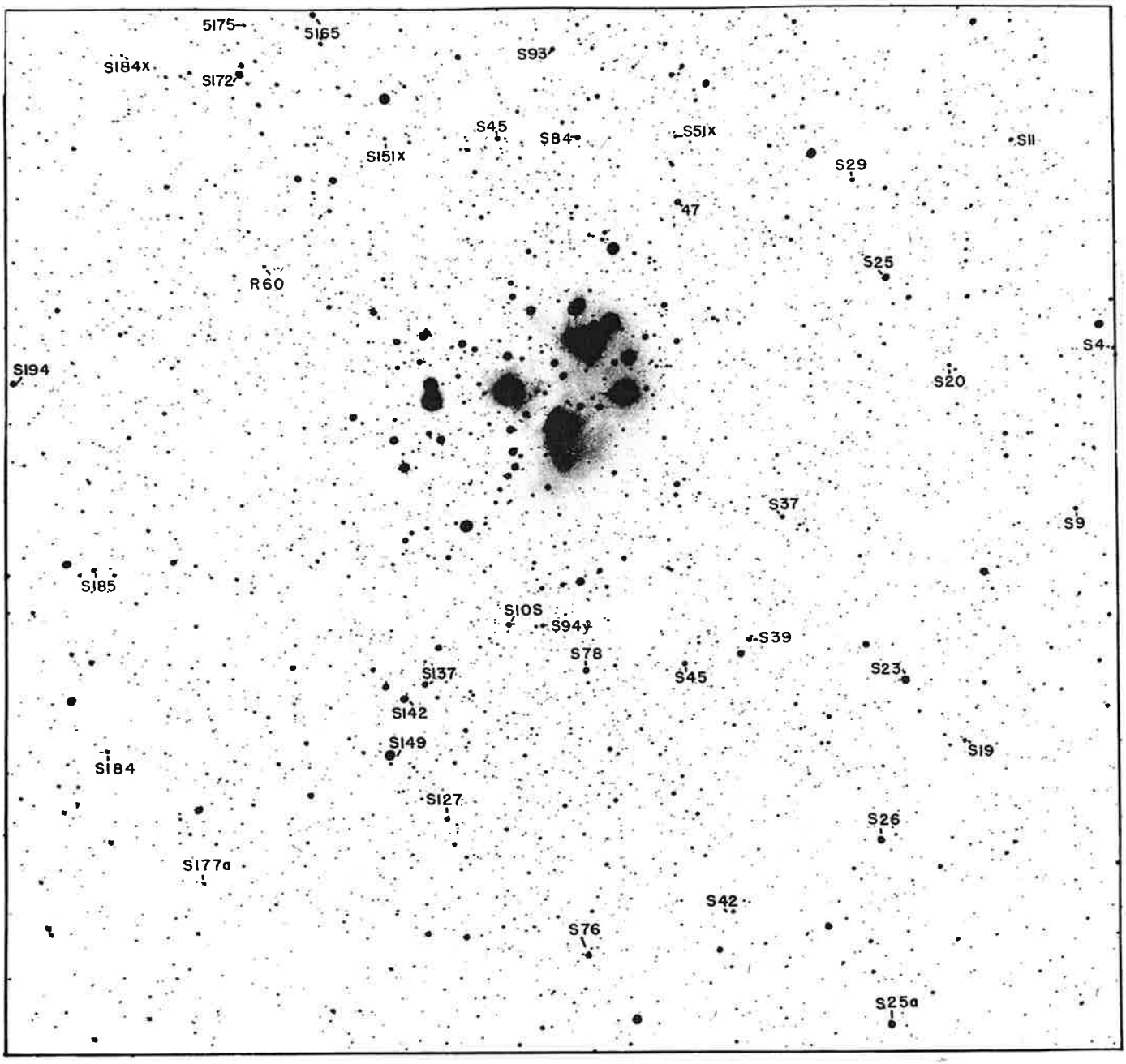
2, visual double, equal magnitudes; separation 0".3. Data refer to combined light.

Col. 3: Magnitudes based on a polar comparison and a cluster comparison.

Col. 5: The mean radial velocity of the cluster is based only on stars 3 (weight 0.3), 5, 6, 7 (weight 0.6). Stars 1, 1a and 2 are probably affected by relativity red shift.

Radial Velocity Measurements

Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectrograph	p.e.
1	Orbit determination of triple system (See Appendix I)				
	Mean	-24.5			± 1.3
2	25875,904	-19.5	.5	I 12	
	7018.013	-48.9	.5	I 12	
	7724.028	-38.1		II 6	
	30230.874	-44.2		II 6	
	1054.648	-37.6		II 6	
	Mean	-38.5	4.0		± 2.5
1a	27753.890	-37.2		II 6	
	8081.841	-26.9		II 6	
	31319.009	-26.7		II 6	
	Mean	-30.3	3.0		± 2.9
3	30230.899	-66.3		II 6	
	0321.879	-50.9		II 6	
	1360.835	-29.0		II 6A	
	2422.957	- 8.4		II 6A	
		-38.6	4.0		
	GCSRV 1582	-98			
	Mean	-50	5.0		±10
5	28404.959	-51	.4	II 3-1/2	
	30230.956	-47.3		II 6	
	0321.824	-39.5		II 6	
	Mean	-44.7	2.4		± 3.2
6	27719.986	-49	.4	II 3-1/2	
	9297.653	-49	.4	II 3-1/2	
	30322.687	-41.2		II 6	
	Mean	-44.7	1.8		± 3.7
7	30592.967	-38.5		II 6	
	0639.964	-29.0		II 6	
	1375.825	- 7.7	.5	II 6A	
	1707.886	-30.9		II 6A	
	2477.970	-54.6		II 6A	
	Mean	-34.9	4.5		± 4.6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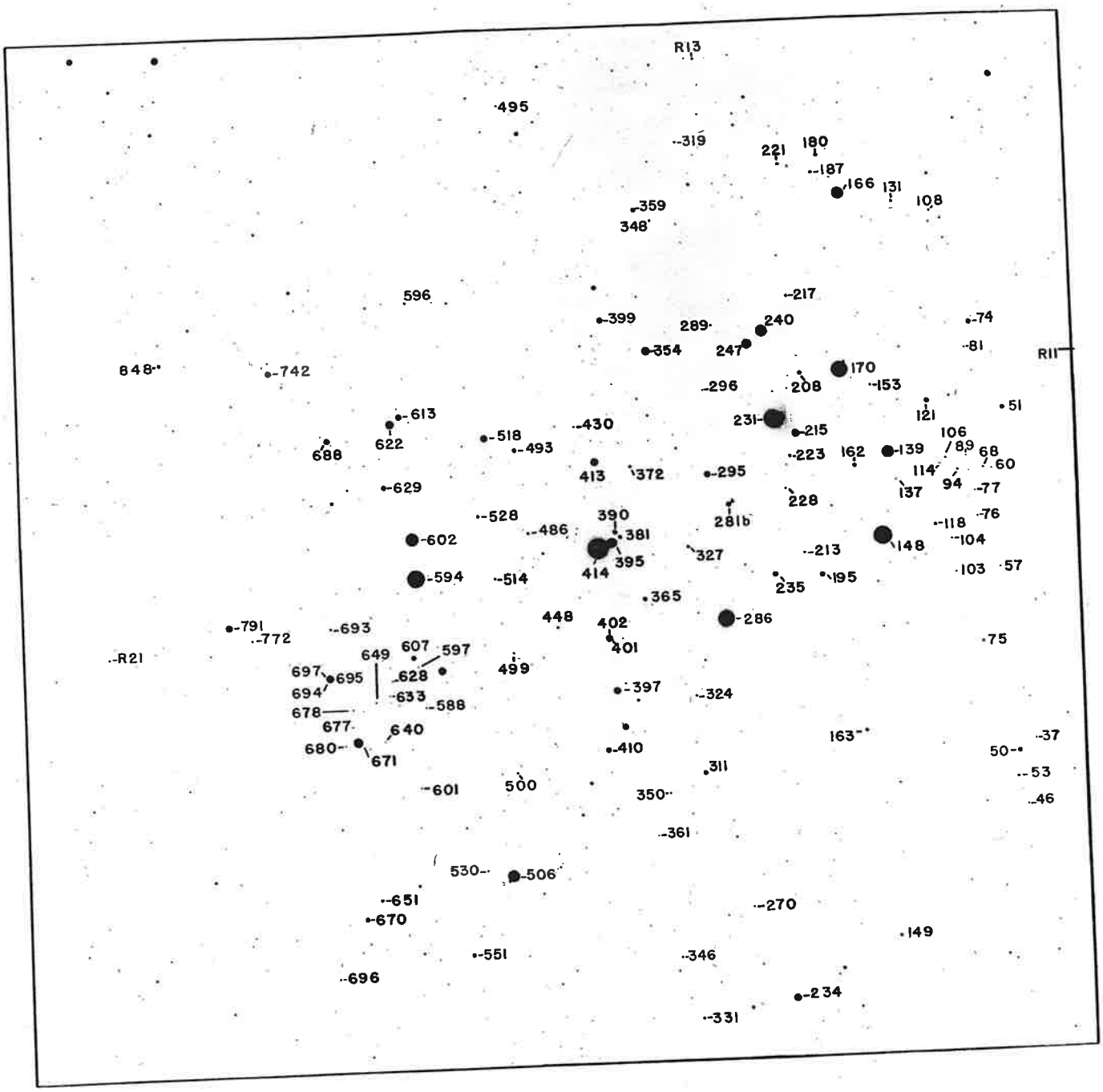
S165
S184x
S172
S93
S45
S84
S51x
S151x
S11
S29
47
S25
R60
S4
S194
S20
S37
S9
S185
S105
S94y
S39
S78
S137
S45
S23
S142
S149
S184
S19
S127
S26
S177a
S42
S76
S25a

Pleiades



Pleiades (inner)

Pleiades

(M45)

α $3^h\ 44^m.5$ δ +23° 57' (1950.0) l^{II} 166°.7 b^{II} -23°.5

Diameter 120' Class II 3 r N; 1 b 6 Radial velocity +7.3 km/sec

No. T	No. HD, BD	m_{pg}	Spectral Type T	M	S	HD	Radial velocity (km/sec.)	p.e.	Other Designations GCSRV	Bi	E
(1)	(2)	(3)		(4)			(5)			(6)	
414R	23630	2.8	B8e	B7III	B5p	B5p	+ 9.7	±1.0	2135	1432	48
594R	23850	3.6	B8	B8III	B8	B8	+ 8.2	±1.0	2171	2168	59
148	23302	3.6	B7	B6III	B5p	B5p	+11.5	±1.1	2079	468	11
231	23408	3.8	B8s	B7III	B5	B5	+ 7.5	±0.5	2097	785	25
286	23480	4.1	B7n	B6nIV	B5	B5	+ 7.8	±1.1	2108	980	31
170	23338	4.2	B7	B6V	B5	B5	+ 4.5	±0.8	2086	563	17
602R	23862	5.0	B8-cA1 pec.		B8p	B8p	+ 4.6	±0.5	2172	2181	60
506	23753	5.4	B9n	B8	B8	B8	+ 8.6	±1.6	2152	1823	54
139	23288	5.4	B8	B7IV	B5	B5	+ 3.3	±1.0	2077	447	10
166	23324	5.6	B9	B8V	B8	B8	+ 9.6	±1.9	2085	541	16
240	23432	5.7	B9	B8V	B8	B8	+ 4.0	±1.8	2100	817	27
671	23923	6.1	B9	B9V	B9	B8	+11.5	±1.6	2187	2425	67
395	23629	6.3	B9			A0	+ 7.7	±1.6	2130	1375	
247	23441	6.4	B9	B9V	B9	B9	+ 5.6	±1.7	2103	859	28
622	23873	6.6	B9	B9	B9	B9	+ 8.6	±2.3	2176	2263	63
234R	23410	6.9	A0			A0	+ 8.6	±2.0	2098	801	
697R	23964	6.8	A0			B9	+12.4 var	±4.1	2190	2507	
354	23568	6.8	B9	B9V	B9	B9	+ 6.4	±2.4	2124	1234	40
413	23642	6.9	A0	A0	B9	B9	+ 1	±8	2137	1431	47
397	23632	7.0	A1	A0	A0	A0	+ 8.5	±2.6	2131	1380	43
791	24076	7.0	A1	A0	A0	A0	+ 4.1 p.v.	±2.9	2200	2866	70
518	23763	7.1	A1	A1	A0	A0	+ 9.2	±2.5	2154	1876	56
402R	23631	7.3	A1	A0	B9	B9	+ 4.4	±2.6	2133	1397	45
215	23387	7.3	A1	A0	B9	B9	+ 9.4	±2.2	2095	717	22
295	23489	7.4	A1	A1	A0	A0	+ 8.5	±2.0	2110	1028	33
742R	24013	7.6	A1	A2		A2	+ 4.5	±2.2		2690	69
688	23948	7.6	A2	A2	A0	A0	+ 6.2	±1.4	2188	2488	68
613R	23872	7.6	A2n	A2	A0	A0	+ 6.3	±1.4	2175	2220	62
399	23628	7.9	A2	A4	A2	A0	+ 8.7	±1.5	2132	1384	44
410	23643	7.9	A3	A3	A0	A0	+ 9.9	±1.6	2136	1425	46
235	23409	8.0	A3	A3	A1	A0	+ 7.5	±1.5	2099	804	26
629	23886	8.2	A2	A4	A2	A2	+ 7.4	±1.7	2179	2289	64
281R	23479	8.3	A7			A3	+ 1.1	±1.4	2107	956	
50	23157	8.2	A8	A8	A3	A5	+ 5.7	±1.6	2055	157	2
195	23361	8.2	A4	A3	A2	A3	+ 9.4	±1.9	2091	652	19

No. T	No. HD,BD	m_{pg}	Sp. Type T	M	S	HD	Rad. Vel. km/sec	p.e.	Other Desig. GCSRV	Bi	E
(1)	(2)	(3)		(4)				(5)		(6)	
74	23194	8.3	A4	A4	A2	A2	+ 4.3	±1.6	2060	232	5
670	23924	8.3	A7	A4	A5	A2	+ 7.5	±1.7	2184	2415	66
607	23863	8.3	A4	A5	A2	A2	+ 4.7	±1.5	2173	2195	61
121	23246	8.4	A4	A7	A8	A5	+ 4.6	±1.5	2069	344	8
311	23512	8.5	A1	A0	A0	A0	+ 5.7	±2.2	2117	1084	34
51	23156	8.5	A7	A7	A4	A5	+ 5.0	±1.5	2054	158	3
390	23607	8.5	A5			A0	+ 5.9	±1.9	2129	1362	
493	23733	8.6	A8	A9	A7	A3	+ 8.9	±3.7	2150	1762	51
359R	23567	8.6	A7			A2	+ 9.2	±1.9	2125	1266	
551	23791	8.7	A8	A6	A2	A3	+ 5.0	±1.9	2163	1993	58
365	23585	8.7	A7	A8	A3	A2	+ 4.1	±1.9	2126	1284	41
162	23325	8.9	A5	A5	A5	A0	+ 5.2	±1.6	2082	531	15
208	23375	9.0	A7	A8	A6	A2	+13.6	±1.3	2093	697	20
381	23608	9.2	F5			G0	+ 5.8	±2.3		1338	
848	24132	9.2	A6		A8	A5	+ 8.6	±1.4	2204	3031	71
149	23289	9.3	F3		A8	F5	+ 3.7	±1.6	2078	470	12
163	23326	9.3	F2		F0	F5	+ 5.4	±1.9	2083	530	14
180	23351	9.4	F2		F2	F5	+10 var	±7	2088	605	18
528R	23778	9.5	F5			F8				1912	
118	23247	9.5	F5		F5	A2	+13.2	±1.7		338	7
651	23912	9.5	F0		F5	F8	+ 4.4	±1.7	2180	2345	65
		9.6			F5					1766	52
327	23511	9.8	F2		F7	F8				1122	36
486	23713	9.8	F8		F5	G0				1726	50
331	23513	9.9	F5		F5	F8				1139	37
R11	23061	10.0	F5		F5	F8				25	1
223	23°513	10.0	F0		F2					745	24
372	23584	9.9	F2		F2	F8				1309	42
53	23158	10.0	F3		F5	G5				164	4
187	23352	10.2	F5			G				627	
221	23386	10.2	F9			G				739	
75	23195	10.2	F3		F5	F8				233	6
217	24°552	10.2	F8		F8					727	23
693R		10.3	B6							2499	
401R		10.4	G6							1392	
131	23260	10.4	F7		F8p	G5				405	9
448	23°545	10.4	F0		F9					1613	49
346		10.4	F5							1200	
R21	24194	10.6	F9			G5				3179	
514	23°552	10.6	F7		F9					1856	55
695R		10.7								2503	
500	23°551	10.7	F6		F8					1797	53
213	23°511	10.8	F8		G0					708	21
94		10.7	F0							281	
270	22°548	10.7	G1		G0					923	30

No. T	No. HD,BD	m_{pg}	Sp. Type T	Sp. Type M	Sp. Type S	Sp. Type HD	Rad. Vel. km/sec p.e.	Other Designations GCSR	Other Designations Bi	Other Designations E
(1)	(2)	(3)		(4)			(5)		(6)	
319		10.9	F9						1101	
696	22°574	10.8	F9						2506	
772		10.9	G1						2786	
324	23°525	10.9	G7		G0				1117	35
530		11.0	F9		G0				1924	57
694R		11.0	G0						2500	
153		11.0	G5		F8				489	13
499		11.0	G0						1794	
596		11.0	G0						2172	
289		11.1	G1		G0				996	32
348		11.1	G1		G0p				1207	
350	23°527	11.2	F9		F9				1215	39
430		11.1	G0						1514	
R13		11.2	G2						1015	
108		11.2	G3						314	
228		11.2	G7						761	
106		11.3	F5						309	
601		11.3	F0						2182	
81		11.3	G0						253	
104R		11.4	G0						303	
46		11.4	G5						152	
68		11.5	K0						213	
37		11.5	G2						120	
588		11.6	G6						2147	
649		11.6	G3						2341	
495		11.6	G4						1776	
76		11.8	K0						234	
677		11.9	F2						2439	
296		12.2	G5						1032	
57		12.0	G0:						180	
678		12.0	G0						2443	
628		12.1	G7:						2284	
60		12.1	K0						193	
103R		12.1	G						299	
137		12.2	G5						430	
640		12.2	K0						2311	
89		12.4	G8						263	
361		12.3	G9						1275	
77		12.4	K2						239	
680		12.4	G5						2462	
633		12.6	K2						2296	
114		12.6	K0						322	
597		12.7	G:						2173	

No. T	No. HD, BD	m_{pg}	Sp. Type T	Sp. Type HD	Rad. Vel. (km/sec)	p.e.	Other Desig. GCSRV	Other Desig. E	d.f.c.
(1)	(2)	(3)	(4)		(5)		(6)		(7)
S149	23950	6.1	B9	B9	+ 7.9	±1.8	2189		2°0
S177	24368	6.5	A2s	A0	+11.2	±1.6	2228		2.1
S 23	22578	6.7	A0	A0	+ 9.1	±2.5	2013		2.5
S 25a	22615	6.7	A0	A0	- 6.1	±1.9	2015		3.7
S142	23913	7.0	A0	B9	+ 4.8	±1.7	2183		1.7
S 25	22614	7.1	A1	A0	+ 8.3	±2.1	2016		2.0
S194	24899	7.2	A0	B9	+ 7.7	±2.0	2273		2.5
S 26R	22637	7.3	A0	A0	+17.6	±2.4	2017		3.0
47	23155	7.7	A2	A2	+ 4.6 var	±3.0	2 52		1.3
S165	24178	7.8	A1	A0	+ 2.5	±2.3	2210	77	2.1
S137	23852	7.9	A3	A0	+ 9.6	±1.5	2174	75	1.6
S 78R	23402	8.0	A3	A0	+ 4.8	±1.7	2096		1.5
S 76	23388	7.9	A2	A3	+10.1	±1.6	2094		2.9
S 84	23430	8.2	A3	A0	+ 8.5	±1.7	2101		1.3
S108	23610	8.4	A3s	A0	+11.3	±2.3		73	1.2
S115	23664	8.6	A5	A2	+10.9	±1.9	2144		1.3
S127	23792	8.8	F1	F0	+ 7.9	±1.5	2162	74	2.2
S185	24711	8.6	A2	A0	+ 8.0	±1.9	2259		2.3
S 45R	23133	9.0	F6	F5	+ 2.3	±2.0	2048		1.6
S 93	23488	9.1	A7	A0	+ 4.3	±1.6	2113		1.8
S 9	22146	9.2	F2	A5	+ 4.5	±2.3			2.9
S 29	22702	8.2	A8	A2	+10.3	±2.0			2.0
S 20	22491	9.1	gK0	G5	+50.4	±2.4	2006		2.2
S 37	22887	9.6	A8	F5				72	1.5
R60	24302	9.9	F3	F8	+ 4.8	±2.2	2217		1.3
S 11R	22308	9.6	F3	F0	+14.4	±1.8			2.8
S 19	22444	9.7	F5	G0					2.9
S39	22977	9.6	F2	F8					1.8
S184	24655	9.5	F3	F8	+ 7.0	±2.1			2.7
S 4R	23°472	10.1	F5		+ 8.6	±2.4			3.0
S175R	24366	9.6	G5	G5					2.3
S177aR	21°549	9.8	G8						2.9
S 94y	23514	10.0	F5	G0					1.2
S151x	23975	10.1	F5	G0				76	1.4
S 42	21°504	10.4	F8						2.9
S 51x	23154	10.4	F5	G					1.6
S184x	25°644	11.1	F0						2.6

Pleiades

Col. 1: T = R. J. Trumpler (L.O.B. 10, 110, 1921)

Remarks (R)

103, ADS 2727A. Data refer to brighter (s.f.) component.

104, ADS 2728AB. Data refer to combined light.

234, ADS 2748A. Data refer to brighter component.

281, ADS 2755AB; close double. Data refer to combined light.

359, ADS 2760AB; close double. Data refer to combined light.

401, ADS 2767B, fainter component of double star.

402, ADS 2767A. Data refer to brighter component.

414, trace of H_β emission on some spectrograms.

528, ADS 2782AB; close double. Data refer to combined light.

594, ADS 2786, doubtful if close double.

602, variable spectral class; photoelectric measurements also suggest a small variation in brightness.

613, our 6 radial velocity observations alone would indicate variable velocity; if GCSRV observations are included, however, variability becomes doubtful.

693, double star, brighter (n.p.) component.

694, ADS 2795C.

695, ADS 2795B.

697, ADS 2795A. Data refer to brightest component only.

742, physical membership doubtful. Binnendijk, on basis of proper motion, does not include it among cluster members. From magnitude-spectral type relation and radial velocity it would appear to be a member.

S4, GCSRV 1966 apparently does not refer to this star, but to HD 22040 which is 2' s.p. of S4.

S11, membership somewhat doubtful; neither proper motion nor radial velocity agree very closely with the motion of the cluster.

S26, radial velocity seems to indicate that this star is not a member.

S45, ADS 2714A. Data refer to brighter component.

S78, wide double, Boss GC 1852. Data refer to brighter component.

S175, S177a, spectral types suggest that these stars are not members.

No. T	No. HD, BD	m_{pg}	Sp. Type T	Sp. Type HD	Rad. Vel. (km/sec)	p.e.	Other Desig. GCSRV	Other Desig. E	d.f.c.
(1)	(2)	(3)	(4)		(5)		(6)		(7)
S149	23950	6.1	B9	B9	+ 7.9	±1.8	2189		2°0
S177	24368	6.5	A2s	A0	+11.2	±1.6	2228		2.1
S 23	22578	6.7	A0	A0	+ 9.1	±2.5	2013		2.5
S 25a	22615	6.7	A0	A0	- 6.1	±1.9	2015		3.7
S142	23913	7.0	A0	B9	+ 4.8	±1.7	2183		1.7
S 25	22614	7.1	A1	A0	+ 8.3	±2.1	2016		2.0
S194	24899	7.2	A0	B9	+ 7.7	±2.0	2273		2.5
S 26R	22637	7.3	A0	A0	+17.6	±2.4	2017		3.0
47	23155	7.7	A2	A2	+ 4.6 var	±3.0	2 52		1.3
S165	24178	7.8	A1	A0	+ 2.5	±2.3	2210	77	2.1
S137	23852	7.9	A3	A0	+ 9.6	±1.5	2174	75	1.6
S 78R	23402	8.0	A3	A0	+ 4.8	±1.7	2096		1.5
S 76	23388	7.9	A2	A3	+10.1	±1.6	2094		2.9
S 84	23430	8.2	A3	A0	+ 8.5	±1.7	2101		1.3
S108	23610	8.4	A3s	A0	+11.3	±2.3		73	1.2
S115	23664	8.6	A5	A2	+10.9	±1.9	2144		1.3
S127	23792	8.8	F1	F0	+ 7.9	±1.5	2162	74	2.2
S185	24711	8.6	A2	A0	+ 8.0	±1.9	2259		2.3
S 45R	23133	9.0	F6	F5	+ 2.3	±2.0	2048		1.6
S 93	23488	9.1	A7	A0	+ 4.3	±1.6	2113		1.8
S 9	22146	9.2	F2	A5	+ 4.5	±2.3			2.9
S 29	22702	8.2	A8	A2	+10.3	±2.0			2.0
S 20	22491	9.1	gK0	G5	+50.4	±2.4	2006		2.2
S 37	22887	9.6	A8	F5				72	1.5
R60	24302	9.9	F3	F8	+ 4.8	±2.2	2217		1.3
S 11R	22308	9.6	F3	F0	+14.4	±1.8			2.8
S 19	22444	9.7	F5	G0					2.9
S39	22977	9.6	F2	F8					1.8
S184	24655	9.5	F3	F8	+ 7.0	±2.1			2.7
S 4R	23°472	10.1	F5		+ 8.6	±2.4			3.0
S175R	24366	9.6	G5	G5					2.3
S177aR	21°549	9.8	G8						2.9
S 94y	23514	10.0	F5	G0					1.2
S151x	23975	10.1	F5	G0				76	1.4
S 42	21°504	10.4	F8						2.9
S 51x	23154	10.4	F5	G					1.6
S184x	25°644	11.1	F0						2.6

Pleiades

Col. 1: T = R. J. Trumpler (L.O.B. 10, 110, 1921)

Remarks (R)

103, ADS 2727A. Data refer to brighter (s.f.) component.

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594, ADS 2786, doubtful if close double.

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S26, radial velocity seems to indicate that this star is not a member.

S45, ADS 2714A. Data refer to brighter component.

S78, wide double, Boss GC 1852. Data refer to brighter component.

S175, S177a, spectral types suggest that these stars are not members.

Col. 3: Magnitudes based on values published by
H. L. Johnson and R. I. Mitchell (Ap.J. 128, 33, 1958),
L. Binnendijk (Ann. Leiden 19, 93, 1946).

Col. 4: Spectral types listed under M were determined by W. W. Morgan and published by H. L. Johnson and W. W. Morgan (Ap.J. 117, 330, 1953). Those listed under S were determined by A. Schwassmann (Abh. Bergedorf 6, 129, 1930).

Col. 5: In the calculation of the mean radial velocity of the cluster, stars 47, 180, 697, 791 were omitted because of variable velocity; star 413 was omitted because of the very large probable error; stars S20, S25a, S26 were omitted because of large discrepancy in the radial velocity and distance from center. The mean is therefore based on the radial velocities of 74 stars.

Col. 6: Bi = L. Binnendijk (see "Col. 3" above)
E = O. J. Eggen (Ap.J. 111, 349, 1950)

Col. 7 (end of table): This column lists, for stars near the end of the table, the angular distance from the central star 414 (Alcyone).

Stars included in this list are those for which radial velocity or spectral type determinations have been made. The list is divided into two parts. In the first part of the list are stars within about 1° of Alcyone (central region), while in the second part are those stars that are more than 1° distant from Alcyone. The great majority of stars in both parts of the list are physical members of the Pleiades group. The following nonmembers, for which membership criteria were previously uncertain, or which have been observed incidentally, are also included in the table: in the first part, stars 57, 68, 76, 77, 94, 106, 114, 597, 601, 633, 677, 678, 693; in the second part, stars S20, S25a, S26, S175, S177a.

For many of the type A stars in the Pleiades, there is a noticeable discrepancy between the spectral classification based on the K line and that based on the metallic lines. The mean of the two is generally given here, but note that the following stars show relatively faint metallic lines: 74, 235, 311, 399, 410, 518, 607, 688, 848, S25, S76, S78, S93, S127, S137, S165, S185; two stars, 51 and 390, show relatively strong metallic lines.

Radial Velocity Measurements

Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectrograph	p.e.
S4	24077.995	+ 5.0		I 12	
	4110.919	+ 8.5		I 12	
	30616.990	+13.8	.7	II 6	
	Mean	+ 8.6	2.7		±1.6
S9	24152.794	+ 5.2		I 12	
	4376.977	+ 7.0		I 12	
	30721.699	+ 1.2		II 6	
	Mean	+ 4.5	3.0		±1.2
S11	24117.890	+12.0		I 12	
	4134.657	+ 9.6		I 12	
	30259.853	+17.8	.7	II 6	
	1819.745	+18.1		II 6A	
	2239.686	+15.7		II 6A	
	Mean	+14.4	4.7		±1.1
S20	24493.748	+38.5		I 12	
	4498.806	+59.9		I 12	
		+49.2	2.0		
	GCSRV 2006	+54	.7		
	Mean	+50.4	2.7	3 pl.	±2.4
S23	22986.854	+18.3		I 16	
	4089.711	+11.7	.6	I 12	
	30319.882	+ 1.7	.5	II 6	
	1054.677	+ 5.6		II 6	
		+10.2	3.1		
	GCSRV 2013	+ 5.0	.8		
	Mean	+ 9.1	3.9	6 pl.	±2.5
S25	22966.044	+20.7	.5	I 16	
	3011.813	+ 5.5		I 16	
	4055.026	+10.0		I 12	
	4405.011	+17.3	.6	I 12	
	31316.940	+12.7		II 6	
	2093.002	- 1.7		II 6A	
		+ 9.3	5.1		
	GCSRV 2016	+ 1.6	.8		
	Mean	+ 8.3	5.9	8 pl.	±2.1
S25a	22979.049	-12.6		I 16	
	3029.707	- 7.9		I 16	
		-10.2	2.0		
	GCSRV 2015	- 4.4	4.8		
	Mean	- 6.1	6.8	8 pl.	±1.9

Radial Velocity Measurements

Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectrograph	p.e.
S26	22987.985	+ 4.9	.5	I 16	
	4082.920	+16.5	.6	I 12	
	4152.708	+13.4	.6	I 12	
	30734.630	+13.6		II 6	
	2093.020	+18.9		II 6A	
		+14.3	3.7		
	GCSRV 2017	+33.1	.8		
	Mean	+17.6	4.5	7 pl.	±2.4
S29	24066.995	+11.1		I 12	
	4152.633	+ 5.5		I 12	
	32063.974	+15.7		II 6A	
	2476.809	+ 8.9		II 6A	
	Mean	+10.3	4.0		±2.0
S45	24423.915	+ 2.9		I 12	
	4493.835	+ 2.4		I 12	
	30594.986	+12.0	.7	II 6	
		+ 5.1	2.7		
	GCSRV 2048	- 3	1.4		
	Mean	+ 2.3	4.1	5 pl.	±2.0
47	22982.927	+ 5.1		I 16	
	3029.759	+ 8.9		I 16	
	4080.995	+33.4		I 12	
	4132.611	-21.4		I 12	
	30257.987	+ 7.0		II 6	
	10 3.962	+ 8.1		II 6	
	1413.695	- 4.8		II 6A	
	1746.817	+ 3.0		II 6A	
		+ 4.9	8.0		
	GCSRV 2052	+ 3.2	2.0		
	Mean	+ 4.6	10.0	10 pl.	±3.0
50	24077.848	+ 6.5		I 12	
	4427.983	+ 4.2		I 12	
	30616.954	+15.9	.7	II 6	
	1826.733	+19.6	.7	II 6A	
		+10.4	3.4		
	GCSRV 2055	+ 0.4	3.1		
	Mean	+ 5.7	6.5	9 pl.	±1.6
51	22967.904	+ 4.2	1.5	I 16	
	4100.905	+ 9.4		I 12	
	30670.908	- 6.1		II 6	
	0734.612	+ 5.1		II 6	
	1412.775	+ 4.9	.7	II 6A	
		+ 3.5	5.2		
	GCSRV 2054	+ 8.4	2.3		
	Mean	+ 5.0	7.5	10 pl.	±1.5

Radial Velocity Measurements

Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectro-graph	p.e.
74	24208.632	+ 0.8	.7	I 12	
	4461.776	+ 3.0	.7	I 12	
	30609.995	+ 8.0		II 6	
	2476.826	+ 7.1		II 6A	
		+ 5.2	3.4		
	GCSRV 2060	+ 3.1	2.4		
	Mean	+4.3	5.8	8 pl.	±1.6
118	24150.643	+15.3		I 12	
	4439.992	+19.1		I 12	
	30223.991	+10.2	.7	II 6	
	0398.679	+10.2	.7	II 6	
	2239.713	+11.5		II 6A	
	2422.993	+11.1		II 6A	
	Mean	+13.2	5.4		±1.7
121	24077.802	+ 7.7		I 12	
	4120.830	- 9.3		I 12	
	4443.832	+7.6		I 12	
	30638.866	+16.6		II 6	
		+ 5.7	4.0		
	GCSRV 2069	+ 3.2	3.1		
	Mean	+ 4.6	7.1		±1.5
139	22986.944	- 6.3	.4	I 16	
	2997.075	+23.4	.7	I 16	
	3022.802	+ 1.3	.7	I 16	
	4054.970	+12.8		I 12	
	4123.857	- 8.2		I 12	
	30011.724	- 0.1		II 6	
	0231.030	+ 7.0		II 6	
		+ 4.5	5.8		
	GCSRV 2077	+ 2.9	17.0		
	Mean	+ 3.3	22.8	24 pl.	±1.0
148	22975.927	- 0.5	.7	I 16	
	2987.973	+16.1	.7	I 16	
	3014.870	+6.2	.7	I 16	
	4077.763	+16.6		I 12	
	4150.851	+10.1	.6	I 12	
	30405.600	+ 1.4		II 6	
	0735.593	+10.9		II 6	
		+ 8.8	5.7		
	GCSRV 2079	+12.4	17.0		
	Mean	+11.5	22.7	24 pl.	±1.1

Radial Velocity Measurements

Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectrograph	p.e.
149	24453.970	+ 4.4		I 12	
	4459.788	+ 3.9		I 12	
	30399.633	- 0.4	.7	II 6	
		+ 3.0	2.7		
	GCSRV 2078	- 4.4	3.1		
	Mean	+ 3.7	5.8	8 pl.	±1.6
162	24117.767	- 4.2		I 12	
	4148.768	+ 3.0		I 12	
	30720.625	+ 7.4	.7	II 6	
		+ 1.5	2.7		
	GCSRV 2082	+ 8.3	3.1		
	Mean	+ 5.2	5.8	8 pl.	±1.6
163	24427.896	+ 1.5		I 12	
	4447.987	+ 5.3		I 12	
	30405.620	+ 2.7	.7	II 6	
		+ 3.2	2.7		
	GCSRV 2083	+ 8.7	1.8		
	Mean	+ 5.4	4.5	6 pl.	±1.9
166	22986.931	+12.6		I 16	
	24054.994	+17.4		I 12	
	4131.687	+ 7.6		I 12	
	30373.798	+ 6.2		II 6	
	1734.840	+ 4.6		II 6	
		+ 9.7	5.0		
	GCSRV 2085	+ 9.2	2.0		
	Mean	+ 9.6	7.0	9 pl.	±1.9
170	22979.066	- 5.5	.7	I 16	
	3001.831	+ 4.1	.7	I 16	
	4037.929	+18.5	.6	I 12	
	4100.878	- 3.8		I 12	
	30011.719	- 2.5		II 6	
	0322.068	+14.8		II 6	
		+ 4.2	5.0		
	GCSRV 2086	+ 4.5	34.0		
	Mean	+ 4.5	39.0	45 pl.	±0.8
180	24404.935	-14.9		I 12	
	4441.987	+ 8.4		I 12	
	30322.884	+27.2		II 6	
	0609.981	+51.2		II 6	
		+18	4.0		
	GCSRV 2088	+ 2	4.0		
	Mean	+10	8.0	8 pl.	±7

Radial Velocity Measurements

Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectrograph	p.e.
195	24116.838	+10.9	.7	I 12	
	4461.828	+ 2.5	.7	I 12	
	30372.598	+ 8.7		II 6	
		+ 7.5	2.4		
	GCSRV 2091	+12	1.8		
	Mean	+ 9.4	4.2	6 pl.	±1.9
208	24019.000	+ 8.4		I 12	
	4459.909	+ 9.8		I 12	
	30638.879	+21.5	.7	II 6	
	2183.685	+ 1.5		II 6A	
		+ 9.4	3.7		
	GCSRV 2093	+16.6	5.2		
	Mean	+13.6	8.9	12 pl.	±1.3
215	24105.940	+ 0.1		I 12	
	9930.995	+30.3	.3	II 6	
	31350.911	+15.2		II 6	
	2205.700	+11.3		II 6A	
		+10.8	3.3		
	GCSRV 2095	+ 7.0	2.0		
	Mean	+ 9.4	5.3	9 pl.	±2.2
S76	22968.000	+ 9.8	1.5	I 16	
	4113.760	+12.0		I 12	
	4116.789	+ 8.0	.7	I 12	
	31358.918	+19.4		II 6	
	1525.648	+10.8		II 6A	
		+12.0	5.2		
	GCSRV 2094	+ 2.1	1.2		
	Mean	+10.1	6.4	7 pl.	±1.6
S78	22982.995	- 3.7	1.5	I 16	
	4459.990	0.0		I 12	
	30638.889	+ 9.5		II 6	
	1022.985	+10.2		II 6	
		+ 3.2	4.5		
	GCSRV 2096	+10.9	1.2		
	Mean	+ 4.8	5.7	8 pl.	±1.7

Radial Velocity Measurements

Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectrograph	p.e.
231	22976.069	- 4.4	.7	I 16	
	4066.833	+14.5		I 12	
	4080.929	+ 9.0		I 12	
	6991.866	+ 9.3		I 12	
	31734.870	+ 3.6		II 6A	
		+ 7.1	4.7		
	GCSRV 2097	+ 7.5	110.0		
	Mean	+ 7.5	114.7	115 pl.	±1.5
234	22983.048	+13.5		I 16	
	3001.850	+13.1		I 16	
	4128.875	- 0.4		I 12	
	30595.019	+ 9.9		II 6	
	1370.995	+ 7.7		II 6A	
		+ 8.8	5.0		
	GCSRV 2098	+ 7.6	1.2		
	Mean	+ 8.6	6.2	8 pl.	±2.0
235	24128.835	- 2.6		I 12	
	4452.832	+ 5.5	.7	I 12	
	30637.004	+15.4		II 6	
	2062.982	+12.6		II 6A	
		+ 7.9	3.7		
	GCSRV 2099	+ 7.0	3.1		
	Mean	+ 7.5	6.8	9 pl.	±1.5
240	22976.062	- 3.3	.5	I 16	
	2983.067	+ 3.4		I 16	
	4116.651	- 3.5		I 12	
	9930.979	+22.4	.6	II 6	
	30734.594	+ 5.9		II 6	
		+ 4.3	4.1		
	GCSRV 2100	+ 3.7	3.5		
	Mean	+ 4.0	7.6	13 pl.	±1.8
S84	22979.791	+ 3.3	1.5	I 16	
	4393.015	+ 9.8	.7	I 12	
	30670.923	+15.5		II 6	
	1054.701	+ 7.7		II 6	
		+ 8.3	4.2		
	GCSRV 2101	+ 9.4	1.2		
	Mean	+ 8.5	5.4	6 pl.	±1.7
247	22986.910	+ 9.0		I 16	
	4027.922	- 2.2		I 12	
	4459.954	+15.8		I 12	
	30735.611	+ 3.6		II 6	
	1877.741	+ 4.3		II 6A	

Radial Velocity Measurements

Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectro-graph	p.e.
247 (cont' d)					
		+ 6.1	5.0		
	GCSRV 2103	+ 4.9	3.4		
	Mean	+ 5.6	8.4	13 pl.	±1.7
281	24469.814	+ 0.2	.7	I 12	
	30225.001	+ 8.9	.7	II 6	
	0319.865	+ 9.9		II 6	
	1469.624	- 5.2		II 6A	
		+ 3.2	3.4		
	GCSRV 2107	- 0.4	4.5		
	Mean	+ 1.1	7.9	11 pl.	±1.4
286	22983.076	+13.3	.7	I 16	
	2986.805	+18.5	.7	I 16	
	4066.949	+11.5	.6	I 12	
	4083.850	+19.8		I 12	
	30372.581	- 4.7		II 6	
	2113.966	+16.7		II 6A	
		+12.2	5.0		
	GCSRV 2108	+ 6.2	14.0		
	Mean	+ 7.8	19.0	20 pl.	±1.1
295	24100.951	+14.0	.6	I 12	
	0286.854	+18.5		II 6	
	1737.841	+ 2.6		II 6A	
		+11.3	2.6		
	GCSRV 2110	+ 6.4	3.6		
	Mean	+ 8.5	6.2	9 pl.	±2.0
S93	24083.004	+ 9.3		I 12	
	4132.698	+ 6.0	.7	I 12	
	30701.723	- 0.3		II 6	
	1373.025	+ 2.3		II 6A	
		+ 4.2	3.7		
	GCSRV 2113	+ 4.5	2.8		
	Mean	+ 4.3	6.5	8 pl.	±1.6
311	24105.993	+ 4.3		I 12	
	4452.784	- 1.8	.6	I 12	
	30721.673	+ 5.6		II 6	
	1742.952	+15.9		II 6A	
		+ 6.9	3.6		
	GCSRV 2117	+ 3.3	1.7		
	Mean	+ 5.7	5.3	8 pl.	±2.2

Radial Velocity Measurements

Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectrograph	p.e.
354	24066.857	+12.0		I 12	
	4176.666	+ 2.8		I 12	
	9931.014	+14.7	.6	II 6	
		+ 9.1	2.6		
	GCSRV 2124	+ 2.1	1.6		
	Mean	+ 6.4	4.2	7 pl.	±2.4
359	24475.789	+ 8.3		I 12	
	30286.819	+19.6	.7	II 6	
	0399.618	+ 0.2		II 6	
		+ 8.2	2.7		
	GCSRV 2125	+10.6	1.8		
	Mean	+ 9.2	4.5	6 pl.	±1.9
365	24423.999	- 3.5		I 12	
	4469.758	+ 8.6		I 12	
	30257.966	+ 4.2	.7	II 6	
		+ 3.0	2.7		
	GCSRV 2126	+ 5.7	1.8		
	Mean	+ 4.1	4.5		±1.9
381	24089.791	- 3.8	.7	I 12	
	9901.855	+11.5		II 6	
	30320.847	- 2.3	.7	II 6	
	1056.680	+15.4	.7	II 6	
	Mean	+ 5.8	3.1		±2.3
390	24092.992	+ 9.3	.7	I 12	
	9901.836	+ 3.7		II 6	
	30640.031	+ 4.1		II 6	
		+ 5.3	2.7		
	GCSRV 2129	+ 6.9	1.8		
	Mean	+ 5.9	4.5	6 pl.	±1.9
395	22967.831	+10.7		I 16	
	2990.061	+ 0.7	.5	I 16	
	4083.910	+17.5	.5	I 12	
	4134.741	+12.8		I 12	
	30224.020	+ 1.6		II 6	
	1525.631	+ 8.7	.5	II 6	
		+ 8.6	4.5		
	GCSRV 2130	+ 7.0	5.6		
	Mean	+ 7.7	10.1	14 pl.	±1.6

Radial Velocity Measurements

Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectrograph	p.e.
397	24066.902	+11.1		I 12	
	4132.781	+ 8.1	.6	I 12	
	30721.650	+10.0		II 6	
		+10.0	2.6		
	GCSRV 2131	+ 5.4	1.2		
	Mean	+ 8.5	3.8	6 pl.	±2.6
399	24113.724	+19.2	.7	I 12	
	30224.011	+14.4		II 6	
	1022.962	+14.8		II 6	
	2239.742	+ 9.0		II 6A	
		+14.0	3.7		
	GCSRV 2132	+2.3	3.1		
	Mean	+8.7	6.8	9 pl.	±1.5
402	24113.680	+ 9.0	.6	I 12	
	30593.021	+ 8.9		II 6	
	1373.048	- 4.7		II 6A	
		+ 3.7	2.6		
	GCSRV 2133	+ 5.9	1.2		
	Mean	+ 4.4	3.8	6 pl.	±2.6
S108	24096.762	+ 8.7		I 12	
	30258.953	+13.3		II 6	
	1023.986	+12.0		II 6	
	Mean	+11.3	3.0		±2.3
410	24037.968	+ 7.4	.7	I 12	
	4128.795	+10.4	.7	I 12	
	30636.985	+12.7		II 6	
		+10.5	2.4		
	GCSRV 2136	+ 9.5	3.9		
	Mean	+ 9.9	6.3	9 pl.	±1.6
413	24066.878	-55.5		I 12	
	4123.836	-35.5		I 12	
	9930.033	- 9.8		II 6	
	30231.024	+54.1		II 6	
	1085.691	- 2.0		II 6	
		-10	5.0		
	GCSRV 2137	+20	3.0		
	Mean	+ 1	8.0	8 pl.	±8

Radial Velocity Measurements

Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectrograph	p.e.
414	22975.899	+12.2	.7	I 16	
	2989.902	+11.5	.7	I 16	
	3001.876	+ 7.8	.7	I 16	
	4027.902	+13.6		I 12	
	4110.837	+13.2		I 12	
	6983.873	+ 8.5		I 12	
	30320.860	- 6.2		II 6	
		+ 8.4	6.1		
	GCSRV 2135	+10.1	21.0		
	Mean	+ 9.7	27.1	28 pl.	±1.0
S115	24096.821	+15.4		I 12	
	4414.028	+10.8		I 12	
	31352.983	+10.5	.7	II 6	
	1819.769	+12.3	.7	II 6A	
		+12.4	3.4		
	GCSRV 2144	+ 6.6	1.2		
	Mean	+10.9	4.6	6 pl.	±1.9
493	24116.683	- 1.2		I 12	
	4148.832	+ 0.1		I 12	
	30258.936	+27.7		II 6	
		+ 8.9	3.0		
	GCSRV 2150	+ 8.8	3.0		
	Mean	+ 8.9	6.0	6 pl.	±3.7
506	22989.970	+13.8		I 16	
	4131.701	+ 8.8		I 12	
	4448.067	+ 8.4		I 12	
	31370.908	+ 6.7		II 6A	
	2205.734	+27.0		II 6A	
		+12.9	5.0		
	GCSRV 2152	+ 3.5	4.2		
	Mean	+ 8.6	9.2	11 pl.	±1.6
518	24096.715	+ 2.9	.6	I 12	
	4405.035	+ 7.5	.6	I 12	
	30610.008	+14.0		II 6	
		+ 9.2	2.2		
	GCSRV 2154	+ 9.3	1.7		
	Mean	+ 9.2	3.9	7 pl.	±2.5

Radial Velocity Measurements

Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectrograph	p.e.
S127	22965.893	+ 4.0	.8	I 16	
	3014.940	+12.4	1.5	I 16	
	4083.949	+ 0.1		I 12	
	30224.985	+ 6.5	.7	II 6	
	1708.966	+20.9		II 6A	
	2093.920	+14.0		II 6A	
		+10.2	6.0		
	GCSRV 2162	- 2	1.4		
	Mean	+ 7.9	7.4	8 pl.	±1.5
551	24116.735	+ 5.0		I 12	
	4205.657	+ 2.6	.7	I 12	
	30938.988	+10.3		II 6	
		+ 6.3	2.7		
	GCSRV 2163	+ 3.0	1.8		
	Mean	+ 5.0		6 pl.	±1.9
594	22979.074	+ 5.0	.7	I 16	
	2996.851	- 3.7	.7	I 16	
	3030.877	+19.9	.7	I 16	
	4064.843	+19.8		I 12	
	4134.854	- 1.0		I 12	
	7021.864	+ 6.0		I 12	
	30640.059	+ 5.9		II 6	
		+ 7.5	6.1		
	GCSRV 2171	+ 8.5	18.0		±1.0
	Mean	+ 8.2	24.1	25 pl.	
602	22975.942	+ 1.2	.7	I 16	
	2996.861	+17.6	.7	I 16	
	4055.008	+19.1		I 12	
	4131.763	- 1.4		I 12	
	30257.975	+ 3.1		II 6	
	0259.869	+ 7.9		II 6	
		+ 7.8	5.4		
	GCSRV 2172	+ 4.4	148.0		
	Mean	+ 4.6	153.4	154 pl.	±0.5
607	24083.877	+ 3.0	.7	I 12	
	9901.873	- 2.4		II 6	
	30229.947	+ 4.4		II 6	
	0405.637	+ 3.9		II 6	
	2092.985	+ 8.3		II 6A	
		+ 3.5	4.7		
	GCSRV 2173	+ 6.9	2.4		
	Mean	+ 4.7	7.1	9 pl.	±1.5

Radial Velocity Measurements

Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectrograph	p.e.
S137	22978.969	+ 7.2	1.5	I 16	
	3006.816	+ 8.1	1.5	I 16	
	4131.795	+ 6.3	.7	I 12	
	30322.902	+14.1		II 6	
	1358.938	+19.3		II 6	
		+10.7	5.7		
	GCSRV 2174	+ 4.4	1.2		
	Mean	+ 9.[illegible]	6.9	7 pl.	±1.[illegible]
613	24067.053	+ 7.1		I 12	
	4120.695	+ .8		I 12	
	31362.839	+ 1.2		II 6A	
	2113.932	- 3.4		II 6A	
	2184.871	+ 3.6		II 6A	
	2240.685	+30.9		II 6A	
		+ 6.7	6.0		
	GCSRV 2175	+ 5.2	2.4		
	Mean	+ 6.3	8.4	10 pl.	±1.4
622	24054.940	+10.9		I 12	
	4113.844	+ 3.9		I 12	
	9930.047	+14.7	.6	II 6	
		+ 9.1	2.6		
	GCSRV 2176	+ 7.9	2.0		
	Mean	+ 8.6	4.6	8 pl.	±2.3
629	24080.955	+ 8.5	.7	I 12	
	4120.644	- 0.5	.7	I 12	
	30640.045	+ 4.4		II 6	
		+ 4.2	2.4		
	GCSRV 2179	+ 9.9	3.1		
	Mean	+ 7.4	5.5	8 pl.	±1.7
651	24413.925	+ 8.9	.7	I 12	
	4472.927	+ 3.8		I 12	
	30670.892	+10.4	.7	II 6	
		+ 7.2	2.4		
	GCSRV 2180	+ 2.3	3.1		
	Mean	+ 4.4	5.5	8 pl.	±1.7
S142	22979.023	+ 8.3		I 16	
	3006.771	+ 1.4		I 16	
	4081.035	+ 1.8		I 12	
	4131.738	- 6.2		I 12	
	31362.880	+ 8.8		II 6A	
	1878.704	+10.5		II 6A	
	2205.716	+ 2.7	.5	II 6A	
	2240.703	+15.4		II 6A	
		+ 5.5	7.5		
	GCSRV 2183	- 2.0	.8		
	Mean	+ 4.8	8.3	10 pl.	±1.7

Radial Velocity Measurements

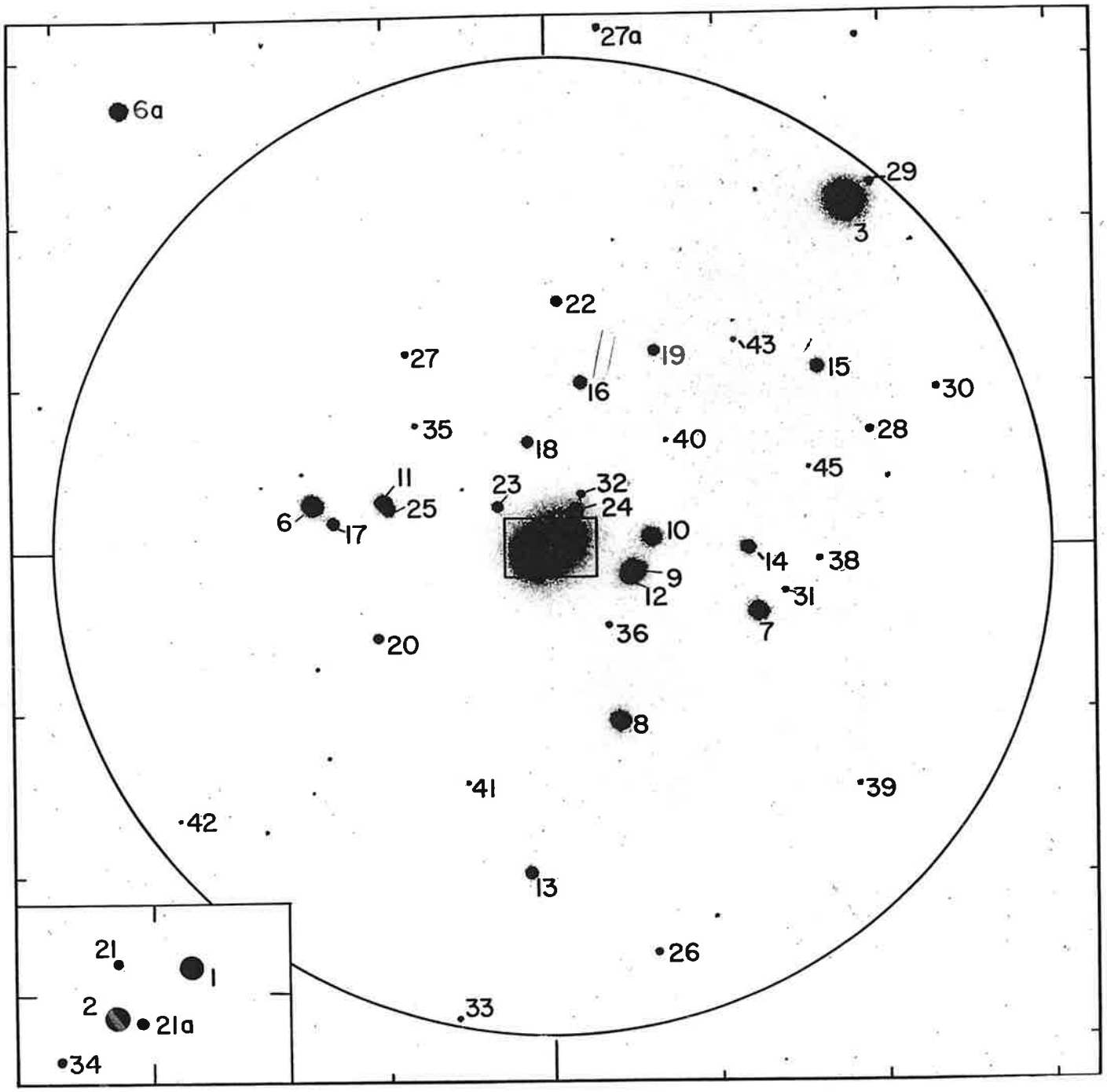
Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectrograph	p.e.
670	24077.893	+ 6.1		I 12	
	4132.825	+ 7.1		I 12	
	30720.823	+ 8.8		II 6	
		+ 7.3	3.0		
	GCSRV 2184	+ 7.7	2.4		
	Mean	+ 7.5	5.4	7 pl.	±1.7
671	22986.881	+ 8.6		I 16	
	2989.951	+ 3.2		I 16	
	4054.859	+21.1		I 12	
	4428.044	+15.4		I 12	
	30286.063	+ 4.7		II 6	
	1733.914	+19.4		II 6A	
	2423.016	+16.9		II 6A	
	2476.843	+10.0		II 6A	
		+12.4	8.0		
	GCSRV 2187	+ 8.3	2.4		
	Mean	+11.5	10.4	14 pl.	±1.6
688	24428.024	- 6.1		I 12	
	30616.970	+ 8.5		II 6	
	0736.774	+ 9.6		II 6	
	1362.862	+11.5		II 6A	
		+ 5.9	4.0		
	GCSRV 2188	+ 6.5	3.7		
	Mean	+ 6.2	7.7	10 pl.	± 1.4
697	22989.925	+29.4		I 16	
	4089.738	+27.2		I 12	
	4205.619	+16.9		I 12	
	30225.015	+15.5		II 6	
	0723.670	-18.6		II 6	
		+14.1	5.0		
	GCSRV 2190	+10.7	5.0		
	Mean	+12.4	10.0	10 pl.	±4.1
S149	22965.821	- 7.7	.5	I 16	
	2968.047	+ 5.4		I 16	
	2996.875	+10.6		I 16	
	4081.059	+ 9.9		I 12	
	30229.973	+10.2		II 6	
	1370.980	+ 3.8		II 6A	
	1733.932	+ 4.7		II 6A	
		+ 6.3	6.5		
	GCSRV 2189	+20.5	.8		
	Mean	+ 7.9	7.3	9 pl.	±1.8

Radial Velocity Measurements

Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectro-graph	p.e.
742	22965.997	+11.1	.5	I 16	
	2975.996	+ 9.1		I 16	
	4113.791	+ 9.9	.6	I 12	
	4424.042	- 1.9		I 12	
	31469.640	- 0.8		II 6A	
	2034.000	+ 5.1		II 6A	
	Mean	+ 4.5	5.1		±2.2
791	24066.929	-23.0		I 12	
	4131.833	- 1.9		I 12	
	30229.965	+12.7		II 6	
	0701.682	+ 3.7		II 6	
	1085.708	+ 2.3		II 6	
	2063.952	+14.8		II 6A	
		+ 1.4	6.0		
	GCSRV 2200	+ 7.4	5.0		
	Mean	+ 4.1	11.0	11 pl.	±2.9
848	24134.807	- 3.5		I 12	
	4441.844	+21.1		I 12	
	30231.011	+ 9.3		II 6	
	1056.697	- 0.8		II 6	
	1744.939	+17.0		II 6A	
		+ 8.6	5.0		
	GCSRV 2204	+ 8.6	3.1		
	Mean	+ 8.6	8.1		±1.4
S165	22990.013	-12.6	.5	I 16	
	4093.036	+ 1.7		I 12	
	4120.746	- 6.1	.6	I 12	
	31350.933	+ 2.3		II 6	
	1826.753	+13.0		II 6A	
		+ 1.7	4.1		
	GCSRV 2210	+ 6.6	.8		
	Mean	+ 2.5	4.9	7 pl.	±2.3
R 60	24150.784	+ 8.7		I 12	
	4417.920	+ 1.8		I 12	
	30286.838	+ 0.5	.7	II 6	
		+ 4.0	2.7		
	GCSRV 2217	+ 8	.7		
	Mean	+ 4.8	3.4	4 pl.	±2.2

Radial Velocity Measurements

Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectrograph	p.e.
S177	22967.795	+13.6	1.5	I 16	
	2975.960	+ 9.9	1.5	I 16	
	4113.816	+11.6	.5	I 12	
	4117.979	+17.4	.7	I 12	
	31370.929	+ 7.2		II 6A	
		+11.6	5.2		
	GCSRV 2228	+ 9.7	1.2		
	Mean	+11.2	6.4	7 pl.	±1.6
S184	24148.647	+10.9		I 12	
	4469.916	+ 8.7		I 12	
	30595.004	+ 2.0	.7	II 6	
	1707.997	+ 5.0		II 6A	
	Mean	+ 7.0	3.7		±2.1
S185	24028.007	+10.7	.7	I 12	
	4418.021	+ 8.1	.7	I 12	
	30720.846	+ 5.2		II 6	
	1355.987	- 3.0		II 6	
		+ 4.5	3.4		
	GCSRV 2259	+17.8	1.2		
	Mean	+ 8.0	4.6	6 pl.	±1.9
S194	22976.036	+12.6		I 16	
	4120.783	- 6.7	.6	I 12	
	30637.021	+ 1.1		II 6	
	1316.983	+15.5		II 6	
	2418.001	+ 1.9	.5	II 6A	
		+ 6.4	4.1		
	GCSRV 2273	+10.1	2.3		
	Mean	+ 7.7	6.4	12 pl.	±2.0


27a
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21a
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NGC 1502

NGC 1502

Col. 1: Z = R. Z (L.O.B. 16, 119, 1933). Stars 6a and 27a have been added.

Remarks (R)

1, spectroscopic binary. Radial velocity from GCSRV.

2, eclipsing and spectroscopic binary. Radial velocity from GCSRV.

9, 11, 12, designations confused in ADS. Star 9 is also listed as $2984A^1$, star 12 as $2984B^1$, star 11 as $2984A^2$.

21, companion noted in ADS as 2984a is not visible on our plates, nor has it been observed by Zug.

Col. 3: Magnitudes based on a polar comparison, a plate taken with the 20-inch Astrograph, and the values published by R. Zug (see "Col. 3" above).

Col. 5: In the calculation of the mean radial velocity of the cluster, stars 11 and 14 were given weight 1/2 because of large probable error, which may be due to velocity variation.

NGC 1502

α $4^h 03^m.4$ δ +62°12' (1950.0) l^{II} 143°.7 b^{II} +7°.7

Diameter 8' Class II3p; 1b1 Radial velocity -12.2km/sec

Limit of completeness: m_{pg} = 14.0, within a radius of 5' from the center.

No. Z	Coordinates x	y	m_{pg}	Spectral Type	Radial velocity p.e. (km/sec)	Other designations HD, BD	GCSRV	ADS
(1)	(2)		(3)	(4)	(5)	(6)		
1R	- 7"	+ 5"	7.5	B1n*	-17.0 var b	25639	2344	2984B
2R	+ 7	- 5	7.6	B1n+	- 9 var d	25638	2345	2984B
3	-179	+210	7.9	A2		25594		
6	+142	+ 27	10.0	B3*	-19.2 p.v. ±3.2		2351	2984D
6a	+258	+271	10.2	B3				
7	-125	- 40	10.2	B3*	- 9.3 ±2.8		2339	
8	- 41	-107	10.2	B3*	-13.3 ±2.6		2342	
9R	- 50	- 12	10.2	B2*	- 4.8 ±2.3		2341	2982A
10	- 60	+ 5	10.4	B3*	-14.9 ±2.5		2340	2984C'
12R	- 47	- 19	10.6	B3*	-17.7 ±2.3			2982B
11R	+100	+ 29	10.7	B3*	-10 p.v. ±6			2989A
14	-119	- 1	11.1	B3*	+1.5 p.v. ±4.3			
13	+ 12	-200	11.2	B5:				
15	-170	+110	11.2	B3				
16	- 19	+101	11.5	B6				
17	+130	+ 15	11.6	B6				
18	+ 13	+ 64	11.8	B8				
25	+ 98	+ 22	11.9					2989B
19	- 63	+120	12.0					
22	- 6	+151	12.0					
21R	+ 7	+ 6	12.1	B8				2984b
23	+ 32	+ 25	12.1	B7				
24	- 16	+ 22	12.1	B9				
20	+104	- 54	12.2	B8				
26	- 62	-250	13.1	B9				
28	-191	+ 70	13.1	B9				
27	+ 87	+119	13.2	A0				
29	-194	+222	13.2	B5:				
30	-232	+ 97	13.2	B8:				
27a	-31	+317	13.3	B9				

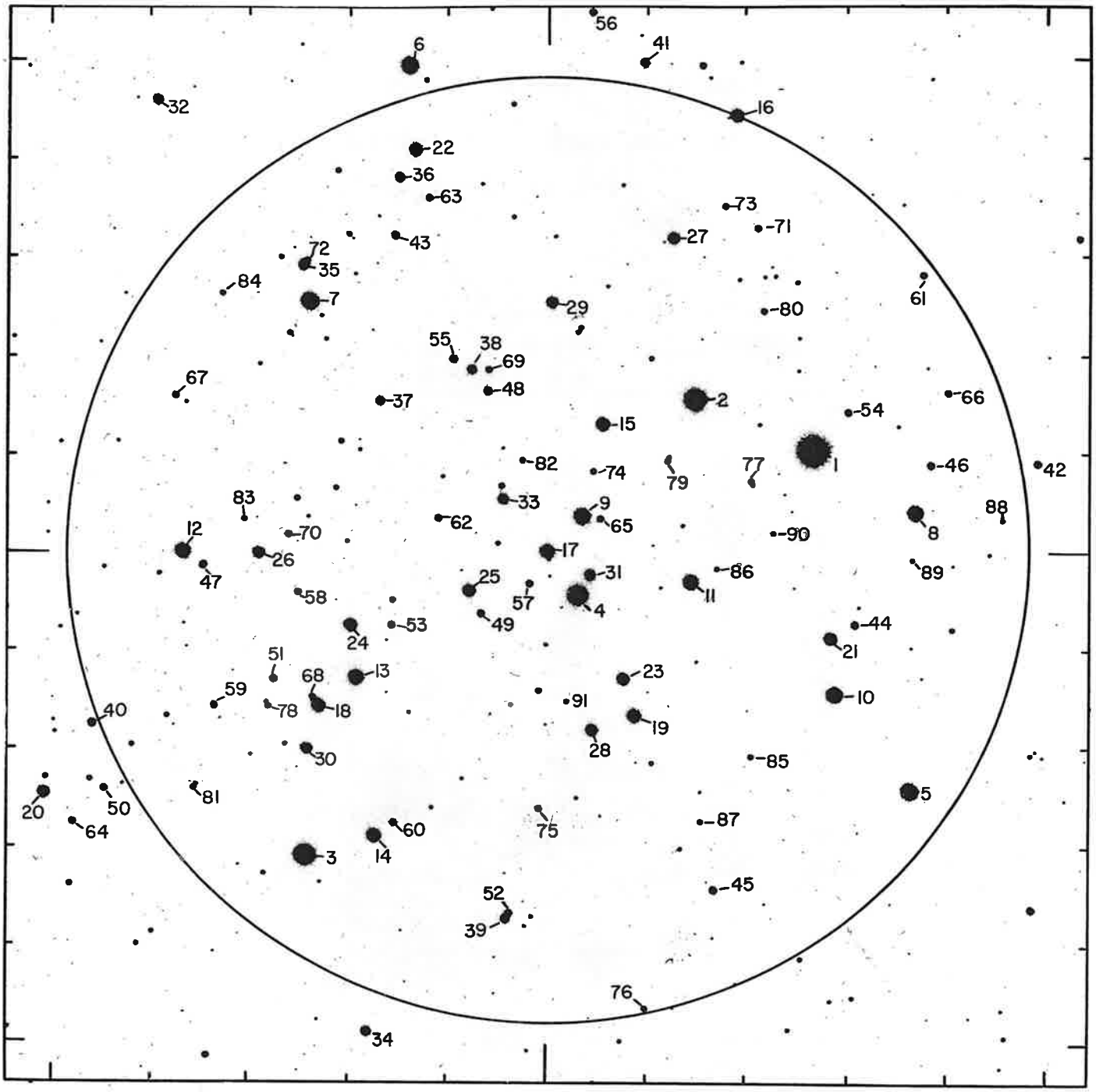
No. Z	Coordinates x	y	m_{pg}	Spectral Type	Radial velocity p.e. (km/sec)	Other designations HD, BD	GCSRV	ADS
(1)	(2)		(3)	(4)	(5)	(6)		
32	- 19"	+ 32"	13.4					
34	+ 18	- 14	13.5	A0				2984cF
31	-140	- 28	13.6					
33	+ 59	-290	13.6	A0				
36	- 35	- 48	13.6	A0				
35	+ 81	+ 75	13.7	A2				
38	-161	- 8	13.8					
40	- 69	+ 64	14.0	A				
39	-183	-145	14.0					
42	+225	-165	14.1	A				
41	+ 51	-144	14.1	G5				
43	-111	+125	14.2	A3				
45	-155	+ 48	14.2					

Radial Velocity Measurements

Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectrograph	p.e.
6	26254.894	-28.1		I 12	
	6406.721	-37.7		I 12	
	7023.797	-25.5		II 6	
	9875.015	- 6.2	.6	II 6	
	30671.900	-11.1		II 6	
	1735.900	- 4.4		II 6A	
		-19.7	5.6		
	GCSRV 2351	-15	.6		
	Mean	-19.2	6.2	8 pl.	±3.2
7	27012.008	-11.1		I 12	
	8466.786	+ 8.1	.6	II 6	
	8895.649	- 5.2	.6	II 6	
	30258.913	-17.2	.6	II 6	
		- 7.0	2.8		
	GCSRV 2339	-30	.3		
	Mean	- 9.3	3.1	5 pl.	±2.8
8	26595.910	- 1.7		I 12	
	7794.884	-29.6		II 6	
	9496.998	- 4.5	.6	II 6	
	32114.794	-13.8		II 6A	
	Mean	-13.3	3.6		±2.6
9	26596.005	+ 5.6		I 12	
	7359.008	- 8.7		II 6	
	8073.946	-17.7	.6	II 6	
	30320.760	- 3.6	.6	II 6	
	2204.704	+ 1.3		II 6A	
		- 3.8	4.2		
	GCSRV 2341	-19	.3		
	Mean	- 4.8	4.5	6 pl.	±2.4
10	26610.893	-38	.3	I 12	
	8075.034	-26	.4	II 3-1/2	
	30615.937	-11.8		II 6	
	0671.928	-11.0		II 6	
	1025.775	- 7.6		II 6	
		-14.1	3.7		
	GCSRV 2340	-25	.3		
	Mean	-14.9	4.0	6 pl.	±2.5
11	27032.939	+12.7		II 6	
	8159.640	- 6.8	.6	II 6	
	9144.986	-28.4		II 6	
	30322.773	-14.8		II 6	
	Mean	-10	3.6		±6

Radial Velocity Measurements

Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectro-graph	p.e.
12	27386.952	-16.4		II 6	
	8102.814	-20.6		II 6	
	9873.974	-33.9		II 6	
	30320.719	- 6.9	.6	II 6	
	1735.996	- 6.3		II 6A	
	Mean	-17.7	4.6		±2.3
14	27369.024	+ 2	.5	II 3-1/2	
	8452.848	- 5.3	.6	II 6	
	8782.004	-34	.4	II 3-1/2	
	30638.034	+10.9		II 6	
	1055.769	+21.0	.5	II 6	
	1359.944	+ 0.4		II 6A	
	Mean	+ 1.5	4.0		±4.3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NGC 1528

NGC 1528

α $4^{h}11^{m}.5$ δ +51° 05' (1950.0) l^{II} 152°.0 b^{II} +0°.2

Diameter 22' Class II2m; 1-2b9 Radial velocity -11.2 km/sec

Limit of completeness: m_{pg} = 14.0, within a radius of 8' from star 17.

No.	Coordinates x	Coordinates y	m_{pg}	Spectral Type	Radial velocity (km/sec)	p.e.	Other designations HD, BD
(1)	(2)		(3)	(4)	(5)		(6)
1R	-266"	+102"	9.1	cB9*	-11.5 var	±0.8	26603
2R	-149	+154	9.3	A0*	- 8.7	±2.8	50°942
3	+241	-310	10.0	F2			50°953
4	- 30	- 43	10.2	A0*	- 7.6	±2.8	50°948
5	-363	-241	10.5	A3			50°936
7	+239	+253	10.5	A0			50°954
6	+139	+495	10.6	A2			50°951
8	-369	+ 40	10.7	gF5*	-14.7	±2.8	50°935
9	- 33	+ 35	10.7	A0*	-14.5	±2.8	50°947
10	-288	-145	10.8	A1			50°938
11	-144	- 31	10.9	F8*	-28.6	±2.8	50°943
12	+365	+ 1	10.9	B9			50°956
13	+193	-130	11.1	A0*	-11.7	±2.5	
14	+173	-290	11.1	G2*	- 7.2	±4.8	50°952
15	- 55	+130	11.2	gG2			
18	+230	-158	11.3	A0			
17	0	0	11.3	B9			
16	-190	+442	11.4	A2			
19	- 88	-168	11.4	B9			50°945
20	+509	-247	11.4	B9			
21	-283	- 88	11.4	gK0			50°937
22	+132	+409	11.5	A0			
23	- 77	-131	11.5	A0			
24	+199	- 73	11.5	B9			
25	+ 78	- 40	11.6	A0			50°950
26	+289	- 1	11.6	A0			
27	-128	+319	11.6	A0			
28	- 44	-182	11.7	A1			
29	- 4	+251	11.8	A5			
31	- 42	- 23	11.8	A0			

No.	Coordinates x	Coordinates y	m_{pg}	Spectral Type	Radial velocity p.e. (km/sec)	Other designations HD, BD
(1)	(2)		(3)	(4)	(5)	(6)
30	+241"	-200"	11.9			
32	+392	+460	12.0	A0		
33	+ 42	+ 52	12.0	B9		
34	+180	-490	12.2	A0		
35	+247	+291	12.2	A0		
36	+149	+381	12.3	A1		
37	+168	+133	12.4	A3		
38	+ 75	+185	12.4	A1:		
41	- 97	+496	12.4	A2		
39	+ 40	-374	12.5	A7		
40	+458	-176	12.6	F0		
42	-492	+ 90	12.7	A0		
43	+153	-321	12.7	A2		
44	-308	- 72	12.7	A1		
45	-169	-345	12.8	B9		
46	-386	+ 88	12.8	A0		
51	+273	-130	12.8	F6		
47	+345	- 13	12.8	G0		
48	+ 59	+162	12.8	G0		
49	+ 65	- 62	12.9	A5		
50	+445	-240	12.9	A3		
53	+157	- 74	12.9	A2		
55	+ 93	+197	13.0	A2		
56	- 43	+548	13.0	A0		
52	+ 37	-369	13.1	A2		
54	-301	+142	13.1	A2		
61	-376	+281	13.1			
62	+109	+ 33	13.1	A5		
59	+333	-157	13.2	A3		
58	+250	- 41	13.2	A2		
66	-400	+161	13.2	F5		
64	+477	-275	13.2	A0		
67	+372	+160	13.2			
60	+154	-276	13.2	A2		
63	+119	+360	13.2	A4		
57	+ 17	- 32	13.3	A4		
65	- 52	+ 33	13.3			
69	+ 58	+185	13.3			
70	+259	+ 18	13.3	A7		
71	-210	+429	13.5	A5		
72	+142	+296	13.5			
68	+235	-149	13.6			
73	-178	+350	13.6	A3		
74	- 47	+ 81	13.6			
75	+ 8	- 26	13.6	A3		

No.	Coordinates x	Coordinates y	m_{pg}	Spectral Type	Radial velocity p.e. (km/sec)	Other designations HD, BD
(1)	(2)		(3)	(4)	(5)	(6)
76	- 98"	-466"	13.6	A		
78R	+279	-159	13.7	F0		
79R	-120	+ 90	13.7	A2		
80	-215	-243	13.7	G0		
77R	-203	+ 70	13.8	A5		
81	+352	-240	13.8	A3		
83	+304	+ 32	14.0	G0		
82	+ 25	+ 92	14.0	A6		
84	+328	+261	14.0	A0		
85	-205	-208	14.0	G2		
87	-155	-275	14.1	A		
86	-170	- 18	14.2	A0		
88	-456	+ 32	14.2			
89	-365	- 8	14.3			
90	-227	+ 18	14.3			
91	- 19	-151	14.4	F0		

NGC 1528

Col. 1: Remarks (R)

1, spectroscopic binary orbit.

2, ADS 3074, separation 0".3. Data refer to combined light.

78, double; brighter (s.p.) component.

79, double; brighter (s.f.) component.

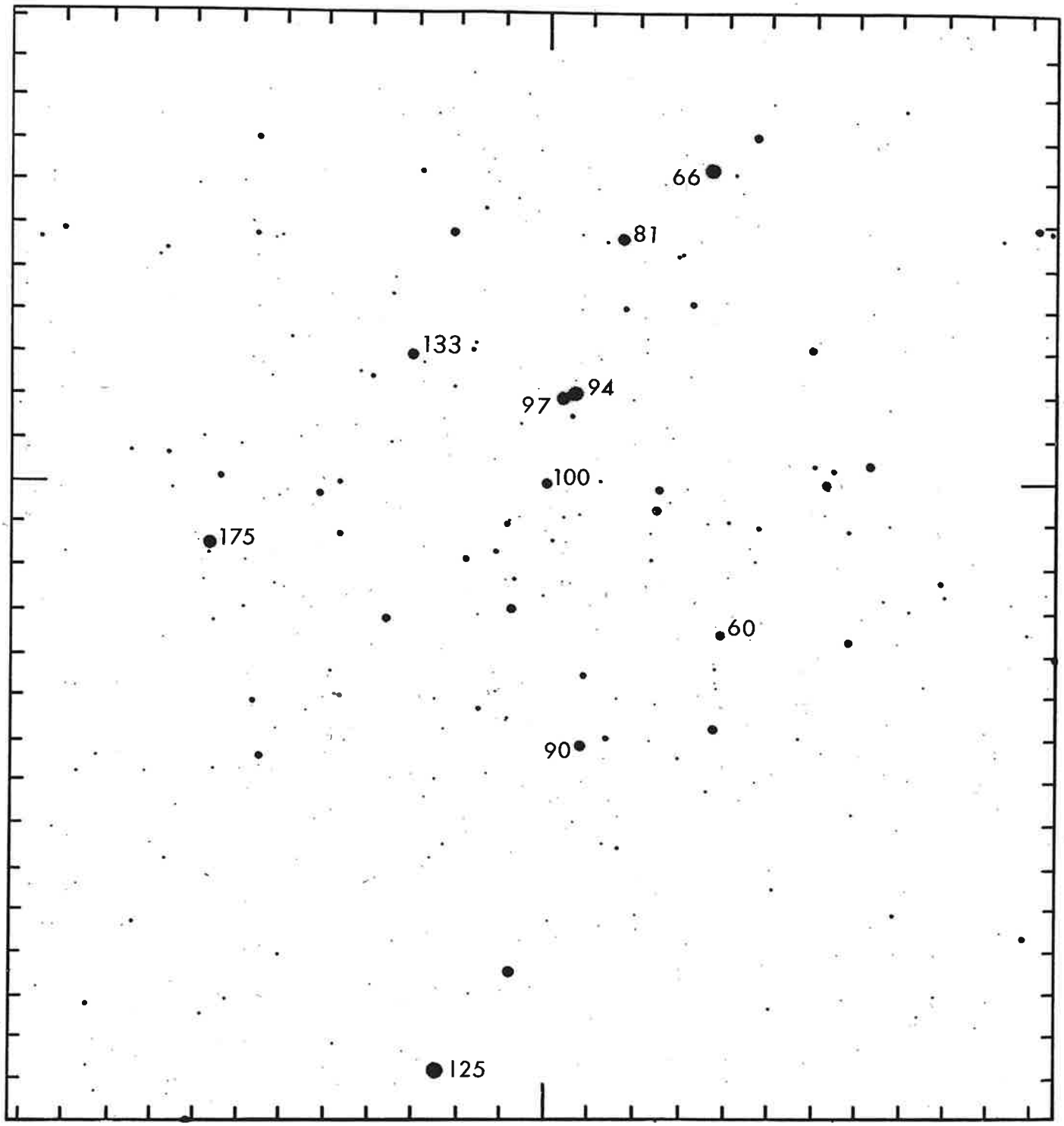
77, double; brighter (n.f.) component.

Col. 3: Magnitudes based on a polar comparison and a plate taken with the 20-inch Astrograph.

Col. 5: In the calculation of the mean radial velocity of the cluster, star 11 was omitted since it is evidently not a cluster member. The velocity of star 1 received weight 2; that of star 14 received weight 1/2 because it is based on one observation only.

Radial Velocity Measurements

Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectro-graph	p.e.
1	Spectroscopic binary orbit (See Appendix I)				
	Mean	-11.5			± 0.8
2	28081.023	+ 3.4	.6	II 6	
	8467.867	- 8.6	.6	II 6	
	30319.745	-16.1		II 6	
	1373.985	- 8.5		II 6A	
	Mean	- 8.7	3.2		± 2.8
4	29166.950	+ 5.1		II 6	
	9275.628	- 8.3	.6	II 6	
	9929.986	- 4.7	.6	II 6	
	31357.977	-21.5		II 6	
	Mean	- 7.6	3.2		± 2.8
8	28780.978	-14.1	.7	II 6	
	9138.994	-13.6	.7	II 6	
	9193.994	-16.5	.7	II 6	
	Mean	-14.7	2.1		± 2.8
9	28466.011	-16.4	.6	II 6	
	9137.975	+ 4.9	.6	II 6	
	9930.790	-14.5		II 6	
	30736.736	-25.0		II 6	
	Mean	-14.5	3.2		± 2.8
11	30286.035	-28.6	.7	II 6	
	0320.808	-40.7	.7	II 6	
	0723.640	-16.4	.7	II 6	
	Mean	-28.6	2.1		± 2.8
13	30615.976	- 8.4		II 6	
	0733.771	-10.0		II 6	
	1023.878	-25.6		II 6	
	1352.924	- 2.7		II 6	
	Mean	-11.7	4.0		± 2.5
14	31351.977	- 7.2	.7	II 6	± 4.8



NGC 1647

NGC 1647

α 4 $^{h}43\,^{m}.1$ δ +18° 59' (1950.0) l^{II} 180°.4 b^{II} -16°.8

Diameter 35' Class III 2m; 1b8 Radial velocity -5.3 km/sec

Limit of completeness: m_{pg} = 9.8 , within a radius of 15' from star 100.

No. H	Coordinates x	y	m_{pg}	Spectral Type T	HD	Radial velocity p.e. (km/sec)	Other designations BD	HD
(1)	(2)		(3)	(4)		(5)	(6)	
125R	+235"	-1386"	6	gK4	K0	+38.3 b	18°719	30197
66R	-368	+744	8.8	B8ne*	B9	+3.5 var ±4.5	19°774	30123
94	- 63	+216	8.9	B9*	A0	-8.7 ±2.7	18°713	30170
175	+774	-144	9.0	B8n*	A0	-10.4 ±2.6	18°725	30263
97	- 35	+204	9.2	B9n*		-5.9 ±2.7	18°714	
81	-170	+576	9.4	B9n*		-3.1 p.v.±5.3	19°775	
90	- 85	-618	9.6	B9*		-1.4 var ±5.4	18°712	
133	+313	+306	9.6	B9*		+5.3 p.v.±3.4	18°720	
100	0	0	9.8	A0*		-3.9 ±2.7	18°715	
60	-397	-354	10.0	B7*		-7.9 ±2.9	18°705	

NGC 1647

Col. 1: H = E. Hertzsprung (Ap.J. 42, 92, 1915)

Remarks (R)

125, GCSRV 2793; radial velocity from GCSRV.

66, H lines broad and diffuse; H_β, H_γ show faint emission at center.

Col. 3: Magnitudes based on a polar comparison.

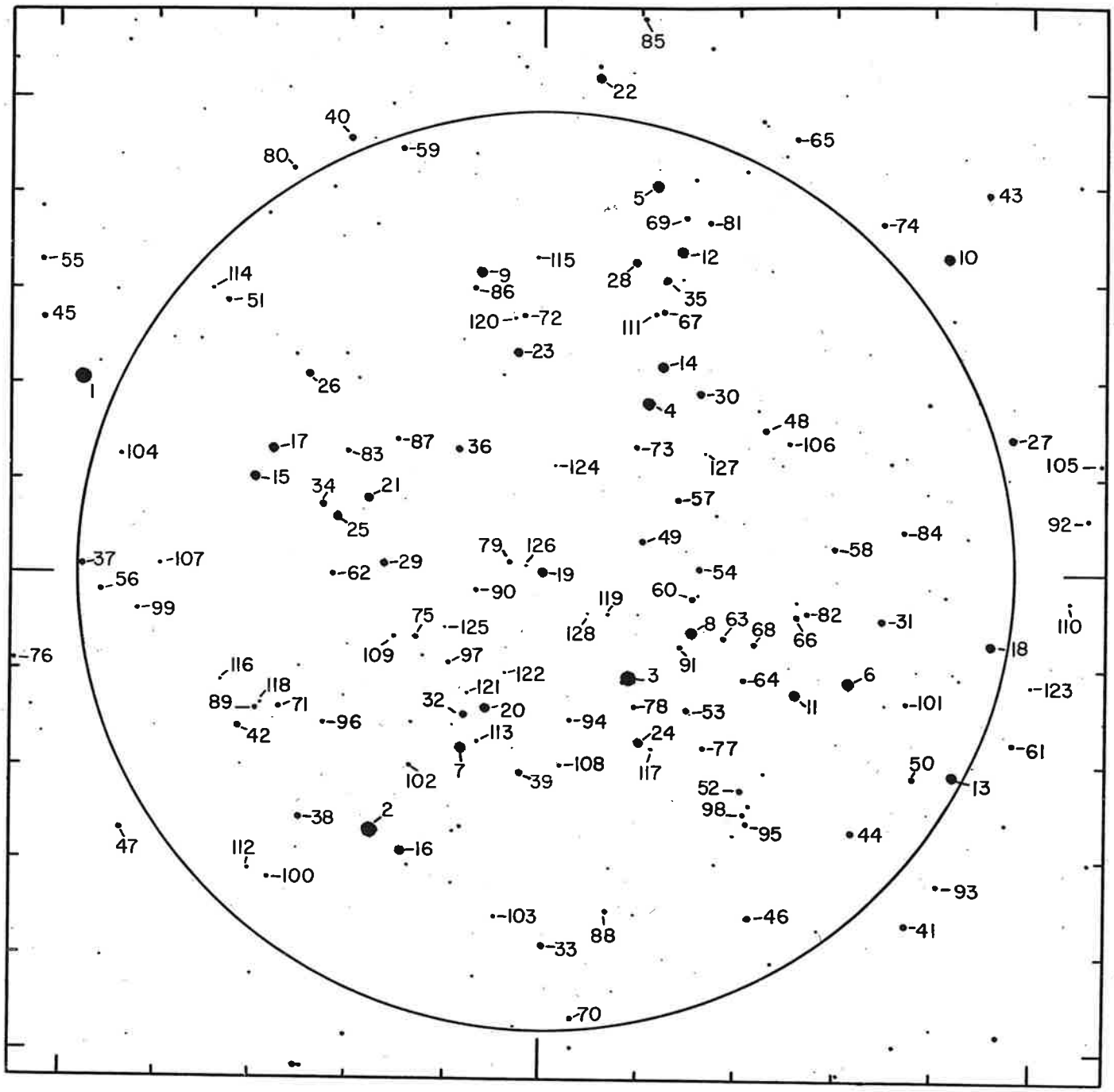
Col. 5: In the calculation of the mean radial velocity of the cluster, star 125 was omitted as a nonmember. Stars 81 and 133 each received weight 0.5, and stars 66 and 90 each received weight 0.3, because of the velocity variation.

Radial Velocity Measurements

Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectrograph	p.e.
60	27365.927	- 3	.5	II 3-1/2	
	8097.000	-21	.4	II 3-1/2	
	9261.685	-20.8		II 6	
	30286.897	+ 7.7		II 6	
	Mean	- 7.9	2.9		± 2.9
66	25511.009	- 6.2		I 12	
	5637.723	- 1.5		I 12	
	7004.825	+13.3		I 12	
	8490.859	+31.3		II 6	
	9613.733	+15.0	.6	II 6	
	30011.742	-29.4		II 6	
	0286.872	+14.4		II 6	
	0372.619	- 9.2		II 6	
	Mean	+ 3.5	7.6		± 4.5
81	25938.812	-13.1		I 12	
	6951.005	- 1.7		I 12	
	8131.876	+16.3		II 6	
	9628.761	-21.2	.6	II 6	
	Mean	- 3.1	3.6		± 5.3
90	26954.999	+16.2		I 12	
	7796.818	-24.1		II 6	
	8897.808	- 5.2	.6	II 6	
	9272.643	-11.4	.6	II 6	
	30259.893	+17.3		II 6	
	Mean	- 1.4	4.2		± 5.4
94	25611.686	-16.5		I 12	
	5664.660	-14.7		I 12	
	7021.952	+ 6.9		II 6	
	9613.704	-15	.3	II 6	
	Mean	- 8.7	3.3		± 2.7
97	25614.783	- 0.1		I 12	
	6300.796	- 2.1		I 12	
	7029.759	-14.6	.5	II 6	
	8498.848	-11.0		II 6	
	Mean	- 5.9	3.5		± 2.7

Radial Velocity Measurements

Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectrograph	p.e.
100	26983.941	+10.6		I 12	
	7003.905	- 7.6		I 12	
	7503.656	-12.6		II 6	
	8096.952	- 9	.4	II 3-1/2	
	Mean	- 3.9	3.4		± 2.7
133	25945.798	- 0.3		I 12	
	7029.821	+24.3		II 6	
	8907.769	+13.3		II 6	
	30259.927	+ 1.8		II 6	
	0637.047	+ 4.8		II 6	
	1054.857	-11.8		II 6	
	Mean	+ 5.3	6.0		± 3.4
175	25506.934	-10.0		I 12	
	5915.825	- 8.8		I 12	
	7499.664	+ 7.7	.6	II 6	
	31350.958	-23.3		II 6	
	Mean	-10.4	3.6		± 2.6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NGC 1912

NGC 1912
(M38)

α $5^h25^m.4$ δ +35°48′ (1950.0) l^{II} 172°.3 b^{II} +0°.7

Diameter 18′ Class II2r; 2b5 Radial velocity −3.7 km/sec

Limit of completeness: m_{pg} = 13.5 ., within a radius of 8′ from star 19.

No.	Coordinates x	y	m_{pg}	Spectral Type	Radial velocity p.e. (km/sec)	Other designations Cu	P	V	Z	HD; BD
(1)	(2)		(3)	(4)	(5)	(6)				
1	+473″	+205″	9.1	gG5		194	550	1	1	35878
2	+175	−272	9.3	B4*	−4.6 ±3.1	93	475	2	2	35°1129
3	− 88	−272	9.6	B7*	−6 var ±7	18	475	2	2	35°1122
4	−107	+177	10.2	A0*	−4.0 ±2.9	50	389	7	5	35°1120
5	−115	+404	10.3	A0*	−5.9 p. v. ±5.1	157	387	9	4	35°1123
6	−310	−116	10.3	B8		133	324	15	11	35°1117
7	+ 83	−185	10.3	A1		97	456	14	7	35°1127
8	−151	− 63	10.5	B9*	−1.6 ±2.9	24	373	10	9	
9	+ 64	+314	10.5	A0*	−2.2 ±3.5	57	448	11	8	35°1126
10	−411	+330	10.5	A0		271	288			35°1112
11	−256	−128	10.6	B9		29	334	13	14	
12	−140	+336	10.6	A0		160	378	18	15	
13	−419	+214	10.8	B8		124	286	22	18	35°1111
14	−121	+216	10.8	A0		49	384	21	22	
15	+295	+100	10.9	G0		70	515	3	6	35°1131
16	+144	−293	10.8	A1		94	469	16	13	35°1128
17	+276	+130	10.9	F2		69	509	8	16	35°1128
18	−455	− 76	10.8	A0		135	274	20	17	
19	0	0	10.8	gG5		3	433	4	12	35°1125
20	+ 58	−143	10.9	A0		11	452	19	19	
21	+178	+ 78	11.0	A0		72	477	17	20	
22	− 55	+518	10.9	G8		292	418	5	10	35°1124
23	+ 26	+230	11.0	A1		55	439	25	21	
24	−100	−177	11.0	G1		16	393	12	24	
25	+210	+ 58	11.0	B9		74	488	23	23	
26	+239	+207	11.3	A5		65	498	27	25	
27	−476	+141	11.4	A2		143	264			
28	− 94	+325	11.2	A2		164	401	28	27	
29	+162	+ 9	11.4	A0		76	473	30	28	
30	− 15	+187	11.4	A0		48	368	26	33	

No.	Coordinates x	Coordinates y	m_{pg}	Spectral Type	Radial velocity p.e. (km/sec)	Other designations Cu	P	V	Z	HD, BD
(1)	(2)		(3)	(4)	(5)	(6)				
31	-346"	- 50"	11.5	A0		134	317	29	32	
32	+ 80	-150	11.5	A:		90	455		26	
33	- 2	-392	11.5	A3		105	432			
34	+225	+ 71	11.5	A0		73	495	32	36	
35R	-125	+305	11.4	A1		163	383	33	34	
36	+ 86	+129	11.5	A0		66	458	31	35	
37	+473	+ 8	11.5	F2		201	551			
38	+248	-258	11.6	A0		92	501		29	
39	+ 23	-211	11.6	A2		99	438		37	
40	+198	+456	11.6	A1		176	484			
41	-370	-370	11.6	A0		251	309			
42	+311	-162	11.7	A1		84	518			
43	-451	+396	11.8	A0		272	275			
44	-314	-272	11.8			120	323	24	31	
45	+515	+266	11.9	A0		193	560			
46R	-211	-362	11.7	A3		112	353			
47	+431	-270	11.9	A0		212	541			
48	-225	+149	12.0	A3		42	342			
49	-101	+ 33	12.0	A1		47	397	35	40	
50	-376	-216	12.2	A0		123	303			
51	+324	+284	12.1	A5		188	522			
52	-201	-228	12.0	A2		117	355			
53	-146	-144	12.1	A2		22	379		44	
54	-158	+ 4	12.2			34	369		38	
55	+516	+327	12.2	A5		308	561			
56	+453	- 19	12.2	A2		203	545			
57	-137	+ 76	12.2	A1		46	382		39	
58	-296	+ 26	12.1	A0		36	326			
59	+145	+443	12.2	A0		174	470			
60	-151	- 28	12.3			33	371		42	
61	-478	-180	12.3	A1		126	262			
62	+215	- 2	12.2	A2		75	489		46	
63	-183	- 69	12.4	A2		27	361		45	
64	-204	-113	12.3	A0		25	354		41	
65	-255	+454	12.3	A2		282	335			
66	-257	- 46	12.3			30	332		43	
67	-122	+272	12.4			162	385		56	
68	-214	- 75	12.5	A0		26	350		52	
69	-144	+372	12.4	A2		158	380		47	
70	- 31	-469	12.3	A:		233	426			

No.	Coordinates x	Coordinates y	m_{pg}	Spectral Type	Radial velocity p.e. (km/sec)	Other designations Cu	P	V	Z	HD,BD
(1)	(2)		(3)	(4)	(5)	(6)				
71	+269"	-142"	12.4	A2		83	507			
72	+ 20	+269	12.3	A0		54	436		49	
73	- 95	+131	12.5			52	400		48	
74	-345	+365	12.4	A2		277	318			
75	+130	- 68	12.5	A3		77	465			
76	+543	- 92	12.4	A2		205	563			
77	-163	-184	12.5	A5		21	366			
78	- 93	-141	12.5	A2		17	402		55	
79	+ 34	+ 11	12.4	A0		4	440		58	
80	+257	+423	12.6	A0		181	503			
81	-167	+366	12.4	A5		159	367		57	
82	-268	- 43	13.3	A1		32	330		53	
83	+199	+126	12.5	A3		68	485		51	
84	-366	+ 44	12.6	A		140	310			
85	-104	+581	12.5	A5		288	396			
86	+ 70	+297	12.5	A1		58	449		58	
87	+148	+139	12.6	A2:		67	471		54	
88	- 66	-356	12.6	A5		106	416			
89	+293	-144	12.7	A2		82	517			
90	+ 68	- 19	12.6	K		5	451	34	50	
91	-139	- 78	12.7			23	374		61	
92	-553	+ 57	12.6	G0		266	237			
93	-403	-328	12.6	A0		252	295			
94	- 28	-155	12.7	A0		15	428		59	
95	-207	-263	13.0			114	357			
96	+224	-158	12.7	A3		85	493			
97	+ 96	- 95	12.7	A2		7	460			
98	-204	-252	13.6			115	358			
99	+416	- 40	12.8	A2		204	538			
100	+279	-322	12.8	A3		215	508			
101	-370	-137	12.8			129	304			
102	+135	-203	12.8	A1		91	468			
103	+ 48	-362	12.9	A4		103	444			
104	+434	+123	13.0	A2		196	542			
105	-566	+114	13.0	A0		270	230			
106	-248	+135	13.0	A3		41	333			
107	+392	+ 9	13.0	K0		200	533			
108	- 9	-203	13.1	A2		104	430			
109	+152	- 68	13.0			78	472			
110	-534	- 30	13.2	F8		263	240			
111	-113	+269	13.3			162f	386		63	
112	+300	-312	13.2			214	519			
113	+ 67	-178	13.2			98	450			
114	+340	+297	13.3	A0		189	525			
115	+ 7	+329	13.4			53	434			

No.	Coordinates x	Coordinates y	m_{pg}	Spectral Type	Radial velocity p.e. (km/sec)	Other designations Cu	P	V	Z	HD, BD
(1)	(2)		(3)	(4)	(5)	(6)				
116	+330"	-115"	13.4	A5		81	524			
117	-111	-186	13.5	A5		16f	392			
118	+288	-137	13.6	A		82f	516			
119	- 66	- 44	13.6	A2		13	414			
120	+ 30	+265	13.7			54f	437			
121	+ 77	-127	14.0			9	453			
122	+ 39	-106	14.0			10	442			
123	-496	-119	14.0	A3		130	258			
124	- 9	+115	14.0			1				
125	+101	- 53	14.0			6	461			
126	+ 20	+ 6	14.1			2				
127	-161	+127	14.1			45				
128	- 47	- 38	14.2	A5		12				

NGC 1912

Col. 1: Remarks (R)

35, double star, faint companion at position angle 145°, separation 2". Data refer to combined light.

46, double star, faint companion at position angle 110°, separation 2". Data refer to combined light.

Col. 3: Magnitudes based on values published by J. Cuffey (H.A. 105, 403, 1937).

Col. 5: In the calculation of the mean radial velocity of the cluster, stars 3 and 5 were given weight 1/2 because of the large probable error due to velocity variation.

Col. 6: Cu = J. Cuffey (see "Col. 3" above)

P = Publ. Potsdam: Astrographic Catalog Vol. 1, plate 677, p. 346, 1899

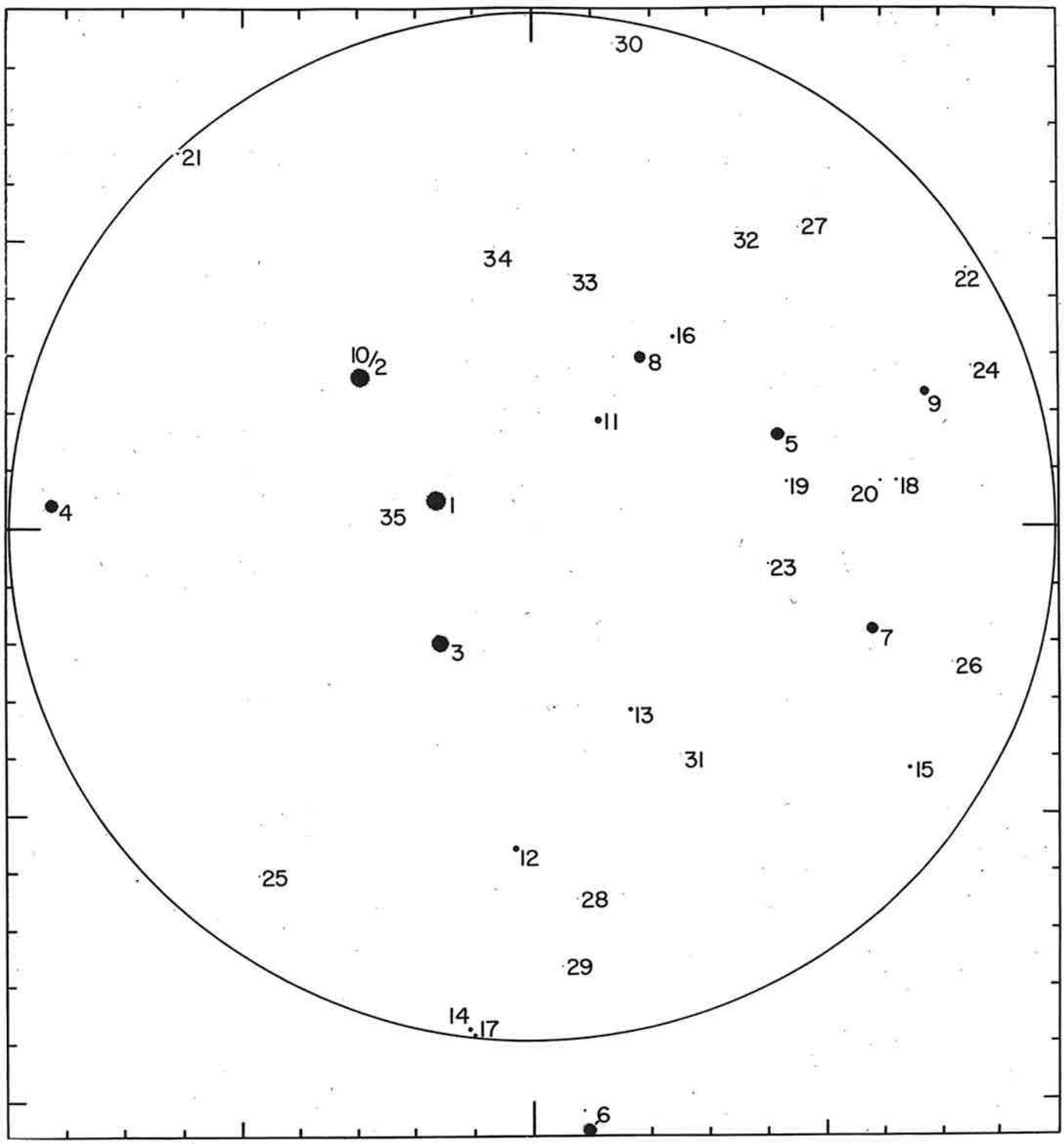
V = H. Vogt (A.N. 212, 73, 1920)

Z = R. Zug (L.O.B. 16, 119, 1933)

Position measurements have also been published by B. Matthiessen (Veröff. Sternw. Karlsruhe 4, 1892).

Radial Velocity Measurements

Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectro-graph	p.e.
2	27349.906	-12.9		II 6	
	7733.899	- 1.2	.6	II 6	
	30322.966	+ 1.6		II 6	
	Mean	- 4.6	2.6		± 3.1
3	28059.996	+19.8	.6	II 6	
	8898.837	- 7.7		II 6	
	9901.906	+16.1	.6	II 6	
	30259.031	-22.9		II 6	
	0736.804	-33.3		II 6	
	Mean	- 6	4.2		± 7
4	28525.884	+ 0.2	.6	II 6	
	8782.971	-16.2	.4	II 3-1/2	
	9145.990	- 0.7		II 6	
	30721.742	- 4.8		II 6	
	Mean	- 4.0	3.0		± 2.9
5	28236.683	-26.5	.6	II 6	
	8894.728	- 8.2		II 6	
	9260.739	+15.9	.6	II 6	
	30322.937	- 4.3		II 6	
	Mean	- 5.9	3.2		± 5.1
8	27451.866	+ 3.9		II 6	
	8783.014	+ 2.8	.4	II 3-1/2	
	8906.649	-20.7	.6	II 6	
	30720.743	+ 2.5		II 6	
	Mean	- 1.6	3.0		± 2.9
9	28097.812	+14.8	.4	II 3-1/2	
	9258.702	-11.9	.6	II 6	
	30258.992	- 3.2		II 6	
	Mean	- 2.2	2.0		± 3.5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NGC 1981

NGC 1981

α $5^{h}33^{m}.0$ δ $-4°27'$ (1950.0) l^{II} $208°.1$ b^{II} $-18°.9$

Diameter 25' Class II3p; 1b2 Radial velocity +29.9 km/sec

Limit of completeness: m_{pg} = 13.0, within a radius of 15' from the center.

No.	Coordinates x	y	m_{pg}	Spectral Type T	S	HD	Radial velocity (km/sec)	p.e.	Other designations HD, BD	GCSRV
(1)	(2)		(3)	(4)			(5)		(6)	
1	+163"	+ 43"	6.0	B3*	B3V	B0	+29.8	±1.7	37016	3420
2R	+295	+260	6.1	B3*	B2-3	B5	+29.4	±1.8	37040	3428
3	+158	-202	6.4	B2*	B1.5V	B0	+35.9 var	±4.5	37017	3419
4	+818	+ 41	7.0	B3*	$B2V_p$	B5	+26.8	±1.6	37129	3453
5R	-422	+156	7.1	B6*	B8-9	B8	+15 var	±8	36883	
6	- 93	-1060	7.3		B3	B5			36958	
7R	-581	- 178	7.3	B9*	B8-9	B9	+34.6	±2.7	36865	
8	-180	+ 293	7.4	B5n*	B5	B8	+29.8 p.v.	±4.4	36936	
9R	-673	+ 232	8.0	B7n*	B3	B9	+26.4 p.v.	±4.4	36842	
10R	+299	+ 262	8.5	B6*			+33.8	±3.2		
11	-112	+184	8.8	A0*	B8-9	A0	+28.3	±2.9	36957	
12	+ 29	-561	8.9	B9*	B8-9	A0	+27.6 p.v.	±5.7	36998	
13	-165	-320	9.9			A			36937	
14	+109	-880	10.0						-4°1182	
15	-645	-424	10.1						-4°1169	
16	-239	+330	10.3	F5*					-4°1174	
17	+100	-890	10.4							
18	-622	+ 82	11.2						-4°1170	
19	-432	+ 80	11.5							
20	-594	+ 80	11.6							
21	+607	+652	11.6							
22	-746	+448	12.0							
23	-400	- 64	12.3							
24	-753	+278	12.5							
25	+472	-606	12.5							
26	-718	-242	12.9							
27	-455	+522	13.0							
28	- 74	-653	13.0							
29	- 50	-769	13.0							
30	-138	+841	13.1							

No.	Coordinates x	Coordinates y	m_{pg}	Spectral Type T	Spectral Type S	Spectral Type HD	Radial velocity p.e. (km/sec)	Other designations HD, BD	Other designations GCSRV
(1)	(2)		(3)	(4)			(5)	(6)	
31	-250"	-402"	13.2						
32	-352	+521	13.3						
33	- 61	+438	13.4						
34	+ 67	+490	13.5						
35	+244	+ 44	13.6						

NGC 1981

Col. 1: Remarks (R)

2, ADS 4192A; separation 4".3; brighter component.

5, ADS 4176AB; separation 1".9; components nearly equal in magnitude. Data refer to combined light.

7, ADS 4172A; separation 1".2. Radial velocity and spectral type (T) refer to brighter component, m_{pg} to combined light.

9, some lines appear double on one spectrogram.

10, ADS 4129B.

Col. 3: Magnitudes based on a polar comparison and two cluster comparisons, together with values published by

S. Sharpless (Ap.J. 116, 258, 1952).

Col. 4: Spectral types listed under S were determined by

S. Sharpless (see "Col. 3" above).

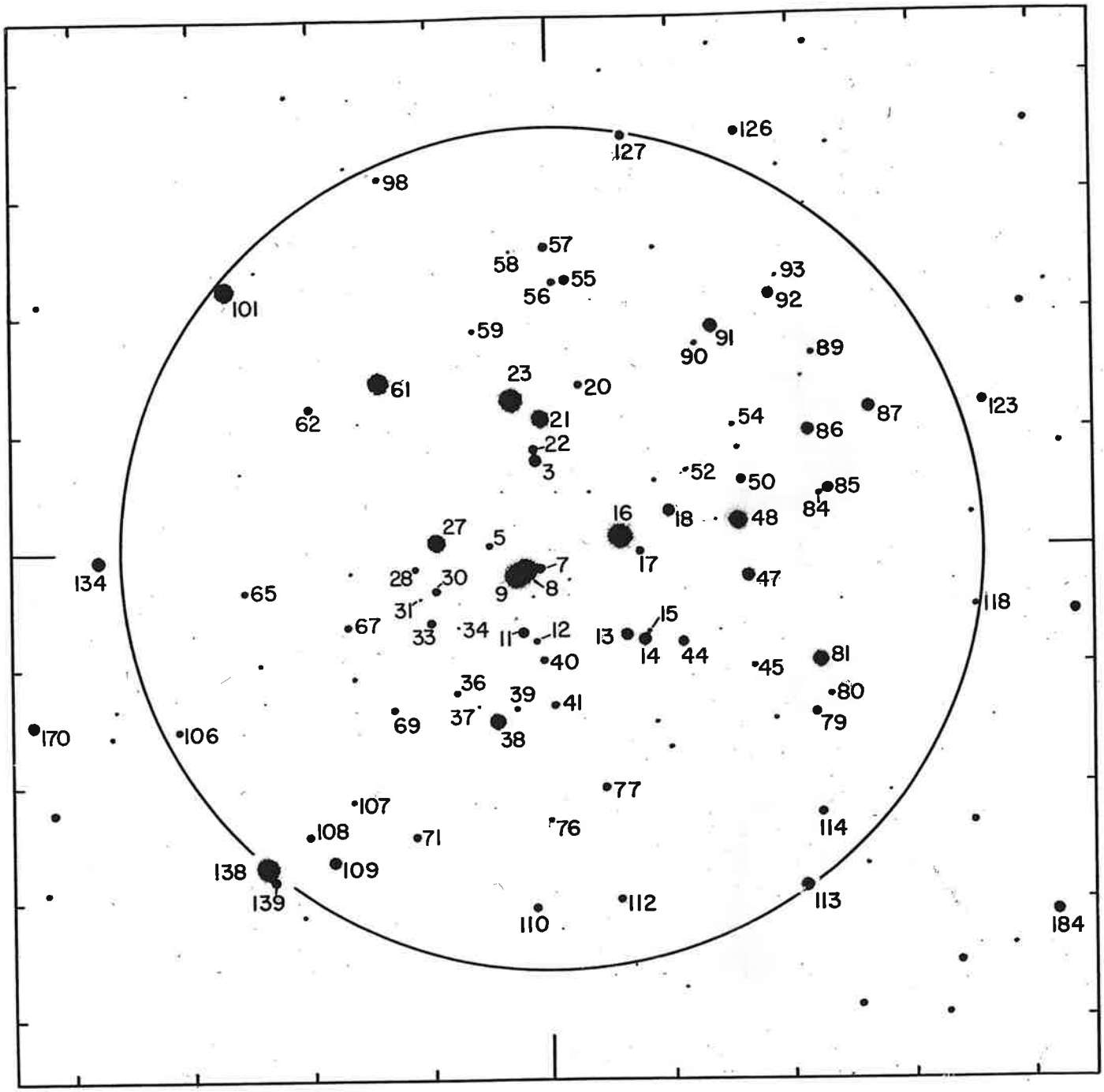
Col. 5: In the calculation of the mean radial velocity of the cluster, star 12 was given weight 0.5 and star 5 weight 0.3 because of velocity variation.

Radial Velocity Measurements

Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectrograph	p.e.
1	26306.844	+28.7		I 12	
	7022.911	+29.7		II 6	
	7824.705	+30.7	.6	II 6	
	8208.649	+22.8	.6	II 6	
		+28.3	3.2		
	GCSRV 3420	+31	5		
	Mean	+29.8	8.2	9 pl.	± 1.7
2	25937.974	+19.2	.5	I 12	
	6338.903	+15.9		I 12	
	7511.645	+29.7		II 6	
	8500.866	+45.3		II 6	
		+28.7	3.5		
	GCSRV 3428	+30	4		
	Mean	+29.4	7.5	8 pl.	± 1.8
3	26338.923	+33.1		I 12	
	7047.797	+46.7		II 6	
	7107.623	+62.7		II 6	
		+47.5	3		
	GCSRV 3419	+29	5		
	Mean	+35.9	8	8 pl.	± 4.5
4	26311.006	+26.1		I 12	
	7047.824	+33.5		II 6	
	7356.055	+23.5		II 6	
	30427.646	+11.6		II 6	
	2113.994	+33.2		II 6	
		+25.6	5		
	GCSRV 3453	+28	5		
	Mean	+26.8	10	10 pl.	± 1.6
5	26637.837	- 8.9	.6	I 12	
	8582.618	+ 2.6		II 6	
	30399.793	+48.8		II 6	
	1351.039	+34.6		II 6	
	2184.830	- 1.1		II 6A	
	Mean	+15	4.6		± 8
7	25934.981	+38.7		I 12	
	7003.055	+37.7		I 12	
	7792.886	+34.3		II 6	
	30319.905	+21.1	.5	II 6	
	Mean	+34.6	3.5		± 2.7
8	25931.899	+10.7		I 12	
	7003.011	+35.8		I 12	
	7350.000	+39.2		II 6	
	30761.643	+33.6		II 6	
	Mean	+29.8	4.0		± 4.4

Radial Velocity Measurements

Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectrograph	p.e.
9	26970.038	+ 5.2	.5	I 12	
	7003.031	+26.1		I 12	
	30319.920	+21.5	.5	II 6	
	0761.627	+ 9.4		II 6	
	2114.014	+35.4		II 6A	
	2184.848	+47.8		II 6A	
	Mean	+26.4	5.0		± 4.4
10	26338.870	+31.4		I 12	
	7445.754	+29.8		II 6	
	8500.849	+46.6	.5	II 6	
	Mean	+33.8	2.5		± 3.2
11	27022.933	+31.6		II 6	
	7107.661	+30.2		II 6	
	7441.777	+23.1		II 6	
	Mean	+28.3	3.0		± 2.9
12	27047.863	+23.4		II 6	
	7441.807	+33.5		II 6	
	7511.671	+50.4	.5	II 6	
	32478.936	+ 1.6	.5	II 6A	
	Mean	+27.6	3.0		± 5.7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NGC 1960

NGC 1960

(M36)

α $5^h 33^m.1$ δ +34°06' (1950.0) l^{II} 174°.6 b^{II} +1°.1

Diameter 16' Class I3m; 1b2 Radial velocity -5.8 km/sec

Limit of completeness: m_{pg} = 13.8, within a radius of 6' from the center.

No. Bo	Coordinates x	y	m_{pg}	Spectral Type T	JM	Radial velocity (km/sec)	p.e.	Other designations BD	GCSRV	H	W
(1)	(2)		(3)	(4)		(5)		(6)			
16R	- 57"	+ 11"	8.9	B3*	B2V	-3.6 var	±1.1	34°1103	3429	e	16
23	+ 32	+128	9.0	B3s*	B3V	-10.4 p.v.	±3.7	34°1109	3432	258	23
138	+238	-273	9.1	B3*	B3:V:	-15.1 p.v.	±2.8	33°1098	3444	350	146
9R	+ 28	- 23	9.1	B2*	B2V	-6.0 var	±0.8	34°1107	3433	250	9
61	+142	+144	9.2	B3n*	B2V:	-8.3	±2.1	34°1111	3443	313	65
101R	+269	+224	9.3	B3e*	B2Ve	-3.6	±2.2	34°1113	3445	365	64
8R	+ 19	- 17	9.4	B4n*	B2V	+9 var	±7	34°1106	3431	249	8
48R	-155	+ 23	9.6	B3n*	B3V	-4.1	±2.5	34°1099	3416	162	48
27	- 95	+ 6	9.6	B3nn*	B2:nn	-11 var	±6	34°1110	3439	294	27
21	+ 7	+111	9.8	B3*	B2.5V	-6.3	±2.4		3430	238	21
38	+ 45	-148	10.0	B4*		-10 var	±7	34°1108	3434	271	38
81	-223	- 97	10.0	B3*	B2III	-9.8	±2.1	34°1098	3408	120	100
134	+377	- 7	10.3							399	139
91R	-134	+189	10.4	B6n*		-4.2	±2.0	34°1101	3417	173	116
47	-164	- 24	10.6	B8	B8?					156	47
113	-210	-290	10.7	B9				33°1096		130	93
86	-214	+100	10.7	B9	B8:III-IV					132	109
87	-264	+119	10.7	B8	B6:V					101	110
170	+433	-149	10.8							416	141
109	+182	-268	10.8							329	82
14	- 77	- 78	10.8	B8	B8:III-IV					197	14
3	+ 11	+ 76	10.9	B8						241	3
18	- 98	+ 32	10.9	B6						189	18
13	- 63	- 74	11.0	B8	B8:nn					206	13
184	-418	-313	11.0							52	165
92	-183	+216	11.0	B8						150	117
11	+ 22	- 71	11.3							251	11
85	-229	+ 50	11.5							118	108
44	-109	- 80	11.5	B9	B8:III-IV					186	44
123	-358	+123	11.7							70	112

No.	Coordinates x	Coordinates y	m_{pg}	Spectral Type T	Spectral Type JM	Radial velocity p.e. (km/sec)	Other designations BD	Other designations GCSRV	Other designations H	Other designations W
(1)	(2)		(3)	(4)		(5)		(6)		
55	- 14"	+229"	11.7	B9					229	55
127	- 62	+352	11.8						207	123
50	-158	+ 58	11.8		B9:				158	50
57	+ 3	+258	11.9	B9					236	57
33	+100	- 63	12.0	B9	B9:V:				297	33
126	-155	+354	12.0						160	121
79	-219	-142	12.0						123	97
62	+200	+122	12.0	B9					336	66
114	-223	-227	12.1						121	94
30	+ 95	- 35	12.2						296	30
110	+ 13	-306	12.2	B9					246	89
77	- 45	-204	12.3	A0					214	91
71	+144	-246	12.3	A0					306	83
108	+202	-245	12.4						337	81
22	+ 13	+ 86	12.4						245	22
139	+231	-284	12.4						347	148
112	- 56	-300	12.5	B5:					208	92
7	+ 7	- 16	12.5						239	7
41	- 3	-134	12.6	A0					233	41
67	+169	- 66	12.6	A1					324	73
20	- 24	+141	12.6	A0					225	20
40	+ 6	- 95	12.6						237	40
17	- 74	- 2	12.7	A2					199	17
69	+131	-137	12.7	B9					310	78
56	- 3	+228	12.8	A2					232	56
106	+310	-154	12.8						380	77
65	+255	- 35	12.9						357	70
28	+113	- 16	13.0	A0					305	28
98	+142	+317	13.0						312	59
36	+ 78	-123	13.0	A1					286	36
5	+ 50	+ 4	13.1						274	5
12	+ 12	- 79	13.2						243	12
118	-351	- 50	13.4						73	104
59	+ 63	+187	13.4						279	60
89	-217	+166	13.5						124	114
80	-231	-126	13.5						116	99
45	-168	-101	13.6						154	45
76	+ 1	-232	13.6	A0:					235	88
107	+165	-216	13.6						321	80
54	-151	+105	13.7						165	54
39	+ 28	-137	13.7						254	39
90	-120	+175	13.7						177	115
84	-222	+ 46	13.8						119	107
52	-112	+ 67	13.9						183	52
93	-187	+231	14.1						146	118

No.	Coordinates x	Coordinates y	m_{pg}	Spectral Type T	Spectral Type JM	Radial velocity p.e. (km/sec)	Other designations BD	GCSRV	H	W
(1)	(2)		(3)	(4)		(5)	(6)			
58	+ 32"	+254"	14.3						259	58
15	- 81	- 70	14.3						196	15
37	+ 60	-134	14.5						277	37
34	+ 76	- 66	14.5						285	34
31	+108	- 42	14.6						303	31

NGC 1960

Col. 1: Bo = E. Bodén (Uppsala Ann. 3, No. 4, 1951)

Remarks (R)

16, spectroscopic binary orbit.

9, ADS 4194A; spectroscopic binary orbit.

61, some lines appear double on one spectrogram.

101, H_β - H_ϵ emission on broad absorption.

8, ADS 4194B.

48, has faint companion (magnitude 14.6); separation 5".8, position angle 82°.

91, double lines on some plates.

Col. 3: Magnitudes based on three polar comparisons and three cluster comparisons, together with values published by

H. L. Johnson and W.W. Morgan (Ap.J. 117, 332, 1953),

E. Bodén (see "Col. 1" above),

J. Hopmann (Veröff. Bonn No. 19, 1924),

A. Wallenquist (Med. Uppsala 32, 1927).

Col. 4: Spectral types listed under JM were published by Johnson and Morgan (see "Col. 3" above).

Col. 5: In the calculation of the mean radial velocity of the cluster, stars 16 and 9 were each given weight 2. Stars 8, 27 and 38 each received weight 1/2 because of velocity variation. Star 138 was omitted because of the large deviation of its radial velocity from that of the cluster, as well as its distance from the center, factors which render its physical membership rather doubtful.

Col. 6: H = J. Hopmann (see "Col. 3" above)

W = A. Wallenquist " " "

Radial Velocity Measurements

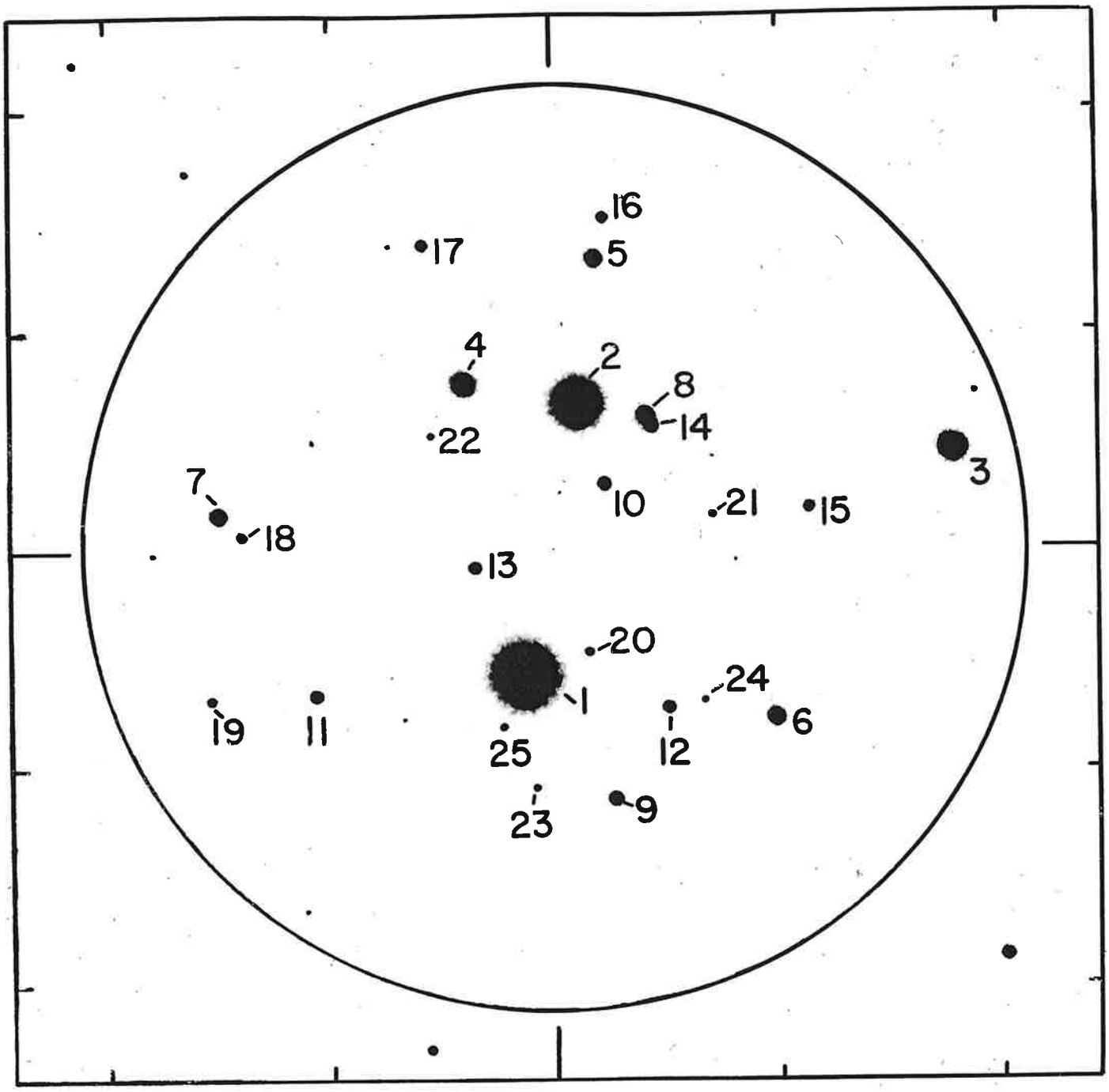
Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectrograph	p.e.
8	24775.984	-11.5		I 12	
	5226.782	+44.2		I 12	
	8922.771	+ 9.9		II 6	
	9275.686	-22.8		II 6	
	30285.913	- 8.0		II 6	
	1746.844	-17.9		II 6A	
		- 1	6.0		
	GCSRV 3431	+40	1.9		
	Mean	+ 9	7.9	8 pl.	± 7
9	Spectroscopic binary orbit (See Appendix I)				
	Mean	- 6.0			± 0.8
16	Spectroscopic binary orbit (See Appendix I)				
	Mean	- 3.6			± 1.1
21	24818.890	-10.3		I 12	
	5320.691	- 2.1		I 12	
	9167.027	- 8.7	.6	II 6	
	31024.038	-12.7		II 6	
		- 8.4	3.6		
	GCSRV 3430	+ 6	.6		
	Mean	- 6.3	4.2	6 pl.	± 2.4
23	24783.018	+ 9.0		I 12	
	4975.672	-31.8		I 12	
	7460.607	- 9.3	.6	II 6	
	8905.656	-22.9	.5	II 6	
	8922.847	-10.7		II 6	
	9931.032	-13.9	.6	II 6	
		-12.5	4.7		
	GCSRV 3432	+ 0.4	.9		
	Mean	-10.4	5.6	9 pl.	± 3.7
27	24826.003	-23.8		I 12	
	5146.992	-17.8		I 12	
	7387.058	-20.0		II 6	
	30616.023	+15.7		II 6	
	Mean	-11	4.0		± 6

Radial Velocity Measurements

Star	J. D. 24...	Rad. vel. (km/sec)	Wt,	Spectrograph	p.e.
38	24859.735	-16.5		I 12	
	5303.717	-33.3		I 12	
	7698.001	+13.2		II 6	
	30259.971	- 4.8		II 6	
	Mean	-10	4.0		± 7
48	25142.960	- 1.2		I 12	
	5253.903	-11.8		I 12	
	8922.816	+ 6.1		II 6	
	30319.785	- 9.6		II 6	
	Mean	- 4.1	4.0		± 2.5
61	24768.004	- 6.6		I 12	
	4963.691	+ 2.5		I 12	
	5341.679	- 9.6		I 12	
	30259.953	+ 3.8	.6	II 6	
	1362.927	-13.6		II 6A	
		- 5.4	4.6		
	GCSRV 3443	-23.2	.9		
	Mean	- 8.3	5.5	8 pl.	± 2.1
81	24921.768	-24.3		I 12	
	5152.960	- 6.0		I 12	
	30028.634	- 4.3		II 6	
	0736.853	-14.0		II 6	
	2205.918	- 1.1		II 6A	
		- 9.9	5.0		
	GCSRV 3408	- 8.9	.6		
	Mean	- 9.8	5.6	7 pl.	± 2.1
91	25293.757	+ 0.2		I 12	
	5296.751	-11.8		I 12	
	9258.785	- 1.5		II 6	
	30285.888	+ 1.5		II 6	
	0671.998	+ 7.6		II 6	
	1054.762	-21.0		II 6	
	Mean	- 4.2	6.0		± 2.0
101	25129.980	+ 1.6		I 12	
	5248.931	+ 3.1		I 12	
	5324.675	+ 1.4		I 12	
	30230.014	-10.4		II 6	
	0720.706	-13.7		II 6	
	Mean	- 3.6	5.0		± 2.2

Radial Velocity Measurements

Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectro-graph	p.e.
138	25136.983	-16.5		I 12	
	5325.663	-11.6		I 12	
	8905.735	-40.1		II 6	
	30075.656	- 9.3	.6	II 6	
	0319.801	- 5.3		II 6	
	1023.047	-11.7		II 6	
	2476.873	-11.9		II 6A	
		-15.6	6.6		
	GCSRV 3444	- 3	.3		
	Mean	-15.1	6.9	8 pl.	± 2.8



NGC 2129

NGC 2129

α $5^h 58^m.1$ δ +23°19′ (1950.0) l^{II} 186°.6 b^{II} +0°.2

Diameter 7′ Class II3p; 1b1 Radial velocity +10.1 km/sec

Limit of completeness: m_{pg} = 14.3, within a radius of 3′.5 from the center.

No.	Coordinates x	Coordinates y	m_{pg}	Spectral Type	Radial velocity (km/sec)	p.e.	Other designations HD, BD	GCSRV	Cu
(1)	(2)		(3)	(4)	(5)		(6)		
1	+ 13″	− 59″	8.0	B1s*	+13.3	±1.6	23°1149	3759	4
2R	− 11	+ 58	8.6	B1*	+ 9.7 p.v.	±2.9	23°1148	3758	7
3	−183	+ 44	10.4	B4*	+22.8	±2.5	23°1145	3754	70
4	+ 40	+ 76	10.8	B3n*	+ 6 var	±7			8
5	− 20	+ 31	11.8	B4*	+ 3.8	±2.6			52
6	− 97	− 86	11.8	F0*					45
7	+149	+ 16	11.9						38
8R	− 42	+ 60	12.1	B5n*	+15.5	±3.2			31
9	− 28	−113	12.2	A7	+59	±6			21
10	− 23	+ 30	12.5						6
11	+105	− 67	12.5						42
12	− 50	− 72	12.7						23
13	+ 35	− 8	12.7						3
14R	− 45	+ 55	12.8						32
15	−114	+ 18	12.9						48
16	− 24	+150	13.0						53
17	+ 58	+138	13.0						35
18	+139	+ 7	13.4						39
19	+152	− 69	13.6						40
20	− 17	− 47	14.0						5
21	− 70	+ 5	14.1						28
22	+ 54	+ 51	14.2						10
23	+ 9	−108	14.2						20
24	− 67	− 70	14.4						24
25	+ 22	− 81	14.4						17

NGC 2129

Col. 1: Remarks (R)

2, ADS 4590A.

8, ADS 4590B.

14, ADS 4590C.

Col. 3: Magnitudes based on a polar comparison and a plate taken with the 20-inch Astrograph, combined with values published by J. Cuffey (H.A. 106, 39, 1938).

Col. 5: In the calculation of the mean radial velocity of the cluster, stars 6 and 9 were omitted because their spectral types deviate considerably from those of the other stars; for star 9, the radial velocity is also quite different. Star 3 was omitted for similar reasons, although the difference in spectral type and radial velocity is not as large. Star 4 received weight 1/2 because of velocity variation.

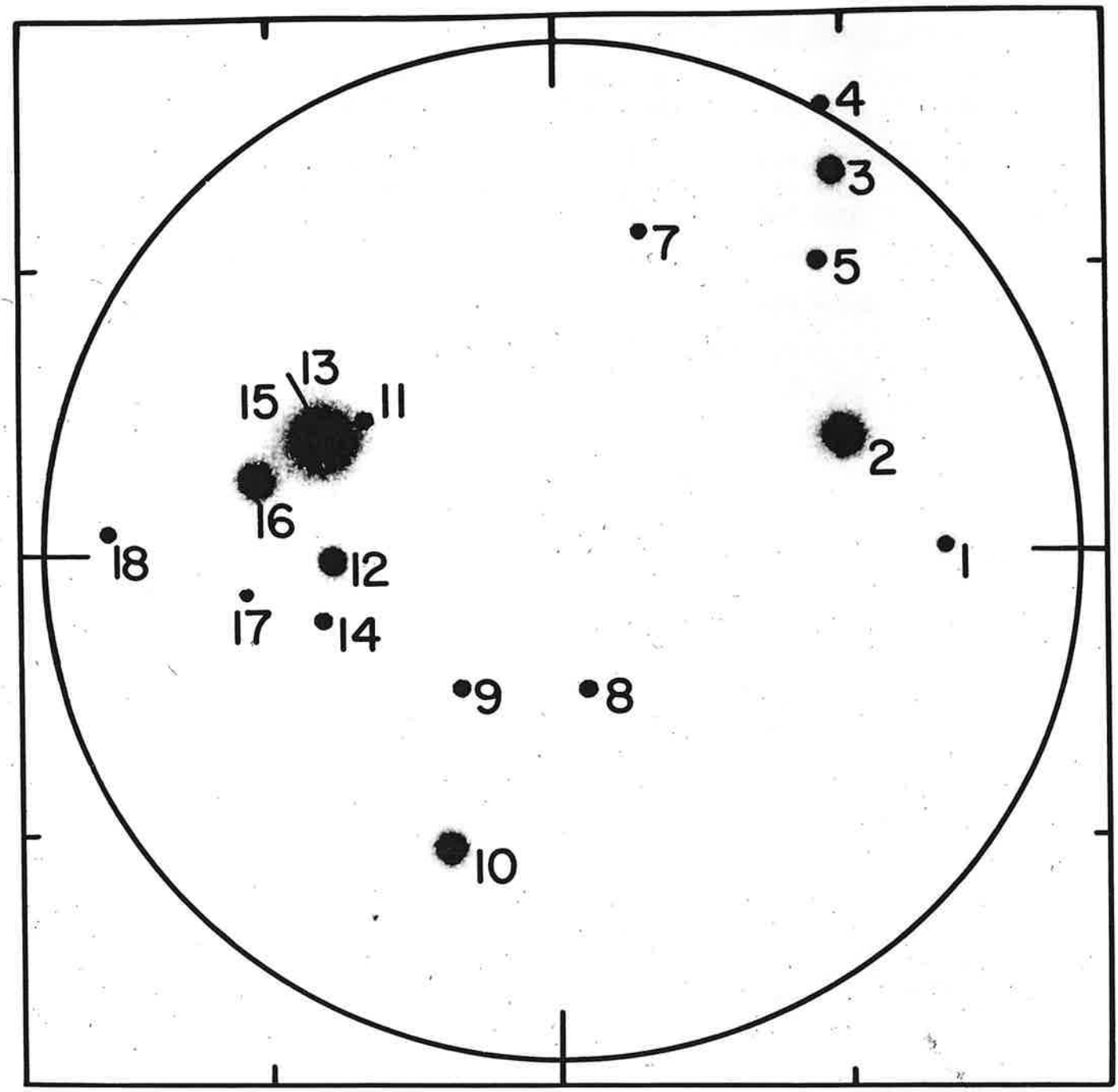
Col. 6: Cu = J. Cuffey (see "Col. 3" above)

Radial Velocity Measurements

Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectrograph	p.e.
1	26392.841	+14.1		I 12	
	6401.758	+ 4.1		I 12	
	6409.891	+14.7		I 12	
	6438.680	+ 8.6		I 12	
	30426.720	+10.4		II 6	
	1359.033	+16.2		II 6	
		+11.3	6.0		
	GCSRV 3759	+16.3	4.0		
	Mean	+13.3	10.0	10 pl.	± 1.6
2	26401.828	+23.0	.5	I 12	
	6424.698	+22.7	.5	I 12	
	8208.848	+ 6.8	.6	II 6	
	30426.732	+ 2.6		II 6	
	0735.634	+17.4		II 6	
	1356.035	+ 8.2		II 6	
		+12.0	4.6		
	GCSRV 3758	+ 3.2	1.6		
	Mean	+ 9.7	6.2	10 pl.	± 2.9
3	28102.948	+ 9.1	.6	II 6	
	9614.971	+27.5	.3	II 6	
	0319.832	+29.7	.6	II 6	
	30638.913	+42.0		II 6	
	1877.809	+14.9		II 6A	
		+25.3	3.5		
	GCSRV 3754	+ 8	.6		
	Mean	+22.8	4.1	7 pl.	± 2.5
4	27429.925	-25.7		II 6	
	8154.787	-16.8		II 6	
	30260.015	+40.7		II 6	
	0399.747	+ 7.0		II 6	
	0617.025	+ 6.3		II 6	
	1358.986	+22.3		II 6	
	Mean	+ 6	6.0		± 7
5	28097.914	+ 9	.4	II 3-1/2	
	9643.819	+11	.4	II 3-1/2	
	30323.030	+14.8		II 6	
	0723.747	- 3.9		II 6	
	1056.843	- 4.4		II 6	
	Mean	+ 3.8	3.8		± 2.6

Radial Velocity Measurements

Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectro-graph	p.e.
8	30735.700	+11.8		II 6	
	1378.917	+ 3	.4	II 3-1/2	
	1737.948	+24.2		II 6A	
	Mean	+15.5	2.4		± 3.2
9	30638.978	+59.3	.7	II 6	± 6



NGC 2169

NGC 2169

α $6^h05^m.6$ δ +13° 58' (1950.0) l^{II} 195°.6 b^{II} -2°.9

Diameter 6' Class II3p; 1b1 Radial velocity +17.4 km/sec

Limit of completeness: m_{pg} = 12.5, within a radius of 3' from the center.

GCSRV

No. V	Coordinates x	y	m_{pg}	Spectral Type T	CM	Radial velocity (km/sec)	p.e.	Other designations HD, BD	GCSRV	ADS	CM
(1)	(2)		(3)	(4)		(5)		(6)			
13	+ 80"	+ 40"	6.6	B1s*	B3	+16.4	±1.4	41943	3862	4728A	1
15	+ 82	+ 39	7.1	B2*	B3	+15.3	±2.3		3863	4728B	
2	- 99	+ 40	7.9	B4*	B5	+ 2 var	±9	13°1120	3855		2
16	+104	+ 25	8.3	B2*	B3	+16.1	±2.5		3864	4728D	3
10R	+ 38	-104	8.5	B5nn*	B3	+10.4	±2.9	13°1123	3860		4
12	+ 78	- 3	9.0	B5*	B3	+18.1	±2.5			4728E	5
3	- 96	+133	9.3	F5*	G2	+43.4	±3.4	14°1160	3856		6
5	- 90	+101	10.5								7
9	+ 34	- 48	10.6	B9n*		+20.8	±2.9				8
8	- 10	- 48	10.6	B9*	B5	+19.3	±2.6				9
11	+ 67	+ 46	11.2							4728C	
14	+ 81	- 24	10.9	B9*		+22.4	±3.1				10
18	+157	+ 7	11.0	G8*	G8III						11
4	- 93	+156	11.1					14°1161			14
1	-132	+ 1	11.1		B8						12
7	- 29	+112	11.1		B5						13
17	+108	- 14	11.8								15

NGC 2169

Col. 1: V = H. C. Vogel (Beob. Sternw. Leipzig Vol. 1, 1876)

Remarks (R)

10, perhaps a double line spectroscopic binary.

Col. 3: Magnitudes based on values published by
J. Cuffey and S. W. McCuskey (Ap.J. 123, 59, 1956),
C. Grubissich (Z.f.A. 47, 24, 1959).

Col. 4: Spectral types listed under CM were published by
J. Cuffey and S. W. McCuskey (see "Col. 3" above).

Col. 5: In the calculation of the mean radial velocity of the cluster, star 3 was omitted because its radial velocity leaves no doubt that it is not a cluster member. Star 2 was omitted because of its large velocity variation.

Col. 6: CM = Cuffey and McCuskey (see "Col. 3" above)

Star 18 might be red giant star belonging to the cluster, but since it is the only one of its kind, it is more probable that it is a background star. It is also doubtful whether the group of stars 1, 2, 3, 4, 5, 7 is really part of the cluster.

Radial Velocity Measurements

Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectrograph	p.e.
2	26255.012	+ 1.4	.5	I 12	
	6409.726	- 4.3	.5	I 12	
	6423.700	-35.3	.3	I 12	
	9273.847	-45.7	.3	II 6	
	30011.766	+18.3	.6	II 6	
		-13	2.2		
	GCSRV 3855	+38.2	.9		
	Mean	+ 2	3.1	7 pl.	± 9
3	26414.771	+50.5	.7	I 12	
	6417.736	+36.3	.7	I 12	
	Mean	+43.4	1.4		± 3.4
8	28498.933	+26.2	.6	II 6	
	30399.668	+11.3		II 6	
	0427.745	+13.5		II 6	
	1819.952	+28.8		II 6A	
	Mean	+19.3	3.6		± 2.6
9	27533.658	+18	.4	II 3-1/2	
	9227.993	+30.8	.6	II 6	
	30320.904	+29.9		II 6	
	0723.726	+ 6.9		II 6	
	Mean	+20.8	3.0		± 2.9
10	26611.003	+14.0		I 12	
	6630.910	*		I 12	
	8922.722	+ 8.4		II 6	
	9615.781	+ 9.4	.5	II 6	
	30320.947	+ 8.1	.5	II 6	
	Mean	+10.4	3.0		± 2.9
12	26394.811	+28.6	.5	I 12	
	6984.026	+17.1		I 12	
	7762.898	+12.3	.6	II 6	
	9261.774	+ 5.9		II 6	
	30399.701	+29.6		II 6	
	Mean	+18.1	4.1		± 2.5
13	26390.824	+23.4		I 12	
	6413.780	+13.1		I 12	
	8102.055	+35.7		II 6	
	30736.685	+19.3		II 6	
	1353.036	+11.9		II 6	
		+20.7	5.0		
	GCSRV 3862	+13.4	7.0		
	Mean	+16.4	12.0	12 pl.	± 1.4

Radial Velocity Measurements

Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectro-graph	p.e.
14	27455.804	+21.9	.6	II 6	
	9273.777	+33.5		II 6	
	30427.687	+11.6		II 6	
	Mean	+22.4	2.6		± 3.1
15	26449.674	+ 4.9		I 12	
	6453.662	+21.9		I 12	
	8102.018	+13.5	.3	II 6	
	8500.900	+27.1	.3	II 6	
	30011.790	+26.7	.6	II 6	
	0426.758	+ 6.6		II 6	
		+14.7	4.2		
	GCSRV 3863	+19.8	.6		
	Mean	+15.3	4.8	8 pl.	± 2.3
16	26407.784	+ 8.0		I 12	
	6414.695	+18.1		I 12	
	7499.736	+20.6		II 6	
	31372.999	+17.9		II 6A	
	Mean	+16.1	4.0		± 2.5

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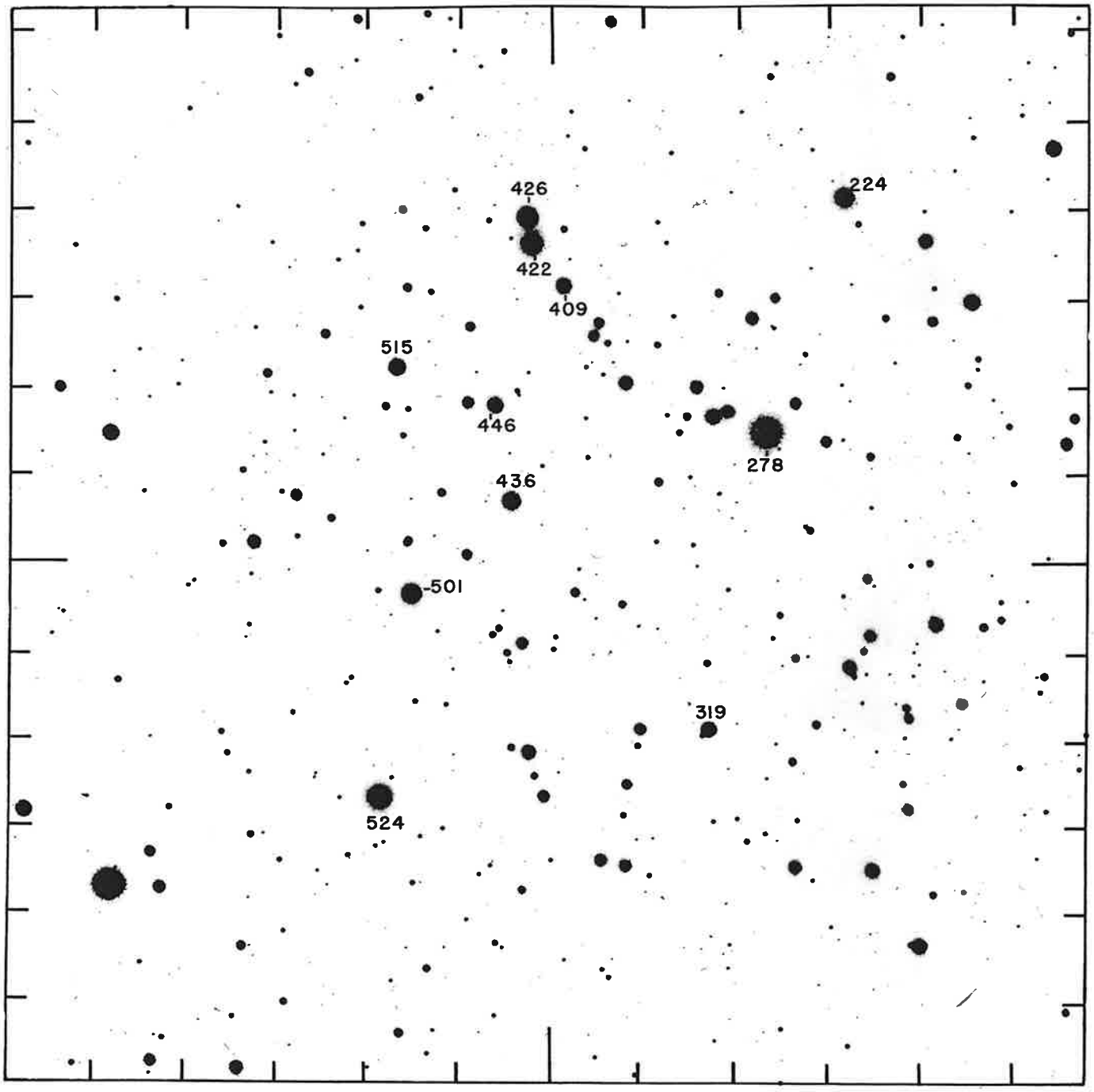
* Double lines; +116 and -163 km/sec.



NGC 2168

NGC 2168

(M 35)

α $6^h\,06^m.2$ δ +24° 20' (1950.0) l^{II} 186°.6 b^{II} +2°.3

Diameter 29' Class III3r; 1-2b Radial velocity -6.4 km/sec

Limit of completeness: $m_{pg} = 9.4$, within a radius of 7' from the center.

No.	Coordinates x	Coordinates y	m_{pg}	Spectral Type	Radial velocity (km/sec)	p.e.	Other designations K	Other designations Cu
(1)	(2)		(3)	(4)	(5)		(6)	
1R	-236"	+147"	7.7		- 9.5 var	±0.9	278	123
2	+ 26	+394	8.3	gG1*	- 9.6	±1.4	426	310
3	+191	-268	8.8	B7*	-12.3	±1.9	524	364
4	+ 12	+363	9.0	B8*	- 6.6	±2.6	422	309
5	+156	- 34	9.0	B8*	- 2.1 p.v.	±4.0	501	177
6	-324	+413	9.1	B9*	- 6.4 p.v.	±5.0	224	293
7	+ 46	+ 71	9.3	B9*	- 3.9	±2.7	436	164
8	+171	+225	9.4	B9*	- 3.4	±2.8	515	323
9	+ 63	+180	9.4	B9*	+ 1.9	±3.0	446	160
10	-174	-192	9.6	gK1*	- 4.8	±1.9	319	81
11	- 14	+316	9.9	B9*	- 3.9	±3.1	409	307

Col. 1: Remarks (R)
1, spectroscopic binary orbit.

Col. 2: Coordinates published by F. Küstner (Veröff. Bonn No. 18, 1923), based on center at $6^h\ 03^m.1$, +24° 20' (1900).

Col. 3: Magnitudes based on values published by J. Cuffey (H.A. 106, 60, 1938).

Col. 5: In the calculation of the mean radial velocity of the cluster, star 1 received weight 2, stars 5, 6, 9 each received weight 1/2 because of velocity variation.

Col. 6: K = F. Küstner (see "Col. 2" above)
Cu = J. Cuffey (see "Col. 3" above)

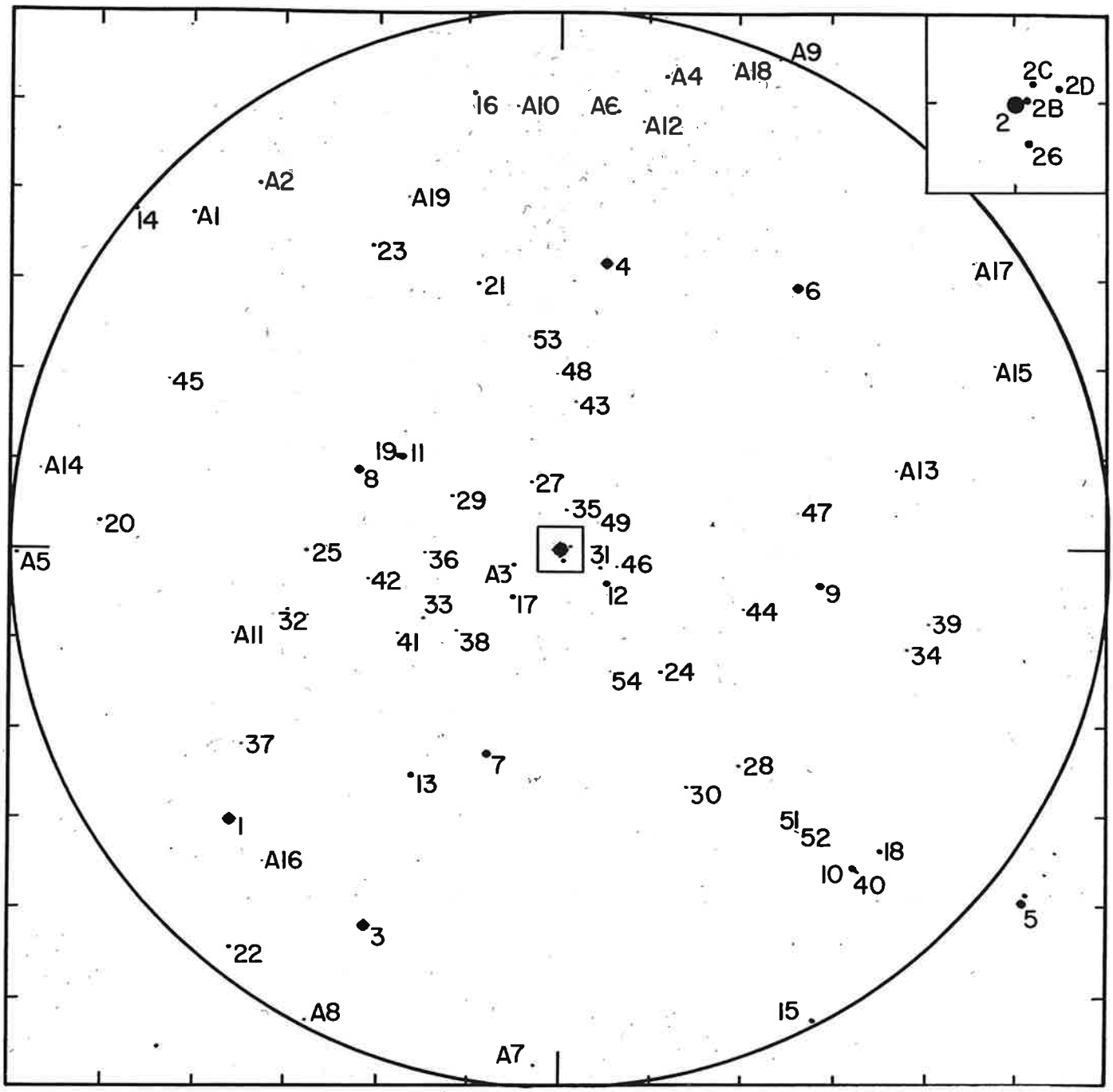
Radial Velocity Measurements

Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectrograph	p.e.
1	Spectroscopic Binary Orbit (See Appendix I)				
	Mean	- 9.5			± 0.9
2	24111.037	- 7.7		I 12	
	5597.757	-17.7		I 12	
	8236.749	- 6.7	.7	II 6	
		-11.1	2.7		
	Victoria*	- 8.9	6		
	Mean	- 9.6	8.7	9 pl.	± 1.4
3	24181.816	-12.5		I 12	
	4250.673	-13.3		I 12	
	5929.825	-11.2		I 12	
	9930.063	-17.0	.6	II 6	
		-13.1	3.6		
	Victoria*	-11.3	3		
	Mean	-12.3	6.6	7 pl.	± 1.9
4	24230.696	- 1.3		I 12	
	5875.996	-17.2		I 12	
	8238.741	-12.1	.6	II 6	
	31054.808	+ 2.0		II 6	
	Mean	- 6.6	3.6		± 2.6
5	24208.750	+ 7.2		I 12	
	5161.955	+13.7		I 12	
	7079.658	- 3.7		II 6	
	30258.014	- 6.9		II 6	
	0733.948	-20.8		II 6	
	Mean	- 2.1	5.0		± 4.0
6	24225.709	+12.7		I 12	
	5587.976	- 9.0		I 12	
	7079.716	- 5.4		II 6	
	30427.785	-23.8		II 6	
	Mean	- 6.4	4.0		± 5.0
7	24205.769	-21.8	.5	I 12	
	5653.788	+ 2.8		I 12	
	7078.694	+ 0.3		II 6	
	30351.012	- 5.7		II 6	
	Mean	- 3.9	3.5		± 2.7
8	24504.940	-16.1		I 12	
	5619.892	+ 8.8		I 12	
	7022.050	+ 8.8	.5	II 6	
	8074.025	-12.8	.6	II 6	
	Mean	- 3.4	3.1		± 2.8

Radial Velocity Measurements

Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectro-graph	p.e.
9	29272.757	+ 4.5	.6	II 6	
	9902.022	-17.3	.6	II 6	
	30349.998	+13.0	.5	II 6	
	0720.792	+ 6.4		II 6	
	Mean	+ 1.9	2.7		±3.0
10	28922.893	-11.8	.7	II 6	
	9272.705	+ 5.0		II 6	
	9901.964	- 7.4	.7	II 6	
		- 3.5	2.4		
	Victoria*	- 6.4	2		
	Mean	- 4.8	4.4	6 pl.	±1.9
11	26991.920	- 4.4		I 12	
	8898.910	- 3.1	.6	II 6	
	30258.036	- 3.9		II 6	
	Mean	- 3.9	2.6		±3.1

* Dominion Astrophysical Observatory, Victoria--unpublished observations (1952).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A18
16
A10
A6
A12
2C
2D
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2B
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A2
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A13
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A5
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A3
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A11
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A8
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A7

NGC 2244

NGC 2244

α $6^h29^m.3$ δ +4° 59' (1950.0) l^{II} 206°.3 b^{II} -2°.1

Diameter 27' Class IV3mN; 1o6 Radial velocity +29.5 km/sec

Limit of completeness: m_{pg} = 13.5., within a radius of 10' from star 2.

No. Z	Coordinates x	y	m_{pg}	Spectral Type T	HD	Radial velocity p.e. (km/sec)	Other designations HD, BD	GCSRV	ADS
(1)	(2)		(3)	(4)		(5)	(6)		
1	+359"	-300"	6.8	gG9*	K0	+18.6 ±1.6	46241	4194	5165A
2	0	0	7.0	O7*	B2	+36.5 ±1.0	46150	4181	
3	+211	-421	7.5	O6*	B2	+43.4 ±1.4	46223	4191	
4	- 50	+318	7.8	O8*	B2	+36.2 ±1.3	46149	4180	
5	-507	-395	8.5	B0n*	B0	+34 var ±6	46056	4167	
6	-260	+290	8.0	B1*	B8	+23.9 ±3.5	46106	4173	
7R	+ 78	-228	8.6	B1*		+29.0 var ±1.9	4°1299	4183	
8	+218	+ 88	8.3	B0*	B2	+35.8 ±1.9	46202	4192	
9	-284	- 38	9.0	A2*	A2	+26.4 ±2.8	46107	4172	
10R	-319	-355	9.6	B3		- 1.4 b	4°1295	4171	
11	+171	+103	9.1	A0s*	A0	- 1 var ±12			5169A
12	- 51	- 38	9.6	B2n*		+24.4 ±2.1	5°1281	4179	
13	+161	-252	9.9	B2n*		+31.2 ±2.4		4189	
14	+464	+380	10.4	A5					
15	-276	-525	10.8	gG0					
16	+ 94	+507	10.9	B4					
17	+ 50	- 50	10.6	B2*		+31.2 ±2.3		4182	
18	-350	-336	10.9	B4					
19	+176	+104	10.3	A3					5169B
20	+502	+ 30	11.2	B5					
21	+ 88	+296	11.4	gG2					
22	+359	-442	11.3						
A1	+401	+372	11.6	B6					
23	+206	+338	11.5	B5					
A2	+330	+407	11.7	B5					
A3	+ 49	- 15	11.6	B4nn*		+25.4 ±2.7			
A4	-116	+525	11.8						
24	-116	-136	11.9	B3*		+33.5 ±2.9			
25	+276	- 2	11.4	A1*					
26	- 4	- 12	11.5	B5*		+ 7 p.v. ±7			5165

No. Z	Coordinates x	y	m_{pg}	Spectral Type T	HD	Radial velocity p.e. (km/sec)	Other designations HD, BD	GCSRV	ADS
(1)	(2)		(3)	(4)		(5)	(6)		
A5	+595"	- 5"	11.9	G0					
A6	- 63	+485	12.0						
A7	+ 27	-575	12.2	G0					
27	+ 30	+ 73	12.2	F8					
28	-197	-240	12.2	B8					
29	+118	+ 58	12.0	A5					
2B	- 3	+ 1	12.						5165B
30	-138	-266	12.4	F8					
31	- 43	- 18	12.5	B8					
32	+299	- 66	12.4	B7					
A8	+275	-526	12.7	B8					
33	+150	- 74	12.6	B9:					
2C	- 5	+ 5	12.7						5165C
34	-379	-110	12.7	B9					
35	- 6	+ 45	12.6						
40	-325	-359	12.4						
36	+146	- 2	12.8	F2:					
A9	-240	+545	13.0						
37	+348	-217	12.9	B8					
A10	+ 48	+492	13.1						
38	+114	- 88	13.1	B9					
39	-412	- 80	13.1	F3					
41	+176	- 92	13.0						
42	+209	- 32	13.0	B9					
2D	- 12	+ 4	13.2	A0					5165D
43	- 16	+163	13.1	A0					
44	-202	- 65	13.1	K					
A11	+357	- 92	13.5						
45	+427	+187	13.3	A					
A12	- 89	+475	13.5						
A13	-366"	+ 88"	13.5	B9:					
A14	+568	+ 88	13.6						
A15	-476	+203	13.6						
A16	+323	-349	13.6	A0					
46	- 64	- 17	13.6	B9					
A17	-450	+319	13.7						
A18	-188	+540	13.7						
A19	+168	+391	13.8						
47	-260	+ 40	14.0						
48	+ 3	+194	13.8						
49	- 40	+ 30	14.3						
51	-261	-316	13.2	A0					
52	-259	-313							
53	+ 34	+236	14.1						
54	- 57	-135	14.0						

NGC 2244

Col. 1: Z = R. Zug (L.O.B. 16, 119, 1933). Stars with prefix A were added, as were the companions of star 2 which are followed by letters B, C, D.

Remarks (R)

7, listed twice in GCSRV, as 4183 and 4186; spectroscopic binary orbit.

10, radial velocity from GCSRV.

Col. 3: Magnitudes based on a polar comparison and two cluster comparisons.

Col. 5: In the calculation of the mean radial velocity of the cluster, stars 1, 10, 11 were omitted because the radial velocity indicates that they are not cluster members. Stars 2, 3, 4 were omitted because of probable relativity red shift. Star 9 was omitted because of the large deviation in spectral type, and star 26 because of inaccuracy or variability of the radial velocity. The radial velocity of star 5 was assigned weight 1/2 because of the large probable error due to velocity variation. The velocity of the double line binary system, star 7, received weight 2.

Radial Velocity Measurements

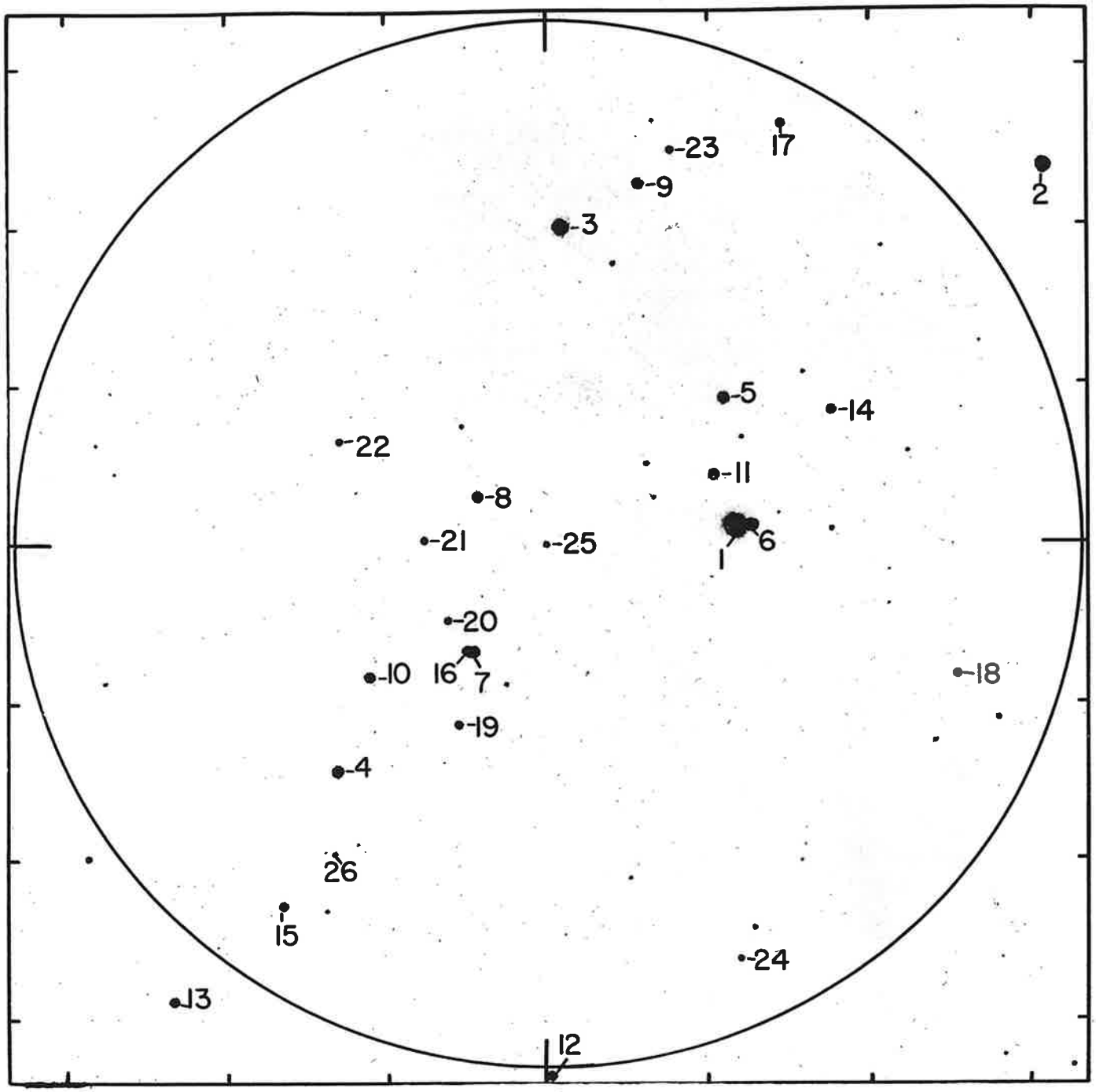
Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectrograph	p.e.
1	25249.848	+ 8.7		I 12	
	5258.841	+23.8		I 12	
	5655.844	+16.0		I 12	
		+16.2	3.0		
	GCSRV 4194	+21.0	3.0		
	Mean	+18.6	6.0	6 pl.	± 1.6
2	24869.886	+51.1		I 12	
	5249.824	+45.9	.5	I 12	
	5597.845	+31.1	.5	I 12	
	7844.651	+32.7		II 6	
	7902.689	+36.3		II 6	
	8208.818	+40.1		II 6	
	8467.060	+35.5		II 6	
	8598.669	+33.1		II 6	
	8906.785	+32.8		II 6	
	9316.644	+22.7		II 6	
	9622.760	+29.4		II 6	
	30027.765	+39.5		II 6	
	0320.968	+38.5		II 6	
	0761.663	+31.9		II 6	
	1360.038	+41.9		II 6A	
	1448.739	+36.3		II 6A	
	2239.780	+47.2		II 6A	
		+36.7	16		
	GCSRV 4181	+36.3	11		
	Mean	+36.5	27	27 pl.	± 1.0
3	24826.071	+44.5		I 12	
	5315.674	+39.2		I 12	
	5904.906	+45.1		I 12	
	7850.808	+36.7		II 6	
	30720.915	+53.0		II 6	
	1738.049	+37.2		II 6A	
		+42.6	6.0		
	GCSRV 4191	+44.0	7.0		
	Mean	+43.4	13.0	13 pl.	± 1.4
4	25240.831	+50.6		I 12	
	5657.661	+33.9		I 12	
	5664.793	+41.5		I 12	
	30075.734	+20.0		II 6	
	1448.755	+17.9		II 6A	
	2114.057	+32.7		II 6A	
		+32.8	6		
	GCSRV 4180	+38.5	9		
	Mean	+36.2	15	15 pl.	± 1.3

Radial Velocity Measurements

Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectrograph	p.e.
5	25249.785	+31.2		I 12	
	5600.838	+63.6		I 12	
	5667.705	-11.5		I 12	
	30075.702	+23.7		II 6	
	1826.939	+25.2		II 6A	
		+26.4	5		
	GCSRV 4167	+45.3	3		
	Mean	+34	8	8 pl.	± 6
6	25253.823	+37.1		I 12	
	5275.832	+23.4		I 12	
	5904.924	+38.3		I 12	
	30074.742	+24.4		II 6	
	1374.030	+24.1		II 6A	
		+29.5	5		
	GCSRV 4173	+11.2	2.2		
	Mean	+23.9	7.2	10 pl.	± 3.5
7	Spectroscopic binary orbit (See Appendix I)				
	Mean	+29.0			± 1.9
8	25162.044	+39.1		I 12	
	5266.831	+36.6		I 12	
	5667.659	+34.2		I 12	
	8907.819	+41.1		II 6	
	31374.017	+40.9		II 6A	
	1826.958	+24.2		II 6A	
		+36.0	6.0		
	GCSRV 4192	+33.7	.6		
	Mean	+35.8	6.6	8 pl.	± 1.9
9	25229.850	+26.1		I 12	
	5507.016	+26.7		I 12	
	Mean	+26.4	2.0		± 2.8
11	25201.883	-18.5		I 12	
	5670.652	+17.4		I 12	
	Mean	- 1.0	2.0		±12
12	25283.796	+20.0	.5	I 12	
	5611.805	+31.5		I 12	
	30027.740	+ 7.3		II 6	
	0320.984	+35.9		II 6	
	0720.876	+15.9		II 6	
	1632.984	+33.7		II 6A	
	Mean	+24.4	5.5		± 2.1

Radial Velocity Measurements

Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectro-graph	p.e.
13	25620.790	+33.9		I 12	
	5924.997	+21.6		I 12	
	30028.709	+43.5	.6	II 6	
	1360.020	+28.1		II 6A	
		+30.5	3.6		
	GCSRV 4189	+35.1	.6		
	Mean	+31.2	4.2	6 pl.	± 2.4
17	25292.737	+35.7		I 12	
	5655.728	+37.9		I 12	
	5943.978	+21.8		I 12	
	30322.038	+28.7		II 6	
		+31.0	4		
	GCSRV 4182	+32.6	.6		
	Mean	+31.2	4.6	6 pl.	± 2.3
24	32114.959	+35.7		II 6A	
	2183.864	+34.0		II 6A	
	2205.829	+30.9		II 6A	
	Mean	+33.5	3		± 2.9
26	30761.712	+14.0	.5	II 6	
	1379.985	+17.8		II 6A	
	1524.675	-19.5	.5	II 6A	
	Mean	+ 7	2.0		± 7
A3	30371.776	+27.4		II 6	
	0734.920	+25.5		II 6	
	1378.021	+ 7.6	.4	II 3-1/2	
	2476.966	+30.3		II 6A	
	Mean	+25.4	3.4		± 2.7



NGC 2251

NGC 2251

α $6^h 31^m.7$ δ $+8° 24'$ (1950.0) l^{II} $203°.6$ b^{II} $+0°.1$

Diameter 7' Class II2p; 1b2 Radial velocity +15.4 km/sec

Limit of completeness: $m_{pg} = 13.0$, within a radius of 5'.5 from star 25.

No.	Coordinates x	Coordinates y	m_{pg}	Spectral Type	Radial velocity (km/sec)	p.e.	Other designations
(1)	(2)		(3)	(4)	(5)		(6)
1R	+116"	- 11"	9.2	B2*	+14.4	±2.4	
2	+308	-237	10.1				
3	+ 8	-199	10.5	B8*	+13.3	p.v. ±4.9	
4	-130	+141	11.0	A0p*	+13.0	±2.5	
5	+110	- 91	11.0	B9*	+20.7	±3.0	
6	+128	- 12	11.2				
7R	- 45	+ 68	11.3	A0*	+39.4	±2.8	
8	- 42	- 30	11.4	A0*	+14.5	±2.9	
9	+ 56	-227	11.4				
10	-110	+ 83	11.5	gG9*	+26.5	±2.5	
11	+102	- 42	11.5				
12	+ 2	+335	11.8				
13	-232	+288	11.8				
14	+175	- 84	12.0				
15	-163	+229	12.0				
16	- 50	+ 67	12.1				
17	+145	-263	12.1				
18	+251	+ 82	12.2				
19	- 56	+113	12.4				
20	- 62	+ 48	12.6				
21	- 77	- 2	12.6				
22	-129	- 65	12.6				
23	+ 77	-248	12.6				
24	+120	+261	13.0				
25	0	0	13.0				
26	-132	+195	13.2				

NGC 2251

Col. 1: Remarks (R)

1, GCSRV 4235.

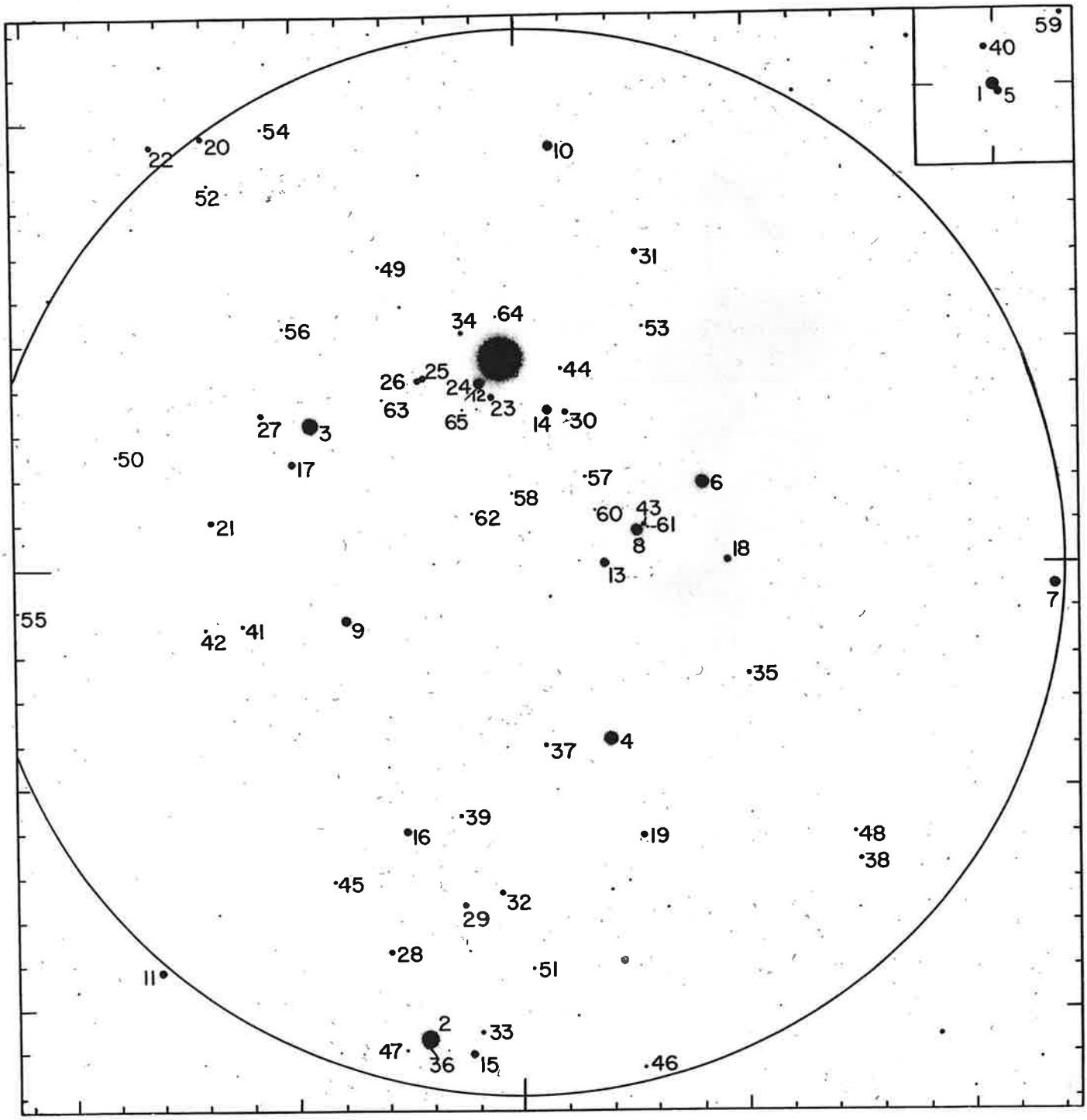
7, probably ADS 5196. With a change in position angle of 180°, the measurement fits the pair 7-16 quite well. The position given in ADS is off by 5', but there is no double star at the ADS position. Star 16 was also on the slit during the exposures.

Col. 3: Magnitudes based on a cluster comparison and a plate taken with the 20-inch Astrograph.

Col. 5: In the calculation of the mean radial velocity of the cluster, stars 7 and 10 were omitted because their radial velocities indicate that they are not physical members of the cluster. Star 3 was given weight 1/2 because of velocity variation.

Radial Velocity Measurements

Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectrograph	p.e.
1	27004.021	+22.3		I 12	
	7022.001	+15.2		II 6	
	8208.675	+ 7.4	.6	II 6	
	9644.766	+ 6.1	.6	II 6	
	32183.972	+15.0		II 6A	
	Mean	+14.4	4.2		± 2.4
3	27072.875	- 9.9	.5	II 6	
	7078.792	- 1.2		II 6	
	8153.851	+23.4	.6	II 6	
	30320.027	+14.7		II 6	
	1636.025	+31.8		II 6A	
	Mean	+13.3	4.1		± 4.9
4	27074.745	+17.3		II 6	
	9257.872	+17.5		II 6	
	30407.845	+10.6		II 6	
	2094.010	+ 6.6		II 6A	
	Mean	+13.0	4.0		± 2.5
5	28098.030	+21	.4	II 3-1/2	
	9258.911	+20.3		II 6	
	9642.938	+19	.4	II 3-1/2	
	31826.868	+21.6		II 6A	
	Mean	+20.7	2.8		± 3.0
7	28499.039	+17	.4	II 3-1/2	
	8907.880	+30	.4	II 3-1/2	
	9644.902	+42	.4	II 3-1/2	
	30698.923	+39.8		II 6	
	1469.714	+50.8		II 6A	
	Mean	+39.4	3.2		± 2.8
8	31791.819	+11.9		II 6A	
	1819.838	+18.0		II 6A	
	1853.825	+13.7		II 6A	
	Mean	+14.5	3.0		± 2.9
10	27366.009	+39	.4	II 3-1/2	
	9644.824	+20	.4	II 3-1/2	
	30321.034	+24.7		II 6	
	1375.998	+25.7	.7	II 6A	
	Mean	+26.5	2.5		± 2.5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NGC 2264

NGC 2264

α $6^h38^m.2$ δ +9°49' (1950.0) l^{II} 203°.0 b^{II} +2°.1

Diameter 30' Class II3pN; 1o7 Radial velocity +22.3 km/sec

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

No.	Coordinates x	y	m_{pg}	Spectral Type T	WM	Radial velocity (km/sec)	p.e.	Other designations HD, BD	GCSRV	ADS	VM	W	Me M
(1)	(2)		(3)	(4)		(5)		(6)					
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	
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	
7R	-1180	- 51	8.2	F0				47554				25	
8R	-259	+ 78	8.3	B5*		+21.1 var	±2.1	47755		5316A	37	74	
9R	+387	-123	8.6	B8n*		+22.9 p.v.	±4.4	47934		5333AB	76	206	
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	
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	
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	
21	+680	+108	9.7		A3-4III			9°1255			112	226	1
22	+813	+949	9.8					10°1230			130	232	
23	+ 61	+380	9.8	B9*		+16.0	±2.2	10°1222	4336	5325C	63	137	
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	
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	
30	-103	+347	10.1	A0n*	A2IV	+25 var	±7	9°1236	4329	5322G	48	100	1

No.	Coordinates x	Coordinates y	m_{pg}	Spectral Type	Radial velocity (km/sec)	p.e.	Other designations HD,BD	GCSRV	ADS	VM	W	Mem
(1)	(2)		(3)	(4)	(5)		(6)					(7)
31	-259"	+700"	10.2	G5IIIp ?			10°1216			29	73	1
32	+ 45	-739	10.2				9°1239				132	
33	+ 91	-1058	10.7	A0V			9°1240				145	
34	+128	+527	10.7	A7-F0 IV -Vp			10°1224			57	158	1
35	-503	-248	10.7	A7 III			9°1229			13	43	1
36	+218	-1084	10.7						5327B			
37	- 56	-410	10.8	A0V							112	
38	-748	-670	10.9								36	
39	+135	-566	11.0	A0V							159	
40	+ 43	+483	11.0	A2*	+20.8	±2.8			5322C	58		1
41	+619	-134	11.2							103	223	1
42	+698	-139	11.4							107	228	1
43	-275	+ 92	11.4	B2V					5316B	35	67	1
44	- 94	+447	11.6	A5IV					5322d	50	104	1
45	+419	-713	11.7								209	
46	-268	-1138	11.7								70	
47	+262	-1097	11.7								189	
48	-735	-604	12.0									
49	+311	+675	12.0	F6-F8 IVp ?						83	196	3
50	+892	+255	12.0							114	236	3
51	- 25	-912	12.3	F5III,IV							116	
52	+684	+863	12.3							127	227	2
53	-272	+536	12.4	G0IV-V						30	68	1
54	+568	+985	12.5							92	221	1
55	+1127	- 94	12.5									
56	+525	+538	12.5							97	216	2
57	-145	+200	12.5	K0IVp						45	92	2
58	+ 18	+165	12.9	F6-G0III-V						68	125	1
59	+ 8	+492	12.9						5322D	59	121	1
60R	-165	+125	12.9							43		1
61	-284	+ 85	13.0						5316C	36	66	1
62	+107	+118	13.0							71	151	1
63	+305	+378	13.2							79	195	1
64	+ 51	+560	13.2							56	134	1
65	+128	+353	13.2							65		1

Col. 1: Remarks (R)

1, S Monocerotis.

6, some lines appear double on two spectrograms.

8, double line spectroscopic binary, involved in bright nebulosity.

9, close visual binary (0".8), not separated.

16, some lines appear double on one spectrogram.

17, visual binary, separation 2".5. Spectral types and radial velocity refer to the brighter (n.p.) component; the magnitude is that of the combined light (the s.f. component is about 0.5 magnitude fainter).

60, listed by G. Herbig (Ap.J. 119, 483, 1955) as having H_α emission L H_α 25) and spectral type A2-A3.

Col. 3: Magnitudes based on a polar comparison, two cluster comparisons, and photoelectric measurements kindly placed at the writer's disposal in advance of publication by M. F. Walker.

Col. 4: Spectral types listed under WM were classified by M. F. Walker and W. W. Morgan and communicated by Walker.

Col. 5: In the calculation of the mean radial velocity of the cluster, star 1 was omitted because it is probably affected by relativity red shift. Stars 5, 14 and 30 received weight 0.5 and star 25 weight 0.3 because of the large probable error. The velocity of the double line binary system 8 was given weight 2.

Col. 6: VM = A. van Maanen (Contr. Mt. Wilson Obs. 405, 1930)
W = M. F. Walker (see "Col. 3" above)

Col. 7: Cluster membership designations have the following significance, and are based on proper motions measured by A. van Maanen (see "Col. 6" above):

1 -- reasonably high probability of membership; the proper motions of these stars deviate from the mean cluster motion by less than 0".012 (three times the probable error);

2 -- doubtful members, not definitely assignable to either 1 or 3; these stars have intermediate deviations of 0".012 to 0".020;

3 -- definite indications of non-membership; the proper motions of these stars deviate from the mean cluster motion by more than 0".020 (five times the probable error).

Radial Velocity Measurements

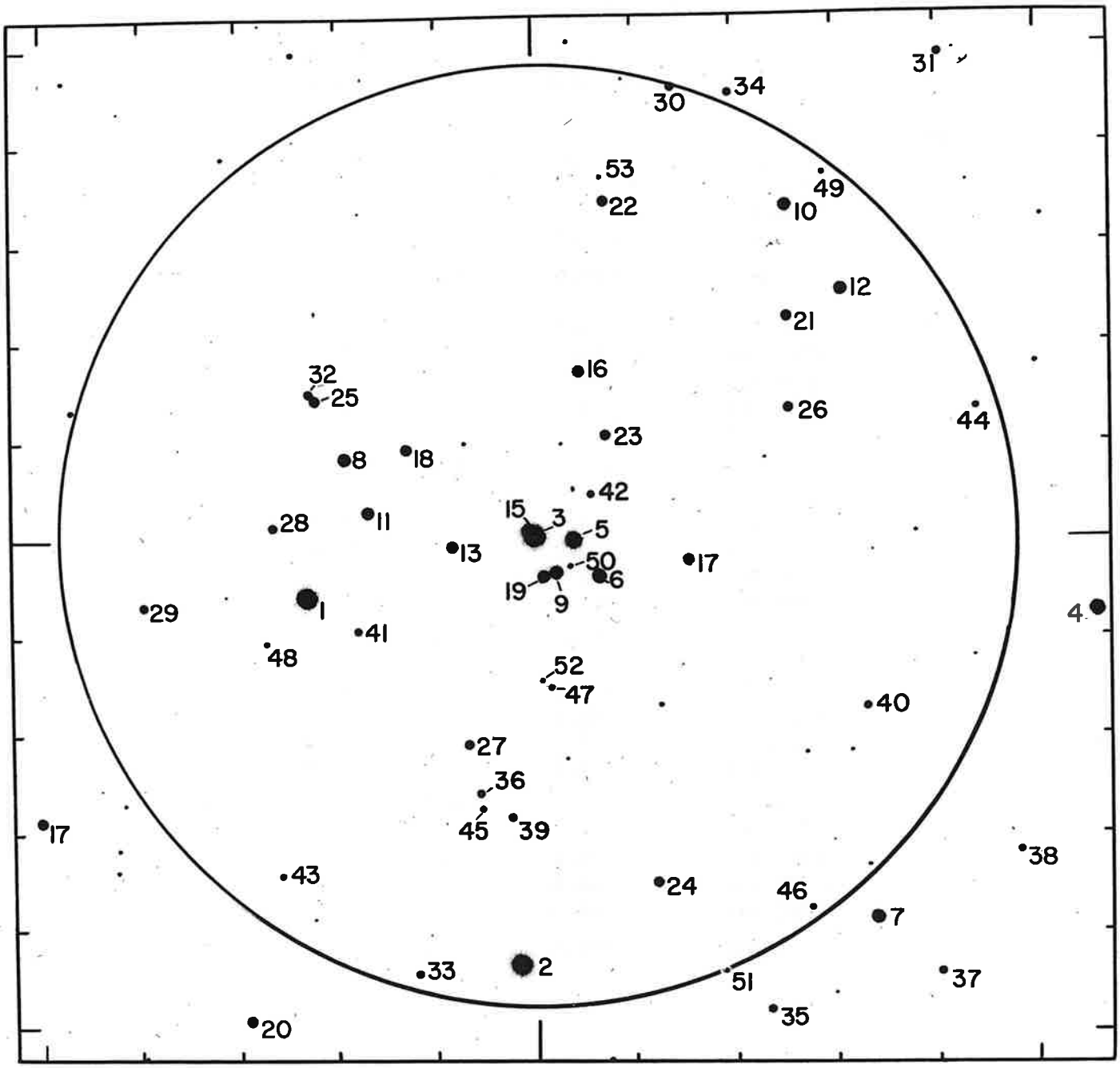
Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectrograph	p.e.
1	24510.913	+25.8		I 12	
	5664.828	+23.1		I 12	
	6992.062	+34.9		I 12	
	7022.080	+24.6		II 6	
	7151.788	+36.9		II 6	
	7499.801	+33.6		II 6	
	7754.084	+34.0		II 6	
	31374.047	+29.0		II 6A	
		+30.2	8.0		
	GCSRV 4334	+34.2	9.5		
	Mean	+32.2	17.5	22 pl.	± 1.1
2	23012.064	+25.0	.7	I 16	
	9622.782	+21.4	.6	II 6	
	30027.869	+17.4	.6	II 6	
	0320.081	+29.9		II 6	
		+24.4	2.9		
	GCSRV 4341	+19.3	.5		
	Mean	+21.2	3.4	9 pl.	± 1.8
3	23030.060	+19.2	.7	I 16	
	7108.875	+34.3		II 6	
	7794.954	+21.8		II 6	
	7850.829	+17.3		II 6	
	32142.027	+15.4		II 6A	
		+21.8	4.7		
	GCSRV 4348	+23.3	6.0		
	Mean	+22.6	10.7	11 pl.	± 1.5
4	23030.014	+27.0	.7	I 16	
	7794.978	+31.4	.6	II 6	
	9622.809	+15.6	.6	II 6	
	30321.077	+29.8	.6	II 6	
	1746.897	+29.2		II 6A	
		+26.9	3.5		
	GCSRV 4327	+38			
	Mean	+29.4	4.5	6 pl.	± 2.4
5	27754.073	+15.7	.5	II 6	
	8500.928	+32.1	.5	II 6	
	Mean	+23.9	1.0		± 5.0
6	27136.799	+21.3		II 6	
	7850.850	+23.9		II 6	
	30399.898	- 6.6	.5	II 6	
	0720.980	+23.3		II 6	
	1791.051	+29.4		II 6A	
	Mean	+21.0	4.5		± 3.4

Radial Velocity Measurements

Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectrograph	p.e.
8	Spectroscopic binary orbit (See Appendix I)				
	Mean	+21.1			± 2.1
9	24511.849	+14.1		I 12	
	7079.791	+10.3		II 6	
	7499.783	+38.5		II 6	
	30074.666	+28.6		II 6	
	Mean	+22.9	4.0		± 4.4
10	25265.910	+12.1		I 12	
	7167.719	+29.2		II 6	
	7827.838	+21.8		II 6	
	Mean	+21.0	3.0		± 2.9
12	27125.831	+16.6		II 6	
	7511.709	+39.8		II 6	
	7754.044	+16.4		II 6	
	Mean	+24.3	3.0		± 2.9
13	25257.914	+ 8.7		I 12	
	7151.763	+17.8		II 6	
	7546.662	+11.3		II 6	
	7873.763	+14.5		II 6	
	30399.883	+27.5		II 6	
	1057.021	+ 7.5		II 6	
	1358.033	+48.8		II 6	
	Mean	+19.4	7.0		± 3.7
14	27108.815	+ 1.7		II 6	
	7184.680	+10.5		II 6	
	7763.066	+39.7		II 6	
	30075.673	+33.1		II 6	
	Mean	+21	4.0		± 6
16	27350.031	+47.9		II 6	
	9259.007	+48.9	.5	II 6	
	30027.826	+33.0		II 6	
	0406.859	+19.2		II 6	
	1525.789	+17.3		II 6A	
	2184.933	+26.8		II 6A	
	Mean	+30.6	5.5		± 3.5
18	27108.771	+29.7		II 6	
	30027.826	+27.8		II 6	
	0339.860	+12.0		II 6	
	1057.006	+10.0		II 6	
	Mean	+19.9	4.0		± 2.5

Radial Velocity Measurements

Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectrograph	p.e.
23	27118.790	+20.4		II 6	
	7449.811	+16.9		II 6	
	9228.061	+ 5.3		II 6	
	0720.954	+17.1		II 6	
	1448.967	+20.5		II 6A	
	Mean	+16.0	5.0		± 2.2
25	27531.679	+17.0		II 6	
	7753.986	+21.1		II 6	
	30028.759	-11.5		II 6	
	0426.791	+ 2.8		II 6	
	0701.038	+56.0		II 6	
	Mean	+17	5.0		± 8
26	27162.712	+26.1		II 6	
	7835.816	+19.9		II 6	
	30320.063	+15.6	.5	II 6	
	2478.969	+30.3	.5	II 6A	
	Mean	+23.0	3.0		± 2.9
30	27479.787	+23.5		II 6	
	7827.780	+46.6		II 6	
	9257.978	- 1.4		II 6	
	30406.839	+30.8		II 6	
	Mean	+25	4.0		± 7
40	27891.683	+31.4	.5	II 6	
	30723.947	+22.6	.5	II 6	
	0761.877	+14.5		II 6	
	Mean	+20.8	2.0		± 2.8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NGC 2281

NGC 2281

α $6^h 44^m.9$ δ +41° 08' (1950.0) l^{II} 174°.9 b^{II} +16°.9

Diameter 15' Class I3p; 1-2a0 Radial velocity +21.0 km/sec

Limit of completeness: m_{pg} = 13.0, within a radius of 8' from star 3.

No.	Coordinates x	Coordinates y	m_{pg}	Spectral Type	Radial velocity (km/sec)	p.e.	Other designations HD, BD	Other designations Cu
(1)	(2)		(3)	(4)	(5)		(6)	
1	+229"	- 59"	8.9	A3*	+ 4.8	±2.8	49098	7
2	+ 17	-438	8.9	A1			49040	55
3R	0	0	9.0	A0*	+21.3	±2.7	49010	17
4	-558	- 74	9.4				41°1504	119
5	- 40	- 2	9.5	A1*	+22.1	±3.4	41°1512	21
6	- 60	- 39	9.9	gG8*	+20.1	±2.4	41°1511	20
7	-340	-387	10.2	A2			41°1506	115
8	+191	+ 80	10.3	A1*	+18.1	±2.9	41°1520	3
9R	- 21	- 37	10.4	A2*	-11.2	±2.4		19
10	-250	+335	10.4				41°1508	76
11	+168	+ 26	10.5	A3			41°1519	5
12	-307	+250	10.5				41°1507	75
13	+ 82	- 9	10.7	G5			41°1517	11
14	+501	-290	10.7	A3				104
15R	+ 6	+ 6	10.8	A2*	+23.4	±2.3		17
16	- 46	+169	10.8	A4				28
17	-155	- 23	10.8	A5			41°1509	23
18	+129	+ 90	10.9				41°1518	4
19R	- 6	- 42	10.9	A0				18
20	+290	-493	10.9	A4			41°1523	106
21	-251	+222	11.1					74
22	- 70	+341	11.2				41°1510	80
23	- 72	+102	11.3	A5				26
24	-121	-351	11.4	A7				59
25	+220	+141	11.4				41°1521	1
26	-253	+132	11.4					73
27	+ 69	-210	11.7	F2				12
28	+264	+ 11	11.8	A5				6
29	+395	- 69	11.8	F0				41
30	-139	+456	11.9					82

No.	Coordinates x	Coordinates y	m_{pg}	Spectral Type	Radial velocity p.e. (km/sec)	Other designations HD, BD	Other designations Cu
(1)	(2)		(3)	(4)	(5)	(6)	
31	-404"	+490"	12.0			41°1505	128
32	+227	+148	12.0	A5:			2
33	+120	-445	12.1	A5			52
34	-197	+450	12.1				78
35	-233	-480	12.2	F2			112
36	+ 58	-260	12.2				56
37	-401	-440	12.2	F2			114
38	-481	-318	12.2	F5			117
39	+ 26	-287	12.2	A5			58
40	-330	-171	12.2	A8			65
41	+179	- 95	12.3	A8			10
42	- 57	+ 42	12.6				24
43	+255	-354	12.8	F0			50
44	-439	+132	12.8				72
45	+ 54	-276	12.9	F			57
46	-274	-376	13.1				61
47	- 15	-153	13.1				14
48	+269	-108	13.3				9
49	-289	+368	13.4				77
50	- 35	- 29	13.7				22
51	-189	-441	13.8				111
52	- 7	-146	13.8				15
53	- 68	+363	14.0				81

NGC 2281

Col. 1: Remarks (R)

3, ADS 5451A, has close companion; separation 1".8, position angle 241°. Data refer to combined light. This star is also listed as ADS 5482A but with an error in position.

9, ADS 5482C.

15, ADS 5451C and 5482B.

19, ADS 5482D.

Col. 3: Magnitudes based on a polar comparison and several cluster comparisons, in addition to values published by

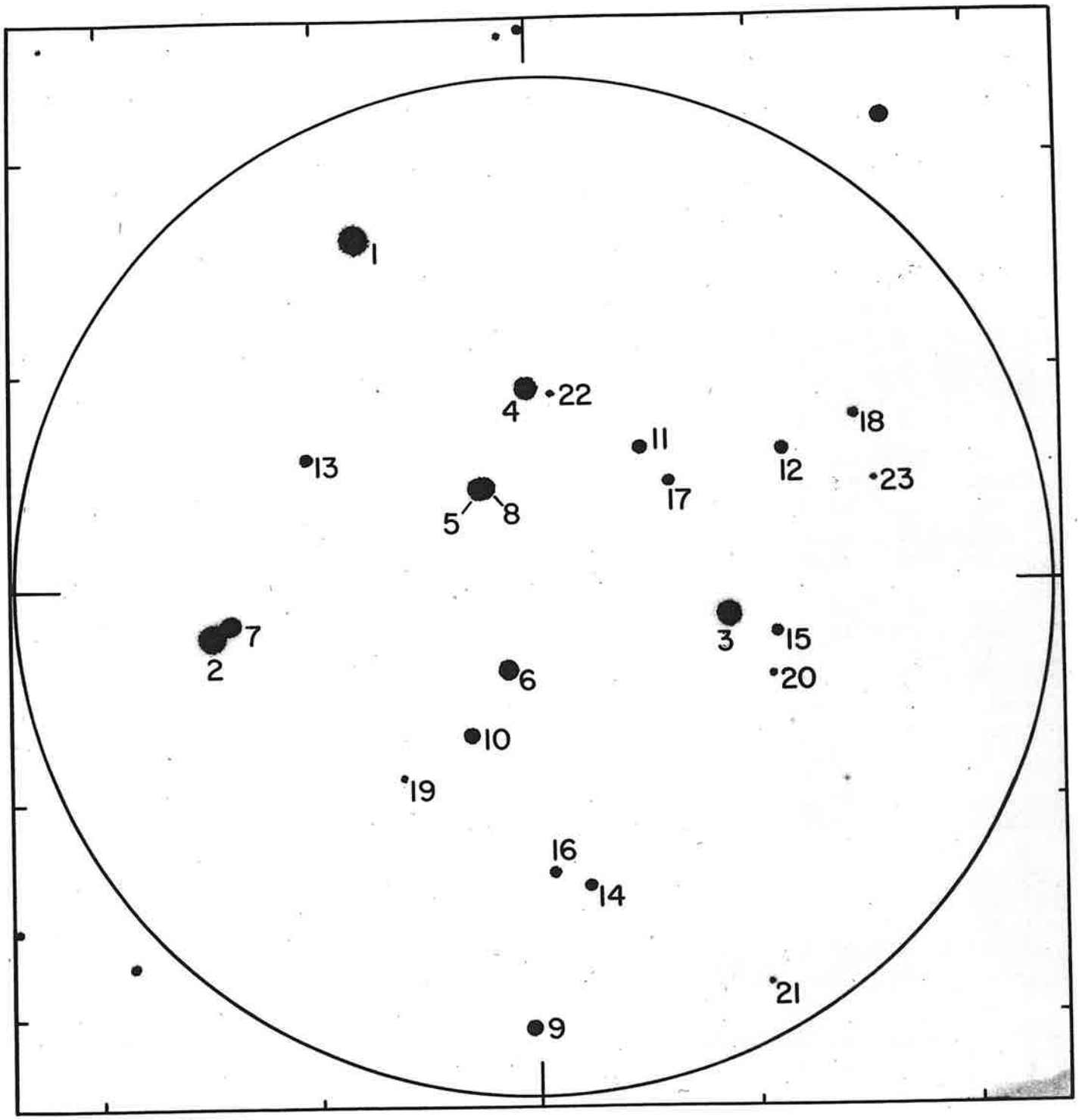
J. Cuffey (H.A. 106, 39, 1938).

Col. 5: In the calculation of the mean radial velocity of the cluster, stars 1 and 9 were omitted because they are not physical members of the cluster according to their radial velocities. The radial velocity of star 6 makes it highly probable that this star is a physical member and represents the giant branch; star 13 may also belong to this branch, although we have no radial velocity to confirm it.

Col. 6: Cu = J. Cuffey (see "Col. 3" above)

Radial Velocity Measurements

Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectrograph	p.e.
1	27806.008	- 7.1	.5	II 6	
	8922.945	- 3.3	.5	II 6	
	30027.922	+14.9		II 6	
	Mean	+ 4.8	2.0		± 2.8
3	28153.047	+33.4		II 6	
	8956.836	+17.9		II 6	
	9229.072	+24.6	.5	II 6	
	30027.898	+10.9		II 6	
	Mean	+21.3	3.5		± 2.7
5	28160.019	+21.1	.6	II 6	
	8898.994	+25.3		II 6	
	9317.857	+17.6	.6	II 6	
	Mean	+22.1	2.2		± 3.4
6	28236.809	+15.3	.7	II 6	
	9263.009	+20.1		II 6	
	9930.881	+23.5		II 6	
	Mean	+20.1	2.7		± 2.4
8	30322.832	+21.6		II 6	
	0405.838	+20.9		II 6	
	0639.044	+11.9		II 6	
	Mean	+18.1	3.0		± 2.9
9	28499.804	- 9.6	.7	II 6	
	9274.961	- 6.2		II 6	
	9616.018	-17.3		II 6	
	Mean	-11.2	2.7		± 2.4
15	30285.954	+21.7		II 6	
	0371.880	+25.5		II 6	
	0733.983	+23.1		II 6	
	Mean	+23.4	3.0		± 2.3



NGC 2343

NGC 2343

α $7^h05^m.7$ δ $-10°32'$ (1950.0) l^{II} $224°.3$ b^{II} $-1°.2$

Diameter 6' Class II 3p; 1 - 2 b 5 Radial velocity +10.9 km/sec

Limit of completeness: m_{pg} = 14.0, within a radius of 4' from the center.

No.	Coordinates x	y	m_{pg}	Spectral Type	Radial velocity p.e. (km/sec)	Other designations HD, BD	ADS
(1)	(2)		(3)	(4)	(5)	(6)	
1	+ 80"	+162"	9.5	B9*	+22.1 p.v. ±3.8	54360	
2	+148	- 22	9.8	gG2*	+ 8.6 ±2.1	54381	5817A
3	- 89	- 15	10.1	B5*	+10.6 ±2.6	54304	
4	+ 3	+ 91	10.5	B9*	+ 8.2 ±3.4		
5R	+ 23	+ 44	10.5	B9n*	+ 6.0 ±3.1	-10°1883	
6	+ 11	- 40	10.9	B9*	+ 9.9 ±3.4		
7	+140	- 18	11.0				5817B
8R	+ 21	+ 45	11.5				
9	+ 3	-205	11.6				
10	+ 29	- 70	11.8				
11	- 50	+ 62	12.2				
12	-114	+ 61	12.4				
14	- 24	-140	12.4				
13	+103	+ 60	12.5				
16	- 8	-133	12.6				
15	-110	- 22	12.7				
17	- 61	+ 48	12.8				
18	-148	+ 78	13.2				
20	-108	- 42	13.6				
19	+ 60	- 90	13.7				
21	-105	-186	13.9				
22	- 8	+ 89	13.9				
23	-157	+ 48	14.2				

NGC 2343

Col. 1: Remarks (R)

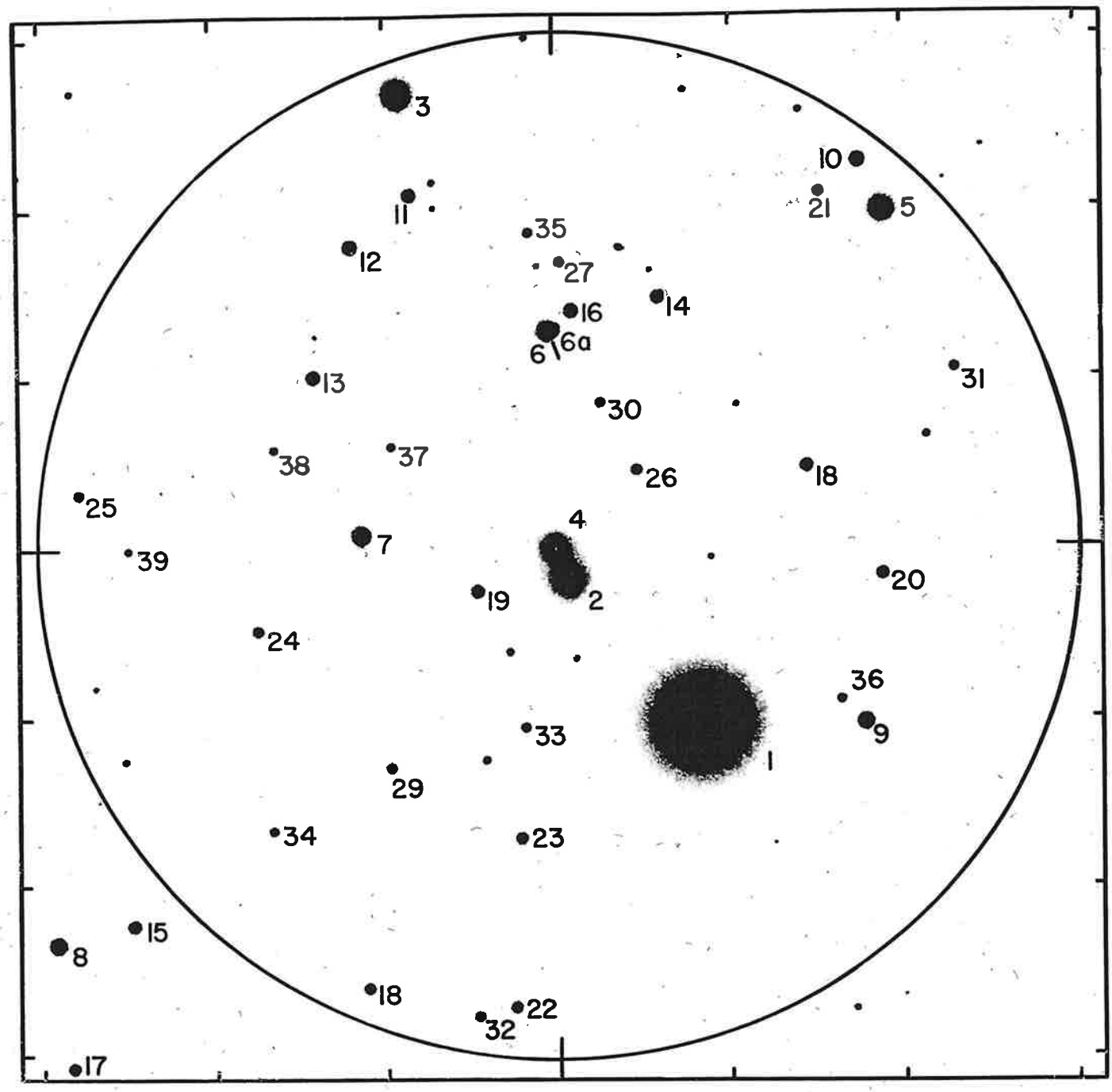
5, 8, double star not noted in ADS; separation 2", position angle 275°. Star 8, which is 1 magnitude fainter than star 5, was also on the slit during the exposures for star 5.

Col. 3: Magnitudes based on five polar comparisons and several cluster comparisons.

Col. 5: In the calculation of the mean radial velocity of the cluster, star 1 was included although its membership is rendered somewhat doubtful by the fact that its radial velocity differs from the mean of the other stars by 3.3 times the probable error. If star 1 is omitted, the mean radial velocity of the cluster is +8.7 km/sec.

Radial Velocity Measurements

Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectrograph	p.e.
1	28103.034	+43.3		II 6	
	8580.793	+17.8		II 6	
	8955.758	+ 6.9	.6	II 6	
	30319.986	+14.9		II 6	
	0699.036	+32.6		II 6	
	1379.026	+10.9		II 6A	
	Mean	+22.1	5.6		± 3.8
2	28136.030	+20.1		II 6	
	9196.007	+ 0.6		II 6	
	9316.789	+ 1.8		II 6	
	31448.874	+13.6	.7	II 6A	
	Mean	+ 8.6	3.7		± 2.1
3	28135.032	+23.5	.6	II 6	
	8633.698	- 2.4		II 6	
	9229.957	+15.2		II 6	
	30405.666	+11.4		II 6	
	Mean	+10.6	3.6		± 2.6
4	28500.020	+14.8		II 6	
	8955.677	- 5.2	.6	II 6	
	9316.716	+10.7	.6	II 6	
	Mean	+ 8.2	2.2		± 3.4
5	28237.697	- 2.9		II 6	
	9272.844	+21.5	.6	II 6	
	30319.954	+ 5.7		II 6	
	Mean	+ 6.0	2.6		± 3.1
6	28157.876	+14.3	.6	II 6	
	9274.845	+ 5.4	.6	II 6	
	30405.716	+ 9.9		II 6	
	Mean	+ 9.9	2.2		± 3.4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NGC 2353

NGC 2353

α $7^h12^m.2$ δ $-10°12'$ (1950.0) l^{II} $224°.7$ b^{II} $+0°.4$

Diameter 20' Class I3mU; 1o9 Radial velocity +17.3 km/sec

Limit of completeness: m_{pg} = 13.0, within a radius of 5' from star 4.

No.	Coordinates x	Coordinates y	m_{pg}	Spectral Type	Radial velocity (km/sec)	p.e.	Other designations HD, BD	Other designations GCSRV
(1)	(2)		(3)	(4)	(5)		(6)	
1R	- 82"	-104"	5.8	O9*	+33.3 var	±0.7	55879	4783
2	- 8	- 20	8.8	cB6*	+15.0	±2.3	55901	4785
3	+ 90	+269	9.2	B8*	+17.4	±2.5	55930	
4	0	0	9.6	cB9*	+13.6	±2.4	-10°1935	
5	-189	+197	9.8	cB9*	+24.8	±2.2	55853	
7	+110	+ 8	10.7	B9*	+13.8 p.v.	±5.8		
6R	+ 5	+126	11.0				- 9°1927	
8	+291	-234	11.0					
9	-177	-102	11.3					
10	-175	+225	11.5					
6aR	+ 2	+127	11.6					
12	+119	+178	11.6					
11	+ 84	+209	11.8					
13	+140	+100	11.8					
16	- 10	+139	11.8					
14	- 60	+140	11.9					
15	+248	-222	11.9					
17	+282	-306	12.0					
18	-146	+ 47	12.0					
19	+ 44	- 25	12.1					
20	-190	- 18	12.2					
21	-152	+208	12.4					
23	+ 21	-172	12.4					
22	+ 25	-272	12.5					
24	+174	- 49	12.6					
26	- 47	+ 44	12.6					
28	+112	-260	12.7					
25	+278	+ 32	12.7					
27	- 3	+169	12.8					
29	+ 98	-130	12.8					

No.	Coordinates x	Coordinates y	m_{pg}	Spectral Type	Radial velocity p.e. (km/sec)	Other designations HD; BD	Other designations GCSRV
(1)	(2)		(3)	(4)	(5)	(6)	
30	- 26"	+ 84"	12.9				
31	-230	+104	12.9				
32	+ 47	-278	13.0				
33	+ 19	-108	13.1				
34	+166	-168	13.2				
35	+ 14	+185	13.2				
36	-164	- 90	13.4				
38	+164	+ 59	13.5				
37	+ 96	+ 60	13.6				
39	+249	- 1	13.8				

NGC 2353

Col. 1: Remarks (R)

1, spectroscopic binary orbit.

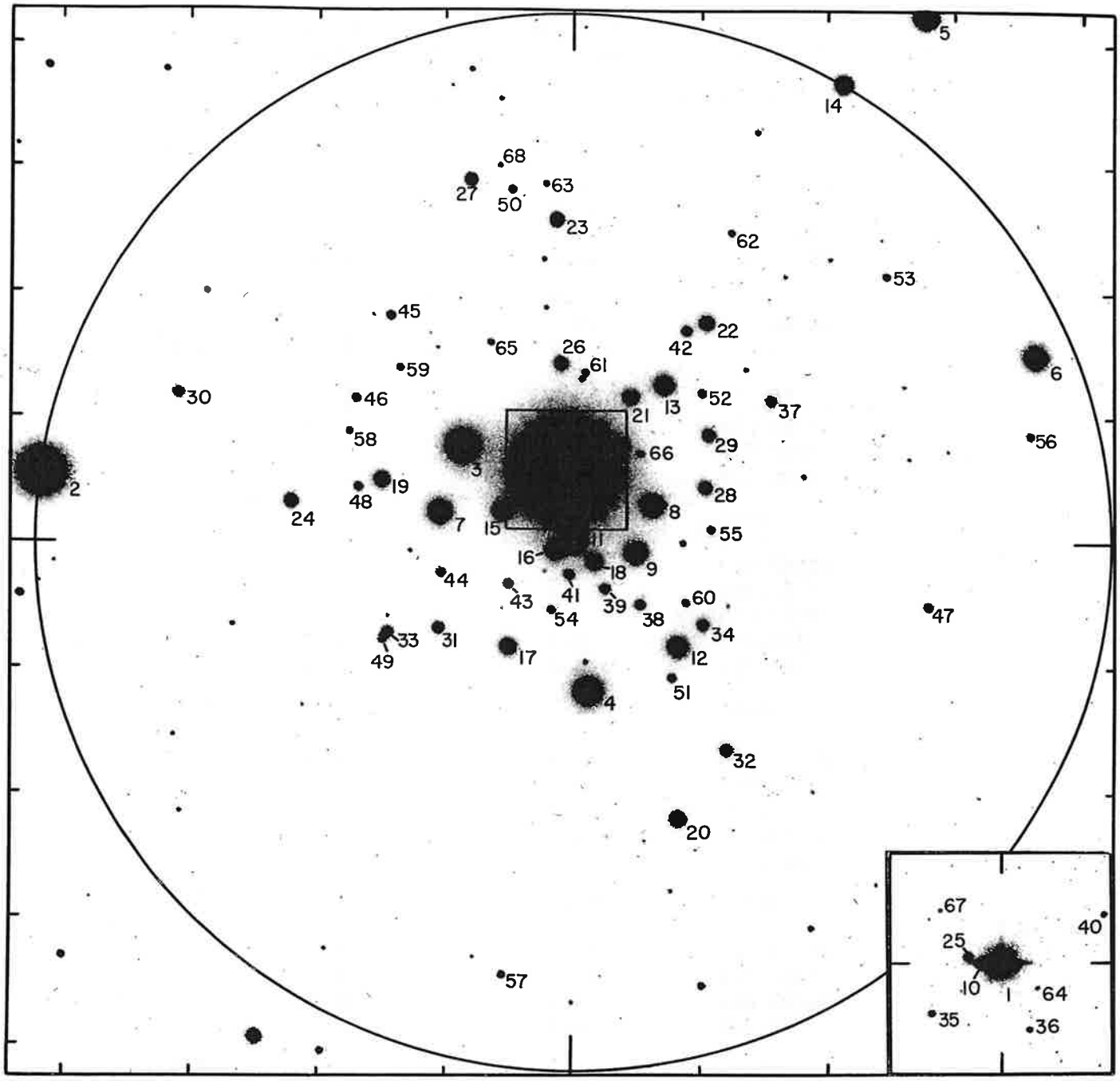
6, 6a, double star not noted in ADS; separation 3", position angle 288°.

Col. 3: Magnitudes based on a polar comparison and two cluster comparisons, as well as a plate taken with the 20-inch Astrograph.

Col. 5: In the calculation of the mean radial velocity of the cluster, star 1 was omitted because of probable relativity red shift. Star 7 received weight 1/2 because of velocity variation.

Radial Velocity Measurements

Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectrograph	p.e.
1	Spectroscopic binary orbit (See Appendix I)				
	Mean	+33.3			± 0.7
2	27136.765	+17.1		II 6	
	7177.671	+15.7		II 6	
	7850.772	+15.8		II 6	
	30011.911	+14.0	.6	II 6	
		+15.8	3.6		
	GCSRV 4785	+12	1.0		
	Mean	+15.0	4.6	6 pl.	± 2.3
3	27125.688	+21.8		II 6	
	7174.679	+18.0		II 6	
	7763.021	+17.9		II 6	
	7792.978	+12.0		II 6	
	Mean	+17.4	4.0		± 2.5
4	27119.712	+11.9		II 6	
	7172.684	+11.7		II 6	
	7757.999	+17.9		II 6	
	30398.831	+ 9.2	.3	II 6	
	1056.981	+14.0		II 6	
	Mean	+13.6	4.3		± 2.4
5	27124.800	+31.9		II 6	
	7459.866	+31.7		II 6	
	7873.700	+15.9		II 6	
	30701.003	+17.4		II 6	
	1448.838	+27.0		II 6A	
	Mean	+24.8	5.0		± 2.2
7	27844.696	+28.8	.5	II 6	
	7855.702	+29.9		II 6	
	30406.801	- 6.0		II 6	
	1056.946	+10.1		II 6	
	Mean	+13.8	3.5		± 5.8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NGC 2362

NGC 2362

α $7^h 16^m.6$ δ $-24° 53'$ (1950.0) l^{II} $238°.2$ b^{II} $-5°.6$

Diameter 7' Class I3p; 1o9 Radial velocity +33.1 km/sec

Limit of completeness: m_{pg} = 13.0, within a radius of 7' from star 11.

No.	Coordinates x	y	m_{pg}	Spectral Type T	JM	Radial velocity (km/sec)	p.e.	Other designations HD	GCSRV	CPD	J	Z
(1)	(2)		(3)	(4)		(5)		(6)				
1R	+ 6"	+ 56"	4.2	O9*	O9III	var		57061	4843	-24°2216	23	1
2R	+415	+ 55	6.6	B3*	B2IV	+31.5 var	±10	57192	4853	-24°2248	46	.
3	+ 88	+ 76	8.0	B2s*	B1V	+35.8	±2.4		4844	-24°2228	30	2
4	- 12	-120	8.6	B2*	B2V	+36.1	±2.5		4842	-24°2213	20	3
5	-276	+422	8.8	B				56995		-24°2185		
7	+104	+ 25	9.2	B3*	B2V	+34.0	±2.7		4845	-24°2231	31	4
6	-362	+150	9.3	B						-24°2182		
8	- 61	+ 30	9.4	B3n*	B3V	+31.0	±2.9			-24°2182		
9	- 48	- 8	9.5	B2n*	B2V	+30.2	±3.1			-24°2207	14	5
10R	+ 14	+ 56	9.5									8
11	0	0	9.7	B3*	B2V	+31.3	±2.7				39	7
12	- 80	- 83	9.8	B5nn*	B3V	+33.6	±2.5			-24°2203	9	10
13	- 70	+127	10.0	B4	B3nn:					-24°2204	12	12
14	-211	+361	10.0	B3						-24°2188		
15	+ 54	+ 25	10.1	B3	B3V					-24°2225	27	9
16	+ 14	- 7	10.2	B	B5V					-24°2220	50	13
17	+ 51	- 84	10.4	B4	B5V					-24°2223	26	17
18	- 15	- 16	10.4	B						-24°2212	21	11
19	+152	+ 50	10.5	B5						-24°2236	34	14
20	- 82	-221	10.6	A:						-24°2201	13	18
21	- 43	+115	10.7	B7	B9V					-24°2208	16	23
22	-103	+177	10.7	B6:	B5V:					-24°2196	5	15
23	+ 12	+257	10.8							-24°2218	25	19
24	+222	+ 32	10.8	B5	B7:nn					-24°2240	36	16
25	+ 20	+ 58	10.9	B8								21
26	+ 9	+143	11.0	B8:	B7nn					-24°2217	24	20
27	+ 81	+290	11.1	A5:						-24°2226	32	28
28	-102	+ 42	11.1							-24°2197	3	
29	-105	+ 86	11.2	A:						-24°2198	2	24
30	+310	+210	11.3	B6						-24°2244	42	

No.	Coordinates x	Coordinates y	m_{pg}	Spectral Type T	Spectral Type JM	Radial velocity p.e. (km/sec)	Other designations HD	GCSRV	CPD	J	Z
(1)	(2)		(3)	(4)		(5)		(6)			
31	+104"	- 76"	11.3						-24°2230	29	22
32	-119	-166	11.4	B6					-24°2195	1	30
33	+147	- 72	11.4	A3					-24°2235		26
34	-100	- 66	11.4	A:					-24°2199	66	31
35	+ 35	+ 34	11.4	B7							27
36	- 6	+ 26	11.5	B8:							25
37	-154	+113	11.8	B9					-24°2191		29
38	- 51	- 49	11.8	B8	B9: V				-24°2206	15	34
39	- 23	- 38	11.9	B9					-24°2211		35
40	- 38	+ 79	11.9	A2						65	33
41	+ 3	- 26	11.9							22	32
42	- 88	+170	12.0	B9					-24°2200	11	37
43	+ 51	- 33	12.0						-24°2222	52	36
44	+104	- 23	12.1						-24°2229	28	
45	+144	+182	12.1	A3					-24°2234	56	
46	+170	+115	12.2	A0					-24°2237	47	
47	-278	- 50	12.2	F5						64	39
48	+170	+ 44	12.3	B9	A0V:					58	
49	+150	- 78	12.4	B9							38
50	+ 49	+282	12.4							59	40
51	- 78	-108	12.4	F0						10	44
52	- 99	+120	12.5							4	45
54	+ 15	- 53	12.6							51	42
55	-108	+ 10	12.7							49	41
53	-246	+312	12.7	B9							43
56	-359	+ 87	12.8								
57	+ 55	-345	12.8								
58	+177	-345	12.8	B9						38	50
59	+137	+140	12.9	F0						37	46
60	- 88	- 48	12.9							8	49
61	- 8"	+136"	13.0								47
62	-121	+249	13.0	A0						6	48
63	+ 21	+287	13.2							40	
64	- 10	+ 45	13.3							52	
65	+ 66	+160	13.3	A5						35	53
66	- 52	+ 71	13.4							17	51
67	+ 32	+ 75	13.5								
68	+ 58	+300	13.7							41	

NGC 2362

Col. 1: Remarks (R)

1, τ CMa; SDS h3948, brighter component.

2, SDS B133; has companion of magnitude 14 at position angle 99°, separation 4".6.

10, SDS h3948, fainter component.

Col. 3: Magnitudes based on a cluster comparison, a plate taken with the 20-inch Astrograph, the photographic magnitudes of the Cape Photographic Durchmusterung (CPD), and values published by

H. L. Johnson and W. W. Morgan (Ap.J. 117, 333, 1953),

R. Zug (L.O.B. 16, 119, 1933).

Col. 4: Spectral types listed under JM were published by

H. L. Johnson and W. W. Morgan (see "Col. 3" above).

Col. 5: In the calculation of the mean radial velocity of the cluster, star 1 was omitted because of relativity red shift and star 2 because of its considerable angular distance from the center of the cluster.

Col. 6: J = H. L. Johnson (see "Col. 3" above)

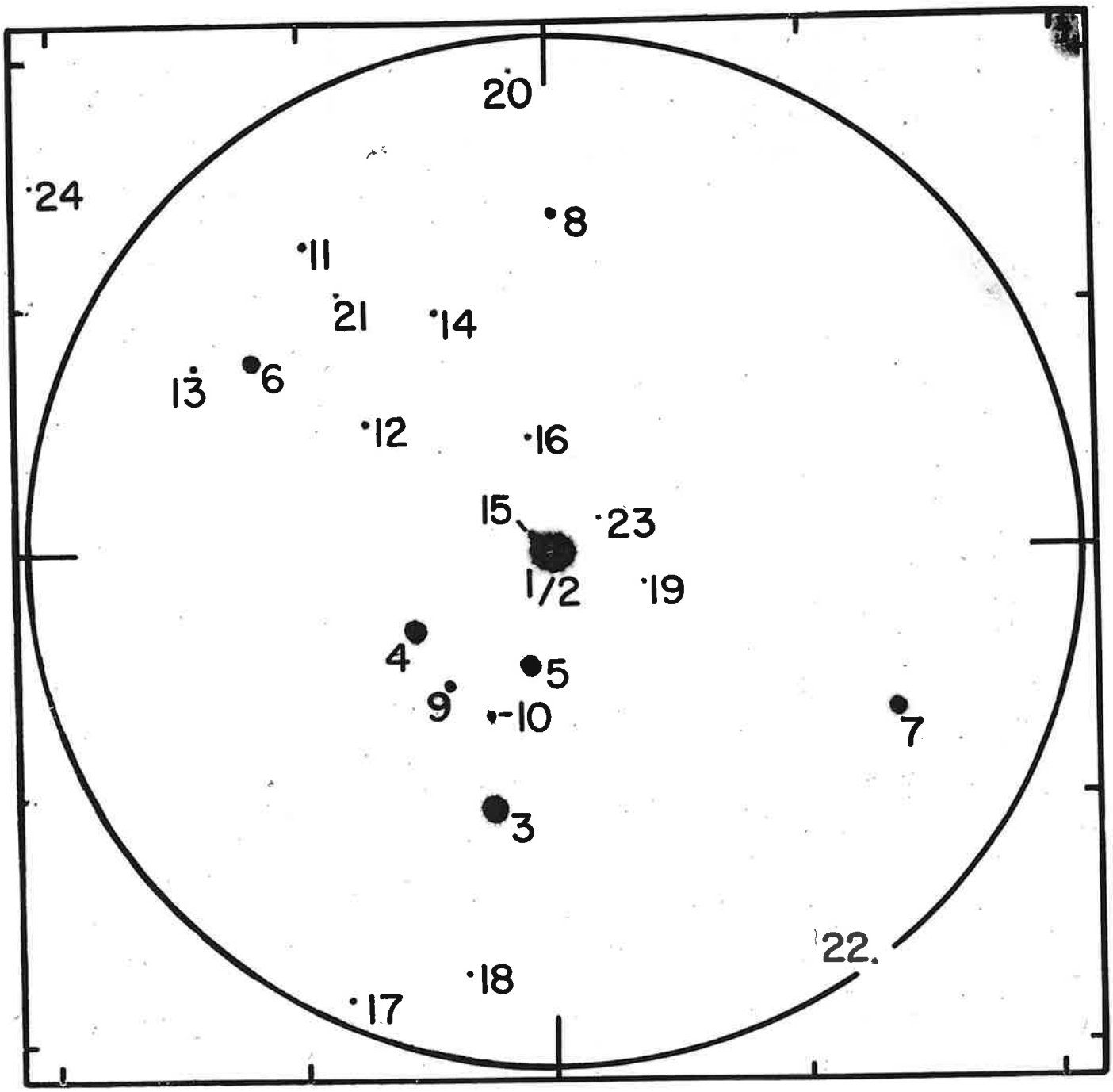
Z = R. Zug " " "

Radial Velocity Measurements

Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectrograph	p.e.
2	25938.006	+21.2		I 12	
	6400.708	+50.2		I 12	
	6409.665	- 6.8		I 12	
	9622.871	+94.1		II 6	
	30426.655	- 3.6		II 6	
		+31.0	5.0		
	GCSRV 4853	+34	1.0		
	Mean	+31.5	6.0	6 pl.	±10
3	26292.001	+38.7		I 12	
	6392.762	+30.8		I 12	
	7167.667	+37.1		II 6	
	7873.636	+30.9		II 6	
		+34.4	4.0		
	GCSRV 4844	+54	.3		
	Mean	+35.8	4.3	5 pl.	± 2.4
4	26390.736	+37.4		I 12	
	6393.730	+37.5		I 12	
	7107.838	+29.8		II 6	
	7383.025	+39.8		II 6	
	Mean	+36.1	4.0		± 2.5
7	26627.033	+32	.4	I 6	
	6631.050	+42	.4	I 6	
	7023.008	+25.4		II 6	
	7107.742	+39.5		II 6	
	30426.667	+35.6	.5	II 6	
	Mean	+34.0	3.3		± 2.7
8	27079.868	+35.6		II 6	
	7109.787	+25.3		II 6	
	8920.744	+32.2		II 6	
	Mean	+31.0	3.0		± 2.9
9	27080.813	+25.6		II 6	
	7151.688	+30.1		II 6	
	8928.767	+38.1	.6	II 6	
	Mean	+30.2	2.6		± 3.1
11	27134.708	+29.8	.5	II 6	
	7145.683	+45.5	.5	II 6	
	8238.672	+17.9		II 6	
	30426.688	+28.4	.5	II 6	
	0733.824	+40.5		II 6	
	Mean	+31.3	3.5		± 2.7

Radial Velocity Measurements

Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectro-graph	p.e.
12	27423.938	+26.3		II 6	
	7835.721	+33.1		II 6	
	9628.898	+48.9		II 6	
	0407.768	+26.2		II 6	
	Mean	+33.6	4.0		± 2.5



NGC 2367

NGC 2367

α $7^{h}18^{m}.0$ δ $-21°47'$ (1950.0) l^{II} $235°.6$ b^{II} $-3°.8$

Diameter 4'5 Class II3pE; 1b2 Radial velocity +27.0 km/sec

Limit of completeness: m_{pg} = 13.5, within a radius of 4' from star 1.

No.	Coordinates x	Coordinates y	m_{pg}	Spectral Type	Radial velocity p.e. (km/sec)		Other designations HD, BD	Other designations CPD	Other designations ADS
(1)	(2)		(3)	(4)	(5)		(6)		
1R	0"	0"	9.2	B2*	+27.7	±3.9	57370	-21°2034	5997A
2	- 5	0	10.0						5997B
3	+ 23	-103	10.0	B2*	+26.9	±3.7	-21°1881	-21°2037	
4	+ 55	- 31	10.5	B2*	+25.5	±3.8	-21°1882	-21°2038	
5	+ 8	- 46	10.8					-21°2035	5997D
6R	+120	+ 78	11.0	B3nn*	+27.7	±2.9		-21°2039	
7	-137	- 65	11.1					-21°2030	
8R	- 1	+138	12.3						
9	+ 41	- 54	12.3						
10R	+ 24	- 67	12.7						
11	+ 99	+124	12.8						
12	+ 74	+ 52	13.0						
13	+142	+ 76	13.1						
17	+ 82	-181	13.2						
14	+ 47	+ 98	13.3						
18	+ 36	-171	13.3						
15	+ 6	+ 8							5997C
16	+ 9	+ 48	13.4						
22	-125	-169	13.5						
19	- 37	- 11	13.6						
20	+ 14	+195							
23	- 19	+ 13	13.6						5997E
21	+ 85	+105	13.7						
24	+208	+150	13.7						

Col. 1: Remarks (R)

1, GCSRV 4865; stars 1 and 2 were both on the slit during the exposures.

6, lines appear double on two spectrograms; probably double line spectroscopic binary.

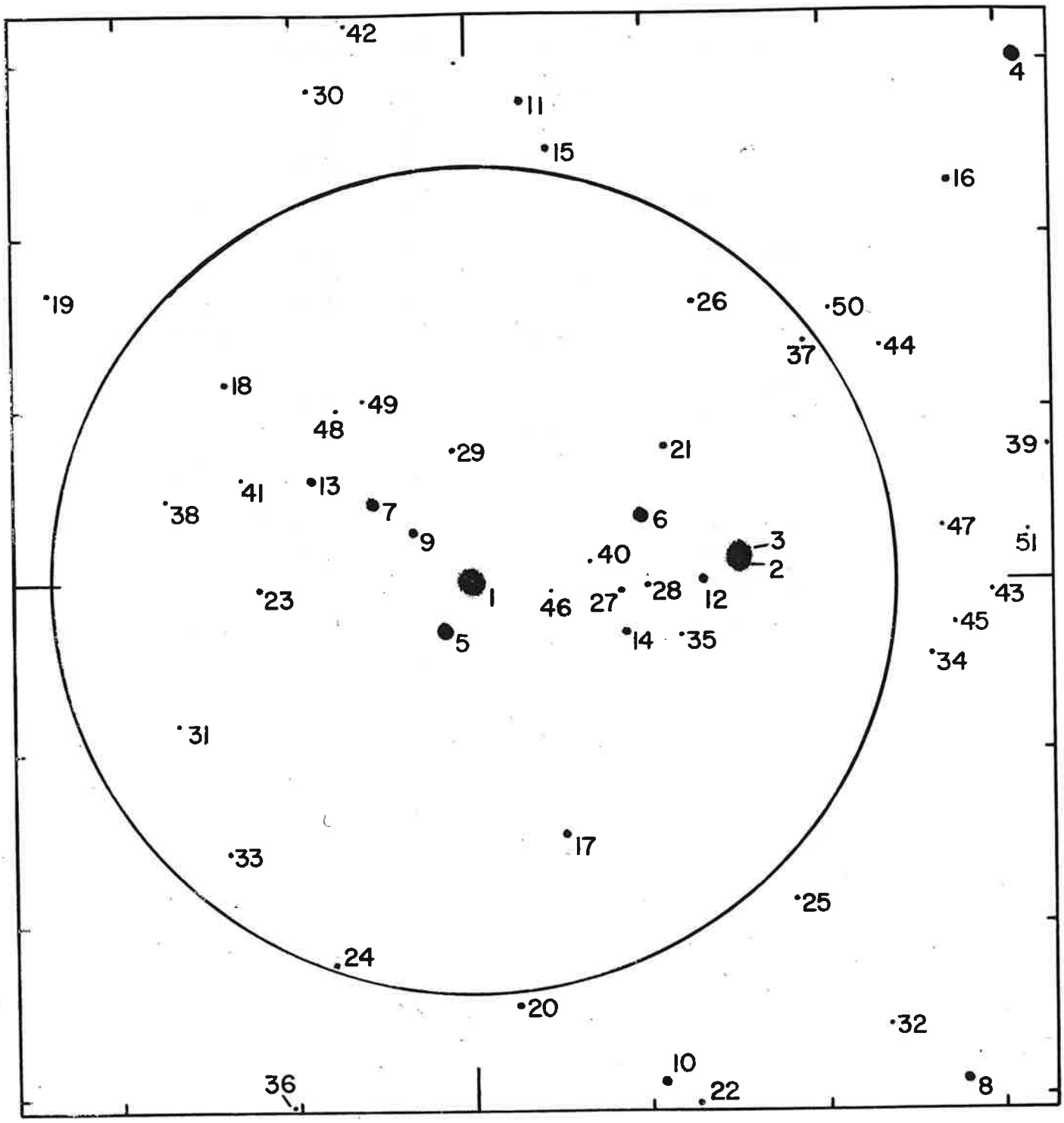
8, appears double.

10, has faint companion at 2" separation.

Col. 3: Magnitudes based on three cluster comparisons and two plates taken with the 20-inch Astrograph.

Radial Velocity Measurements

Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectrograph	p.e.
1-2	27792.924	+15.2	.3	II 6	
	8208.740	+42.9	.5	II 6	
	8598.724	+31.4	.3	II 6	
	8920.850	+17.9	.5	II 6	
	Mean	+27.7	1.6		± 3.9
3	28153.963	+20.5	.6	II 6	
	8499.909	+38.8	.6	II 6	
	8894.853	+21.3	.6	II 6	
	Mean	+26.9	1.8		± 3.7
4	28131.999	+35.4	.6	II 6	
	8580.665	+20.3	.5	II 6	
	9317.672	+19.9	.6	II 6	
	Mean	+25.5	1.7		± 3.8
6	28489.950	+ 7	.4	II 3-1/2	
	8581.733	+20.3		II 6	
	9228.963	+27.9	.5	II 6	
	30733.882	+43.3		II 6	
	Mean	+27.7	2.9		± 2.9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NGC 2384

NGC 2384

α $7^h 22^m.9$ δ $-20°55'$ (1950.0) l^{II} 235°.4 b^{II} −2°.4

Diameter 4'.5 Class II3p; 1b0 Radial velocity +47.0 km/sec

Limit of completeness: m_{pg} = 13.5, within a radius of 4' from star 1.

No.	Coordinates x	Coordinates y	m_{pg}	Spectral Type	Radial velocity (km/sec)	p.e.	Other designations HD, BD	Other designations CPD	Other designations Z
(1)	(2)		(3)	(4)	(5)		(6)		
1R	0"	0"	8.7	B0*	+53.2	±2.5	58509	−20°2375	1
2R	−152	+ 10	9.3	B0*	+49.3	±2.4	58465	−20°2365	2
3R	−153	+ 15	9.9	B1*	+40.4	±2.8			3
4	−309	+312	10.0	A3			−20°1914	−20°2359	
5	+ 15	− 29	10.2	B1*	+47.5	±3.0		−20°2376	5
6	− 98	+ 38	10.4	B2*	+44.7	±3.4	−20°1918	−20°2369	4
7	+ 56	+ 45	10.8	B3				−20°2379	6
8	−279	−290	11.5	B3				−20°2360	
9	+ 32	+ 29	11.8	B3				−20°2378	9
10	−107	−291	11.8	B3					
11	− 31	+278	11.8	F0				−20°2371	10
12	−131	0	11.9	B9					14
13	+ 90	+ 59	11.9	gK2				−20°2381	7
14	− 88	− 31	12.1	B8					12
15	− 46	+250	12.1	A4					13
16	−272	+230	12.1	gG8					8
17	− 52	−148	12.2	gG0					11
18	+140	+114	12.3	A1					16
19	+239	+168	12.4	gK0					
20	− 25	−248	12.5	A1					
21	−110	+ 79	12.6	B9					17
22	−128	−303	12.6	G0					
23	+121	− 4	12.7	B8					18
24	+ 80	−222	12.8	K0					
25	−182	−186	12.8	gK0					
26	−128	+160	12.9	F0					19
27	− 86	− 6	13.2	B9					
28	−101	− 2	13.2	F0					21
29	+ 10	+ 76	13.3						
30	+ 90	+286	13.4	B8					

No.	Coordinates x	Coordinates y	m_{pg}	Spectral Type	Radial velocity p.e. (km/sec)	Other designations HD, BD	Other designations CPD	Other designations Z
(1)	(2)		(3)	(4)	(5)	(6)		
31	+168"	- 82"	13.5	F5				
32	-325	-259	13.5	B5				
33	+140	-156	13.5	A0				
34	-261	- 43	13.6	B8				
35	-119	- 32	13.7	A4				
36	+104	-306	13.7	G0				
37	-190	+138	13.7	G0				23
38	+174	+ 48	13.7	F2				25
39	-327	+ 78	13.9	B9				24
40	- 68	+ 11	13.9					
41	+130	+ 60	13.9	A0				
42	+ 69	+321	13.9	B8				
43	-296	- 7	14.0	F2				
44	-231	+134	14.0	F8				
45	-274	- 27	14.2	F0				
46	- 46	- 6	14.2	A0				
47	-268	+ 30	14.3	A				
48	+ 78	+ 99	14.3	A				
49	+ 61	+104	14.4	F0:				
50	-203	+157	14.5	A2				
51	+312	+ 29	14.6	K0				

NGC 2384

Col. 1: Remarks (R)

1, GCSRV 4938.

2, ADS 6062A; GCSRV lists this star twice, as 4929 and 4931.

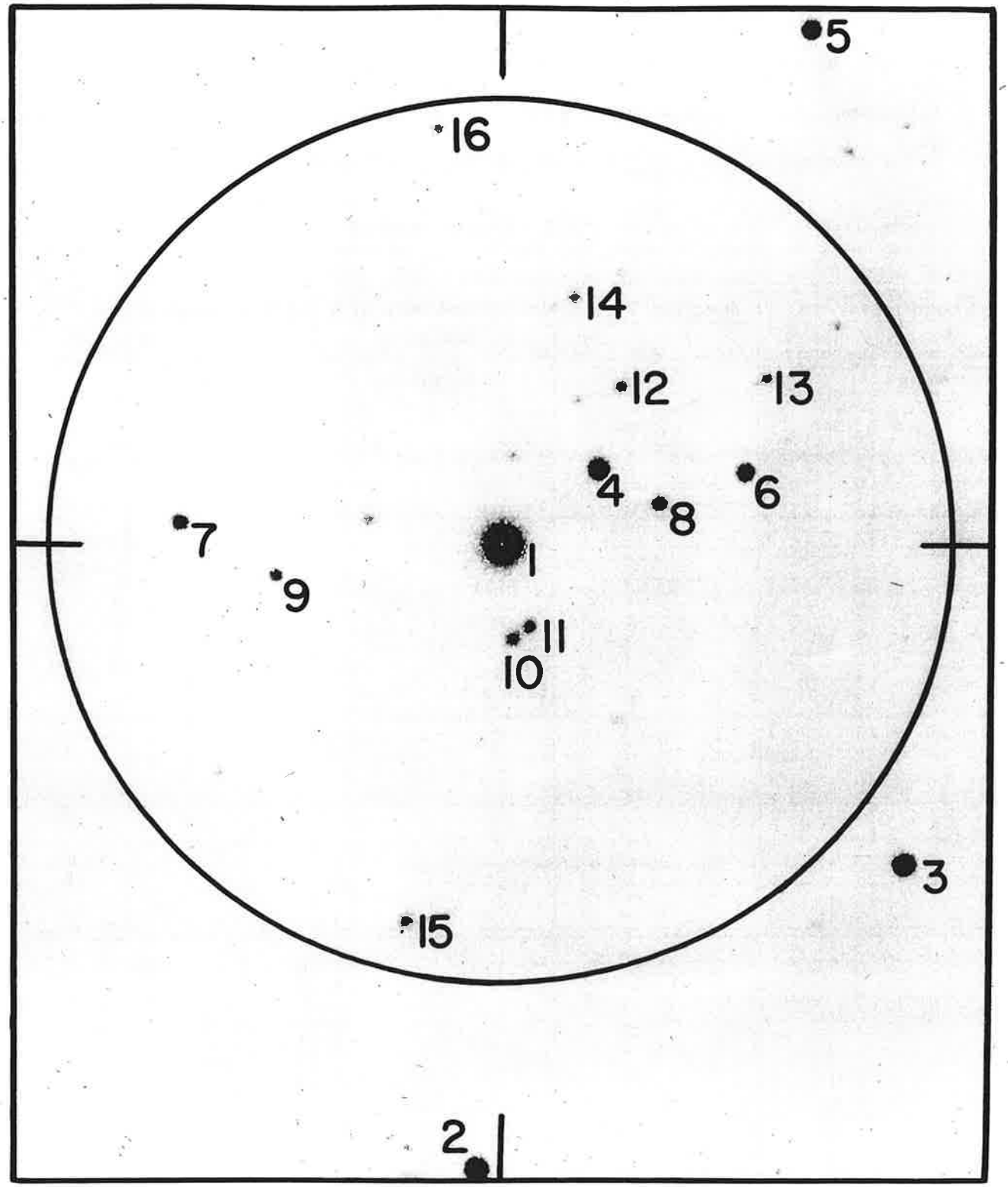
3, ADS 6062B.

Col. 3: Magnitudes based on a cluster comparison, the photographic magnitudes of the Cape Photographic Durchmusterung (CPD), and values published by R. Zug (L.O.B. 16, 119, 1933).

Col. 6: Z = R. Zug (see "Col. 3" above)

Radial Velocity Measurements

Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectrograph	p.e.
1	26400.788	+59.4	.5	I 12	
	7762.963	+50.1		II 6	
	8208.779	+57.3		II 6	
	9622.847	+39.8	.6	II 6	
	31490.716	+57.0		II 6A	
	Mean	+53.2	4.1		± 2.5
2	26652.990	+47.2		I 12	
	6670.941	+47.6		I 12	
	7802.911	+48.7	.6	II 6	
	9628.815	+48.5	.6	II 6	
	31526.688	+54.0		II 6A	
	Mean	+49.3	4.2		± 2.4
3	27163.683	+40.9		II 6	
	8136.890	+18.9	.5	II 6	
	8921.806	+58.3	.6	II 6	
	9317.724	+39.9		II 6	
	Mean	+40.4	3.1		± 2.8
5	27771.959	+48.4	.6	II 6	
	8134.917	+38.3	.6	II 6	
	9615.937	+43.7	.6	II 6	
	31792.014	+54.8		II 6A	
	Mean	+47.5	2.8		± 3.0
6	27396.005	+46.3		II 6	
	8159.903	+41.7	.6	II 6	
	9615.853	+44.9	.6	II 6	
	Mean	+44.7	2.2		± 3.4



NGC 2414

NGC 2414

α $7^h 31^m.0$ δ $-15° 20'$ (1950.0) l^{II} $231°.4$ b^{II} $+2°.0$

Diameter 8 ' Class I3p; 1b0 Radial velocity +70.9 km/sec

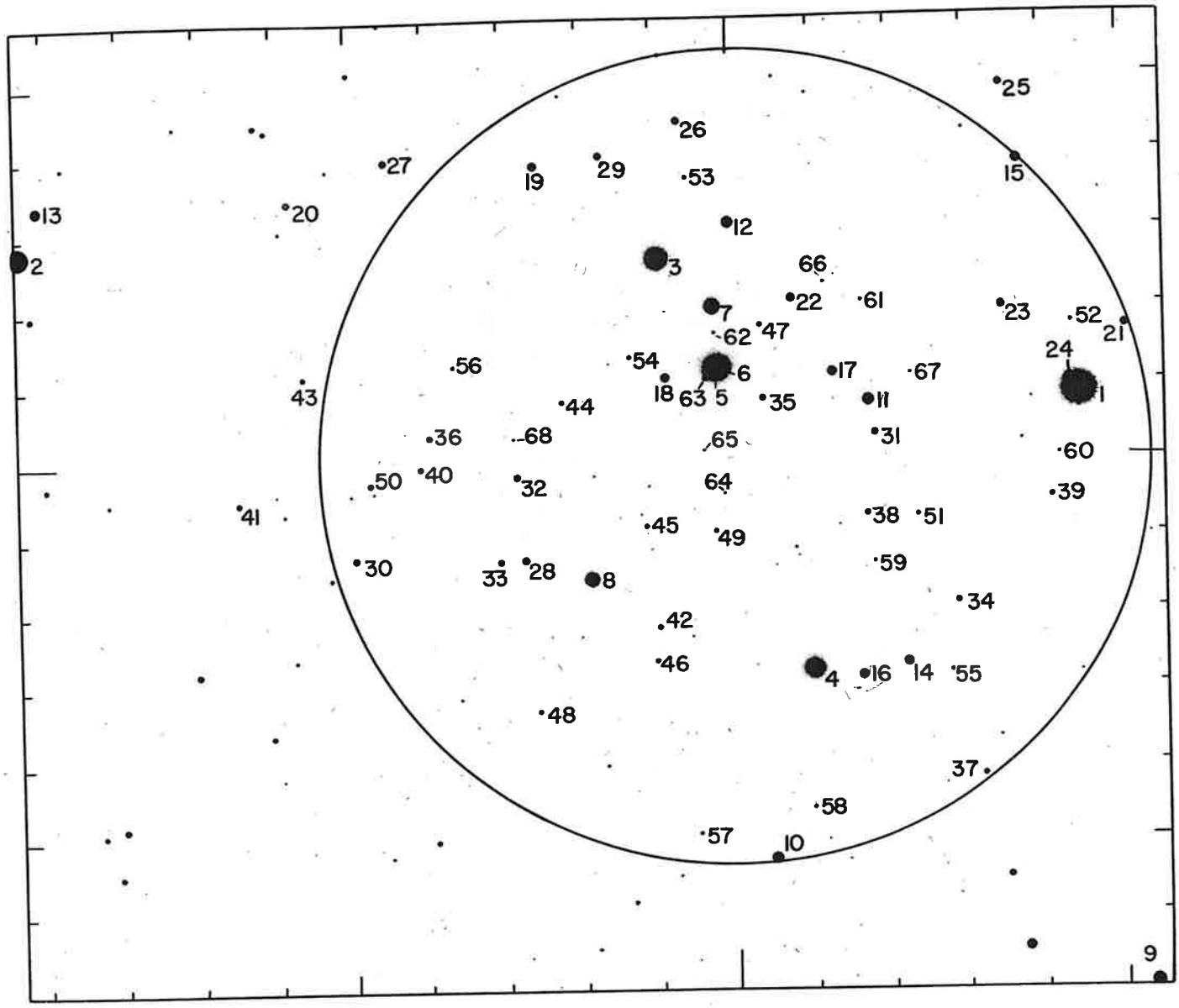
Limit of completeness: m_{pg} = 13.5, within a radius of 2'.5 from star 1.

No.	Coordinates x	y	m_{pg}	Spectral Type	Radial velocity (km/sec)	p.e.	Other designations HD, BD
(1)	(2)		(3)	(4)	(5)		(6)
1	0"	0"	8.5	cB1*	+70.4	±2.6	60308
2	+ 8	-213	10.8				-15°1893
3	-135	-109	10.8				
4	- 32	+ 26	11.1	B0*	+66.0	±3.2	
5	-102	+172	11.3				-15°1891
6	- 80	+ 25	11.7	B1*	+76.4	±2.9	
7	+107	+ 8	12.2				
8	- 52	+ 4	12.6				
10	- 3	- 32	12.9				
9	+ 74	- 11	13.0				
11	- 9	- 29	13.1				
12	- 40	+ 52	13.2				
16	+ 21	+140	13.4				
14	- 25	+ 82	13.5				
13	- 88	+ 56	13.6				
15	+ 31	-128	13.6				

Col. 3: Magnitudes based on a polar comparison and a cluster comparison.

Radial Velocity Measurements

Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectrograph	p.e.
1	27855.796	+59.0		II 6	
	8501.017	+63.3	.6	II 6	
	9622.901	+77.4		II 6	
	31826.783	+79.0		II 6A	
	Mean	+70.4	3.6		± 2.6
4	28490.081	+67.5	.4	II 3-1/2	
	30671.051	+67.1		II 6	
	0735.890	+64.2		II 6	
	Mean	+66.0	2.4		± 3.2
6	30723.843	+71.9		II 6	
	1054.977	+72.2		II 6	
	1827.847	+85.0		II 6A	
	Mean	+76.4	3.0		± 2.9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NGC 2422

NGC 2422

α $7^{h}34^{m}.3$ δ $-14°24'$ (1950.0) l^{II} $231°.0$ b^{II} $+3°.1$

Diameter 30' Class II3m; 1b3 Radial velocity +30.3 km/sec

Limit of completeness: m_{pg} = 12.5, within a radius of 9' from the center.

No.	Coordinates		m_{pg}	Spectral Type		Radial velocity (km/sec)			Other designations			
	x	y		T	HD				HD, BD	ADS	CP	Z
(1)	(2)		(3)	(4)		(5)			(6)			
1R	−448"	+ 80"	5.3	B3e*	B5	+35.5	p.v.	±3.9	60855	6208A	10	
2	+930	+280	6.5	B8*	B9	+38.4		±2.5	61224		32	
3	+ 92	+266	6.8	B7*	B9	+27.6		±2.5	61017	6216I	29	2
4	−100	−280	7.0	B5*	B9	+33.7		±2.9	60969		21	1
5	+ 21	+118	7.2	B6*	B9	+29.5		±2.9	60998	6216A	26	3
6	+ 15	+122	7.5	B6*	B9	+25.4		±2.3	60997	6216B	25	4
7R	+ 22	+202	7.9	B7*		+33.1	p.v.	±5.0	−14°2022	6216G	27	6
8	+186	−156	8.0	B8*	A0	+32.5		±3.1	61045		30	5
9	−538	−700	8.0	B7*	B9	+28.2		±2.5	60856		9	
10	− 49	− 531	8.8	A0*	A0	+28.3	p.v.	±5.7	60999		22	
11	−174	+ 73	8.8	B9*	A	+33.6		±2.9	60940		18	10
12	+ 1	+313	8.9	B9*	A	+33.1		±2.9	60996	6216J	24	11
13	+910	+341	8.9	B9*		+29.0		±2.5	−14°2052		31	
14	−220	−269	9.1	B9*	A0	+27	var	±7	60941		16	8
15	−372	+388	9.1	gG5*	K2	+19.8		±2.0	60898		13	7
16	−161	−288	9.2	A0*	A0	+ 36	var	±6	60942		19	9
17	−129	+113	9.5	A0*		+25.9		±2.4	−14°2015	6216H	20	15
18	+ 86	+109	9.8	A0*		+26.4		±2.9	−14°2024	6216D	28	13
19	+255	+389	9.8	A0					−14°2032			
20	+576	+345	9.9	A0					−14°2041			
21	−505	+166	9.9	A0*		+46	var	±8	−14°1996			14
22	− 78	+210	9.9	K0*	K0	− 3.2		±3.0	60968			12
23	−349	+196	10.0	A0					−14°2005		15	20
24R	−437	+ 99	10.0	A0*		+17.7	var	±5.6	−14°2000	6208B	11	18
25	−350	+485	10.1	A1					−14°2003		14	19
26	+ 65	+445	10.2	A1					−14°2023			23
27	+449	+400	10.2	A2					−14°2037			
28	+270	−131	10.2	A1					−14°2034			17
29	+168	+300	10.4	A2					−14°2028			22
30	+495	−126	10.4	A0					−14°2040			

No.	Coordinates x	Coordinates y	m_{pg}	Spectral Type T	Spectral Type HD	Radial velocity p.e. (km/sec)	Other designations HD,BD	Other designations ADS	Other designations CP	Other designations Z
(1)	(2)		(3)	(4)		(5)	(6)			
31	-182"	+ 30"	10.6	A1						26
32	+280	- 20	10.6	A2			-14°2033			21
33	+305	-132	10.9	A1						27
34	-288	-191	10.9	A1						24
35	- 40	+ 80	11.0	A2				6216E		25
36	+394	+ 31	11.1	F8						
37	-320	-420	11.1				-14°2006			
38	-170	- 74	11.2							28
39	-411	- 56	11.2	F5						
40	+408	- 7	11.2	A4			-14°2036			
41	+647	- 50	11.2	A3			-14°2044			
42	+ 98	-221	11.6	A5						
43	+559	+114	11.7	F2						
44	+221	+ 78	11.8	A7						31
45	+113	- 88	11.9	F0						30
46	+100	-266	11.9							
47	- 38	+177	11.9	A8:				6216F		32
48	+256	-332	11.9	B9						
50	+472	- 28	11.9	A5			-14°2038			
49	+ 22	- 96	12.0							35
51	-236	- 77	12.0	F0						29
52	-439	+173	12.2							37
53	+ 56	+370	12.2	F0						36
54	+132	+133	12.2	F0						
55	-279	-285	12.2				-14°2008			34
56	+360	+127	12.3	F						
57	+ 49	-502	12.3							
58	- 98	-463	12.4							
59	-179	-139	12.7							39
60	-423	+ 5	12.7	A8						
61	-167	+205	12.7							38
62	+ 21	+164	12.9							42
63	+ 33	+106	13.0	F				6216C		
64	+ 11	- 45	13.1							
65	+ 37	+ 9	13.1							41
66	-118	+229	13.2							
67	-230	+109	13.2	F8:						
68	+285	+ 30	13.5							

NGC 2422

Col. 1: Remarks (R)

1, GCSRV 5068; H_β , H_γ emission.

7, lines appear double on one spectrogram.

24, 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.

Col. 3: Magnitudes based on two polar comparisons and two cluster comparisons, as well as values published by

R. Zug (L.O.B. 16, 119, 1933).

Col. 5: In the calculation of the mean radial velocity of the cluster, stars 2, 9, 13 were omitted because they lie outside the limiting circle (although the radial velocities and spectral types make it probable that stars 9 and 13 are cluster members), and stars 15 and 22 because of their radial velocities and spectral types. The radial velocities of stars 7, 10, 14, 16, 24 received weight 0.5, and that of star 21 received weight 0.3, because of large probable error probably due to velocity variation.

Col. 6: CP = B. A. Gould, Cordoba Photographs, Lynn, Mass., 1897, p. 106.

Z = R. Zug (see "Col. 3" above)

Radial Velocity Measurements

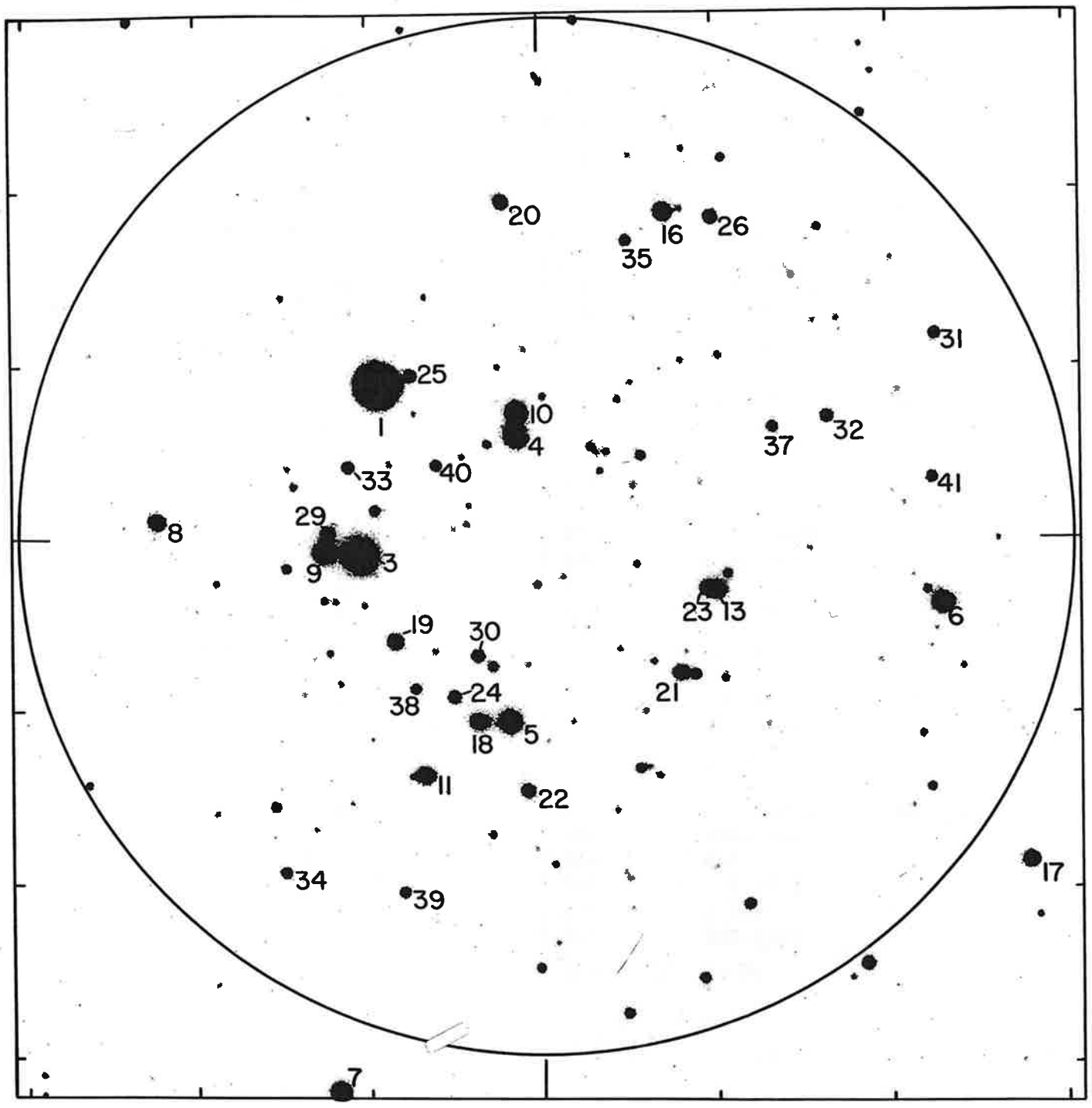
Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectrograph	p.e.
1	24460.021	+51.8		I 12	
	4490.887	+32.8		I 12	
	5674.751	+43.1		I 12	
	30011.866	+23.6	.6	II 6	
	0399.841	+21.5		II 6	
	Mean	+35.5	4.6		± 3.9
2	24460.071	+44.8		I 12	
	4511.922	+47.2		I 12	
	30026.811	+39.3		II 6	
	1525.752	+22.3		II 6A	
	Mean	+38.4	4.0		± 2.5
3	24460.046	+40.8		I 12	
	4499.880	+23.2		I 12	
	5674.768	+16.4		I 12	
	30399.809	+29.9		II 6	
	Mean	+27.6	4.0		± 2.5
4	24473.028	+33.3		I 12	
	4510.821	+32.5		I 12	
	5667.746	+35.2		I 12	
	Mean	+33.7	3.0		± 2.9
5	24470.062	+28.7		I 12	
	4499.967	+30.8		I 12	
	7109.871	+29.1		II 6	
	Mean	+29.5	3.0		± 2.9
6	24470.037	+23.4		I 12	
	4510.850	+24.1		I 12	
	7109.846	+32.4		II 6	
	30026.792	+17.4	.6	II 6	
	0699.014	+26.6		II 6	
	Mean	+25.4	4.6		± 2.3
7	24470.003	+21.1		I 12	
	4510.883	+36.8		I 12	
	7079.929	+58.4		II 6	
	9622.964	+27.0	.6	II 6	
	30074.673	+19.6		II 6	
	Mean	+33.1	4.6		± 5.0

Radial Velocity Measurements

Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectro-graph	p.e.
8	24489.002	+32.4		I 12	
	4511.901	+30.5		I 12	
	9622.949	+36.0	.6	II 6	
	Mean	+32.5	2.6		± 3.1
9	25184.050	+31.5		I 12	
	5251.906	+26.3		I 12	
	30011.882	+13.9		II 6	
	0698.999	+40.8		II 6	
	Mean	+28.2	4.0		± 2.5
10	24877.916	+43.1		I 12	
	5700.676	+14.1		I 12	
	9196.052	+27.6		II 6	
	Mean	+28.3	3.0		± 5.7
11	24499.930	+40.0		I 12	
	4869.949	+31.1		I 12	
	5610.926	+29.6		I 12	
	Mean	+33.6	3.0		± 2.9
12	24488.943	+34.4		I 12	
	5599.923	+24.9		I 12	
	8928.821	+40.1		II 6	
	Mean	+33.1	3.0		± 2.9
13	25905.025	+52.3	.5	I 12	
	5920.032	+27.8		I 12	
	9622.926	+33.0	.6	II 6	
	30074.699	+26.6		II 6	
	1525.732	+18.6		II 6A	
	Mean	+29.0	4.1		± 2.5
14	25281.807	+39.9		I 12	
	5935.042	+44.6		I 12	
	8928.859	- 2.5		II 6	
	30399.825	+25.9		II 6	
	Mean	+27	4.0		± 7
15	25236.927	+19.7		I 12	
	5305.720	+25.6		I 12	
	5922.044	+24.6		I 12	
	31526.727	+ 9.1		II 6A	
	Mean	+19.8	4.0		± 2.0

Radial Velocity Measurements

Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectrograph	p.e.
16	25555.012	+40.7		I 12	
	5670.733	+43.4		I 12	
	9272.921	+ 7.7		II 6	
	30672.044	+51.3		II 6	
	Mean	+36	4.0		± 6
17	25187.010	+24.1		I 12	
	7080.901	+29.9		II 6	
	9230.041	+17.4	.5	II 6	
	30011.837	+14.1		II 6	
	0405.791	+39.9		II 6	
	Mean	+25.9	4.5		± 2.4
18	25685.701	+21.9		I 12	
	5932.000	+32.3		I 12	
	30026.755	+25.0		II 6	
	Mean	+26.4	3.0		± 2.9
21	25657.765	+12.2	.5	I 12	
	5948.970	+64.2		I 12	
	30028.824	+50.8		II 6	
	0405.765	+57.4		II 6	
	Mean	+46	3.5		± 8
22	25201.986	- 4.3		I 12	
	9273.902	- 1.7	.7	II 6	
	Mean	- 3.2	1.7		± 3.0
24	24951.667	-19.9	.5	I 12	
	5674.689	+29.9		I 12	
	30293.043	+10.0		II 6	
	0698.979	+27.6		II 6	
	1468.891	+22.7		II 6A	
	2479.039	+36.7		II 6A	
	Mean	+17.7	5.5		± 5.6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NGC 2439

NGC 2439

α $7^h 38^m.9$ δ -31° 32' (1950.0) l^{II} 246°.4 b^{II} -4°.4

Diameter 9' Class II3mU; ob1 Radial velocity +62.6 km/sec

Limit of completeness: m_{pg} = 12.7 ., within a radius of 5' from the center.

No. Z	Coordinates x	y	m_{pg}	Spectral Type	Radial velocity p.e. (km/sec)	Other designations CPD
(1)	(2)		(3)	(4)	(5)	(6)
1R	+ 92"	+ 90"	8.1	cG0*	+60.5 ±1.9	-31°1782
3	+104	- 10	8.8	B1*	+63.3 ±2.3	-31°1785
4R	+ 13	+ 58	10.1	B2e*	+65.3 ±3.0	-31°1773
5R	+ 18	-106	10.2	B3*	+32 var ±10	-31°1786
9	+125	- 8	10.4	B3*	+53 var ±10	-31°1786
6	-230	- 38	10.4			-31°1763
7	+118	-320	10.5			-31°1784
10	+ 12	+ 71	10.6	B3*	+61.5 ±2.9	
13	-100	- 30	10.9			-31°1767
16	- 72	+187	10.9			-31°1770
11	+ 68	-138	11.0			±31°1779
8	+222	+ 9	11.1			-31°1790
18	+ 38	-106	11.2			-31°1778
17	-279	-185	11.3			-31°1762
19	+ 85	- 60	11.3			-31°1780
20	+ 21	+192	11.6			
21	- 80	- 79	11.6			-31°1768
23	- 95	- 29	11.8			
22	+ 8	-146	11.9			
26	- 99	+182	11.9			
29	+122	+ 3	12.0			
24	+ 50	- 91	12.1			
30	+ 38	- 69	12.2			
25	+ 73	+ 93	12.2			
32	-164	+ 69	12.3			
33	+111	+ 40	12.4			
31	-227	+116	12.4			
41	-225	+ 33	12.5			
35	- 50	+170	12.6			
34	+149	-193	12.7			

No. Z	Coordinates x	Coordinates y	m_{pg}	Spectral Type	Radial velocity p.e. (km/sec)	Other designations CPD
(1)	(2)		(3)	(4)	(5)	(6)
39	+ 81"	-204"	12.7			
40	+ 60	+ 41	12.7			
37	-132	+ 62	12.8			
38	+ 73	- 87	13.2			

Col. 1: Z = R. Zug (L.O.B. 16, 169, 1933). Stars 40 and 41 were added.

Remarks (R)

1, HD 62058.

4, H_β emission on broad absorption; H_γ faint.

5, perhaps double line binary.

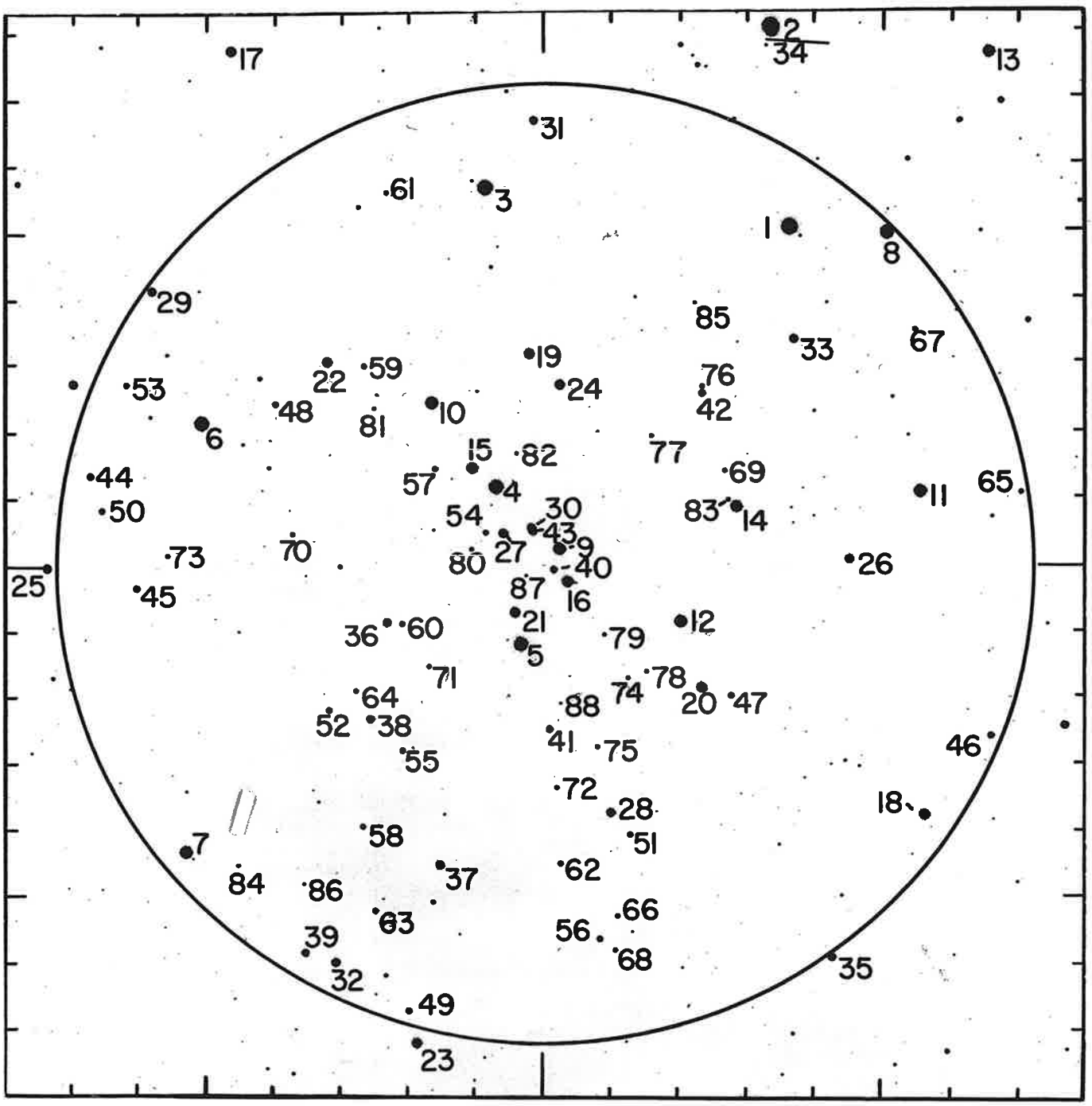
Col. 3: Magnitudes based on a cluster comparison, magnitudes of the Cape Photographic Durchmusterung (CPD), and values published by R. Zug (see "Col. 1" above).

Col. 5: In the calculation of the mean radial velocity of the cluster, stars 5 and 9 were omitted because of velocity variation.

This cluster is remarkable for the presence of a supergiant G-star which is undoubtedly a physical member. The red star 8 might also belong to the supergiant class, but its physical membership is uncertain.

Radial Velocity Measurements

Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectrograph	p.e.
1	27047.933	+74.1		II 6	
	8500.975	+62.6	.7	II 6	
	8920.802	+55.6		II 6	
	9628.852	+52.6	.7	II 6	
	30735.773	+55.9		II 6	
	Mean	+60.5	4.4		± 1.9
3	27125.760	+64.0		II 6	
	8135.934	+73.4		II 6	
	8906.846	+54.0	.6	II 6	
	30321.915	+71.2		II 6	
	1448.920	+50.2		II 6A	
	Mean	+63.3	4.6		± 2.3
4	28193.795	+40	.4	II 3-1/2	
	9642.838	+76	.4	II 3-1/2	
	30321.970	+68.3		II 6	
	0734.837	+68.2		II 6	
	Mean	+65.3	2.8		± 3.0
5	27132.733	+ 3.2		II 6	
	8152.934	+78.9	.6	II 6	
	9260.881	+26.3		II 6	
	30407.718	+63.0		II 6	
	0735.813	+ 8.4		II 6	
	Mean	+32	4.6		±10
9	28600.680	+18	.4	II 3-1/2	
	9262.878	+46.7		II 6	
	30370.845	+49.0		II 6	
	0670.979	+45.1		II 6	
	1413.959	+105.2		II 6A	
	Mean	+53	4.4		±10
10	30761.803	+50.5		II 6	
	1469.846	+73.9		II 6A	
	2004.814	+60.1		II 6A	
	Mean	+61.5	3.0		± 2.9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NGC 2548

NGC 2548

α $8^h11^m.2$ δ $-5°38'$ (1950.0) l^{II} 227°.9 b^{II} +15°.4

Diameter 30' Class I2r; 1-2a1 Radial velocity +7.6 km/sec

Limit of completeness: m_{pg} = 12.5, within a radius of 12' from the center.

No.	Coordinates x	y	m_{pg}	Spectral Type T	HD	Radial velocity p.e. (km/sec)	Other designations HD,BD	G	E	Memb.
(1)	(2)		(3)	(4)		(5)	(6)			(7)
1	-360"	+506"	8.8	A1n*	A0	- 3 var ±6	68669	52	90	I
2R	-331	+809	8.9	A2s*	A0	+10.6 ±2.2	68685	53	95	1
3	+ 86	+569	9.0	A2n*	A2	+ 5 var ±6	68778	86	52	1
4R	+ 70	+124	9.0	A2*		+ 9.3 ±2.4	-5°2435	85	44	1
5	+ 36	-119	9.1	A1n*	A	+12.5 ±2.6	68779	80	65	1
6	+501	+210	9.2	A2n*	A2	+ 8.5 ±2.8	68878	112	13	1
7	+525	-427	9.2	gG5	K0		68879	113	8	1
8	-503	+496	9.2	A1*	A2	+12.3 ±2.6	68646	45	103	1
9R	- 22	+ 25	9.4	A2p*		+ 4.4 ±1.8	-5°2430	72	69	1
10R	+165	+247	9.4	A1*	A2	+ 7.3 ±2.6	68794	89	47	1
11	-547	+115	9.4	A1n*	A2	+ 2.6 ±2.2	68617	44	101	1
12	-198	- 89	9.5	A1n*		+11 var ±12	-5°2424	61	82	1
13	-652	+763	9.6		A0		68585	40	115	1
14	-282	+ 86	9.7	A1			-5°2421	56	83	1
16	- 36	- 20	9.8	A3			-5°2429	70	67	1
15	+106	+149	9.9	A1			-5°2437	87	45	1
17	+461	+774	9.9	F5	F5		68853	108	28	3
18	-557	-375	9.9	A2	A0		68618	43	99	1
19	+ 24	+315	10.0	A0				78	76	1
20	-234	-185	10.0	A1			-5°2423	59	81	1
21	+ 43	- 75	10.0	gG0			-5°2433	81	66	1
22	+318	+304	10.1	B8			-5°2442	103	27	1
23	+185	-716	10.1	A2			-5°2439	92	29	1
24	- 24	+275	10.1	A2				73	75	1
25	+734	0	10.2				-5°2454	122	3	3
26	-448	+ 12	10.3	A2			-5°2416	48	100	1
27	+ 61	+ 50	10.3	A2			-5°2434	84	72	1
28	- 99	-376	10.4	G8			-5°2426	66	58	1
29	+577	+416	10.4				-5°2448	114	16	1
30R	+ 19	+ 58	10.4	A			-5°2431	77	71	1

No.	Coordinates x	Coordinates y	m_{pg}	Spectral Type T	Spectral Type HD	Radial velocity p.e. (km/sec)	Other designations HD, BD	Other designations G	Other designations E	Memb.
(1)	(2)		(3)	(4)		(5)	(6)			(7)
31	+ 17"	+671"	10.6					76	77	1
32	+305	-600	10.6	A0			-5°2443	104	17	1
33	-372	+336	10.6	A:			-5°2418	50	88	1
34	-334	+800	10.6					54	94	1
35	-426	-583	10.7	A0			-5°2417	49	98	1
36	+232	- 89	10.7	A2			-5°2440	94	41	1
37	+151	-450	10.8	A3				90	34	1
38	+255	-233	10.8	A3			-5°2441	98	37	1
39	+348	-579	10.9	A0				105	18	1
40	- 15	- 5	11.0	A3				75	68	1
43R	+ 15	+ 50	11.0	A					70	1
44	+668	+141	11.0				-5°2451	119	12	3
41	- 7	-248	11.1	A1				74	61	1
42	-229	+262	11.1	G0				60	86	3
45	+598	- 31	11.1	A			-5°2449	115	9	1
46	-654	-255	11.2	A2				41	107	1
47	-273	-200	11.4	A3				57	80	1
48	+396	+247	11.5	A				107	25	1
49	+196	-669	11.5					93	30	3
50	+649	+ 81	11.5					118	11	1
51	-128	-404	11.6	A5				63	57	1
52	+316	-215	11.6	G0				102	21	3
56	- 84	-558	11.6	A5:				67	54	2
53	+613	+273	11.7					117	14	1
58	+266	-392	11.7	K0				97	35	3
55	+206	-273	11.7	A					36	1
54	+ 85	+ 55	11.8						43	1
57	+160	+144	11.8	A:					46	1
59	+266	+301	11.8						49	1
60	+209	- 89	11.8	A3:					40	1
62	- 27	-445	11.9	A2					56	1
63	+246	-520	11.9						32	1
61	+232	+561	12.0						51	1
65	-701	+109	12.0						110	3
64	+276	-188	12.1						38	1
66	-109	-527	12.1					65	55	1
67	-541	+350	12.2						102	3
68	-107	-575	12.2						53	3
69	-262	+143	12.3						85	1
70	+371	+ 49	12.3						23	1
71	+170	-147	12.4						39	3
72	- 20	-339	12.4	A:					59	2
73	+555	+ 15	12.4						10	1
83	-267	+ 99	12.5						84	3
74	-122	-167	12.5						62	2

NGC 2548

Col. 1: Remarks (R)

2, double star; brighter (n.f.) component.

4, ADS 6674A and 6672C, has companion of magnitude 10 at position angle 81°, separation 3". Magnitude refers to combined light, radial velocity and spectral type to brighter component.

9, spectral type peculiar: metallic lines strong (as in F2), while Ca II lines resemble those of an A2 star; may be composite.

10, some lines appear double; perhaps a double line spectroscopic binary.

30, ADS 6672A; fainter companion (s.p.) of star 2.

43, ADS 6672B.

Col. 3: Magnitudes based on a polar comparison and a cluster comparison, as well as a plate taken with the 20-inch Astrograph.

Col. 5: In the calculation of the mean radial velocity of the cluster, the results for star 1 and star 3 received weight 1/2 because of the large probable error due to velocity variation, and star 12 was omitted for the same reason. Although the velocity of star 1 differs by more than 10 km/sec from the mean, this star may still be a member of the cluster, since the difference is less than twice the probable error.

Col. 6: G = K. Graff (Sitzungsber. Wien 148, 207, 1939)

E = E. G. Ebbighausen (Ap.J. 90, 689, 1939)

Col. 7: Cluster membership designations, based on proper motions published by E. G. Ebbighausen (see "Col. 6" above), have the following significance:

1 -- reasonably high probability of membership;

2 -- doubtful members, not definitely assignable to either 1 or 3;

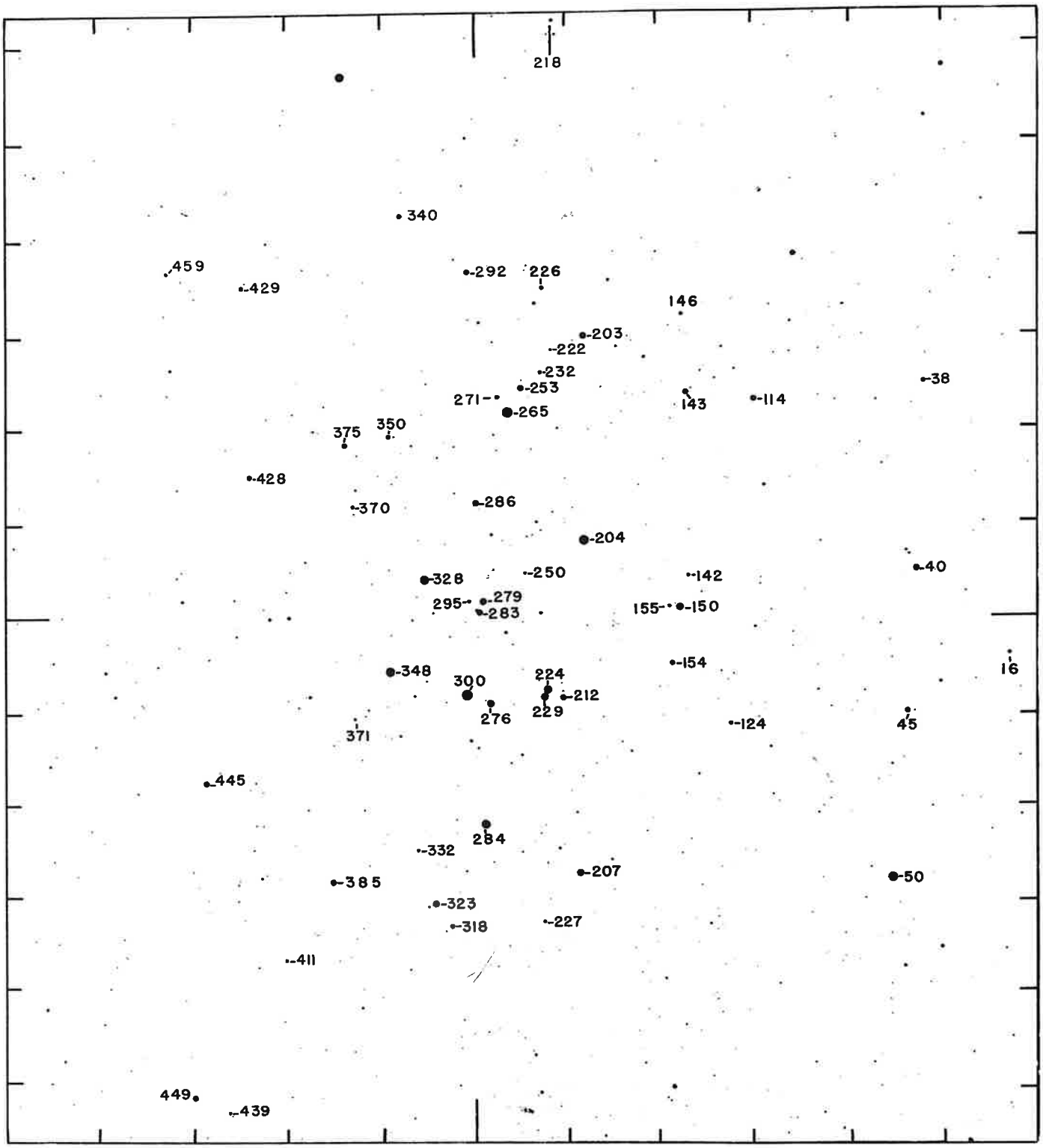
3 -- definite indications of nonmembership.

Radial Velocity Measurements

Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectrograph	p.e.
1	25599.984	+35.5		I 12	
	7174.725	-10.4		II 6	
	7459.944	+ 5.2	.6	II 6	
	9273.987	-29.7	.6	II 6	
	9623.015	-14.5	.6	II 6	
	30011.948	- 4.0	.5	II 6	
	Mean	- 3	4.3		± 6
2	25251.840	+16.6		I 12	
	7177.721	+14.2		II 6	
	8955.844	+ 9.1	.5	II 6	
	30028.918	+ 1.6		II 6	
	Mean	+10.6	3.5		± 2.2
3	25237.013	+31.2		I 12	
	7107.920	+ 5.2		II 6	
	8955.806	-24.5	.5	II 6	
	9622.992	+ 9.2	.7	II 6	
	Mean	+ 5	3.2		± 6
4	25667.812	+14.3		I 12	
	7136.835	+ 9.4		II 6	
	7855.828	+ 2.2	.7	II 6	
	Mean	+ 9.3	2.7		± 2.4
5	25674.819	+22.7		I 12	
	5717.685	+ 9.3		I 12	
	8906.978	+ 9.1	.7	II 6	
	9316.843	+ 7.8		II 6	
	Mean	+12.5	3.7		± 2.6
6	27108.925	+ 8.1		II 6	
	7802.976	+10.2	.5	II 6	
	8928.905	+ 7.6	.5	II 6	
	Mean	+ 8.5	2.0		± 2.8
8	28501.064	+ 0.7		II 6	
	8906.924	+25.2		II 6	
	9273.958	+ 6.9	.6	II 6	
	30735.983	+14.1		II 6	
	Mean	+12.3	3.6		± 2.6
9	25659.830	+ 4.1		I 12	
	7124.879	+10.8		II 6	
	8921.934	+ 6.1		II 6	
	9628.970	- 3.3		II 6	
	30735.958	+ 4.2	.7	II 6	
	Mean	+ 4.4	4.7		± 1.8

Radial Velocity Measurements

Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectrograph	p.e.
10	25670.821	+15.3		I 12	
	7132.834	- 1.8		II 6	
	8237.804	+ 2.6	.6	II 6	
	9272.975	+11.2		II 6	
	Mean	+ 7.3	3.6		± 2.6
11	27109.922	+ 4.5		II 6	
	8154.047	- 4.4		II 6	
	8580.858	+13.1		II 6	
	30028.883	- 7.9		II 6	
	0699.085	+ 7.9		II 6	
	Mean	+ 2.6	5.0		± 2.2
12	27079.984	+14.6		II 6	
	7479.869	+36.4	.6	II 6	
	8133.060	-39.0		II 6	
	30699.071	+34.1		II 6	
	Mean	+11	3.6		±12


218
340
459
292
226
429
146
203
222
232
253
38
271
143
114
265
375
350
428
370
286
204
328
250
142
40
295
279
283
155
150
154
16
348
300
224
212
276
229
124
45
371
445
284
332
207
50
385
323
318
227
411
449
439

NGC 2632

NGC 2632

(Praesepe, M44)

α $8^h37^m.2$ δ +20° 10' (1950.0) l^{II} 205°.5 b^{II} 32°.5

Diameter 90' Class I2r; 2a3 Radial velocity +33.3 km/sec

Limit of completeness: $m_{pg} = 9.8$, within a radius of 8' from the center.

No. KW	Coordinates x	y	m_{pg}	Spectral Type	Radial velocity (km/sec)	p.e.	Other designations BD	HD
(1)	(2)		(3)	(4)	(5)		(6)	
300	+ 54"	-414"	6.5	A5*	+31.5	±2	20°2171	73731
265	-180	+1128	6.6	B9*	+32.6	±1.3	20°2159	73666
204	-576	+408	6.9	F0*	+30.5	±1.2	20°2149	73575
284	- 36	-1128	7.0	F0*	+35.7	±1.4	19°2069	73712
50	-2208	-1440	6.9	A5*	+31.3	±1.5	19°2053	73210
328	+276	+198	7.1	F0*	+32.3	±2.0	20°2172	73785
348	+462	-300	6.9	A8*	+29.0	±1.3	20°2175	73819
283	- 24	+ 36	7.5	gK0*	+35.5	±1.1	20°2166	73710
253	-252	+1254	7.4	gG9*	+35.8	±1.2	20°2158	73665
224	-384	-384	7.5	A5*	+34.0 p.v.	±2.7	20°2152	73618
212	-456	-426	7.5	gG8*	+33.5	±1.7	20°2150	73598
276	- 78	-468	7.7	A3s*	+36.1	±1.5	20°2163	73711
229R	-348	-426	7.8	A4:	+32.6 var	a	20°2153	73619
428	+1218	+768	7.9	gG9*	+29.3	±1.5	20°2185	73974
150	-1098	+ 48	7.7	A4:*	+31.8	±1.6	20°2143	73449
279	- 36	+102	7.9		+26.2 var	±4.6	20°2165	73709
286	- 6	+630	8.2	A3*	+30.4	±1.6	20°2168	73730
207	-540	-1386	7.9	A5:*	+35.4	±1.7	19°2064	73576
203	-582	+1512	7.9	A5*	+34.4	±1.7	20°2148	73574
40	-2352	+234	8.0	A5:*	+49 var	±4	20°2132	73174
385R	+792	-1452	8.2	A6*	+38.5 var	±4	19°2078	73890
445	+1464	-900	8.2	A6*	+35.8	±2.0	19°2083	74028
449	+1536	-2610	8.1	A6*	+39.0	±2.6	19°2084	74050
114	-1500	+1164	8.3	A6*	+35.4	±1.8	20°2138	73345
45	-2298	-540	8.5	A6*	+33.9	±1.7	20°2133	73175
375	+696	+936	8.5	A4:*	+31.3	±1.5	20°2179	73872
323	+234	-1566	8.0	A7*	+34.9	±2.4	19°2073	73763
429	+1242	+1794	8.8	A7*	+33.8 var	±5.4	20°2186	73993
154	-1050	-264	8.8	A6*	+32.9	±1.6	20°2144	73450
38	-2400	+1254	9.0	A6*	+35.1	±1.9	20°2131	73161

No. KW	Coordinates x	Coordinates y	m_{pg}	Spectral Type	Radial velocity (km/sec)	p.e.	Other designations BD	Other designations HD
(1)	(2)		(3)	(4)	(5)		(6)	
292	+ 30	+1872	8.5	A8:*	+17 var	±5	20°2169	73729
143	-1134	+1206	8.5	A8*	+32.7	±1.7	20°2141	73430
340	+390	+2166	8.7	A7*	+33.1	±2.2	20°2173	73798
318	+150	-1680	8.9	F0*	+35.0	±1.9	19°2072	73746
350	+468	+972	9.0	F1*	+34.2	±2.3	20°2174	73818
124	-1362	-594	9.3	F1*	+30.2	±2.3	20°2139	73397
271	-126	+1194	9.1	F1:*	+40.9	±1.9		
226	-366	+1794	9.2	F0*	+41.5 p.v.	±3.2	20°2154	73616
370	+660	+600	9.4	F1*	+34.3	±2.3	20°2177	73854
459	+1650	+1872	9.6	dF1*	+32.8	±2.2	20°2191	74058
218R	-438	+3234	9.8	F2:*	+30.1	±2.1	19°1882	73597
295	+ 36	+ 90	9.8	F2*	+36.2	±2.4		
411	+1044	-1866	9.7	dF3*	+31.0	±1.7		
146	-1110	+1632	9.8	F4*	+31.0	±2.6	20°2142	73429
16	-2844	-234	9.8	dF5*	+31.7	±2.4	20°2128	73081
232	-354	+1332	9.6	F2*	+32.4	±2.3	20°2155	73617
439	+1356	-2700	9.8	dF2:*	+36.7	±2.2	19°2082	73994
142	-1140	+216	9.8	dF6*	+31.2	±2.3		
155	-1038	+ 54	9.8	dF3*	+30.9	±2.4		
227	-348	-1668	9.9	dF5*	+29.1	±1.7		
332	+330	-1266	10.0	dF5*	+32.4	±2.3		
250	-270	+240	10.3	dF7*	+35.7	±2.9		
371	+660	-552	10.6	dF8*	+34.0	±2.6		
222	-414	+1446	10.6	dF8*	+30.1	±2.6		

NGC 2632

Col. 1: KW = W. J. Klein Wassink (Publ. Groningen No. 41, 1927)

Remarks (R)

229, radial velocity from GCSRV, spectroscopic binary orbit by R. F. Sanford.

385, GCSRV lists this as a double line spectroscopic binary; our observations confirm variability.

292, GCSRV lists this as a double line spectroscopic binary; our observations confirm velocity variability, but do not show double lines.

218, northern component of double star.

Col. 2: Coordinates refer to the center adopted by W. J. Klein Wassink (see "Col. 1" above), $8^h\ 34^m\ 39^s$, $+20^\circ\ 01'.0$ (1900).

Col. 3: Magnitudes based on values published by H. L. Johnson (Ap.J. 116,640, 1952).

Col. 5: In the calculation of the mean radial velocity of the cluster, stars 40 and 292 were omitted because of their large deviation in radial velocity, stars 300, 328, 224, 279, 385, 429, 226 were given weight 1/2 because of velocity variation, and star 229 was given weight 2 because it is the result of a spectroscopic binary orbit determination. However, if all stars are included with unit weight, the resulting mean velocity is hardly affected.

Radial Velocity Measurements

Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectrograph	p.e.
300	24216.831	+43.6	.7	I 12	
	5336.811	+37.2	.7	I 12	
		+40.4	1.4		
	GCSRV 5713	+30	8.3		
	Mean	+31.5	9.7	14 pl.	± 2
265	24212.897	+34.8		I 12	
	5291.936	+21.7		I 12	
	7462.948	+42.1		II 6	
		+32.9	3.0		
	GCSRV 5706	+33.8	11		
	Mean	+32.6	14.0	14 pl.	± 1.3
204	24250.731	+27.3	.7	I 12	
	5653.959	+28.6		I 12	
	6649.783	+27.0	.7	I 12	
	31853.903	+26.8		II 6A	
	2477.057	+36.9		II 6A	
		+29.6	4.4		
	GCSRV 5692	+31.0	6		
	Mean	+30.5	10.4	11 pl.	± 1.2
284	24511.950	+45.4	.7	I 12	
	6407.836	+35.7		I 12	
	7496.918	+48.0		II 6	
	31826.983	+41.2	.7	II 6A	
	2115.059	+31.1		II 6A	
		+39.9	4.4		
	GCSRV 5710	+31.2	4.0		
	Mean	+35.7	8.4	9 pl.	± 1.4
50	24964.057	+24.7	.7	I 12	
	7172.796	+46.3		II 6	
	30398.898	+34.4		II 6	
		+36.3	2.7		
	GCSRV 5668	+27.9	4		
	Mean	+31.3	6.7	7 pl.	± 1.5
328	24270.671	+34.0		I 12	
	5293.869	+28.8	.7	I 12	
	7462.985	+41.8		II 6	
		+35.5	2.7		
	GCSRV 5720	+31.2	9		
	Mean	+32.3	11.7	12 pl.	± 2.0

Radial Velocity Measurements

Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectrograph	p.e.
348	24488.876	+31.4	.7	I 12	
	5004.721	+21.1		I 12	
	9755.674	+34.7	.7	II 6	
	32204.998	+37.5		II 6A	
		+30.8	3.4		
	GCSRV 5722	+28.1	6		
	Mean	+29.0	9.4	10 pl.	± 1.3
283	24489.071	+35.1		I 12	
	7451.943	+36.6		II 6	
	30724.062	+35.0		II 6	
		+35.6	3.0		
	GCSRV 5711	+35.4	10		
	Mean	+35.5	13.0	13 pl.	± 1.1
253	24208.844	+42.0		I 12	
	7459.948	+38.6		II 6	
	30027.966	+29.1	.7	II 6	
		+37.4	2.7		
	GCSRV 5704	+35.3	8		
	Mean	+35.8	10.7	11 pl.	± 1.2
224	24511.980	+32.1	.7	I 12	
	5315.815	+25.0	.7	I 12	
	30133.709	+14.8		II 6	
	0723.088	+29.1		II 6	
	31055.084	+45.2		II 6	
		+29.3	4.4		
	GCSRV 5699	+40	4		
	Mean	+34.0	8.4	9 pl.	± 2.7
212	24270.702	+32.5		I 12	
	7499.825	+31.6	.7	II 6	
	30027.986	+35.9	.7	II 6	
		+33.2	2.4		
	GCSRV 5696	+33.8	3		
	Mean	+33.5	5.4	6 pl.	± 1.7
276	24870.029	+40.2	.7	I 12	
	7555.745	+43.1	.7	II 6	
	30075.848	+23.1		II 6	
	1057.079	+29.6		II 6	
		+32.7	3.4		
	GCSRV 5707	+39.0	4		
	Mean	+36.1	7.4	8 pl.	± 1.5

Radial Velocity Measurements

Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectrograph	p.e.
229	24500.005	+39.8	.7	I 12	
	9755.693	+38.5	.7	II 6	
	30371.056	+25.7		II 6	
		+33.5	2.4		
	GCSRV 5700	+32.6	(adopted)		
428	24473.067	+26.5		I 12	
	7496.885	+26.6		II 6	
	9623.062	+30.0	.7	II 6	
	30723.064	+30.8		II 6	
		+28.3	3.7		
	GCSRV 5737	+30.5	3		
	Mean	+29.3	6.7	7 pl.	± 1.5
150	24489.040	+37.7	.7	I 12	
	6449.741	+38.0	.7	I 12	
	30075.817	+24.3		II 6	
		+32.2	2.4		
	GCSRV 5686	+31.5	3.5		
	Mean	+31.8	5.9	8 pl.	± 1.6
279	24171.923	+24.5	.7	I 12	
	5610.995	+22.0	.7	I 12	
	30133.693	+54.4		II 6	
		+34	2.4		± 7
	GCSRV 5709	+18.5	2.4		
	Mean	+26.2	4.8	6 pl.	± 4.6
286	24171.961	+38.4	.7	I 12	
	7555.699	+29.7		II 6	
	9623.075	+31.2	.7	II 6	
	30497.677	+18.2		II 6	
	1820.024	+39.4		II 6A	
		+30.9	4.4		
	GCSRV 5715	+29.3	2.1		
	Mean	+30.4	6.5	8 pl.	± 1.6
207	24500.038	+34.7		I 12	
	6409.835	+40.2	.7	I 12	
	30134.677	+34.4		II 6	
	2240.806	+35.9	.5	II 6A	
		+36.0	3.2		
	GCSRV 5693	+34.5	2.1		
	Mean	+35.4	5.3	7 pl.	± 1.7
203	24984.736	+28.8	.7	I 12	
	7564.739	+36.6	.7	II 6	
	30141.684	+24.2		II 6	
	2185.042	+38.3		II 6A	
		+31.9	3.4		
	GCSRV 5691	+38.5	2.1		
	Mean	+34.4	5.5	7 pl.	± 1.7

Radial Velocity Measurements

Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectrograph	p.e.
40	24984.783	+67.9	.7	I 12	
	9642.989	+36.0	.7	II 6	
	30351.090	+51.3		II 6	
	1820.007	+65.8		II 6A	
	2142.047	+64.7		II 6A	
		+57.8	4.4		
	GCSRV 5665	+35.9	3.0		
	Mean	+49	7.4	8 pl.	± 4
385	24999.690	+28.7	.7	I 12	
	5600.070	+19.6	.7	I 12	
	30399.960	+51.8		II 6	
	1469.973	+38.3	.7	II 6A	
		+36.3	3.1		
	GCSRV 5728	+41.5	2.3		
	Mean	+38.5	5.4	7 pl.	± 4
445	25004.681	+37.0	.7	I 12	
	5620.009	+44.1	.7	I 12	
	9755.737	+37.4	.7	II 6	
		+39.5	2.1		
	GCSRV 5741	+32.0	2.1		
	Mean	+35.8	4.2	6 pl.	± 2.0
449	25303.827	+43.9	.7	I 12	
	6414.833	+35.5	.7	I 12	
	30134.701	+38.0		II 6	
	Mean	+39.0	2.4		± 2.6
114	24977.792	+35.8	.7	I 12	
	5291.896	+27.4		I 12	
	5620.054	+44.8	.7	I 12	
	31819.992	+32.6	.7	II 6A	
		+34.4	3.1		
	GCSRV 5680	+36.8	2.1		
	Mean	+35.4	5.2	7 pl.	± 1.8
45	25257.990	+19.9		I 12	
	7562.741	+40.0	.7	II 6	
	30398.919	+40.3		II 6	
	2239.862	+39.2		II 6A	
		+34.4	3.7		
	GCSRV 5667	+33.0	2.1		
	Mean	+33.9	5.8	7 pl.	± 1.7
375	24172.006	+39.8	.7	I 12	
	6446.779	+20.3		I 12	
	30027.946	+30.3		II 6	
	2115.045	+28.3		II 6A	
	2205.992	+38.2		II 6A	
		+30.8	4.7		
	GCSRV 5727	+32.5	2.1		
	Mean	+31.3	6.8	8 pl.	± 1.5

Radial Velocity Measurements

Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectrograph	p.e.
323	24500.067	+35.1		I 12	
	7555.661	+31.7	.7	II 6	
	30133.676	+36.9		II 6	
	Mean	+34.9	2.7		± 2.4
429	24990.757	+51.3	.7	I 12	
	6432.821	+33.2	.7	I 12	
	9623.042	+12.7		II 6	
	30399.976	+37.8		II 6	
	Mean	+33.8	3.4		± 5.4
154	24256.723	+36.4	.7	I 12	
	5717.750	+43.8	.7	I 12	
	9755.711	+20.9		II 6	
	30724.062	+32.9	.7	II 6	
		+32.3	3.1		
	GCSRV 5687	+33.5	2.8		
	Mean	+32.9	5.9	8 pl.	± 1.6
38	24267.724	+30.8		I 12	
	5737.694	+31.1	.7	I 12	
	9643.008	+41.2	.7	II 6	
		+33.9	2.4		
	GCSRV 5664	+36.5	2.1		
	Mean	+35.1	4.5	6 pl.	± 1.9
292	25010.703	+12.7		I 12	
	5653.916	+13.4		I 12	
	9643.037	+37.0	.7	II 6	
	30398.945	+40.4		II 6	
	0735.034	+32.4	.7	II 6	
	1932.720	+25.2		II 6A	
	2185.071	+46.2		II 6A	
		+30	6.4		
	GCSRV 5714	- 4.5	4		
	Mean	+17	10.4	11 pl.	± 5
143	24999.743	+26.1	.5	I 12	
	5671.891	+42.5	.7	I 12	
	7891.829	+27.7		II 6	
	31468.962	+39.0		II 6A	
		+34.2	3.2		
	GCSRV 5685	+30.4	2.1		
	Mean	+32.7	5.3	7 pl.	± 1.7
340	24990.689	+36.6	.7	I 12	
	5289.926	+28.1		I 12	
	9616.075	+44.9	.7	II 6	
	32239.803	+27.5		II 6A	
	Mean	+33.1	3.4		± 2.2

Radial Velocity Measurements

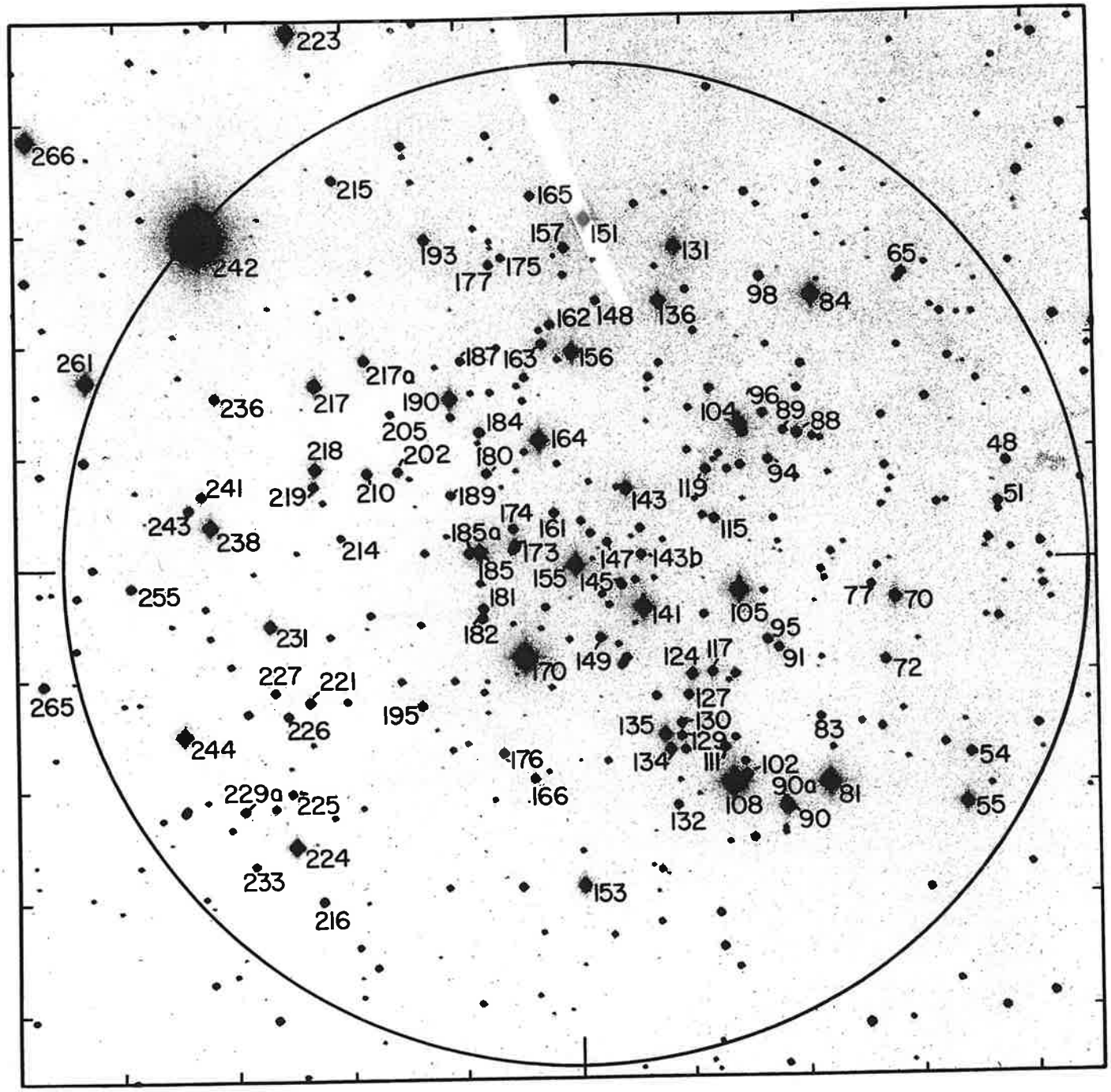
Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectrograph	p.e.
318	24276.690	+37.4	.7	I 12	
	5366.711	+23.2		I 12	
	7546.774	+35.8	.7	II 6	
		+31.0	2.4		
	GCSRV 5719	+39.5	2.1		
	Mean	+35.0	4.5	6 pl.	± 1.9
350	24225.826	+31.7		I 12	
	5320.812	+34.5		I 12	
	7135.889	+36.4		II 6	
	Mean	+34.2	3.0		± 2.3
124	24250.778	+25.3		I 12	
	5341.775	+31.7		I 12	
	7172.760	+33.6		II 6	
	Mean	+30.2	3.0		± 2.3
271	25249.027	+45.0		I 12	
	6434.789	+39.5		I 12	
	6438.787	+43.2	.7	I 12	
	30734.066	+42.0	.7	II 6	
	2204.972	+35.8		II 6A	
	Mean	+40.9	4.4		± 1.9
226	24975.763	+45.5		I 12	
	5657.905	+55.4		I 12	
	7129.906	+27.3		II 6	
	30736.059	+38.3	.7	II 6	
	2185.018	+40.0		II 6A	
	Mean	+41.5	4.7		± 3.2
370	25265.993	+31.2		I 12	
	5684.825	+45.7		I 12	
	7873.807	+26.0		II 6	
	Mean	+34.3	3.0		± 2.3
459	25324.790	+27.8		I 12	
	7177.780	+28.6		II 6	
	9615.063	+36.0	.5	II 6	
	32477.043	+40.4		II 6A	
	Mean	+32.8	3.5		± 2.2
218	25726.727	+40.1	.7	I 12	
	30028.962	+23.9		II 6	
	0735.057	+30.5		II 6	
	1932.700	+29.0		II 6A	
	Mean	+30.1	3.7		± 2.1

Radial Velocity Measurements

Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectrograph	p.e.
295	25325.781	+43.2		I 12	
	7162.799	+32.5		II 6	
	9274.036	+31.4	.7	II 6	
	Mean	+36.2	2.7		± 2.4
411	25352.731	+34.4		I 12	
	7854.903	+21.6		II 6	
	30723.039	+35.5	.7	II 6	
	1526.831	+21.7		II 6A	
	1904.784	+39.2	.7	II 6A	
	2205.955	+37.3		II 6A	
	Mean	+31.0	5.4		± 1.7
146	25345.740	+26.7		I 12	
	7859.896	+30.5	.7	II 6	
	30135.691	+37.6	.7	II 6	
	Mean	+31.0	2.4		± 2.6
16	25700.784	+31.9		I 12	
	30074.825	+39.2	.7	II 6	
	0761.953	+26.2		II 6	
	Mean	+31.7	2.7		± 2.4
232	24963.984	+35.1		I 12	
	7151.829	+36.3		II 6	
	9259.065	+25.7		II 6	
	Mean	+32.4	3.0		± 2.3
439	26339.022	+48.2		I 12	
	9275.035	+38.8	.7	II 6	
	30373.046	+23.9	.7	II 6	
	2239.831	+32.6		II 6A	
	Mean	+36.7	3.4		± 2.2
142	27174.787	+30.4		II 6	
	7562.690	+32.8		II 6	
	30761.975	+30.3		II 6	
	Mean	+31.2	3.0		± 2.3
155	27163.799	+27.7		II 6	
	7564.651	+30.5		II 6	
	30373.025	+36.2	.7	II 6	
	Mean	+30.9	2.7		± 2.4

Radial Velocity Measurements

Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectro-graph	p.e.
227	27184.752	+24.7		II 6	
	9258.059	+35.8		II 6	
	30351.040	+21.3		II 6	
	1526.863	+24.1		II 6A	
	1791.077	+33.1	.7	II 6A	
	2204.938	+36.8		II 6A	
	Mean	+29.1	5.7		± 1.7
332	27546.721	+32.0	.7	II 6	
	7891.776	+30.7		II 6	
	30351.066	+37.1	.7	II 6	
	0497.702	+30.6	.7	II 6	
	Mean	+32.4	3.1		± 2.3
250	27531.770	+35.0	.5	II 6	
	30399.931	+47.6	.7	II 6	
	0761.917	+24.2	.7	II 6	
	Mean	+35.7	1.9		± 2.9
371	27424.051	+36.4		II 6	
	30734.039	+28.3	.7	II 6	
	1469.942	+36.2	.7	II 6A	
	Mean	+34.0	2.4		± 2.6
222	27430.045	+34.2		II 6	
	30372.993	+24.8	.7	II 6	
	0734.996	+29.5	.7	II 6	
	Mean	+30.1	2.4		± 2.6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NGC 2682

NGC 2682

(M67)

α $8^h 48^m.7$ δ +12° 00' (1950.0) l^{II} 215°.7 b^{II} +31°.9

Diameter 18' Class II 2r; 3a Radial velocity +20.3 km/sec

Limit of completeness: m_{pg} = 13.5, within a radius of 7'.5 from star 155.

No. F	Coordinates x	y	m_{pg}	Spectral Type T	P	Radial velocity (km/sec)	p.e.	Other designations VL	M	Memb. E	M
(1)	(2)		(3)	(4)		(5)		(6)		(7)	
242	+328"	+300"	8.9	gK0				751	317	3	3
81	-221	-200	10.0	B9*	B8 - 9V	+25.5	±2.9	483	90		
261	+427	+170	10.8	A3				790	328	3	3
155R	0	0	11.0	dG0*		+ 4.8	±2.9	613	206	2	
170	+ 45	- 83	11.1	gK2*	K3III	+18.2	±3.0	637	230		
108	-136	-198	11.1	gK2*	K4III	+16.9	±3.4	527	135		
156	+ 1	+192	11.1	A2*	A2V	+18.2	±2.9	614	207		
238	+320	+ 38	11.2	A3*		+20.4	±3.0	745	312		
190	+109	+151	11.3	A6*	A7III	+17.7	±3.0	666	259		
153	- 5	-290	11.4	A3	A2V			609	202		
185	+ 84	+ 12	11.5	A4				657	248		
105	-143	- 25	11.6	gK0	K2-3 III			523	132		
151	- 12	+312	11.6	gG9				604	200		
141	- 59	- 39	11.6	gK1*	K2III	+25.0	±3.0	579	182		
90R	-182	-220	11.6	F3				503	107		
266	+477	+388	11.6	gG5				809			
164	+ 30	+112	11.7	gG9	K1III			629	222		
223	+247	+485	11.7	gG8				720	294		
84	-209	+241	11.7	gK1				490	99		
131	- 91	+285	11.7	F1				561	160		
55	-341	-220	11.7	A4				434	56	2	
244	+344	-151	11.7	gG6				757	319		
224	+247	-250	11.9	gK2				719	295		
136	- 80	+237	12.0	F9				570	167		
70	-280	- 33	12.0	F2				455	73	3	3
217	+226	+164	12.2	gK0				711	289		
104	-146	+126	12.2	gG5				522	132		
143	- 46	+ 69	12.4	gG8	K0III			584	184		
135	- 77	-154	12.6	gK0	K2III			569	165		
231	+268	- 53	12.6	gK0				730	302		

No. F	Coordinates x	y	m_{pg}	Spectral Type T	P	Radial velocity p.e. (km/sec)	Other designations VL	M	Memb. E	M
(1)	(2)		(3)	(4)		(5)	(6)		(7)	
124	-103"	-101"	12.6	F1			554	153		
184	+ 82	+122	12.7	F0			656	247		
218	+226	+ 89	12.8	G:			712	290		
88	-196	+116	12.9	G0			497	104		
134	- 82	-168	12.9	G0			568	163		
210	+181	+ 84	12.9	F8			694	278		
265	+466	-105	12.9	F9			805	332		3
217a	+183	+186	13.0	G:			697	279		
221	+233	-121	13.0	F8			716	293	3	3
65	-290	+260	13.1	F4			450	69		
236	+314	+154	13.1	G0			743	310		
219	+229	+ 74	13.1				713	291		
90aR	-181	-217	13.1					108		
202	+154	+ 86	13.1	F5			684	271		
173R	+ 52	+ 19	13.1	G:			641	232		
119	-116	+ 85	13.2	F8			542	148		
180	+ 77	+ 84	13.2	F8			651	242		
216	+221	-302	13.2	F5			710	287	2	
51	-371	+ 52	13.2	F5			423	46		
149	- 22	- 66	13.2	F5			600	197		
176	+ 65	-167	13.2	F8			647	236		
182	+ 82	- 47	13.2				655	244		
95	-168	- 70	13.2	F5			510	118		
165	+ 35	+334	13.2	F5			630	224	2	
215	+208	+351	13.2	F5			706	284		
229a	+294	-219	13.2	F5:			738	306	3	3
102	-148	-192	13.2				519	128		
174	+ 54	+ 33	13.2	F8			643	234		
243	+338	+ 53	13.2				753	318		
98	-165	+258	13.2	F5			515	123		
54	-345	-175	13.2				433	55		
115	-123	+ 41	13.2	F6			536	142		
163	+ 27	+201	13.2	G0			628	220		
161	+ 18	+48	13.2	F3			625	213		
193	+129	+295	13.3	gG5			672	261		
241	+330	+ 66	13.3	F8			750	316		
143b	- 59	+ 9	13.3				580	177		
255	+390	- 17	13.3	G0			776	323		
111	-129	-167	13.3	G0			531	138		
48	-380	+ 88	13.3	G:			420	44		
72	-271	- 89	13.3	K:			460	76	3	
127	- 99	-119	13.3	G			557	156		
157	+ 6	+286	13.3	F8			616	209		
162	+ 19	+217	13.4	F8			626	219		
94	-170	+ 93	13.4	F8:			509	117		

No. F	Coordinates x	y	m_{pg}	Spectral Type T	P	Radial velocity p.e. (km/sec)	Other designations VL	M	Memb. E	M
(1)	(2)		(3)	(4)		(5)	(6)		(7)	
189	+108"	+ 64"	13.4				665	254		
91	-177	- 77	13.4				505	112	2	
117	-120	- 98	13.4				538	146		
145	- 41	- 18	13.4	G0:			586	180		
185a	+ 94	+ 11	13.5	G0			661	249		
195	+135	-126	13.5	G0			675	263		
130	- 91	-144	13.5				562	159		
181	+ 82	- 39	13.5				654	243		
226	+253	-134	13.5	G0			722	297		
225	+249	-203	13.6				721	296		
177	+ 72	+273	13.7	F8			648	238		
132	- 88	-218	13.7	G:			564	161		
96	-166	+135	13.7	G:			513	120		
166	+ 37	-192	13.7	G5			631	225		
148	- 22	+238	13.7	G0			602	196		
129	- 92	-156	13.8	G0			560	158		
83	-212	-140	13.8				489	158		
187	+ 98	+185	13.8	F8			662	251		
227	+264	-113	13.8	G			725	298		
233	+283	-266	13.9	G0			734	303		
147	- 28	+ 20	13.9	G0:			596	193		
205	+160	+138	13.9	G0			687	273		
77	-259	- 21	14.0	G			471	82		
89	-183	+119	14.0	G:			502	114		
175	+ 61	+278	14.3	G:			646	235		
214	+205	+ 27	14.4	G0			705	283		

Col. 1: F = E. Fagerholm (Dissertation, Uppsala, 1906). Numbers followed by a or b represent double star components or stars added by H. Shapley (Contr. Mt. Wilson Obs. 117, 1916).

Remarks (R)

155, close double star, according to van Maanen; data refer to combined light.

90, double star. The fainter component 90a is at 3" separation, position angle 20°. Shapley designates the two components 90α and 90β.

173, double star, brighter (n.p.) component. Shapley designates this 173α.

Col. 3: Magnitudes based on values published by

H. L. Johnson and A. R. Sandage (Ap.J. 121, 616, 1955),

H. L. Vanderlinden (Med. Gent No. 10, 1945; Verhandel. Vlaamsche Acad. Wetenschappen België No. 15, 1945),

E. Fagerholm (see "Col. 1" above),

H. Shapley " " "

Col. 4: Spectral types listed under P were determined by D. Popper and quoted by H. L. Johnson and A. R. Sandage (see "Col. 3" above). For the red giants, our types are slightly earlier than those of Popper, which are based on the MKK system.

Col. 5: The radial velocity of star 81 seems to indicate that it is a cluster member. Star 155 definitely is not a member on the basis of its radial velocity and spectral type.

Col. 6: VL = H. L. Vanderlinden (see "Col. 3" above)

M = A. van Maanen (Ap.J. 96, 382, 1942)

Col. 7: Cluster membership designations have the following significance:

2 -- doubtful members;

3 -- definite indications of nonmembership.

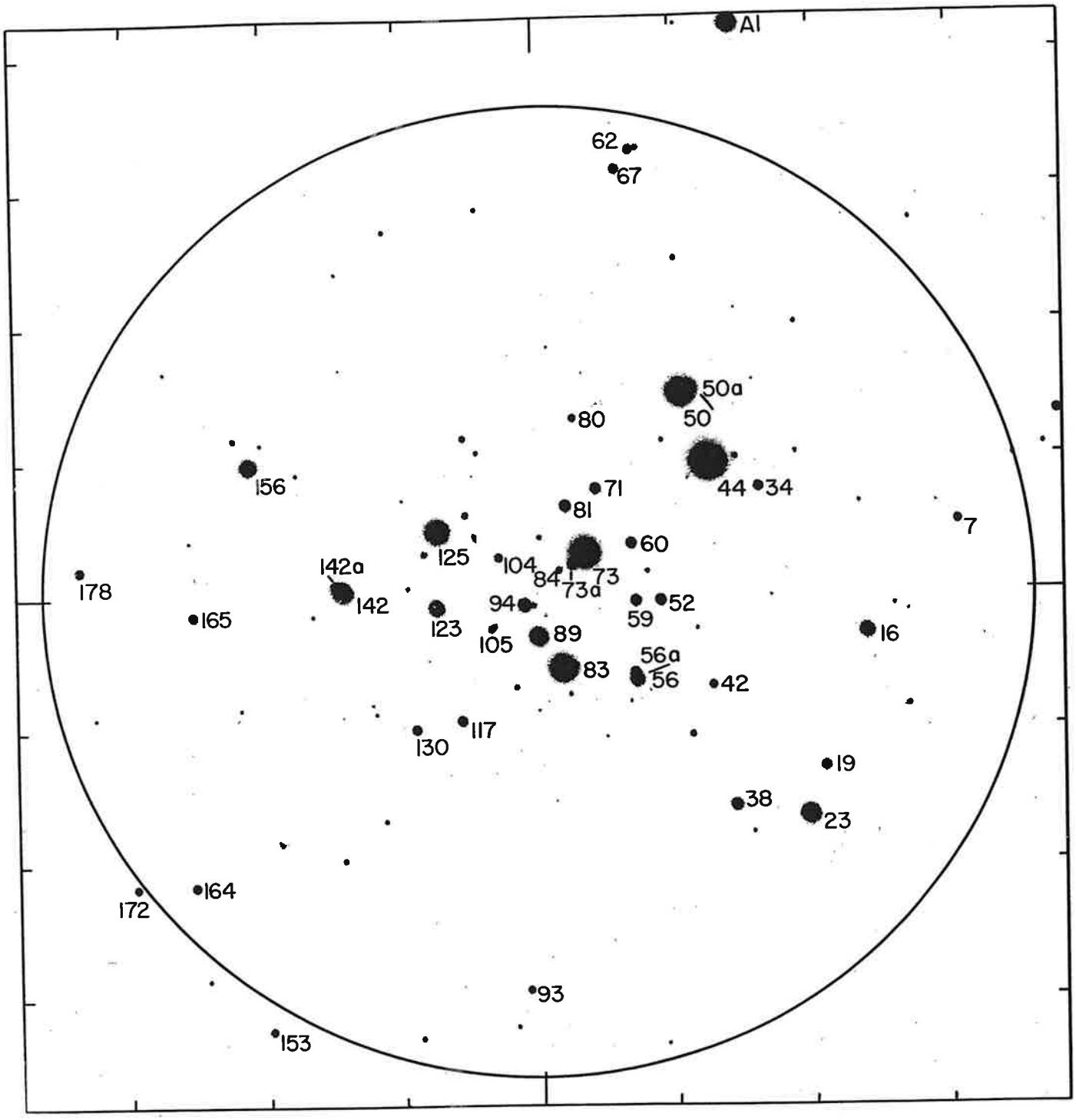
They are based on proper motions published by

E. G. Ebbighausen (Ap.J. 91, 244, 1940) (E),

A. van Maanen (see "Col. 6" above) (M).

Radial Velocity Measurements

Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectrograph	p.e.
81	27511.797	+34.5		II 6	
	8238.821	+19.0		II 6	
	30736.022	+23.0		II 6	
	Mean	+25.5	3.0		± 2.9
156	28193.950	+ 4	.4	II 3-1/2	
	8581.900	+21	.4	II 3-1/2	
	30405.924	+22.7		II 6	
	Mean	+18.2	1.8		± 3.0
190	27545.729	+ 9	.4	II 3-1/2	
	8526.033	+24	.4	II 3-1/2	
	30406.921	+18.6		II 6	
	Mean	+17.7	1.8		± 3.0
238	28600.814	+17	.4	II 3-1/2	
	8907.996	+34	.4	II 3-1/2	
	30427.825	+16.3		II 3-1/2	
	Mean	+20.4	1.8		± 3.0
155	27503.786	0	.4	II 3-1/2	
	8192.964	+25	.4	II 3-1/2	
	9645.001	- 5	.4	II 3-1/2	
	30407.920	+ 1.6	.7	II 6	
	Mean	+ 4.8	1.9		± 2.9
170	27456.957	+27	.4	II 3-1/2	
	8599.823	+10	.4	II 3-1/2	
	30426.851	+17.9		II 6	
	Mean	+18.2	1.8		± 3.0
108	27533.755	+28	.4	II 3-1/2	
	30370.991	+12.4		II 6	
	Mean	+16.9	1.4		± 3.4
141	27538.737	+19	.4	II 3-1/2	
	9643.976	+26	.4	II 3-1/2	
	30371.987	+27.0		II 6	
	Mean	+25.0	1.8		± 3.0


A1
62
67
50a
50
80
156
71
44
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81
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125
60
142a
104
84
73
73a
178
142
94
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165
123
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105
56a
83
56
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117
130
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23
164
172
93
153

NGC 6231

NGC 6231

α $16^h\ 50^m.7$ δ $-41°45'$ (1950.0) l^{II} $343°.5$ b^{II} $+1°.2$

Diameter 16' Class I3r; 1o8 Radial velocity -25.1 km/sec

Limit of completeness: m_{pg} = 10 ., within a radius of 6' from the center.

No. S	Coordinates x	y	m_{pg}	Spectral Type T	M	HD	Radial velocity (km/sec)	p.e.	Other designations HD	GCSRV	CPD	St
(1)	(2)		(3)	(4)			(5)		(6)			
44R	-129"	+ 98"	5.5	cB0*	cB0.5	B0	- 8.2 p.v.	±2.7	152234	9706	-41°7716	7
73R	- 37	+ 30	6.0	O8*	O8	B	-35.0 var	b	152248	9709	-41°7728	10
83	- 19	- 57	6.5	B0*	cO9	B0	-24.2	±1.1	152249	9710	-41°7731	11
50R	-106	+149	6.5	O8*	O6	B0	-15.3	±1.6	152233	9707	-41°7718	6
125R	+ 71	+ 46	6.6	O8*w	WR	Oa	-44 var	b	152270	9713	-41°7741	19
142R	+140	+ 2	7.5	B0*	O8		-36.6 var	±4.5	326331	9716	-41°7744	14
23	-198	+420	7.4			B			152219		-41°7707	
A1R	-145	+420	7.4		dO9	B5	-44	d	152218	9701	-41°7713	5
156R	+210	+ 98	7.8		dO9	B	-34	c	152314	9716	-41°7749	15
89R	0	- 31	7.8	O9*	dO9		-23.1 var	±1.3	326329	9711	-41°7733	12
16	-241	- 30	7.9			B8			152200		-41°7702	
123R	+ 72	- 10	8.3	O9*	dO9		-19.7 var	± 2.7		9712	-41°7742	13
56R	- 73	- 64	8.1	B1*			-29 var	±11			-41°7721	
50a	-113	+152	8.8									
94	+ 8	- 8	9.0								-41°7735	
38	-144	-158	9.0								-41°7712	
81	- 20	+ 64	9.6								-41°7730	
52	- 90	- 5	9.5								-41°7719	
59	- 72	- 5	9.4								-41°7723	
165	+251	- 13	9.5								-41°7752	
117	+ 54	- 95	9.5								-41°7738	
71	- 42	+ 79	9.7								-41°7727	
178	+333	+ 21	9.6								-41°7757	
142a	+146	+ 7	9.5									
60	- 70	+ 38	9.8								-41°7724	
130	+ 89	-100	9.4								-41°7743	
19	-210	-130	9.6								-41°7706	
34	-162	+ 78	10.0								-41°7711	
56a	- 72	- 59	9.7									
164	+252	-217	9.6								-41°7753	

No. S	Coordinates x	y	m_{pg}	Spectral Type T	M	HD	Radial velocity p.e. (km/sec)	Other designations HD	GCSRV	CPD	St
(1)	(2)		(3)	(4)			(5)	(6)			
73a	- 25"	+ 21"	9.8								
67	- 60	+316	9.9							-41°7725	
104	+ 28	+ 27	10.0							-41°7736	
172	+296	-217	9.8							-41°7755	
62	- 70	+329	9.8							-41°7722	
7	-307	+ 50	9.8							-41°7700	
42	-129	- 69	10.0							-41°7715	
153	+198	-323	10.0							-41°7748	
80	- 28	-296	10.1								
93	+ 8	-296	10.1							-41°7734	
105R	+ 33	- 26	10.0							-41°7727	
84	- 15	+ 17	11.8								

NGC 6231

Col. 1: S = H. Shapley and H. B. Sawyer (H.B. 846, 1927). Star A1 and several double star companions (followed by a) were added.

Remarks (R)

44, SDS λ293:A; has two faint companions at 21", position angle 282°, and 18", position angle 128°.

73, Brownlee and Cox (see "Col. 3" below) find some variability indicated; double line binary orbit determined by O. Struve (see "Col. 6" below). Two of our plates show normal (single) lines, two show very broad lines not clearly separated.

50, SDS λ294A; data refer to brighter component.

125, spectroscopic binary orbit determined by O. Struve (see "Col. 6" below). The spectrum shows an emission band at 4686 A and several other broad emissions.

142, SDS h4893A.

A1, 156, radial velocity from GCSRV.

89, spectroscopic binary orbit.

123, double line spectroscopic binary orbit.

56, double star given in SDS; data refer to brighter (s.p.) component.

105, double; has companion of magnitude 13 at about 3" separation, position angle 305°. Data refer to the brighter component.

Col. 3: Magnitudes based on a plate taken with the 20-inch Astrograph, as well as values published by

R. R. Brownlee and A. N. Cox (Ap.J. 118, 165, 1953),

H. Shapley and H. B. Sawyer (see "Col. 1" above).

Col. 4: Spectral types listed under M were determined by W. W. Morgan and published by Brownlee and Cox (see "Col. 3" above).

Col. 5: The radial velocities of stars in this cluster show considerable dispersion, although there cannot be any doubt about the physical membership of the stars. In the calculation of the mean radial velocity of the cluster, star A1 was omitted because it lies outside the cluster limits, and star 125 because of its Wolf-Rayet spectrum. All other stars were given equal weight.

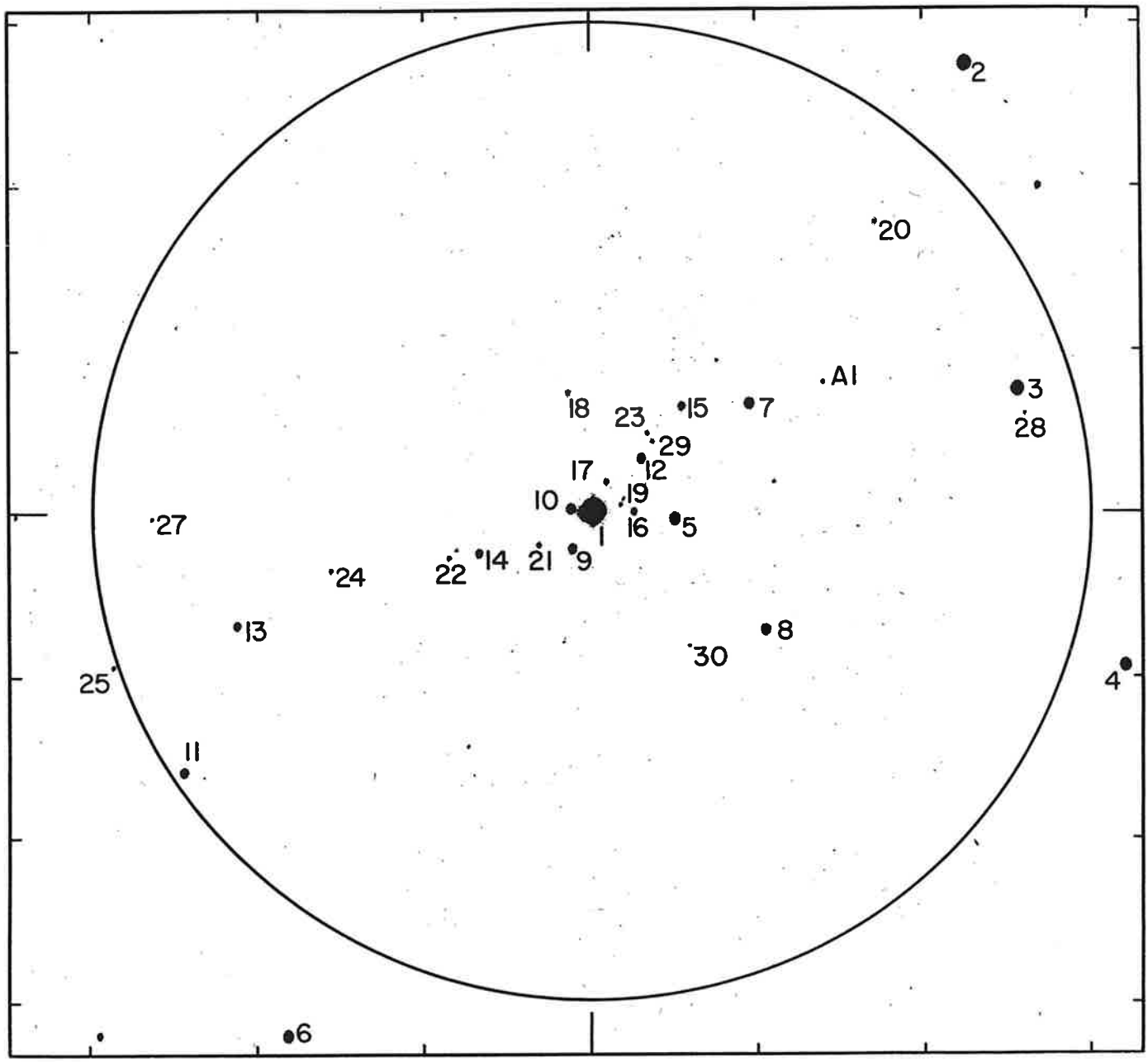
Col. 6: St = O. Struve (Ap.J. 100, 189, 1944)

Radial Velocity Measurements

Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectrograph	p.e.
44	27205.922	- 8.2		II 6	
	8372.729	-25.4		II 6	
	31672.677	-21.7		II 6A	
		-18.4	3.0		
	GCSRV 9706	- 6	14.0		
	Mean	- 8.2	17.0	18 pl.	± 2.7
50	26482.900	- 3.4		I 12	
	6517.809	-36.2	.5	I 12	
	7995.733	-10.1		II 6	
	8383.694	-17.2		II 6	
		-13.9	3.5		
	GCSRV 9707	-16.1	6.0		
	Mean	-15.3	9.5	10 pl.	± 1.6
56	28366.724	- 5.8		II 6	
	9069.802	-74.9		II 6	
	9085.758	-32.5		II 6	
	9762.903	- 1.5		II 6	
	Mean	-29	4.0		±11
73	26482.876	-21.8		I 12	
	6517.775	-42.4		I 12	
	7610.806	-13.8		II 6	
	8377.678	+11.1		II 6	
	Mean	-17	4.0		± 7
	GCSRV 9709	-35.0 (adopted)		39 pl.	
83	27995.749	-26.1	.6	II 6	
	8383.677	-25.1		II 6	
		-25.5	1.6		
	GCSRV 9710	-24.1	20.0		
	Mean	-24.2	21.6	22 pl.	± 1.1
123	Spectroscopic binary orbit (See Appendix I)				
	Mean	-19.7			± 2.7
125	27205.898	- 4.3		II 6	
	7588.852	+ 5.9	.5	II 6	
	8005. 31	- 6.4		II 6	
	0174.784	+ 1.5		II 6	
	Mean	- 1.8	3.5		
	GCSRV 9713	-44 (adopted)		44 pl.	

Radial Velocity Measurements

Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectro-graph	p.e.
142	27610.785	- 9.8		II 6	
	8005.706	-40.3		II 6	
	8377.698	-27.1		II 6	
	30167.798	-52.1		II 6	
	1675.677	-50.6		II 6A	
		-36.0	5.0		± 5.3
	GCSRV 9715	-38	2.0		
	Mean	-36.6	7.0	7 pl.	± 4.5
89	Spectroscopic Binary Orbit (See Appendix I)				
	Mean	-23.1			± 1.3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NGC 6383

NGC 6383

α $17^h\ 31^m.4$ δ $-32°\ 33'$ (1950.0) l^{II} $355°.7$ b^{II} $+0°.1$

Diameter $5'.5$ Class II3p; 1o6 Radial velocity -2.5 km/sec

Limit of completeness: $m_{pg} = 13.0$, within a radius of $5'$ from star 1.

No. Z	Coordinates x	y	m_{pg}	Spectral Type	Radial velocity (km/sec)	p.e.	Other designations CPD
(1)	(2)		(3)	(4)	(5)		(6)
1R	0"	0"	5.6	O6*	var		-32°4616
2	-225	+272	8.4				-32°4606
3	-257	+ 76	8.6				-32°4603
4	-322	- 95	9.3				-32°4602
5	- 50	- 4	9.8	B6n*	- 1 var	±6	-32°4611
6	+182	-321	9.8				-32°4621
7	- 96	+ 66	10.0	B3*	+ 0.9	±3.5	-32°4610
8	-105	- 70	10.2	A0*	+14	±8	-32°4608
9	+ 11	- 21	10.4	cB7*	- 6.8	±3.2	
10	+ 12	+ 2	10.4	B5*	+ 0.2	±3.0	
11	+244	-159	10.5				-32°4623
12	- 30	+ 32	10.6	B8*	- 7.2 p.v.	±6	-32°4615
13	+213	- 69	11.0				-32°4622
14	+ 68	- 24	11.2	B7*	- 2.6	±3.8	
15	- 54	+ 65	11.2				-32°4613
16	- 25	+ 1	11.6				
19	- 17	+ 5	12.1				
17	- 9	+ 19	12.2				
18	+ 12	+ 72	12.2				
20	-169	+177	12.4				
21	+ 31	- 19	12.5				
23	- 33	+ 49	12.5				
22	+ 86	- 27	12.6				
24	+157	- 36	12.6				
25	+288	- 95	12.6				
27	+263	- 3	12.7				
26	+348	- 2	12.8				
A1	-140	+ 80	12.9				
28	-260	+ 60	13.0				
30	- 59	- 81	13.2				
29	- 38	+ 43	13.3				

NGC 6383

Col. 1: Z = R. Zug (L.O.B. 18, 89, 1937). Star A1 was added.

Remarks (R)

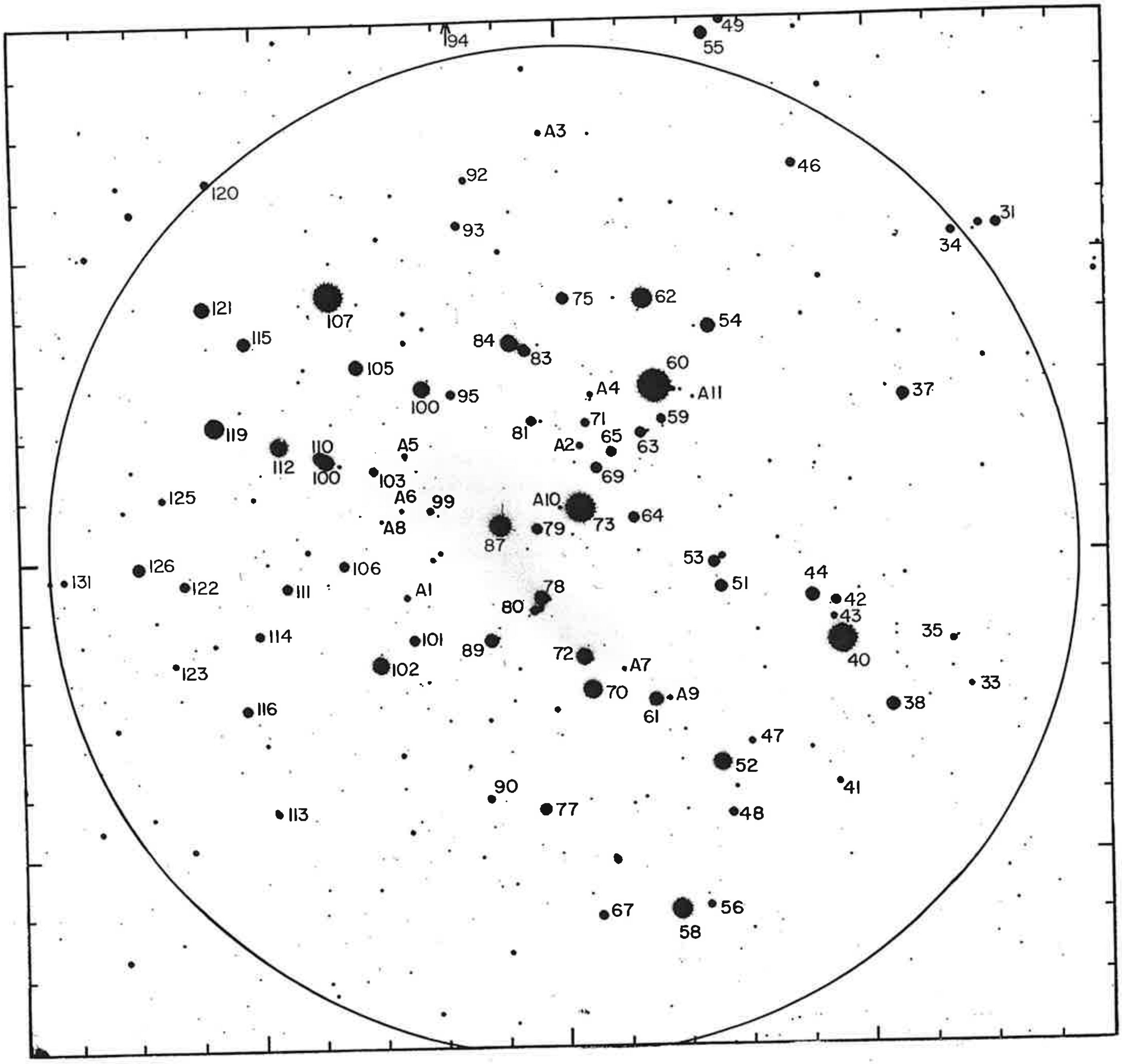
1, HD 159176, GCSRV 10145, Boss GC 23804, SDS h4962A; companion of magnitude 10.5, separation 5".5, position angle 100°. Double line spectroscopic binary.

Col. 3: Magnitudes based on a cluster comparison, magnitudes given in the Cape Photographic Durchmusterung (CPD), and values published by R. Zug (see "Col. 1" above).

Col. 5: In the calculation of the mean radial velocity of the cluster, star 8 was omitted because it is probably not a cluster member; stars 5 and 12 received weight 1/2.

Radial Velocity Measurements

Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectrograph	p.e.
5	27243.815	+17.3		II 6	
	7571.927	+23.6	.6	II 6	
	7986.801	-14.6		II 6	
	9458.749	-12.5	.6	II 6	
	30224.675	-21.1		II 6	
	Mean	- 1	4.2		± 6
7	27280.713	- 8	.4	II 3-1/2	
	7627.731	+ 8	.4	II 3-1/2	
	8330.843	+12.6	.6	II 6	
	30189.735	- 9.6	.6	II 6	
	Mean	+ 0.9	2.0		± 3.5
8	27277.729	+14	.4	II 3-1/2	± 8
9	27246.830	+20	.2	II 3-1/2	
	7566.922	- 3	.4	II 3-1/2	
	8362.737	-31	.4	II 3-1/2	
	9425.833	+11	.4	II 3-1/2	
	30518.794	-11.2		II 6	
	Mean	- 6.8	2.4		± 3.2
10	28367.711	-33	.2	II 3-1/2	
	8723.775	+ 6.6		II 6	
	9461.750	- 3.7		II 6	
	30198.712	+ 8.5	.5	II 6	
	Mean	+ 0.2	2.7		± 3.0
12	27252.777	-19	.5	II 3-1/2	
	7576.932	-13	.4	II 3-1/2	
	9100.745	-29	.4	II 3-1/2	
	30497.855	+ 9.7		II 6	
	Mean	- 7.2	2.3		± 6.0
14	30903.780	-16	.3	II 3-1/2	
	1617.795	+ 9	.4	II 3-1/2	
	1649.771	- 3.3		II 6A	
	Mean	- 2.6	1.7		± 3.8



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A4
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A5
A2
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A6
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A10
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A7
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A9
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NGC 6405

NGC 6405

(M 6)

α $17^h\,37^m.0$ δ $-32°\,15'$ (1950.0) l^{II} $356°.6$ b^{II} $-0°.8$

Diameter 26' Class II 3 m; 1 b 5 Radial velocity -13.1 km/sec

Limit of completeness: m_{pg} = 11.2, within a radius of 14' from the center.

No. G	Coordinates x	y	m_{pg}	Spectral Type T	HD	Radial velocity (km/sec)	p.e.	Other designations HD	CPD
(1)	(2)		(3)	(4)		(5)		(6)	
60R	-155"	+279"	7.0	B6ne*	B8	-13.5 var	±5.6	160202	-32°4704
40	-455	-148	7.2	B5*	B5	-13.6 p.v.	±5.0	160124	-32°4686
73	- 30	+ 78	7.2	B8n*	B8	-17.2	±2.8	160221	-32°4715
107	+382	+438	7.4	B4*	B8	-14.2	±2.8	160335	-32°4745
119R	+573	+226	7.7v	gG8*	K0	- 7.4	±2.1	160371	-32°4756
58	-182	-593	8.0	B9*	B9	- 7 var	±7	160189	-32°4700
87	+104	+ 51	8.1	B8*	B9	-14.7	±2.8	160260	-32°4728
62	-139	+426	8.2	B7n*		-13.9	±2.4		-32°4706
70	- 42	-223	8.3	B9n*	B9	- 9.2	±2.2	160222	-32°4712
52	-254	-349	8.5	B8n*	B9	-16.4	±2.6	160167	-32°4697
84R	+ 83	+356	8.6	B9*	B9	-12.3	±2.9	160259	-32°4726
112	+469	+190	8.6	B9					-32°4750
102	+307	-177	8.7	B9*	B9	-10.0	±2.8	160298	-32°4740
54	-246	+378	8.9	B9	A0			160166	-32°4698
100	+228	+282	8.9	B9	A0			160297	-32°4737
121	+588	+424	9.0	A0	A0			160392	-32°4758
72	- 30	-169	9.0	B9					-32°4714
38R	-537	-258	9.1	A0	A0			160094	-32°4683
105	+338	+321	9.1	B9					-32°4743
55	-245	+866	9.2	A0	B9			160188	-32°4874
109	+421	+ 87	9.2	B9					-32°4746
44	-409	- 73	9.2	B9					-32°4690
115	+523	+365	9.2	A1					-32°4754
126	+695	- 6	9.2	A8	A0			160409	-32°4762
61	-146	-242	9.3	B9					-32°4703
37	-565	+260	9.3	A0	A0			160093	-32°4681
78	+ 39	- 69	9.3	A0					-32°4271
89	+122	-140	9.4	B9					-32°4227
94	+174	+935	9.5	A0	B9			160280	-32°4886
51	-259	- 55	9.5	B9					-32°4695

No. G	Coordinates x	y	m_{pg}	Spectral Type T	HD	Radial velocity p.e. (km/sec)	Other designations HD	CPD
(1)	(2)		(3)	(4)		(5)	(6)	
83	+ 58"	+343"	9.6	B9				-32°4725
77	+ 39	-422	9.7	A0				-32°4719
75	- 8	+429	9.8	B9				-32°4717
53	-248	- 15	9.9	A0				-32°4696
64	-117	+ 61	9.9	A0				-32°4708
69	- 58	+146	9.9	A0				-32°4711
116	+529	-248	9.9	A1				-32°4753
49	-275	+890	9.9					-32°4873
31	-694	+464	10.0		A2		160044	-32°4675
101	+249	-137	10.0	A2				-32°4738
63	-131	+202	10.0	A3				-32°4707
110	+402	+172	10.0	A2				-32°4747
46	-375	+647	10.0	A1				-32°4692
111	+459	- 46	10.0	A1				-32°4748
122	+626	- 37	10.1	G0				-32°4759
67	- 52	-600	10.1	A				-32°4710
65	- 82	+172	10.1	A1				-32°4709
42	-446	- 81	10.1	A3				-32°4687
106	+365	- 10	10.1	A0				-32°4744
79	+ 43	+ 46	10.1	A1				-32°4722
114	+507	-124	10.2	A2				-32°4751
120	+579	+633	10.3					-32°4757
59	-166	+225	10.3	A3				-32°4702
81	+ 49	+225	10.3	A1				-32°4720
95	+180	+273	10.4	A2				-32°4734
34	-651	+528	10.4					-32°4678
48	-272	-433	10.5	A3				-32°4694
93	+167	+554	10.5	A3				-32°4733
71	- 40	+221	10.6	A2				-32°4713
56	-232	-585	10.6					-32°4699
80	+ 50	- 91	10.6	A2				-32°4724
103	+312	+ 148	10.6	A2:				-32°4741
90	+127	-404	10.8	A				-32°4730
125	+692	+ 30	10.8	A				-32°4761
35	-638	-150	11.0					-32°4679
92	+152	+631	11.0	A5				-32°4732
41	-446	-384	11.0					-32°4688
47	-303	-314	11.1	F				-32°4693
113R	+477	-423	11.1					-32°4749
131	+828	- 25	11.1					-32°4768
43	-443	-109	11.1					-32°4689
A1	+254	- 64	11.2					-32°4739
A2	- 31	+182	11.2	K				-32°4716
33	-668	-226	11.2					-32°4677
123	+645	-169	11.2					

No.	Coordinates x	Coordinates y	m_{pg}	Spectral Type T	Spectral Type HD	Radial velocity p.e. (km/sec)	Other designations HD	Other designations CPD
(1)	(2)		(3)	(4)		(5)	(6)	
A3	+ 30"	+702"	11.2					-32°4705
99	+218	+ 79	11.3	A2				-32°4736
A4	- 46	+268	11.5	A4				
A5	+254	+174	11.9					
A7	- 95	-190	12.4					
A6	+260	+ 78	12.5					
A9	-170	-234	12.6					
A8	+296	+ 62	12.7					
A11	-214	+258	12.9					
A10	+ 5	+ 78	13.0					

NGC 6405

Col. 1: G = B. A. Gould, Cordoba Photographs, Lynn, Mass., 1897. Stars with prefix A were added.

Remarks (R)

60, H_β faint emission.

119, BM Scorpii, irregular variable; its physical membership is doubtful.

84, visual double star, SDS I608, companion of magnitude 12.3, separation 2".0, position angle 304°. The magnitude refers to combined light, radial velocity and spectral type to the brighter component.

38, visual double star, SDS I107, companion of magnitude 11.2, separation 1".5, position angle 137°. Data refer to combined light.

113, double star; brighter (s.p.) component.

Col. 3: Magnitudes based on two cluster comparisons, a plate taken with the 20-inch Astrograph, and magnitudes given in the Cape Photographic Durchmusterung (CPD).

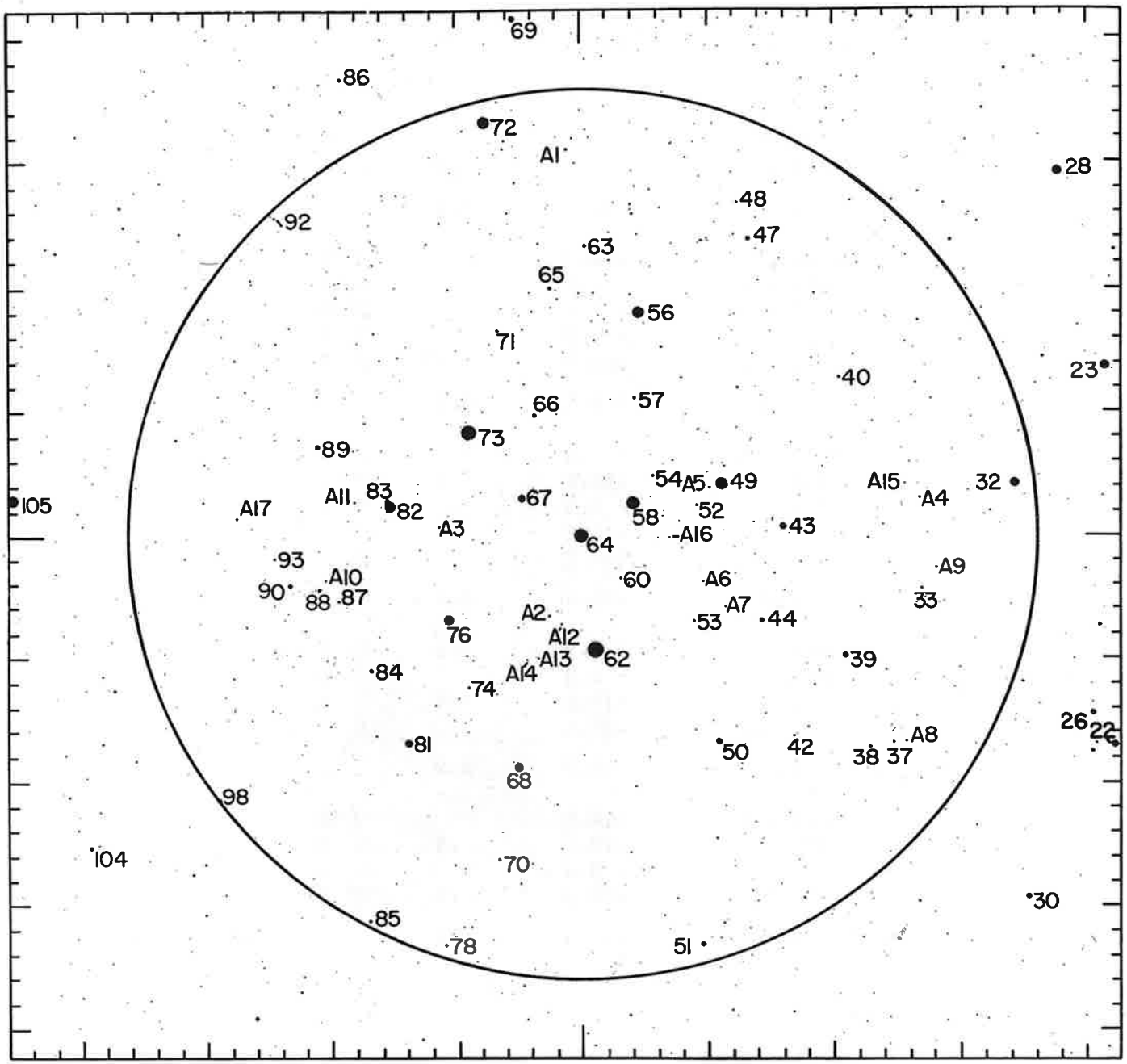
Col. 5: In the calculation of the mean radial velocity of the cluster, stars 60, 40 and 58 were given weight 1/2 because of their variable velocity; star 119 was omitted.

Radial Velocity Measurements

Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectro-graph	p.e.
60	24017.674	+ 5.4		I 12	
	6202.697	-38.2		I 12	
	6944.672	- 4.8		I 12	
	7288.692	-27.2		II 6	
	9496.677	- 1.5		II 6	
	Mean	-13.5	5.0		± 5.6
40	23966.806	+ 7.6		I 12	
	6944.690	- 6.2		I 12	
	7995.706	-29.7	.5	II 6	
	9061.788	-26.3	.6	II 6	
	30176.707	-26.7		II 6	
	Mean	-13.6	4.1		± 5.0
73	23952.846	-24.8		I 12	
	4268.966	- 8.9	.5	I 12	
	7288.734	-17.5		II 6	
	8027.738	-11.1	.6	II 6	
	Mean	-17.2	3.1		± 2.8
107	23958.824	-16.0		I 12	
	4019.676	-20.5		I 12	
	7610.753	- 0.8	.6	II 6	
	8364.691	-14.3	.6	II 6	
	Mean	-14.2	3.2		± 2.8
119	25802.775	+ 1.2		I 12	
	7590.913	-12.5	.7	II 6	
	9044.891	- 1.6		II 6	
	30525.746	-18.3		II 6	
	Mean	- 7.4	3.7		± 2.1
62	24701.775	-28.8		I 12	
	6160.780	-16.5		I 12	
	7995.822	- 9.5	.6	II 6	
	9075.819	- 4.0		II 6	
	9762.850	- 5.5	.6	II 6	
	Mean	-13.9	4.2		± 2.4
58	25802.718	+13.4		I 12	
	7974.868	+ 1.7		II 6	
	8360.703	+ 3.0		II 6	
	9049.893	- 7.3		II 6	
	9084.699	-45.0		II 6	
	Mean	- 7	5.0		± 7

Radial Velocity Measurements

Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectro-graph	p.e.
87	26152.776	- 0.2		I 12	
	7974.828	- 9.9	.6	II 6	
	8687.832	-23.4		II 6	
	9465.698	-29.3	.6	II 6	
	Mean	-14.7	3.2		± 2.8
70	24678.845	- 2.0		I 12	
	7590.876	- 6.7		II 6	
	8329.863	- 7.1		II 6	
	9057.794	- 9.6		II 6	
	30189.765	-20.8		II 6	
	Mean	- 9.2	5.0		± 2.2
52	28329.815	- 9.8		II 6	
	8685.835	-28.6	.6	II 6	
	9421.799	- 3.5	.6	II 6	
	9761.856	-15.2	.6	II 6	
	30176.726	-24.2		II 6	
	Mean	-16.4	3.8		± 2.6
102	28688.818	- 5.6	.6	II 6	
	9081.768	- 0.3		II 6	
	9411.830	-18.3	.6	II 6	
	30519.763	-17.4		II 6	
	Mean	-10.0	3.2		± 2.8
84	24711.741	-18.2		I 12	
	7974.776	-13.2	.6	II 6	
	8704.814	- 5.9		II 6	
	9496.708	-12.1	.3	II 6	
	Mean	-12.3	2.9		± 2.9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IC 4665

IC 4665

α $17^h 43^m.7$ δ $+5°41'$ (1950.0) l^{II} $30°.6$ b^{II} $+17°.1$

Diameter 50' Class II2p; 1b4 Radial velocity -15.7 km/sec

Limit of completeness: m_{pg} = 12.0, within a radius of 30' from star 64.

No. K	Coordinates x	y	m_{pg}	Spectral Type T	Bgd	HD	Radial velocity (km/sec)	p.e.	Other designations HD,BD	GCSRV	V	Memb.
(1)	(2)		(3)	(4)			(5)		(6)			(7)
62	- 55"	-460"	6.9	B4*	B7	B8	-15.2	±1.3	161573	10271	36	1
73	+452	+417	7.2	B7n*	B7	B8	-17.4	±1.8	161677	10281	47	1
64	0	0	7.4	B6*	B8	B9	-14.1	±1.7	161603	10272	37	1
105R	+2277	+141	7.5		B9	B9	- 6	d	162028	10307	60	3
56	-229	+900	7.6	A1*	A0	A0	-27.2	±1.2	161542	10269	32	3
58	-205	+130	7.6	B6*	B8	B8	-14.4	±1.7	161572	10270	34	1
49	-554	+210	7.7	B6s*	B9	B8	-21 var	±8	161480		26	2
72	+390	+1666	7.8	B8s*	B9	B9	-13.5	±2.5	161660		45	3
28	-1888	+1464	7.9		A2	A2			161223			3
82	+767	+116	8.1	B6*	A0	B8	-20.1	±2.0	161733		50	1
23	-2075	+679	8.1		A0	A0			161184		3	1
76R	+532	-338	8.3	B9*	A0	B9	-16 var	±6	161698		48	1
32	-1715	+213	8.4	A0*	A2	B9	- 7.2	±2.6	161261		9	2
68	+253	-938	8.4	dF3*	F3	F0	- 7.1	±1.8	161622		42	3
22	-2108	-847	8.8		A0	B8			161165		2	1
69	+271	+2083	8.9		gG7	K0			161638		43	3
81	+695	-841	9.0	B9n*	A3	A0	- 5.5 p.v.	±5.6	161734		49	1
67aR	+240	+147	9.0	A2n*	A0	A0	-16.8 p.v.	±3.4	161621		41	1
67bR	+239	+150		A2n*			-16.3 p.v.	±4.2				1
30	-1769	-1456	9.1		gG7	K2			161242		7	3
43	-803	+ 37	9.2	A1*	A0	A0	-17.5	±1.9	161426		22	2
50	-545	-836	9.3	A1*	A0	A0	-17.6 var	±3.0	161481		27	1
26	-2022	- 720	9.3	K0*	G6	K0			161185		6	3
39	-1047	-480	9.7	A2*	A1	A0	-15.4 p.v.	±4.6	161370		19	2
98	+1451	-1073	9.7		G7	K2			161867			3
90	+1166	-202	10.1	gK2*	dK5	K5	+12.8	±3.4	161820		58	3
89	+1058	+358	10.1	A2	A0	A0			161786		57	2
44	-713	-339	10.1	B9	A0	A0			161445		23	3
51	-478	-1652	10.2		A2	A2			161482		28	1
104	+1965	-1264	10.2		G6	K2			161980			3

No. K	Coordinates x	y	m_{pg}	Spectral Type T	Bgd	HD	Radial velocity p.e. (km/sec)	Other designations HD, BD	GCSRV	V	Memb.
(1)	(2)		(3)	(4)			(5)	(6)			(7)
47	-664"	+1192"	10.3	dG2	F9			6°3520		24	3
83	+780	+144	10.5	A2n*	A0:		-13.3 ±2.3			51	2
84	+842	-548	10.5	dF8	F7			5°3496		52	3
66	+186	+486	10.7	A3	A2			5°3486		40	1
86	+963	+1837	10.9		F8			6°3529		54	1
63	- 14	+1164	10.9	A5	A0					38	2
85	+853	-1563	11.0		A0			5°3495			3
65	+126	+1001	11.0	A6	F2			5°3485		39	2
78	+549	-1659	11.2		A2			5°3492			3
38	-1144	-851	11.2	F0	F0					18	1
88	+1048	-213	11.3	A5	A3					56	1
71	+337	+825	11.4	F5	F5					44	3
40	-1027	+637	11.5	K0	K2			5°3474		20	3
70	+336	-1309	11.6		G9			5°3489			3
57	-210	+555	11.6		A					33	1
60	-155	-171	11.7	F8	G1					35	3
87	+972	-264	11.7	A3	A5					53	3
33	-1350	-212	11.8	F1	F0:					11	3
A1	+ 56	+1558	11.8								
74	+452	-613	11.8		G8					46	3
37	-1236	-834	11.9		A8					17	1
53	-442	-341	11.9	F0	F0:					30	1
54	-285	+240	11.9	K0	G7					31	3
A2	+128	-325	11.9	F2							
A3	+572	+ 38	11.9	F0							
93	+1226	- 88	12.0	G0	G5					59	3
A4	-1338	+158	12.0	F2						13	
A17	+1385	+ 75	12.0	F2							
52	-455	+122	12.0		G5					29	3
48	-617	+1339	12.1		F7					25	1
42	-841	-808	12.3	K0	K5:					21	3
92	+1226	+1281	12.3		Ma						3
A5	-504	+201	12.5								
A6	-476	-184	12.6								
A7	-570	-292	12.6								
A8	-1285	-831	12.7							14	
A9	-1405	-124	12.7							10	
A10	+1022	-183	12.8	F2						55	
A11	+912	+128	13.0	F							
A12	+ 83	-355	13.1	F							
A13	+172	-492	13.1								
A14	+225	-500	13.2								
A15	-1280	+210	13.2							15	
A16	-345	- 7	13.3								

Col. 1: K = E. Kopff (A.N. 274, 69, 1943; Mitt. Bergedorf 8, No. 52, 1943). Stars with prefix A were added.

Remarks (R)

105, radial velocity from GCSRV.

76, ADS 10783AB; close double (separation 0".7). Data refer to combined light.

67a, 67b, ADS 10779. 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.

Col. 3: Magnitudes based on a polar comparison, two cluster comparisons, and values published by

G. E. Kron (A.J. 60, 365, 1955),

E. Kopff (see "Col. 1" above).

Col. 4: Spectral types listed under Bgd were estimated by A. A. Wachmann (Spektal-Durchmusterung von Milchstrassenfeldern, Teil I. Hamburg-Bergedorf, 1939). For the brighter stars, our classification is generally somewhat earlier than that of Wachmann.

Col. 5: In the calculation of the mean radial velocity of the cluster, stars 105, 56, 32, 68, 90 were omitted; stars 76, 81, 39 received weight 0.5 and star 49 received weight 0.3 because of the large probable error due to velocity variation.

Col. 6: V = H. Vogt (A.N. 221, 41, 1924)

Col. 7: Cluster membership designations are based on proper motions measured by S. Vasilevskis (A.J. 60, 384, 1955) and have the following significance:

1 -- reasonably high probability of membership;

2 -- doubtful members, not definitely assignable to either 1 or 3;

3 -- definite indications of nonmembership.

Our own estimates of cluster membership, based mainly on radial velocities and the magnitude-spectral type relation, generally agree well with Vasilevskis' criteria. Exceptions are star 72, which we would include on the basis of radial

velocity and spectral type, and star 86, which we would reject on the basis of magnitude and spectral type. It is notable that none of the many late G and K type stars appears to be a member; the cluster is thus of the Pleiades type and contains no late-type giants.

Radial Velocity Measurements

Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectrograph	p.e.
62	23960.684	- 7.9	.6	I 12	
	5027.791	-18.1		I 12	
	5427.698	-18.1		I 12	
	9761.783	-17.6	.6	II 6	
		-16.1	3.2		
	GCSRV 10271	- 7	1.5		
	Victoria**	-16.1	11.0		
	Mean	-15.2	15.7	20 pl.	± 1.3
73	23925.938	- 3.5		I 12	
	3952.877	-17.1		I 12	
	5001.996	-29.0		I 12	
	30133.782	-13.0		II 6	
	1267.983	- 2.0	.5	II 6	
		-14.1	4.5		
	GCSRV 10281	-26	1.5		
	Victoria*	-18.5	2.0		
	Mean	-17.4	8.0	12 pl.	± 1.8
64	23932.743	-32.4	.5	I 12	
	5047.834	-12.2		I 12	
	5433.698	-8.4	.6	I 12	
	30168.693	-24.4		II 6	
	1268.945	-16.1		II 6	
		-18.0	4.1		
	GCSRV 10272	- 8.0	2.1		
	Victoria*	-12.4	2.0		
	Mean	-14.1	8.2	14 pl.	± 1.7
56	23952.911	-27.5	.6	I 12	
	4020.698	-22.2		I 12	
	9414.736	-28.8		II 6	
	9763.964	-29.3		II 6	
		-26.9	3.6		
	GCSRV 10269	-29.5	2.4		
	Victoria*	-26.7	10		
	Mean	-27.2	16.0	22 pl.	± 1.2
58	23932.778	-19.9		I 12	
	3977.686	-26.7	.5	I 12	
	5047.723	+ 3.2		I 12	
	9763.951	-15.5	.6	II 6	
	30526.694	-16.2		II 6	
	1266.711	-13.8		II 6	
		-13.6	5.1		
	GCSRV 10270	-19	1.8		
	Victoria*	-12.4	2.0		
	Mean	-14.4	8.9	14 pl.	± 1.7

Radial Velocity Measurements

Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectro-graph	p.e.
82	23958.861	-36.9	.5	I 12	
	5072.721	-15.7		I 12	
	5404.963	-25.0	.6	I 12	
	30168.710	-15.2		II 6	
	2416.704	-16.8		II 6A	
	2421.695	-15.9		II 6A	
		-19.0	5.1		
	Victoria*	-25.8	1.0		
	Mean	-20.1	6.1	7 pl.	± 2.0
49	23958.888	-59.1	.6	I 12	
	4233.050	-44.6		I 12	
	5401.888	-58.6	.6	I 12	
	30134.778	+22.6		II 6	
	0905.695	-42.4		II 6	
		-36			
	Victoria*	+ 3.1			
	Mean	-21		8 pl.	± 8
72	24020.667	- 7.4		I 12	
	4372.747	-23.1		I 12	
	5427.744	-13.5		I 12	
	30175.690	-10.1		II 6	
	Mean	-13.5	4.0		± 2.5
76	23960.743	-13.3		I 12	
	4701.699	-42.5		I 12	
	6153.717	- 6.4		I 12	
	9756.807	- 2.1	.6	II 6	
	Mean	-16	3.6		± 6
32	24223.055	- 4.3	.6	I 12	
	4381.723	+ 3.0		I 12	
	9496.756	-11.5		II 6	
	30175.708	-14.7		II 6	
	Mean	- 7.2	3.6		± 2.6
68	25042.872	+ 1.4	.7	I 12	
	5047.772	-14.8	.7	I 12	
	9756.825	- 9.4	.7	II 6	
		- 7.6	2.1		
	Victoria*	- 6.7	3.0		
	Mean	- 7.1	5.1	6 pl.	± 1.8

Radial Velocity Measurements

Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectrograph	p.e.
81	24312.831	+29.8		I 12	
	5059.722	- 0.4		I 12	
	9496.776	-29.1	.6	II 6	
	9755.807	-19.3	.6	II 6	
	30527.696	- 8.7		II 6	
	1742.615	- 5.4		II 6A	
	Mean	- 5.5	5.2		± 5.6
43	24748.698	-18.4		I 12	
	5045.848	-16.7		I 12	
	7554.894	- 8.7		II 6	
	30134.801	-22.3		II 6	
		-16.5	4.0		
	Victoria*	-18.9	3.0		
	Mean	-17.5	7.0	7 pl.	± 1.9
50	24342.696	-10.9		I 12	
	30133.805	- 8.5		II 6	
	0497.789	-12.9		II 6	
	1268.925	-16.5		II 6	
		-12.2	4.0		
	Victoria*	-22.9	4.0		
	Mean	-17.6	8.0	8 pl.	± 3.0
67a	26171.751	+ 7.8	.6	I 12	
	9426.727	-13.2		II 6	
	30135.766	-23.9		II 6	
	0639.612	-33.6		II 6	
	1616.970	-13.6		II 6A	
		17.2	4.6		
	Victoria*	-14.7	1.0		
	Mean	-16.8	5.6	6 pl.	± 3.4
67b	29761.807	-10.3		II 6	
	30135.789	-32.0		II 6	
	0639.624	-25.0		II 6	
	Mean	-16.3	3.0		± 4.2
39	25001.883	+ 3.1	.7	I 12	
	5053.763	-28.6	.7	I 12	
	9458.839	-10.3		II 6	
	30518.729	-24.1		II 6	
	Mean	-15.4	3.4		± 4.6
90	25101.712	+ 9.5	.7	I 12	
	5124.682	+16.1	.7	I 12	
	Mean	+12.8	1.4		± 3.4

Radial Velocity Measurements

Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectrograph	p.e.
83	30520.725	- 9.0		II 6	
	0874.774	-19.2		II 6	
	1353.696	-11.7		II 6	
	Mean	-13.3	3.0		± 2.3

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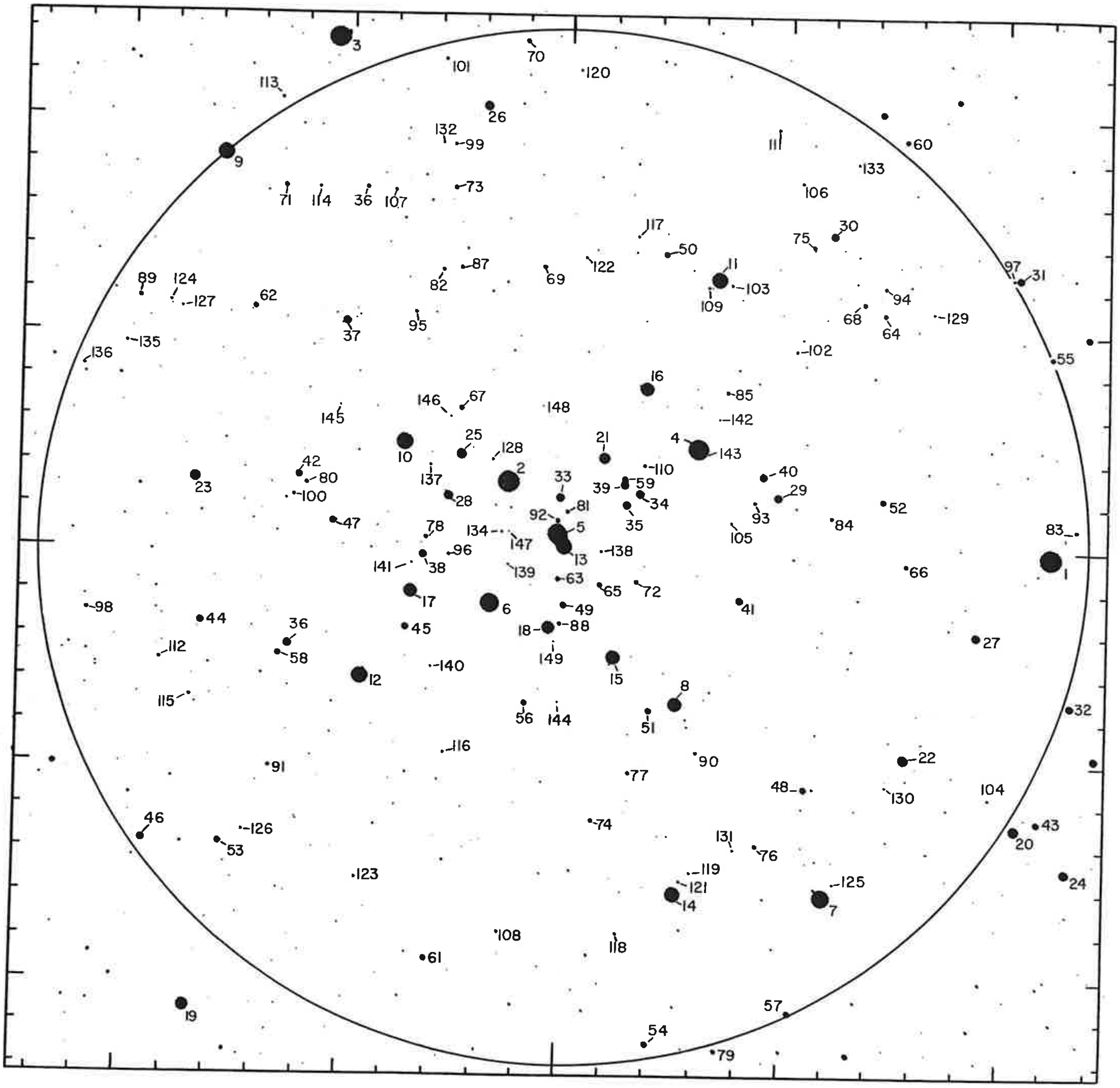
* Dominion Astrophysical Observatory, Victoria—unpublished observations (1952).

** Communicated by R.M. Petrie, August, 1952.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NGC 6475

NGC 6475

(M 7)

α $17^h\ 50^m.4$ δ -34°47' (1950.0) l^{II} 355°.8 b^{II} -4°.5

Diameter 50' Class I3m; 1b6 Radial velocity -11.3 km/sec

Limit of completeness: m_{pg} = 12.3, within a radius of 20' from star 71.

No.	Coordinates		m_{pg}	Spectral Type			Radial velocity p.e. (km/sec)	Other designations		
	x	y		T	W	HD		HD	GC	CPD
(1)	(2)		(3)	(4)			(5)	(6)		
1R	-1115"	- 10'	5.7	B6s*	B8	B8	-11.0 p.v. ±3	162374	24259	-34°7216
2	+143	+149	5.9	B9n*	B8	B9	- 0.3 ±2.0	162724		-34°7306
3	+534	+1176	6.0		A0	A0		162817	24329	-34°7334
4R	-301	+237	6.0	B8*	B8	B9	-10.7 ±2.8	162586	24290	-34°7266
5	+ 17	+ 30	6.4	B9*	B8	A0	-15.7 ±2.8	162678	24307	-34°7297
6	+171	-132	6.4	A0p*	B8	A0	-13.3 ±2.8	162725	24314	-34°7308
7	-601	-804	6.5	A0*	B8	A0	- 2 var ±9	162515	24277	-34°7244
8R	-257	-360	6.7	gK0*		K0	-19.3 ±2.0	162587	24294	-34°7270
9	+787	+904	6.9		B8	A0		162888		-34°7350
10	+374	+238	6.9	A0n*	B8	A0	-12.8 ±2.9	162780	24324	-34°7325
11	-344	+628	6.9	A0*	B8	B9	-12.1 ±3.1	162576	24285	-34°7263
12	+465	-305	7.0	B9*	A0	A0	-10.4 ±3.1	162804	24326	-34°7328
13	0	0	7.2	B9*	A0:	A	- 5.2 ±2.3	162679		-34°7293
14	-261	-799	7.2	A0*	B8	B9	-13 var ±7	162588	24293	-34°7269
15	-116	-254	7.4	A1n*	A0	A0	-14.5 ±3.1	162631		-34°7285
16	-182	+371	7.5	A0*	A0	A0	- 8.0 ±2.3	162630		-34°7275
17	+355	-107	7.6	A0n*	A0	A0	-20.6 ±2.2	162781		-34°7322
18	+ 34	-187	7.7	A1*	A0	A0	-15.8 p.v. ±5.6	162680		-34°7299
19	+851	-1067	8.1		B8	B9		162891	24339	-34°7462
20	-1041	-641	8.1		A0	A0		162393	24260	-34°7220
21	- 89	+208	8.2	A0*	A0	A2	- 9.8 ±2.4	162656		-34°7286
22	-784	-481	8.2	A0*	A0	A0		162454		-34°7234
23	+846	+151	8.4		A0	A0		162889		-34°7353
24	-1163	-739	8.4		A0	A0		162349		-34°7211
25	+243	+213	8.5	A1	B8					-34°7311
26	+194	+1024	8.7		A2	A2		162723		-34°7309
27	-946	-193	8.8		A3	A5		162416		-34°7227
28	+294	+117	8.8	A1	A2					-34°7316
29	-486	+124	9.0	A2	A0					-34°7254
30	-607	+736	9.0		A2	A3		162514		-34°7245

No.	Coordinates x	Coordinates y	m_{pg}	Spectral Type T	Spectral Type W	Spectral Type HD	Radial velocity p.e. (km/sec)	Other designations HD	Other designations GC	Other designations CPD
(1)	(2)		(3)	(4)			(5)	(6)		
31	-1035"	+641"	9.0			A0		162392		-34°7222
32	-1165	-358	9.0		A2					-34°7210
33	+ 11	+116	9.1							-34°7295
34	-171	+127	9.2	A1	A0					-34°7278
35	-142	+101	9.2	A4	A2					-34°7282
36	+630	-230	9.2	A0	A0	A0		162858		-34°7338
37	+507	+521	9.3		A0	A0		162818		-34°7331
38	+328	- 22	9.3	A0	A0					-34°7321
39	-135	+147	9.3	A1	A0:					-34°7284
40R	-452	+171	9.3	A1	A0					-34°7257
41	-402	-118	9.4	A1	A2					-34°7260
42	+610	+161	9.5	A	A2					-34°7337
43	-1095	-626	9.5		A3					-34°7217
44	+829	-180	9.6		A0	A2		162890		-34°7352
45	+365	-189	9.6	A3						-34°7323
46	+945	-683	9.6		A0	A0		162924		-34°7357
47	+532	+ 55	9.6	A0	A0					-34°7333
48	-556	-554	9.7		F0					-34°7248
49	0	-134	9.7							-34°7292
50	-221	+686	9.8		A3					-34°7272
51	-197	-376	9.8	A3	F0					-34°7273
52	-726	+119	9.9		A3					-34°7238
53	+778	-687	9.9		A3					-34°7349
54	-206	-1143	9.9		A2					-34°7403
58	+646	-253	9.9							-34°7340
55	-1111	+458	10.0		A3					-34°7215
56	+ 88	-361	10.0	A4	A3					-34°7302
57	-534	-1062	10.0		F0					-34°7387
59R	-135	+161	10.1							-34°7283
60	-767	+959	10.1		A3	A2		162478		-34°7236
61	+307	-951	10.2		A0					-34°7427
62	+713	+549	10.3		F0					-34°7347
63	+ 13	- 75	10.3							-34°7296
64	-725	+552	10.4		A0					-34°7237
65	- 83	- 86	10.4							-34°7287
66	-781	- 32	10.4		F0					-34°7235
67	+243	+326	10.4							-34°7310
68	-678	+577	10.5							-34°7241
69	+ 56	+662	10.5							-34°7301
70	+103	+1176	10.6							-34°7305
71	+648	+832	10.7		A3:					-34°7341
72	-166	- 82	10.7		F0					-34°7277
73	+269	+835	10.7							-34°7314
74	- 75	-635	10.8		F0					-34°7289
75	-558	+707	10.8							-34°7250

No.	Coordinates x	Coordinates y	m_{pg}	Spectral Type T	Spectral Type W	Spectral Type HD	Radial velocity p.e. (km/sec)	Other designations HD	Other designations GC	Other designations CPD
(1)	(2)		(3)	(4)			(5)	(6)		
76	-446"	-686"	10.8							-34°7256
77	-154	-524	10.9							-34°7280
78	322	+ 20	11.0							-34°7320
79	-365	-1156	11.0	F0						-34°7397
83	-1170	+ 52	11.0							-34°7209
80	+588	+144	11.0							-34°7335
81	- 6	+ 84	11.1							-34°7291
82	+294	+648	11.1							-34°7317
84	-611	+ 79	11.1							-34°7243
85	-370	+374	11.1							-34°7262
87	+255	+655	11.1							-34°7312
86	+469	+849	11.2							-34°7329
89	+982	+568	11.2							-34°7358
88	+ 6	-167	11.3							-34°7294
90	-307	-474	11.4							-34°7267
91	+665	-519	11.5							-34°7343
92	+ 13	+ 59	11.5							-34°7298
93	-432	+119	11.6							-34°7258
94	-726	+615	11.6							-34°7239
95	+355	+548	11.6							-34°7324
96	+269	- 10	11.6							-34°7313
97	-1021	+645	11.6							
98	+1083	-149	11.7							-34°7361
99	+272	+945	11.7							-34°7315
100	+617	+122	11.7							-34°7339
101	+296	+1130	11.8							-34°7318
102	-523	+460	11.8							-34°7253
103	-373	+614	11.9							
104	-979	-564	11.9							-34°7225
105	-382	+ 58	11.9							-34°7261
106	-532	+854	11.9							-34°7252
107	+407	+831	11.9							-34°7326
108	+139	-881	11.9							-34°7415
109	-317	+606	12.0							
110	-180	+189	12.0							-34°7276
111	-474	+980	12.0							-34°7255
112	+921	-266	12.0							-34°7356
113	+665	+1031	12.0							-34°7345
114	+574	+833	12.0							
115	+848	-358	12.0							-34°7354
116	+271	-480	12.0							
117	-155	+723	12.0							-34°7281
118	-134	-892	12.1							
119	-296	-750	12.1							-34°7268
120	- 17	+1114	12.1							

No.	Coordinates x	Coordinates y	m_{pg}	Spectral Type T	Spectral Type W	Spectral Type HD	Radial velocity p.e. (km/sec)	Other designations HD	Other designations GC	Other designations CPD
(1)	(2)		(3)	(4)			(5)	(6)		
121	-273"	-775"	12.1							
122	- 35	+683	12.2							
123	+463	-772	12.2							
124	+913	+562	12.2							
125	-625	-776	12.2							
126	+720	-665	12.2							
127	+880	+552	12.2							
128	+167	+200	12.2							
129	-839	+559	12.2							
130	-742	-544	12.2							
131	-396	-690	12.2							
132	+299	+947	12.2							
133	-661	+907	12.2							
134	+145	+ 31	12.2							
135	+1009	+459	12.2							
136	+1107	+416	12.3							
137	+313	+183	12.3							
138	- 88	- 3	12.3							
139	+132	- 30	12.4							
140	+302	-275	12.8							
141	+349	- 33	12.8							
142	-352	+300	12.9							
143R	-313	+222	13.0							
144	+ 8	-364	13.0							
145	+521	+319	13.2							
146	+269	+299	13.4							
147	+129	+ 31	13.5							
148	+120	+285	13.5							
149	+ 18	-222	13.6							

NGC 6475

Col. 1: Remarks (R)

1, GCSRV 10328.

4, SDS β1123; close double star of 0".4 separation, observed as one star.

8, SDS λ342; close double star of 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.

40, SDS B361, companion of magnitude 12 at 3".6 separation. Data refer to brighter component.

59, SDS B362, companion of magnitude 13 at 4".6 separation. Data refer to brighter component.

143, fainter (s.p.) companion of star 60; separation approximately 20".

Col. 3: Magnitudes based on a cluster comparison, magnitudes given in the Cape Photographic Durchmusterung (CPD), and values determined by

A. Wallenquist (Ann. Bosscha 3, No.4, 1931),

R. T. Mathews (Unpublished thesis, University of California),

B. A. Gould, Cordoba Photographs, Lynn, Mass., 1897.

Col. 4: Spectral types listed under W were published by

A. Wallenquist (see "Col. 3" above).

Col. 5: In the calculation of the mean radial velocity of the cluster, stars 2, 8, 17 were omitted because of the large deviation in radial velocity. Stars 14 and 18 received weight 0.5, star 7 weight 0.3 because of velocity variation.

Radial Velocity Measurements

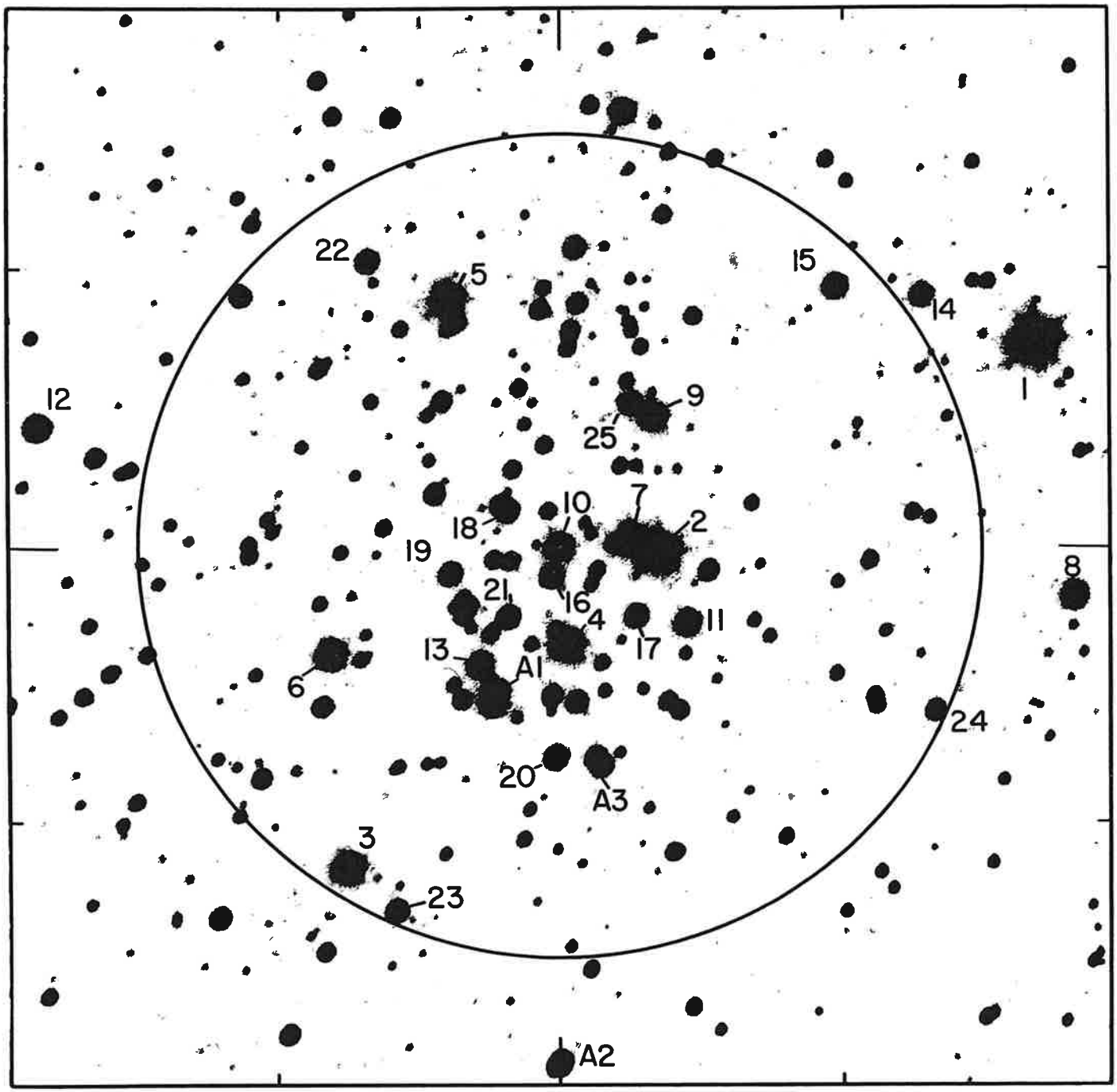
Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectrograph	p.e.
1	24273.945	- 1.5		I 12	
	4388.652	-20.1		I 12	
	9061.806	-23.9	.6	II 6	
	9465.793	-16.8	.6	II 6	
	30203.732	+ 8.0		II 6	
		- 9.0	4.2		
	GCSRV 10328	-13.7	3.0		
	Mean	-11.0	7.2		± 3
2	24273.974	-11.4		I 12	
	4963.048	- 4.4		I 12	
	8027.669	+18.5		II 6	
	9442.776	+ 6.0		II 6	
	30174.801	- 2.0		II 6	
	0581.671	- 8.3		II 6	
	Mean	- 0.3	6.0		± 2.0
4	24308.829	-11.5		I 12	
	5404.861	-17.4		I 12	
	8385.677	- 4.9	.6	II 6	
	9465.769	- 3.9	.6	II 6	
	Mean	-10.7	3.2		± 2.8
5	24308.874	-12.9		I 12	
	4388.672	-19.5		I 12	
	8027.713	-11.9	.6	II 6	
	9442.796	-17.8	.6	II 6	
	Mean	-15.7	3.2		± 2.8
6	24333.822	-13.3		I 12	
	4665.889	-15.7		I 12	
	8385.720	- 8.1	.6	II 6	
	9442.816	-14.4	.6	II 6	
	Mean	-13.3	3.2		± 2.8
7	24372.671	- 8.8		I 12	
	7610.837	+18.3		II 6	
	9421.874	+34.3		II 6	
	30140.887	-10.4		II 6	
	0518.871	-41.0		II 6	
	Mean	- 2	5.0		± 9
8	24342.747	-18.3		I 12	
	4376.657	- 9.1		I 12	
	9061.831	-24.3		II 6	
	30581.684	-25.7		II 6	
	Mean	-19.3	4.0		± 2.0

Radial Velocity Measurements

Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectrograph	p.e.
10	24342.795	-22.0		I 12	
	6153.811	-11.0		I 12	
	8383.729	- 5.5		II 6	
	Mean	-12.8	3.0		± 2.9
11	24342.772	-12.3		I 12	
	5433.820	-16.0		I 12	
	7991.782	- 5.3	.6	II 6	
	Mean	-12.1	2.6		± 3.1
12	24333.783	- 8.2		I 12	
	5780.787	-12.6		I 12	
	8383.742	-10.3	.6	II 6	
	Mean	-10.4	2.6		± 3.1
13	24300.864	+10.1	.5	I 12	
	5780.836	+ 1.9		I 12	
	8027.690	-27.7	.6	II 6	
	9762.946	- 1.6	.6	II 6	
	30167.825	- 7.7		II 6	
	0518.874	- 6.3		II 6	
	Mean	- 5.2	4.7		± 2.3
14	24376.690	-29.9		I 12	
	7610.825	+10.2		II 6	
	9421.907	-33.1		II 6	
	9761.962	+ 2.5		II 6	
	Mean	- 2	4.2		± 9
15	25404.847	-22.9		I 12	
	6152.848	- 4.8		I 12	
	8385.700	-16.8	.6	II 6	
	Mean	-14.5	2.6		± 3.1
16	24381.672	- 9.4		I 12	
	7991.770	- 3.2		II 6	
	8383.713	- 9.1	.6	II 6	
	30140.906	-10.2		II 6	
	0203.722	- 8.6		II 6	
	Mean	- 8.0	4.6		± 2.3
17	24729.694	-13.6		I 12	
	6153.774	-13.5		I 12	
	9421.890	-29.4		II 6	
	30174.811	-19.8		II 6	
	0581.700	-26.8		II 6	
	Mean	-20.6	5.0		± 2.2

Radial Velocity Measurements

Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectrograph	p.e.
18	25433.771	-17.4		I 12	
	5815.719	-33.5		I 12	
	8755.679	- 4.8	.6	II 6	
	9761.944	+ 5.3	.6	II 6	
	Mean	-15.8	3.2		± 5.6
21	25364.975	+ 7.2		I 12	
	9094.769	-10.3	.6	II 6	
	9465.741	-13.2	.6	II 6	
	30140.927	- 8.7		II 6	
	0203.747	-25.6		II 6	
	Mean	- 9.8	4.2		± 2.4



NGC 6520

NGC 6520

α $18^h\ 00^m.3$ δ $-27°53'$ (1950.0) l^{II} $2°.9$ b^{II} $-2°.8$

Diameter 4'.5 Class II3m; 2b4 Radial velocity -29.1 km/sec

Limit of completeness: m_{pg} = 12.5, within a radius of 2'.5 from star 10.

No. Z	Coordinates x	y	m_{pg}	Spectral Type	Radial velocity p.e. (km/sec)	Other designations CPD
(1)	(2)		(3)	(4)	(5)	(6)
1R	-170"	+ 75"	9.3	B9		-27°6020
2R	- 35	- 2	9.7	gF3*	-26.2 ±2.1	-27°6024
4	- 2	- 33	10.5	gG8*	-27.4 ±2.1	-27°6027
3R	+ 75	-118	10.6	K0		-27°6033
5	+ 38	+ 94	10.6	cB7*	-37.6 ±2.7	-37°6030
6R	+ 83	- 36	10.7	B5*	-26.7 ±3.2	-37°6034
A1R	+ 23	- 54	10.8	B4ne*	-12 p.v. ±17	-27°6029
7R	- 24	+ 3	10.9	B6*	-34.2 ±3.2	
9	- 33	+ 47	11.0			-27°6023
8	-182	- 17	11.2	B9		-27°6019
10	0	0	11.3	B5*	-22.7 ±3.4	-27°6026
11	- 45	- 28	11.5	B9		-27°6022
12	+183	+ 44	11.6	B9		-27°6039
A2	- 2	-192	11.6	K0		-27°6028
A3R	+ 14	- 79	11.6	A:		-27°6025
13	+ 30	- 42	11.8			
14	-130	+ 93	11.8			
15	- 98	+ 96	11.9			
16	+ 5	- 12	12.0			
17	- 25	- 25	12.2			
18	+ 21	+ 14	12.2			
19	+ 41	- 10	12.2			
20	+ 3	- 77	12.2			
22	+ 70	+106	12.3			
21	+ 20	- 24	12.4			
23	+ 60	-133	12.4			
24	-133	- 55	12.5			
25	- 25	+ 53	12.5			

NGC 6520

Col. 1: Z = R. Zug (L.O.B. 18, 89, 1937). Stars with prefix A were added.

Remarks (R)

1, HD 164621.

2, HD 164654.

3, HD 164684. The spectral type is from the HD catalog.

6, GCSRV 10481.

A1, GCSRV 10478. Double star, n.f. component.

7, GCSRV 10474. Double star, n.f. component.

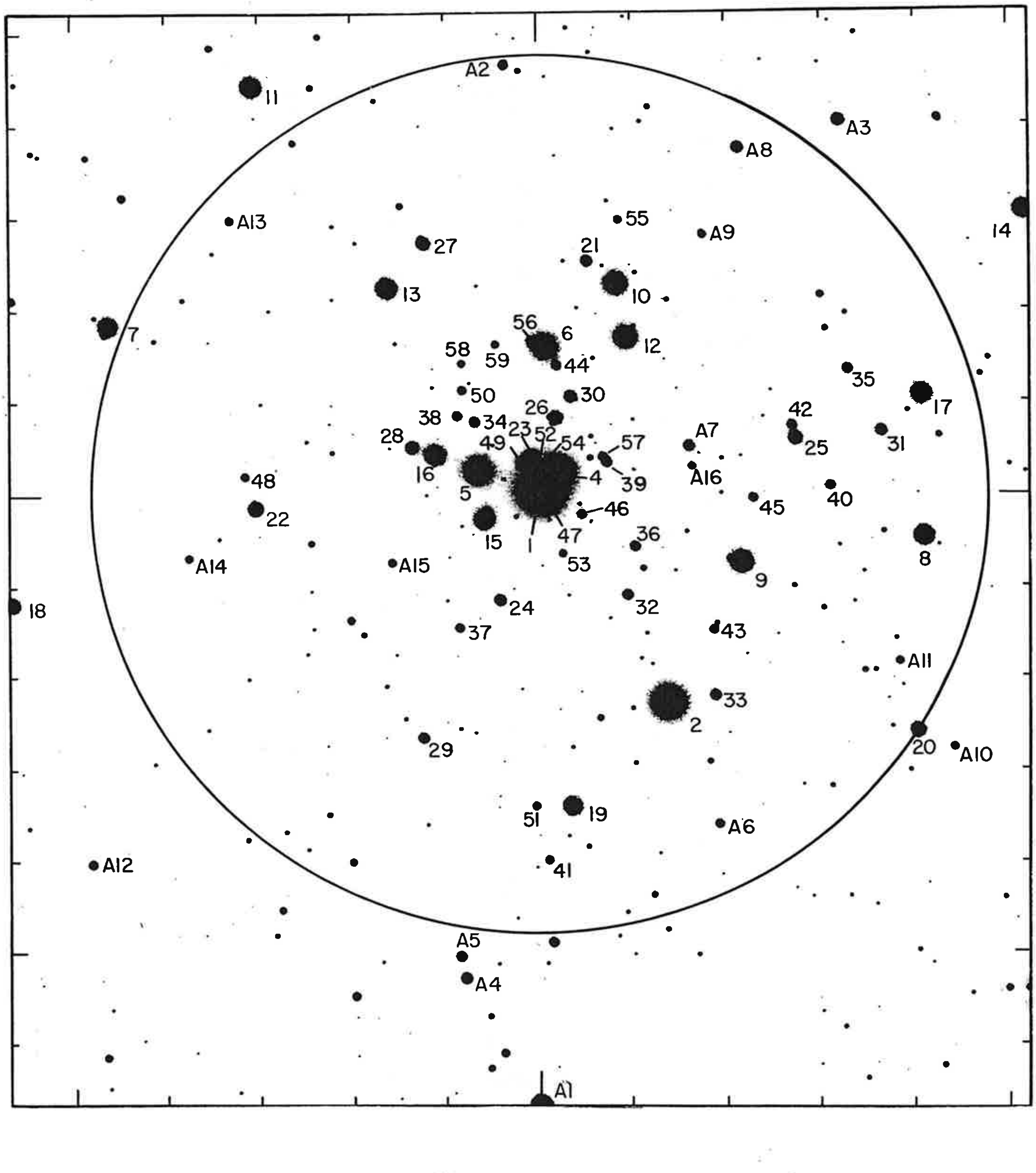
A3, double star, not separated.

Col. 3: Magnitudes based on a cluster comparison, magnitudes given in the Cape Photographic Durchmusterung (CPD), and values published by R. Zug (see "Col. 1" above).

Col. 5: In the calculation of the mean radial velocity of the cluster, star A1 was omitted because of the large probable error in its radial velocity.

Radial Velocity Measurements

Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectrograph	p.e.
2	27237.894	-23.0		II 6	
	7625.750	-26.3		II 6	
	9057.864	-25.0	.7	II 6	
	30882.915	-30.3		II 6	
	Mean	-26.2	3.7		± 2.1
4	27217.908	-26.8		II 6	
	7578.932	-20.3		II 6	
	9079.780	-33.7	.7	II 6	
	30588.676	-30.6		II 6	
	Mean	-27.4	3.7		± 2.1
5	28370.729	-36.7	.4	II 3-1/2	
	30527.814	-35.0		II 6	
	0585.689	-33.9		II 6	
	1316.717	-44.5		II 6	
	Mean	-37.6	3.4		± 2.7
6	27239.840	-22.4		II 6	
	9426.806	-30	.4	II 3-1/2	
	30553.768	-29.7		II 6	
	Mean	-26.7	2.4		± 3.2
7	28365.783	-36.8		II 6	
	9432.833	-41	.4	II 3-1/2	
	30519.821	-28.9		II 6	
	Mean	-34.2	2.4		± 3.2
Al	27254.799	+13.2	.5	II 6	
	30198.741	-73.0	.5	II 6	
	1616.717	+ 5.3		II 6A	
	Mean	-12.3	2.0		±17
10	27219.917	-21	.4	II 3-1/2	
	7629.752	-17	.4	II 3-1/2	
	9098.760	- 6	.4	II 3-1/2	
	30520.823	-32.2		II 6	
	Mean	-22.7	2.2		± 3.4



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NGC 6531

NGC 6531

(M21)

α $18^h 01^m.2$ δ -22° 30' (1950.0) l^{II} 7°.7 b^{II} -0°.4

Diameter 12' Class I3p; 1b1 Radial velocity -11.1 km/sec

Limit of completeness: m_{pg} = 12.5, within a radius of 8' from star 1.

No. Z	Coordinates x	y	m_{pg}	Spectral Type	Radial velocity (km/sec)	p.e.	Other designations M	S	HD	CPD
(1)	(2)		(3)	(4)	(5)		(6)			
1	0"	0"	7.2	B1*	-10.9	±1.9	16		164883	-22°6628
2	-136	-228	8.2	B2*	- 6.9 var	±3.4	9	32	164844	-22°6616
3R	-663	-413	8.2	B4					164717	-22°6589
4R	- 20	+ 25	8.7	B4nn*	-14.5	±2.2	14		164863	-22°6625
5	+ 65	+ 28	8.8	B3*	- 3.1 var	±3.9	19	46		-22°6634
6	- 5	+162	9.2	B3n*	-10.6	±2.4	15	33		-22°6627
A1	0	-670	9.4	A5					164864	-22°6626
9	-213	- 74	9.6	B4n*	-14.2	±2.5	8	29		-22°6615
8	-410	- 47	9.7					16		-22°6602
12	- 90	+175	9.7	B4n*	-10.2	±2.8	10	25		-22°6617
10	- 82	+228	9.7	B2s*	-11.5	±2.7	11	24		-22°6618
11	+308	+448	9.9	B4			25		164946	-22°6645
16	+112	+ 45	9.9	B4*	-10.5	±2.9	20	47		-22°6637
7	+459	+184	10.0	B4			26		164992	-22°6647
14	-512	+313	10.0	B4						-22°6600
13	+164	+224	10.0	B4			23	55		-22°6641
17	-404	+107	10.0	B7			6	10		-22°6603
15	+ 63	- 30	10.0	B3*	-18.7	±2.6		45		-22°6633
19	- 34	-343	10.2	B4				70		-22°6621
18	+563	-119	10.4	B5						-22°6649
20	-398	-262	10.6	B5						-22°6604
22	+303	- 19	10.7	B6				63		-22°6644
23	+ 9	+ 43	10.9	B9						-22°6629
25	-270	+ 61	11.2	B9						-22°6611
A3	-320	+405	11.2	F						-22°6607
27R	+124	+272	11.2	B8				54		-22°6639
26	- 17	+ 83	11.3					36		-22°6624
24	+ 42	-128	11.3	A3				44		-22°6631
28	+137	+ 52	11.4	B9				48		-22°6640
30	- 34	+105	11.5	B9				35		-22°6623

No. Z.	Coordinates x	y	m_{pg}	Spectral Type	Radial velocity p.e. (km/sec)	Other designations M	S	HD	CPD
(1)	(2)		(3)	(4)	(5)	(6)			
31	-364"	+ 69"	11.6	A0		11			-22°6605
29	+124	-269	11.7	A0		65			-22°6638
A4	+ 78	-525	11.7	A2					-22°6635
32	- 94	-109	11.7	B9:		42			
21R	- 52	+252	11.7	A0		23			-22°6620
A8	-214	+374	11.8	A0					-22°6614
33	-187	-220	11.8	A:		31			
A2	+ 35	+465	11.8						
A7	-159	+ 56	11.9	B9		26			
35	-326	+134	11.9			9			
36	-101	- 57	11.9	B9		41			
A5	+ 83	-501	11.9	A0					-22°6636
34	+ 69	+ 79	12.0			49			
A6	-191	-347	12.1	A		73			
A12	+479	-402	12.1	K					
39	- 72	+ 32	12.2			37			
40	-308	+ 6	12.2	A0		18			
38	+ 86	+ 85	12.2	A1		50			
37	+ 85	-148	12.3	A		57			
A10	-439	-274	12.3	A0		89			
45	-226	- 7	12.3	A2		28			
41	- 10	-403	12.4	B9		72			
42	-266	+ 76	12.4			19			
A9	-177	+282	12.4			6			
43	-185	-151	12.4			30			
A13	+328	+296	12.4	A5:		91			
A14	+372	- 68	12.4	K		64			
44	- 18	+138	12.4						
46	- 45	- 25	12.5	A0		39			
48	+314	+ 21	12.5	G		62			
51	+ 5	-344	12.5	A0		71			
A11	-372	-181	12.6	A0		87			
47	- 11	- 17	12.6						
50	+ 82	+111	12.6	A1		51			
53	- 25	- 64	12.6			40			
52	+ 2	+ 20	12.7						
A15	+156	- 39	12.7	A		58			
49	+ 21	+ 38	12.7	A1					
54	- 11	+ 40	12.7						
55	- 84	+298	12.7			22			
A16	-165	+ 34	12.8						
57	- 67	+ 38	12.8	A0					
59	+ 48	+164	12.9			53			
56	+ 10	+170	13.0						
58	+ 83	+140	13.0			52			

Col. 1: Z = R. Zug (L.O.B. 18, 89, 1937). Stars with prefix A were added.

Remarks (R)

3, wide double, not in ADS; outside the limit of the chart.

4, Boss GC 24590.

27, double star.

21, the photographic magnitude given by Zug appears to be too bright by 1 magnitude.

Col. 3: Magnitudes based on two cluster comparisons, magnitudes given in the Cape Photographic Durchmusterung (CPD), and values determined by

S. N. Svolopoulos (M.N. 113, 758, 1953),

R. Zug (see "Col. 1" above),

R. T. Mathews (Unpublished thesis, University of California).

Col. 6: M = R. T. Mathews (see "Col. 3" above)

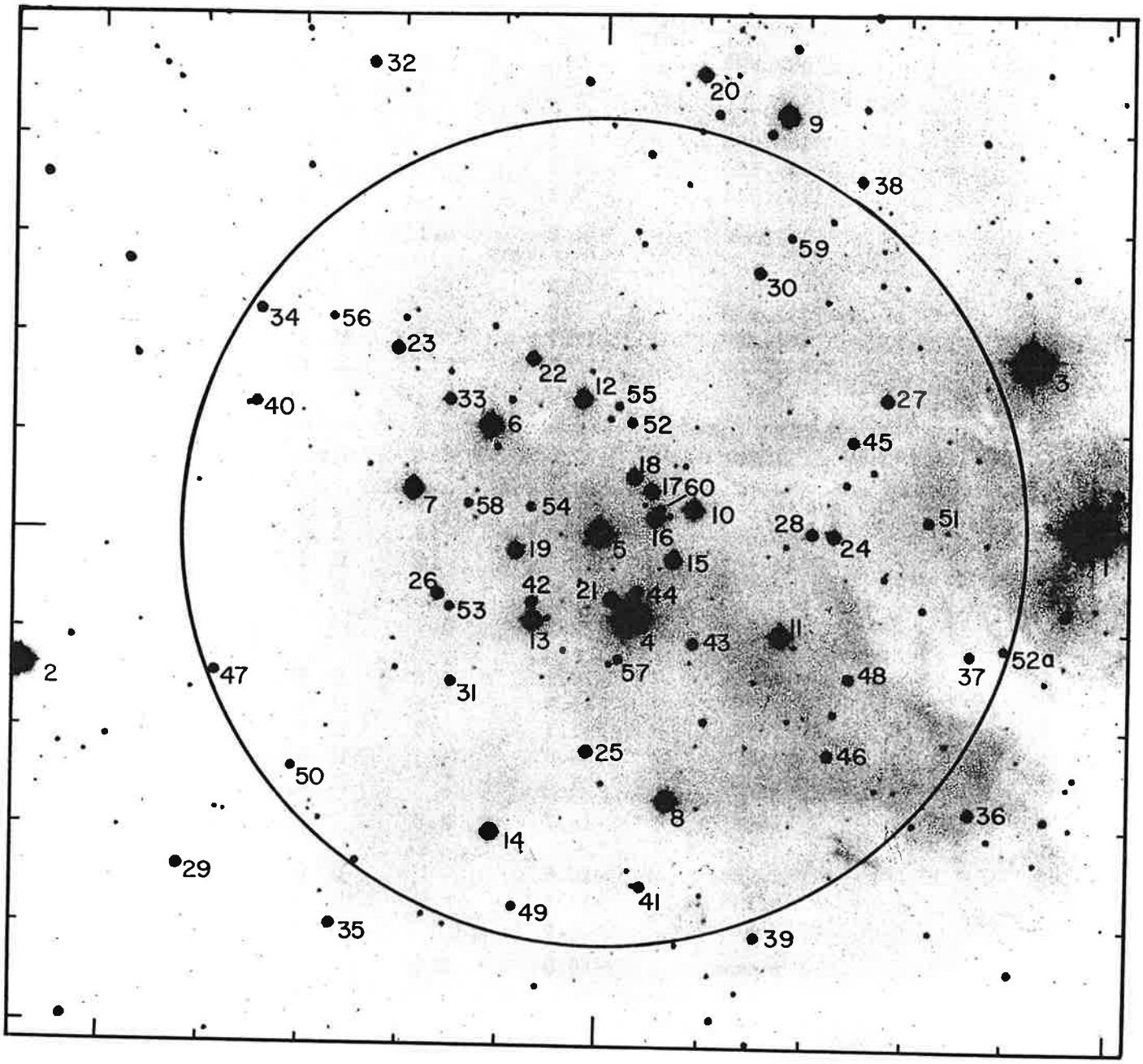
S = S. N. Svolopoulos " " "

Radial Velocity Measurements

Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectrograph	p.e.
1	24717.699	- 8.7		I 12	
	6456.917	- 8.0		I 12	
	6461.892	-11.3		I 12	
	7215.985	-13.1		II 6	
	7217.988	- 8	.4	II 3-1/2	
	7618.841	-17.2		II 6	
	30589.664	-12.0		II 6	
		-11.5	6.4		
	GCSRV 10500	- 5	0.6		
	Mean	-10.9	7.0	9 pl.	± 1.9
2	25371.927	+ 1.9		I 12	
	6461.957	-11		I 12	
	6463.898	+ 7		I 12	
	7569.985	+ 3.4		II 6	
	9059.886	- 6.2		II 6	
	9468.802	-40.7		II 6	
	30134.832	-12.4		II 6	
		- 8.3	7.0		
	GCSRV 10493	- 2	2.0		
	Mean	- 6.9	9.0	9 pl.	± 3.4
4	26513.866	- 4.8		I 12	
	7320.660	-25.7		II 6	
	7574.896	-11	.4	II 3-1/2	
	8985.019	- 9.7	.6	II 6	
	30134.857	-14.8		II 6	
	1641.711	-17.0		II 6A	
	Mean	-14.5	5.0		± 2.2
5	24743.708	-14.4		I 12	
	6482.961	+15.5		I 12	
	8033.684	- 7.8		II 6	
	8319.804	+11.8		II 6	
	30188.800	- 8.1		II 6	
	0552.701	-33.6		II 6	
		- 6.1	6.0		± 5.0
	GCSRV 10504	+ 3	3.0		
	Mean	- 3.1	9.0	9 pl.	± 3.9
6	25830.730	-16.7		I 12	
	6476.935	-10.4		I 12	
	7580.963	+ 3.2		II 6	
	9044.936	-15.2	.6	II 6	
		- 9.2	3.6		
	GCSRV 10501	-16	.9		
	Mean	-10.6	4.5	7 pl.	± 2.4

Radial Velocity Measurements

Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectro-graph	p.e.
9	27543.990	- 7	.3	II 6	
	7574.920	-17	.4	II 3-1/2	
	7634.786	- 9	.4	II 3-1/2	
	8662.965	-13.4		II 6	
	30589.684	-29.0		II 6	
	1353.644	- 3.2		II 6	
	Mean	-14.2	4.1		± 2.5
10	26542.768	-14.3	.5	I 12	
	7215.932	- 9.0		II 6	
	7676.699	-17.7	.6	II 6	
	31647.798	-10.2		II 6A	
		-11.9	3.1		
	GCSRV 10496	- 7	.3		
	Mean	-11.5	3.4	5 pl.	± 2.7
12	25742.932	-16.2		I 12	
	6505.869	+11.5	.5	I 12	
	7618.781	-23.2	.6	II 6	
	30196.769	- 7.4		II 6	
	Mean	-10.2	3.1		± 2.8
15	27947.896	-13.1	.6	II 6	
	8309.907	-24.2	.6	II 6	
	8717.805	+ 1.1	.6	II 6	
	9439.830	-28.0		II 6	
	30229.670	-21.5		II 6	
	Mean	-18.7	3.8		± 2.6
16	27212.936	-15.8		II 6	
	7569.915	-11.3		II 6	
	8713.801	- 4.5		II 6	
	Mean	-10.5	3.0		± 2.9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NGC 6530

NGC 6530

α $18^h 01^m.4$ δ $-24° 23'$ (1950.0) l^{II} $6°.1$ b^{II} $-1°.3$

Diameter 14' Class II2mN; 1b0 Radial velocity -10.8 km/sec

Limit of completeness: m_{pg} = 13.0 ., within a radius of 7' from star 5.

No.	Coordinates		m_{pg}	Spectral Type		Radial velocity (km/sec)		p.e.	Other designations			
	x	y		T	W				HD	GCSRV	CPD	Wk
(1)	(2)		(3)	(4)		(5)			(6)			
1R	-482"	+ 3"	5.9	O6*	Bτ	+9		c	164794	10488	-24°6144	7
2R	+580	- 37	6.9	O7n*	Bτ	+3		c	165052	10523	-24°6201	116
3R	-423	+172	7.0	B0	Bτ				164816		-24°6146	9
4R	- 30	- 93	7.6	B0nne*	Bτ	-4.4	var	±5.9	164906	10511	-24°6169	64
5R	0	0	8.4	B0n*	B5τ-	-14.3	var	±2.4		10510	-24°6172	72
6	+110	+106	8.6	B2nn*	Bτ-	-14.6		±2.1		10514	-24°6182	90
8	- 65	-273	9.0	B2n*	B5τ-	-2.2		±2.3		10512	-24°6163	
10R	- 89	+ 21	9.2	B3nne*	Bτ-	-8.4	var	±6.3		10505	-24°6161	55
11R	-176	-109	9.2	B3n*	Bτ-	-19.0		±2.3		10503	-24°6156	42
14	+108	-308	9.2	G0	F8				164948		-24°6180	86
13R	+ 68	- 98	9.5	B2n*	Bτ-	-10.9	var	±4.4		10513	-24°6177	79
9R	-177	+420	9.5		Bτ-						-24°6154	43
7R	+187	+ 37	9.6	B3*	B5τ-	+6.1		±2.8	164947		-24°6168	98
12	+ 20	+136	9.6	B2n*	Bτ-	-19.0		±2.3		10503	-24°6156	42
16R	- 53	+ 12	9.8	B3nne*		+4.3	p.v.	±4.1		10509	-24°6164	59
7aR	+186	+ 40	9.8						164947		-24°6186	98
19R	+ 84	- 22	10.0	B4n*	Bτ-						-24°6197	84
15	- 71	- 30	10.1	B3e	Bτ:						-24°6162	57
9aR	-178	+424	10.2								-24°6154	43
20	- 96	+456	10.2		Bτ						-24°6160	54
18R	- 32	+ 50	10.3	B2ne*		-12.0		±2.9			-24°6168	65
17	- 50	+ 36	10.4	B5							-24°6165	60
24	-226	- 5	10.5	B6	Bτ-						-24°6152	32
21	- 10	- 72	10.6	B7	Aκ						-24°6170	69
22	+ 69	+170	10.6	B	Bτ						-24°6176	82
23	+202	+178	10.7	B8	A3						-24°6187	103
25	+ 14	-228	10.8	B7							-24°6173	73
26	+162	- 67	10.9	B7	F:						-24°6185	97
27	-278	+134	11.0	B8	B5τ-						-24°6150	19
28	-204	- 3	11.0	K0	B5τ-						-24°6153	28

No.	Coordinates x	Coordinates y	m_{pg}	Spectral Type T	Spectral Type W	Radial velocity p.e. (km/sec)	Other designations HD	Other designations GCSRV	Other designations CPD	Other designations Wk
(1)	(2)		(3)	(4)		(5)		(6)		
29	+419"	-347"	11.1	B5	A2				-24°6195	115
30	-153	+262	11.2	F5:	F8				-24°6159	48
35	+226	-403	11.4	B5					-24°6189	108
32	+227	+468	11.4		A2				-24°6188	
31	+149	-154	11.4	G:					-24°6183	93
33	+151	+140	11.5	B9					-24°6184	95
34	+337	+222	11.6	A					-24°6190	114
36	-361	-285	11.6	B8					-24°6147	14
38	-251	+353	11.6		F5				-24°6151	25
40	+341	+130	11.7						-24°6191	
37	-401	-126	11.8	B7						15
39	-156	-407	11.8	A0					-24°6158	46
41	- 41	-366	11.8						-24°6166	
42	+ 88	-113	11.8							53
42	+ 69	- 76	11.9							80
44	- 36	- 65	11.9						-24°6167	63
45	-244	+ 89	11.9	A0						26
47	+383	-143	11.9	A0						
46	-220	0232	12.0	A0						31
48	-242	-149	12.1	B9:						24
49	+ 86	-388	12.1	A0						83
51	-319	+ 7	12.1	A:						17
50	+319	-247	12.3	B9						112
52	- 31	+107	12.4							66
53	+150	- 83	12.4							94
52a	-398	-123	12.5							12
54	+ 71	+ 23	12.6							81
56	+262	+205	12.9							109
58	+130	+ 30	12.9	A:						92
59	-183	+292	12.9							41
55	- 18	+127	13.0							68
57	- 19	-131	13.1	A:						
60	- 59	+ 23	13.7							

Col. 1: Remarks (R)

1, 2, 3, these stars lie outside the limiting circle adopted for the cluster and probably are not cluster members; in nearly all clusters containing O-type stars, the two or three brightest stars are in the central part of the cluster. The radial velocities of stars 1 and 2 are from GCSRV. The spectral type of star 3 is from the HD catalog.

4, lines appear double; probably a double line binary. H_β, H_γ emission.

5, double line spectroscopic binary orbit.

7, 7a, visual double star, ADS 11024, SDS h5010; for combined light, $m_{pg} = 8.9$. The large deviation of the radial velocity makes it probable that this star is not a cluster member.

9, SDS β1126AB; close double star, separation 0".6. Data refer to combined light.

9a, SDS h5009C; separation 4".0, position angle 22°. For combined light of ABC, $m_{pg} = 9.1$.

10, H_β, H_γ faint emission on broad absorption; perhaps double lines on some plates.

11, H_β, H_γ faint emission on broad absorption?

13, line width variable; perhaps double lines.

16, H_β, H_γ faint emission on broad absorption; perhaps double lines on some plates.

18, H_β, H_γ emission on broad absorption.

19, lines very poor, perhaps double.

Col. 3: Magnitudes based on two cluster comparisons, magnitudes given in the Cape Photographic Durchmusterung (CPD), photoelectric measurements by M. F. Walker kindly placed at the author's disposal in advance of publication, and for 14 of the brighter stars, photoelectric measurements by R. T. Mathews (Unpublished thesis, University of California).

Col. 4: Spectral types listed under W were published by A. Wallenquist (Ann. Bosscha 5, No. 5, 1939).

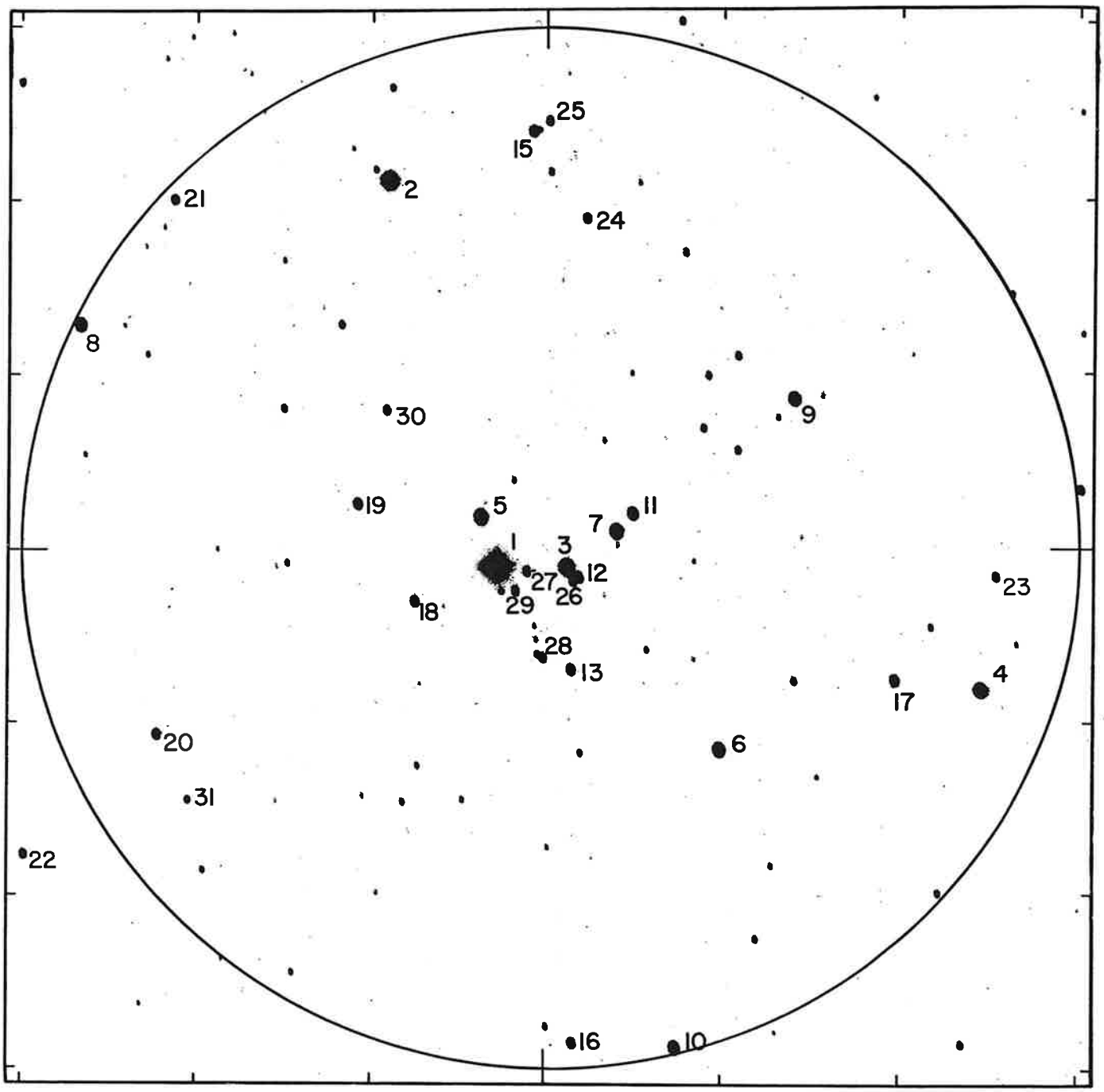
Col. 6: Wk = M. F. Walker (see "Col. 3" above)

Radial Velocity Measurements

Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectro-graph	p.e.
4	25399.821	+20.0		I 12	
	7590.938	+ 8.4		II 6	
	7671.673	+10.8		II 6	
	7963.919	+ 9.9		II 6	
	9094.690	-33.6		II 6	
	31266.742	+17.1		II 6	
	1646.698	-35.1		II 6A	
	1647.694	-32.5		II 6A	
	Mean	- 4.4	8.0		± 5.9
5	Spectroscopic binary orbit (See Appendix I)				
	Mean	-14.3			± 2.4
6	25343.009	-17.0		I 12	
	6465.973	-27.8		I 12	
	6515.851	+ 0.6		I 12	
	8641.001	-13.5		II 6	
	30189.806	-14.2		II 6	
		-14.4	5.0		
	GCSRV 10514	-16	.6		
	Mean	-14.6	5.6	7 pl.	± 2.1
7	27658.698	+12.0		II 6	
	7966.850	+10.4	.6	II 6	
	9421.842	- 1.0	.6	II 6	
	30581.727	+ 1.9		II 6	
	Mean	+ 6.1	3.2		± 2.8
8	25736.947	+ 6.0		I 12	
	6459.939	-19	.3	I 12	
	6470.938	+ 3.4	.5	I 12	
	7574.875	+ 3	.4	II 3-1/2	
	9084.740	-10.1	.6	II 6	
	30874.834	- 5.8		II 6	
	1285.802	- 2.0		II 6	
	Mean	- 2.2	4.8		± 2.3
10	25446.746	-33.1		I 12	
	6448.965	-14.2		I 12	
	7574.854	-21		II 3-1/2	
	7634.716	+35		II 3-1/2	
	30176.753	- 7.3		II 6	
	1266.767	- 9.6		II 6	
	Mean	- 8.4	6.0		± 6.3

Radial Velocity Measurements

Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectro-graph	p.e.
11	25385.943	-16.6	.3	I 12	
	5751.943	-14.6		I 12	
	6452.953	- 1.8		I 12	
	9441.838	-28.2	.6	II 6	
	30189.826	-36.3		II 6	
	0525.776	-18.4		II 6	
	Mean	-19.0	4.9		± 2.3
12	25745.922	-40.3	.5	I 12	
	6175.792	-18.0		I 12	
	7601.856	-21.1		II 6	
	30189.786	-15.9		II 6	
	0525.810	- 9.5		II 6	
	Mean	-18.8	4.5		± 2.4
13	25823.748	-36.1		I 12	
	7580.885	+14.6		II 6	
	7976.871	- 0.3		II 6	
	30176.779	-12.2		II 6	
	1268.788	-20.4		II 6	
		-10.9	5.0		
	GCSRV 10513	-11	2.0		
	Mean	-10.9	7.0	7 pl.	± 4.4
16	25448.765	+36.2	.5	I 12	
	5764.893	-16.6	.5	I 12	
	7566.990	+ 9	.4	II 3-1/2	
	7634.748	-11	.4	II 3-1/2	
	9435.766	+16	.4	II 3-1/2	
	30581.757	+ 3.2		II 6	
	1286.780	- 0.4		II 6	
	Mean	+ 4.3	4.2		± 4.1
18	30874.876	- 8.8		II 6	
	0904.768	-10.9		II 6	
	1288.790	-16.3		II 6	
	Mean	-12.0	3.0		± 2.9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NGC 6604

NGC 6604

α $18^h15^m.3$ δ $-12°16'$ (1950.0) l^{II} $18°.2$ b^{II} $+1°.7$

Diameter 2.'8 Class I3p; 1o8 Radial velocity -2.7 km/sec

Limit of completeness: m_{pg} = 14.0, within a radius of 5' from the center.

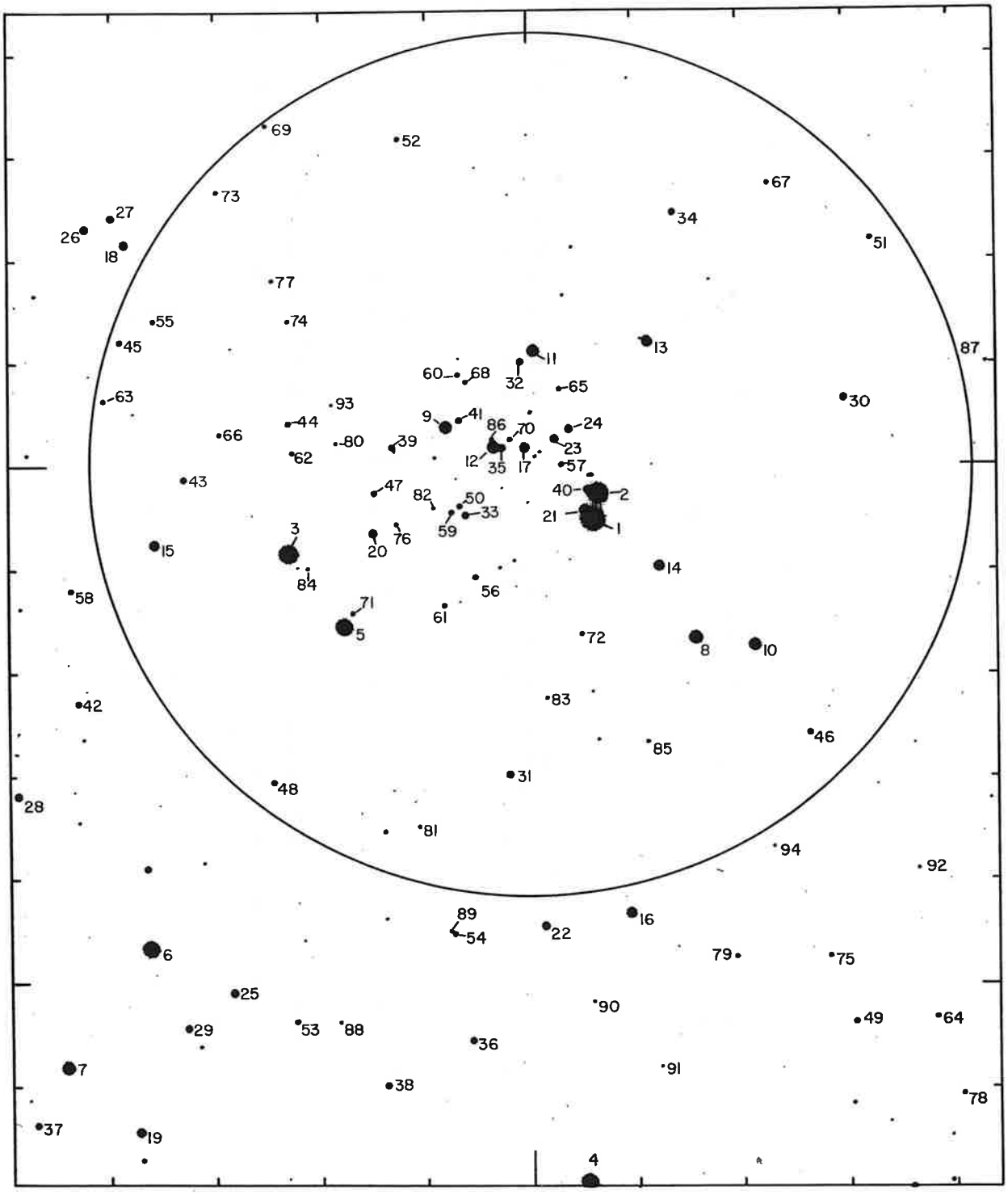
No.	Coordinates x	Coordinates y	m_{pg}	Spectral Type	Radial velocity p.e. (km/sec)	Other designations HD, BD	Other designations GCSRV
(1)	(2)		(3)	(4)	(5)	(6)	
1	+ 27"	- 7"	7.9	O8*	+ 8.7 var ±3.8	167971	10754
2	+ 91	+207	10.0	O9*	+17.1 ±2.4	-12°4982	10755
3	- 14	- 5	10.4	B0n*	+ 3.2 p.v. ±4.9	-12°4979	
4	-250	- 91	10.4	K0		-12°4971	
5	+ 37	+ 15	10.8	B0n*	- 5 var ±8	-12°4981	
7	- 41	+ 10	11.1	B3*	- 5.0 ±2.7	-12°4978	
6	-100	-122	11.2	B0		-12°4975	
8	+266	+130	11.4	B3		-12°4985	
9	-144	+ 86	11.6	B2		-12°4973	
10	- 74	-289	11.7	B4		-12°4977	
11	- 49	+ 16	12.5	B3			
12	- 16	- 15	12.6	B4			
13	- 15	- 79	12.8				
15	+ 8	+245	12.8	B3			
16	- 18	-288	12.8	B7:			
17	-201	- 88	12.8	B4			
18	+ 74	- 30	12.9	B3			
19	+110	+ 22	12.9	B3			
20	+212	-120	12.9	B4			
21	+213	+193	13.1	M5			
22	+296	-189	13.2	A2			
24	- 20	+185	13.5	A5			
25	0	+250	13.5				
27	+ 11	- 8	13.6	B8			
28	+ 1	- 71	13.8	B5:			
29	+ 18	- 25	13.8	B5:			
23	-253	- 16	13.9				
30	+ 93	+ 74	13.9				
26	- 15	- 18	14.0				
31	+204	-144	14.3	G5			

Col. 3: Magnitudes based on two cluster comparisons.

Col..5: In the calculation of the mean radial velocity of the cluster, star 1 was omitted because of probable relativity red shift. Star 2 was omitted because its radial velocity and large angular distance from the center suggest that it is not a cluster member. Star 3 received weight 0.5, star 5 weight 0.3 because of the large probable error due to velocity variation.

Radial Velocity Measurements

Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectro-graph	p.e.
1	26158.880	+11.3		I 12	
	6207.767	+ 2.0		I 12	
	6463.991	+23.4		I 12	
	6525.724	+14.3		I 12	
	7671.704	+29.4		II 6	
	7720.611	+ 8.0		II 6	
	7733.601	- 1.1		II 6	
	8383.820	+20.1		II 6	
	31267.798	-28.8	.5	II 6	
	Mean	+ 8.7	8.5		± 3.8
2	27658.776	+21.2		II 6	
	7966.937	+12.0		II 6	
	8329.938	+12.5		II 6	
		+15.2	3.0		
	GCSRV 10755	+21	1.5		
	Mean	+17.1	4.5	6 pl.	± 2.4
3	27636.754	-15.3		II 6	
	7665.734	- 0.1	.6	II 6	
	8704.921	+10.6		II 6	
	9411.924	+16.5		II 6	
	Mean	+ 3.2	3.6		± 4.9
5	27629.866	-16	.4	II 3-1/2	
	7693.673	-28	.4	II 3-1/2	
	7961.891	+28.1		II 6	
	9109.747	-26.4		II 6	
	30608.663	+18.5		II 6	
	Mean	- 5	3.8		± 8
7	27687.684	-22	.4	II 3-1/2	
	8013.766	-11.1		II 6	
	8371.778	- 1.3		II 6	
	30195.817	+ 9.7	.6	II 6	
	1287.764	- 4	.4	II 3-1/2	
	Mean	- 5.0	3.4		± 2.7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NGC 6611

NGC 6611

(M 16)

α $18^h15^m.8$ δ $-13°49'$ (1950.0) l^{II} $16°.9$ b^{II} $+0°.8$

Diameter 8' Class II3mN; 1o6 Radial velocity +2.4 km/sec

Limit of completeness: m_{pg} = 13.8, within a radius of 7' from the center.

No.	Coordinates x	Coordinates y	m_{pg}	Spectral Type	Radial velocity (km/sec)	p.e.	Other designations HD, BD	GCSRV	Wk
(1)	(2)		(3)	(4)	(5)		(6)		
1	- 60"	- 53"	8.6	O6*	+11.1	±1.9	168076	10763	17
2R	- 68	- 28	9.1	O8*	+ 6.2 p.v.	±3.6	168075	10762	16
3R	+230	- 84	9.3	O8*	+12.1	±2.1	168137	10775	22
4	- 53	-694	9.4	gK0			168097		
5	+177	-155	9.6	B0*	+ 4.8 var	±4.2	-13°4930	10776	1
6	+363	-470	9.7	B1			-13°4934		B
7	+443	-583	10.3	B0			-13°4936		
8	-158	-167	10.3	B0			-13°4921		7
9R	+ 80	+ 39	10.4	B0nn*	+ 1.7 p.v.	±3.8	-13°4929		20
10	-211	-173	10.4	B1			-13°4920		6
11	- 6	+111	10.4	O9*	+ 6.0	±2.5	-13°4927		18
12	+ 35	+ 18	10.6	B0nn*	- 2 var	±11	-13°4928		
13	-111	+120	10.8	B2			-13°4923		9
14	-122	- 99	10.9	O9*	+ 1.1	±2.7			8
15	+360	- 76	11.1	B3			-13°4933		11
16	- 95	-435	11.1	gG5			-13°4924		
17	+ 5	+ 17	11.2	B2*	+ 3.8	±3.0			29
18	+386	+215	11.5	A0			-13°4935		
19	+375	-644	11.6	K0					
20R	+150	- 65	11.6	Ble*	- 2.9	±3.2			24
21	- 53	- 41	11.7	B3					
22	- 13	-450	11.8	B2					
23R	- 24	+ 26	11.8	Be					28
24	- 39	+ 35	11.8	B3					27
25	+283	-523	12.0	A7					
26	+423	+230	12.0	B7					
27	+399	+240	12.0	B9					
28	+488	-319	12.1	B5					
29	+329	-545	12.1	B5					
30	-300	+ 66	12.1	B5					

No.	Coordinates x	Coordinates y	m_{pg}	Spectral Type	Radial velocity p.e. (km/sec)	Other designations HD, BD	GCSRV	Wk
(1)	(2)		(3)	(4)	(5)	(6)		
31	+ 19"	-300"	12.2	A1				
32	+ 9	+100	12.3	B3				19
33	+ 61	- 48	12.3	B3				62
34R	-138	+244	12.3	B1				10
35	+ 26	+ 17	12.4	B4				
36	+ 58	-557	12.6	B4				
37	+544	-583	12.7	B5				
38	+139	-600	12.7	B5				
39	+130	+ 18	12.7	B5				
40	- 55	- 23	12.7					
41	+ 68	+ 44	12.7	B6:				21
42	+431	-230	12.8	K0				
43	+330	- 11	12.8	A5				
44	+230	+ 41	12.8					
45	+390	+120	12.9	B8:				
46	-265	-266	12.9	A0				
47	+149	- 27	13.0					23
48	+245	-308	13.1	B3				
49	-307	-540	13.1	A3				
50	+ 68	- 39	13.1					
51	-325	+218	13.1	B8				
52	+123	+318	13.1	B7				
53	+323	-540	13.2	B9				
54	+ 74	-455	13.2	F0				
55	+360	+140	13.2	B8:				
56	+ 52	-110	13.2	B6				
57	- 30	+ 1	13.2	B7				
58	+438	-120	13.2	B8				
59	+ 75	- 45	13.3	B8				60
60	+ 69	+ 88	13.3					
61	+ 81	-135	13.3					
62	+127	+ 12	13.4					
63	+407	+ 63	13.4	B9				
64	-382	-535	13.4	A7				
65	- 29	+ 73	13.4					30
66	+295	+ 30	13.5	G5				
67	-228	+271	13.5	G8				
68	+ 60	+ 80	13.6					
69	+250	+331	13.6	G0				
70	+ 18	+ 25	13.6	B7				
71	+170	-141	13.6	B5				
72	- 49	-164	13.6					
73	+297	+256	13.6	F5				
74	+230	+140	13.7					
75	-281	-476	13.7	F1				

No.	Coordinates x	Coordinates y	m_{pg}	Spectral Type	Radial velocity p.e. (km/sec)	Other designations HD, BD	GCSRV	Wk
(1)	(2)		(3)	(4)	(5)	(6)		
76	+128"	- 57"	13.7	B9				25
77	+243	+180	13.8	K0				
78	-407	-607	13.8	K0				
79	-195	-477	13.8	A4				
80	+185	+ 22	13.9	B8				
81	+109	-350	14.0	F0				
82	+ 92	- 41	14.0	B8:				26
83	- 15	-227	14.0	A0				
84	+211	-100	14.1	F0				
85	-111	-269	14.1	G0				
86	+ 37	+ 26	14.1					
87	-435	+ 99	14.2	A0				
88	+182	-540	14.2	F2				
89	+ 78	-452	14.2	F5				
90	- 59	-520	14.2	F2				
91	-120	-583	14.3	F				
92	-368	-391	14.4	A5				
93	+189	+ 60	14.4	A2				
94	-230	-370	14.5	B9				

NGC 6611

Col. 1: Remarks (R)

2, 3, Si IV lines faint.

9, some lines appear double on one spectrogram.

20, $H\beta$, $H\gamma$, $H\delta$ emission on broad absorption.

23, $H\beta$ emission.

34, early spectral type and large color index indicates that this star is a background star, either very distant or heavily obscured.

Col. 3: Magnitudes based on two polar comparisons and preliminary results of photoelectric measurements kindly made available to the author in advance of publication by M. F. Walker.

Col. 5: In the calculation of the mean radial velocity of the cluster, stars 1, 2, 3 were omitted because they probably are affected by relativity red shift. Star 12 was omitted because of large probable error due to velocity variation.

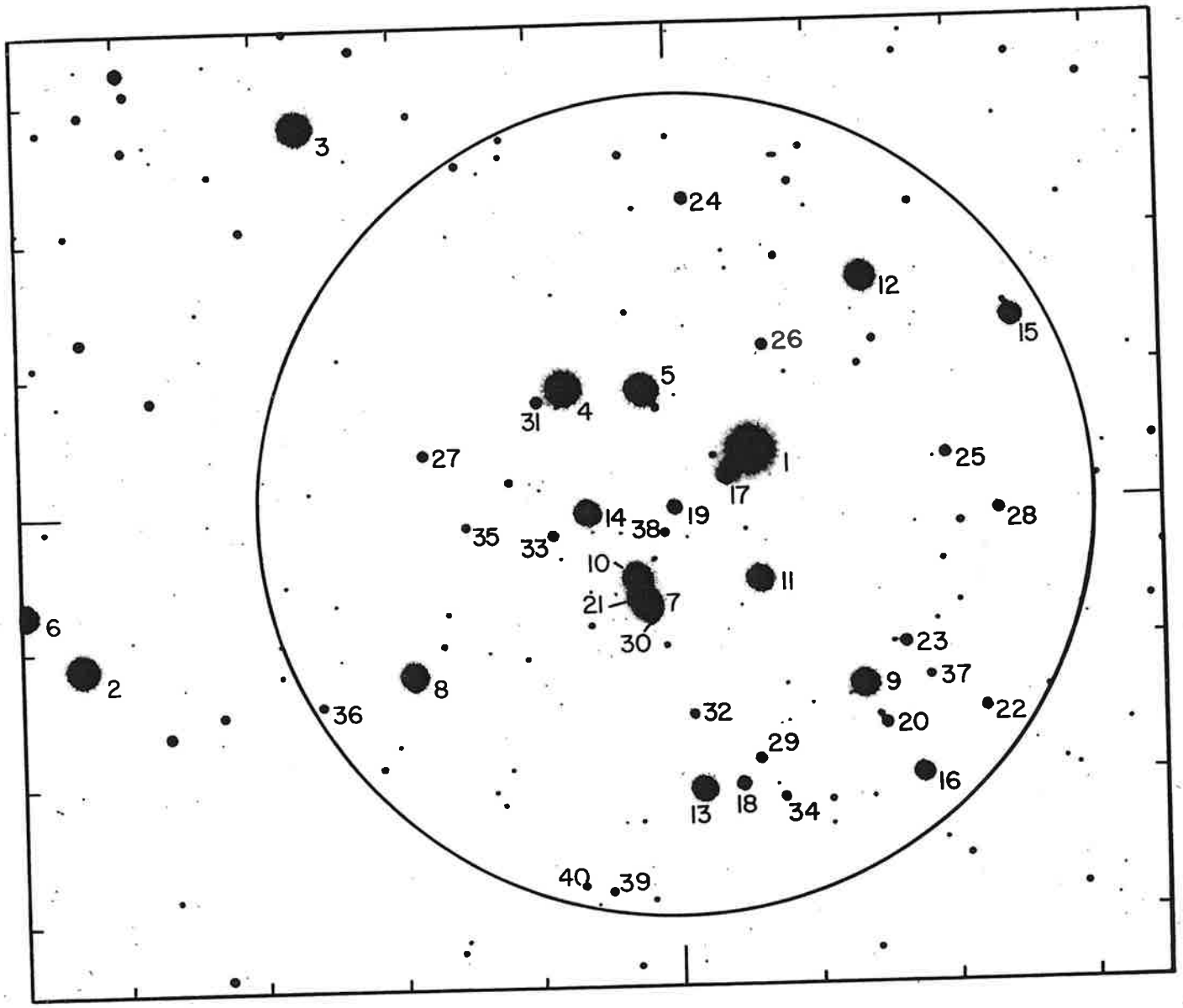
Col. 6: Wk = M. F. Walker (see "Col. 3" above)

Radial Velocity Measurements

Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectrograph	p.e.
1	25854.675	+ 8.0	.5	I 12	
	6136.945	+17.9	.5	I 12	
	6526.735	+19.5		I 12	
	7963.961	+16.0		II 6	
	8383.775	- 6.6		II 6	
	30937.682	+15.1		II 6	
	1266.803	+19.6		II 6	
		+12.8	6.0		
	GCSRV 10763	- 6	.6		
	Mean	+11.1	6.6	9 pl.	± 1.9
2	25857.685	+14.3	.5	I 12	
	6143.931	- 2.4	.5	I 12	
	8042.720	-16.7		II 6	
	8385.826	+19.5		II 6	
	30615.634	- 5.8		II 6	
	0879.897	- 2.6		II 6	
	1317.765	+10.8	.5	II 6	
	1616.917	+16.0		II 6A	
		+ 3.4	6.5		
	GCSRV 10762	+37	.6		
	Mean	+ 6.2	7.1	10 pl.	± 3.6
3	25865.699	+19.8	.5	I 12	
	6474.925	+14.8	.3	I 12	
	8068.644	- 0.4		II 6	
	8385.768	+18.2		II 6	
	30885.827	+14.5		II 6	
	1616.940	+ 7.2		II 6A	
		+11.2	4.8		
	GCSRV 10775	+19	.6		
	Mean	+12.1	5.4	8 pl.	± 2.1
5	26506.841	+28.7	.3	I 12	
	6509.894	+22.8		I 12	
	7679.692	-14.6	.6	II 6	
	8378.815	-21.1	.6	II 6	
	30879.933	+ 3.4		II 6	
	1638.829	- 2.9		II 6A	
		+ 2.7	4.5		
	GCSRV 10776	+ 9.1	.9		
	Mean	+ 4.8	5.4	9 pl.	± 4.2

Radial Velocity Measurements

Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectro-graph	p.e.
9	27303.720	- 0.3		II 6	
	7597.914	+23.3		II 6	
	8404.713	- 9.3		II 6	
	30198.835	- 5.0		II 6	
	1317.719	- 0.3		II 6	
	Mean	+ 1.7	5.0		± 3.8
12	27638.792	+10.7		II 6	
	8021.739	-33.0		II 6	
	8069.648	-40.0	.4	II 3-1/2	
	9053.918	+52.4	.5	II 6	
	30203.797	- 2.4		II 6	
	Mean	- 2.0	3.9		±11
11	27603.850	+19.8		II 6	
	7648.747	+ 2.5		II 6	
	8319.905	+10.5		II 6	
	31268.865	- 8.9		II 6	
	Mean	+ 6.0	4.0		± 2.5
14	28362.836	+19.0	.4	II 3-1/2	
	8374.768	- 7.2		II 6	
	8729.779	- 5.2		II 6	
	30202.814	+ 8.4		II 6	
	Mean	+ 1.1	3.4		± 2.7
17	27308.717	+23	.4	II 3-1/2	
	8310.929	-12	.4	II 3-1/2	
	8697.883	+ 8.0		II 6	
	30229.734	- 1.7		II 6	
	Mean	+ 3.8	2.8		± 3.0
20	31617.895	+ 1.0	.4	II 3-1/2	
	1639.874	- 4.9		II 6A	
	1674.749	- 2.4		II 6A	
	Mean	- 2.9	2.4		± 3.2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NGC 6613

NGC 6613

(M 18)

α $18^h17^m.0$ δ $-17°06'$ (1950.0) l^{II} $14°.2$ b^{II} $-1°.0$

Diameter 7' Class II3p; 1b2 Radial velocity -22.2 km/sec

Limit of completeness: m_{pg} = 14.0, within a radius of 5' from star 19.

No.	Coordinates x	y	m_{pg}	Spectral Type T	HD	Radial velocity p.e. (km/sec)		Other designations HD, BD	GCSRV	CP	Al
(1)	(2)		(3)	(4)		(5)		(6)			
1	− 56"	+ 39"	9.0	B2*	B2	-15.5	±2.0	168352	10791	899	29
2	+425	-114	9.4	B2	B8			168448		953	
3R	+265	+282	9.8	B3	B3	-20	d	168418	10801	941	
4	+ 76	+ 87	9.8	B3*	B3	-20.5	±2.6	168368	10796	925	50
5	+ 20	+ 85	9.9	A5p*		− 6.4	±4.8	-17°5137		916	43
6	+466	− 73	10.0	B3	B9			168463		956	
8	+189	-123	10.2	B2				-17°5140		931	68
7R	+ 20	− 74	10.3	B3*		-25.6	±2.5	-17°5138	10797	917	45
9	-134	-134	10.5	B4						890	18
10	+ 27	− 52	10.5	B4*		-20.2	±2.9			919	46
13	− 18	-209	10.5	B5						907	37
12	-138	+166	10.6	B9	A			168327		889	14
11	− 62	− 55	10.6	B4n*		-29.2	±2.5			898	28
14	+ 61	− 4	10.6	cB9*		− 4 var	±6			922	49
15	-245	+136	11.2	A2	A			168303		873	1
16	-175	-199	11.2	F3						883	10
17	− 40	+ 22	11.8	A2						902	
19	0	0	12.3	B8						912	39
18	− 44	-207	12.4	A0							33
24	− 10	+235	13.0								34
20	-146	-158	13.0	A1							15
21	+ 30	− 65	13.0								
23	-164	-105	13.1	A2							12
25	-194	+ 29	13.2								6
26	− 63	+122	13.2	B8							26
27	+185	+ 38	13.2	B9:							67
28	-230	− 5	13.2	B9							2
22	-220	-152	13.3	A:							3
31	+ 97	+ 86	13.3	B9							
29	− 56	-180	13.4								30

No.	Coordinates x	Coordinates y	m_{pg}	Spectral Type T	Spectral Type HD	Radial velocity p.e. (km/sec)	Other designations HD,BD	GCSRV	CP	Al
(1)	(2)		(3)	(4)		(5)	(6)			
30	+ 21"	- 85"	13.5							
32R	- 10	-152	13.6							38
33	+ 89	- 15	13.6	K						52
34	- 73	-220	13.8	B9						27
36	+256	-144	13.9							
35	+152	- 10	14.0	A						
39	- 48	-280	14.1	A0						
38	+ 10	- 15	14.2							41
37	-180	-130	14.2							9
40	- 68	-275	14.4	A						

NGC 6613

Col. 1: Remarks (R)

3, radial velocity from GCSRV.

7, Alter's magnitude corrected for companions.

32, Alter's magnitude corrected by +1 magnitude.

Col. 3: Magnitudes based on two polar comparisons, one cluster comparison, a plate taken with the 20-inch Astrograph, and values published by

G. Alter (M.N. 103, 10, 1943),

B. A. Gould, Cordoba Photographs, Lynn, Mass., 1897.

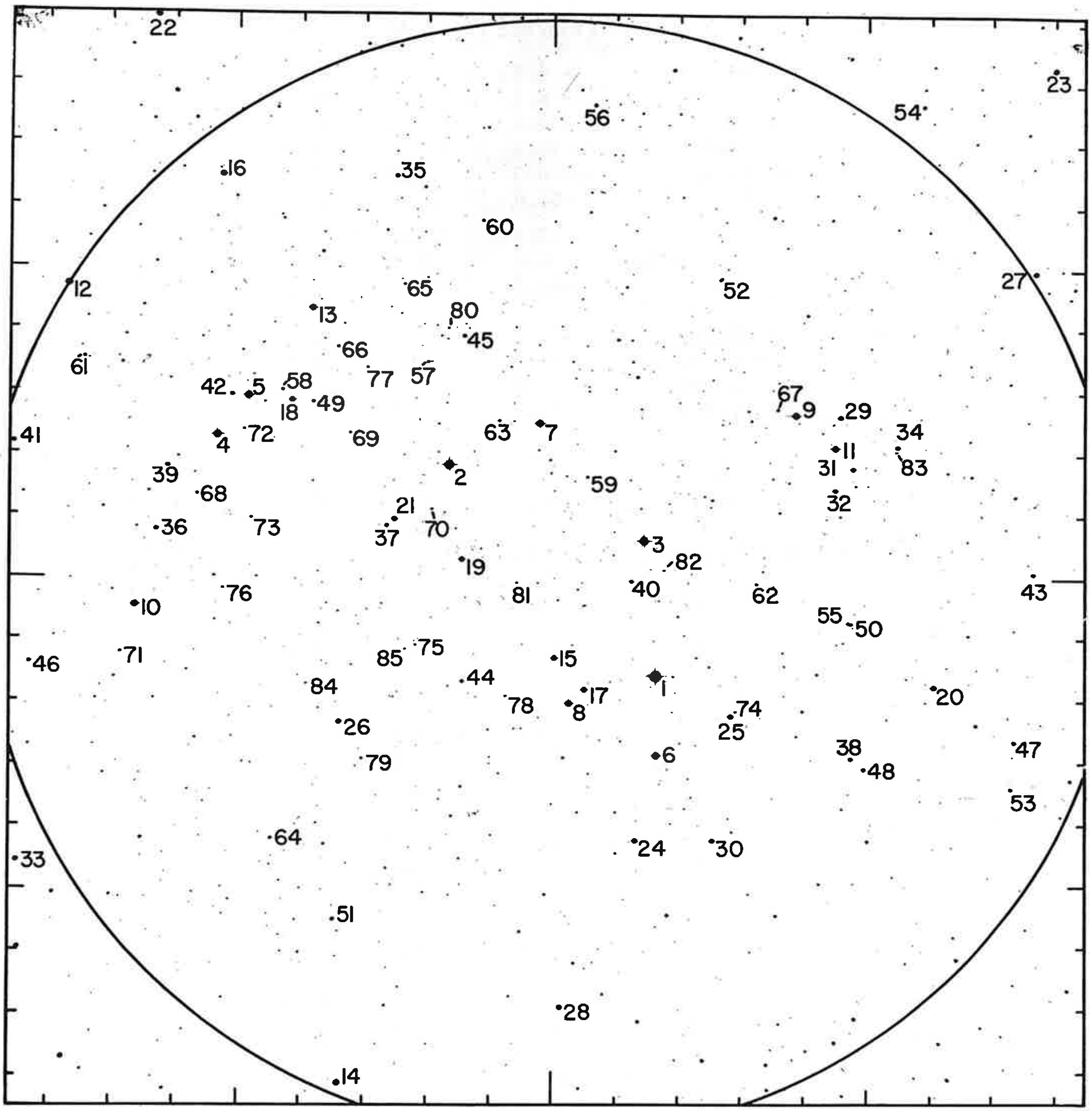
Col. 5: In the calculation of the mean radial velocity of the cluster, stars 3, 5, 14 were omitted, the first because of its large angular distance from the center of the cluster, the other two because their spectral types and radial velocities differ considerably from those of the other cluster stars and render their physical membership doubtful.

Col. 6: CP = B. A. Gould (see "Col. 3" above)

Al = G. Alter " " "

Radial Velocity Measurements

Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectro-graph	p.e.
1	27638.699	- 9.9		II 6	
	8330.960	- 8.5	.6	II 6	
	9087.860	- 8.5	.6	II 6	
	9468.829	-19.0		II 6	
	30188.879	-20.6	.6	II 6	
	0609.659	-22.6		II 6	
		-15.4	4.8		
	GCSRV 10791	-15.8	1.3		
	Mean	-15.5	6.1	9 pl.	± 2.0
4	28005.796	-23.4		II 6	
	8741.777	-10.4	.6	II 6	
	9079.890	-31.6		II 6	
	30168.871	-12.2	.5	II 6	
		-21.7	3.1		
	GCSRV 10796	-14	.6		
	Mean	-20.5	3.7	6 pl.	± 2.6
5	27653.722	- 6.4	.7	II 6	± 4.8
7	28372.810	-15.0	.6	II 6	
	8689.930	-35.3		II 6	
	9440.865	-25.9	.6	II 6	
	30140.971	-27.3	.6	II 6	
	0904.824	-26.0		II 6	
		-26.9	3.8		
	GCSRV 10797	- 9	.3		
	Mean	-25.6	4.1	5 pl.	± 2.5
10	28377.794	-15.7	.6	II 6	
	9055.930	- 7.3	.3	II 6	
	9436.885	-26.4		II 6	
	31285.857	-20.5		II 6	
	Mean	-20.2	2.9		± 2.9
11	28747.747	-11.5	.6	II 6	
	9085.854	-27.4	.6	II 6	
	9453.854	-44.1		II 6	
	30196.807	-26.9		II 6	
	0552.736	-28.4		II 6	
	Mean	-29.2	4.2		± 2.5
14	28751.739	- 3.8		II 6	
	9408.924	-21.6	.6	II 6	
	9755.924	+22.8	.4	II 3-1/2	
	30133.936	+ 9.5		II 6	
	0615.666	-26.2		II 6	
	Mean	- 4	4.0		± 6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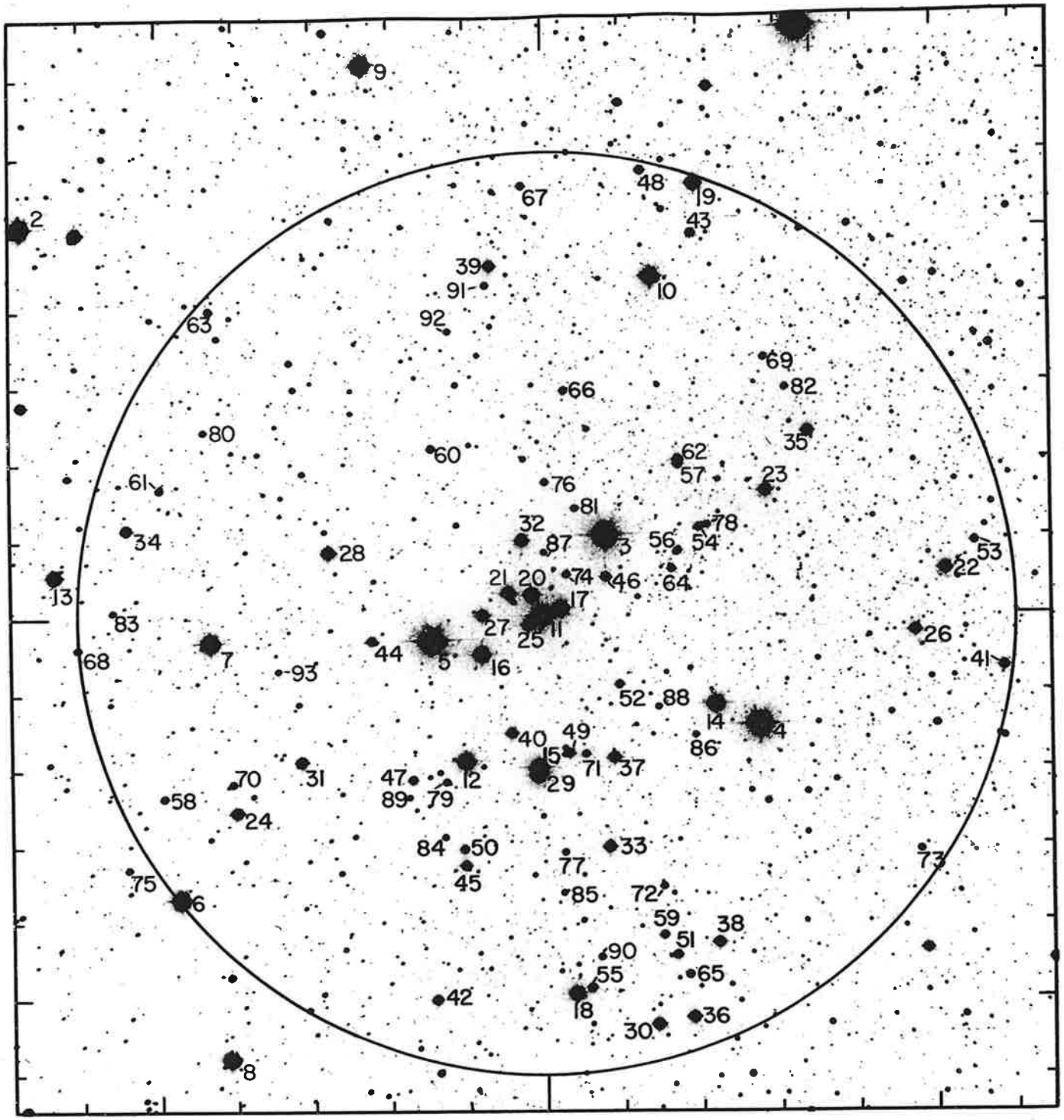
NGC 6633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IC 4725

IC 4725

(M 25)

α $18^h\,28^m.8$ δ -19°11' (1950.0) l^{II} 13°.7 b^{II} -4°.4

Diameter 35' Class IV3r; 1-2b5 Radial velocity -5.2 km/sec

Limit of completeness: m_{pg} = 12.7., within a radius of 10' from star 11.

No.	Coordinates x	y	m_{pg}	Spectral Type T	HD	Radial velocity p.e. (km/sec)	Other designations HD, BD	GCSRV	CPD	Al	ADS 11433
(1)	(2)		(3)	(4)		(5)	(6)				
1R	-320"	+770"	7.8	K1	K0	-46.5 b	170657	10974		33	
5R	+142	- 30	8.2	gG*	F8-K0	- 2.6 p.v. ±1.9	170764	10989	-19°6907	117	A
3	- 80	+105		B8*	B9	- 5.8 var ±5.4	170719	10986	-19°6892	72	
4	-274	-143		B6*	B8	+ 1.5 ±2.0	170682	10976	-19°6881	41	
2R	+670	+510	8.4	gG5	K0	-14 d	170886	10996	-19°6921	162	
6R	+466	-372	9.0	B5nn*	B9	-11.4 p.v. ±4.0	170835	10993	-19°6917	143	
7	+425	- 35	9.0	gG7*	K2	-11.5 p.v. ±4.0	170820	10992	-19°6915	141	
8	+405	-580		B7s*	B9	- 5.0 p.v. ±4.9	170836		-19°6914	140	
9	+227	+721	9.2	B7	A0		170763		-19°6908	120	
11R	0	0	9.2	B8nne*		- 6.0 p.v. ±3.5	-19°5044		-19°6896	92	E
10	-139	+442	9.3	F0	A5		170681		-19°6888	61	
12	+100	-189	9.3	A8			-19°5046		-19°6905	104	P
15R	+ 7	-199	9.3	cB7*		-10 var ±11	-19°5045		-19°6899	94	C
13R	+625	+ 53	9.4	B9	B9		170860		-19°6919	159	
14	-216	-115	9.5	B8n*		- 7.2 ±2.5	-19°5037		-19°6882	47	
16R	+ 79	- 50	9.5	B6ne*		- 0.3 ±2.4			-19°6904	103	BC
17	- 23	+ 9	9.8	B8*		- 4.2 ±2.7			-19°6895	87	F
18	- 34	-493		A7			-19°5043		-19°6893	83	
19	-195	+560	9.9	B8			-19°5040		-19°6885	49	
20	+ 14	+ 27	10.0	B8					-19°6898	95	K
21	+ 44	+ 30	10.2	B8					-19°6902	99	J
22	-511	+ 55	10.3	B9			-19°5034		-19°6876	18	
29	+ 9	-210	10.3	A						94a	D
24	+393	-257	10.4	B9			-19°5050		-19°6912	135	
23	-281	+165	10.4	B9					-19°6880	39	
25	+ 18	- 11	10.4	B9					-19°6897	96	L
28R	+275	+ 80	10.4	B9					-19°6909	126	
27	+ 77	+ 1	10.5	B9					-19°6903	102	H
26	-475	- 20	10.6	A0					-19°6877	26	
30	-138	-538	10.6	B5					-19°6889	67	

No.	Coordinates x	Coordinates y	m_{pg}	Spectral Type T	Spectral Type HD	Radial velocity p.e. (km/sec)	Other designations HD, BD	GCSRV	CPD	Al	ADS 11433
(1)	(2)		(3)	(4)		(5)	(6)				
32	+ 26"	+ 98"	10.6	B9					-19°6901	97	M
31	+312	-191	10.7	B9					-19°6910	129	
33	- 82	-300	10.7	B9					-19°6891	73	
34	+538	+117	10.8	B9						148	
36	-183	-533	10.8	B9					-19°6886	53	
35	-338	+236	10.9	A0					-19°6879	31	
37	- 88	-185	10.9	A2					-19°6890	70	
39	+ 67	+468	11.0	G0						100	
40	+ 41	-154	11.0						-19°6900	98	Q
38R	-220	-430	11.1	M4					-19°6883	46	
41	-590	- 71	11.1	A0					-19°6875	13	
42	+141	-499	11.2	B9						116	
45	+100	-327	11.3							105	
43	-290	+497	11.5	A						50	
44	+219	- 31	11.5	B9						121	R
51	-165	-442	11.5	A0						59	
55	- 58	-487	11.5	B9							
46	- 79	+ 51	11.6							71	
48	-126	+580	11.6	A						65	
49	- 31	-181	11.8	B9						84	
50	+102	-305	11.9							106	
47	+168	-214	11.9	A0						118	
57R	-171	+195	11.9	A1					-19°6887	56	
52	- 97	- 90	12.0	A0						69	
54	-196	+114	12.0	A1						48	
59	-150	-416	12.0	A0						62	
63	+430	+400	12.0	B9						138	
53	-450	+ 91	12.1	A						16	
62R	-171	+200	12.1	A0							
58	+490	-238	12.1	A3						44	
56R	-171	+ 82	12.2	A						55	
65	-180	-470	12.2	A3						54	
60	+141	+220	12.3	A1						113	
61	+495	+170	12.3	A0						144	
64	-163	+ 60	12.5	A2						57	
66	- 25	+294	12.5	A2						82	
70	+400	-220	12.5	A1						136	
67	+ 24	+559	12.6							93	
68	+600	- 40	12.6	A0						156	
69	-283	+334	12.6	A						38	
71	- 52	-180	12.6	A1						79	
72	-149	-352	12.6							63	
75	+540	-330	12.7	A0						149	
74	- 30	+ 53	12.8	A1						81	
76	- 3	+174	12.8	A1						88	

No.	Coordinates x	Coordinates y	m_{pg}	Spectral Type T	Spectral Type HD	Radial velocity p.e. (km/sec)	Other designations HD, BD	GCSRV	CPD	Al	ADS 11433
(1)	(2)		(3)	(4)		(5)	(6)				
91	- 72"	+443"	12.8	A							101
73	-480	-308	12.9								25
77	- 25	-310	12.9	A							86
78	-210	+118	13.0								
79	+125	-218	13.0	A0							110
90	- 68	-446	13.0	A0							75
80	+440	+245	13.1	A4							142
81	- 40	+140	13.1	A8							80
82	-310	+297	13.3								37
83	+558	+ 10	13.3	K							151
84	+128	-258	13.4								111
85	- 22	-362	13.4								85
87	0	+ 80	13.5								90
86	-191	-156	13.6	A4							51
92	+122	+383	13.6	F0:							107
88	-146	-118	13.6	A5							64
89	+174	-238	13.8	A							119
93	+340	- 73	13.9	A5:							

Col. 1: Remarks (R)

1, 2, radial velocity from GCSRV.

5, U Sgr. Spectral type variable gF8-gG2.

6, double lines observed on one spectrogram.

11, H_β faint emission; perhaps double lines on some plates.

15, H lines narrow. Northern component of double star.

13, double star, Lamont Hussey 6855; has companion of magnitude 13 at separation 3".0, position angle 64°.

16, close double, separation 0".7; data refer to combined light. H_β faint emission on some plates.

28, BD -19° 5049, close double, Lamont Hussey 6852; separation 0".7, observed as one star.

38, BD -19° 5038.

57, southern component of double star; magnitudes given by Alter and CPD, which are for combined light, have been reduced to those of the brighter component.

62, northern component of double star.

56, appears double on Crossley photograph; about 2" separation, equal magnitudes. Data refer to combined light.

Col. 3: Magnitudes based on two polar comparisons, a cluster comparison, magnitudes given in the Cape Photographic Durchmusterung (CPD), and values published by

G. Alter (M.N. 103, 10, 1943).

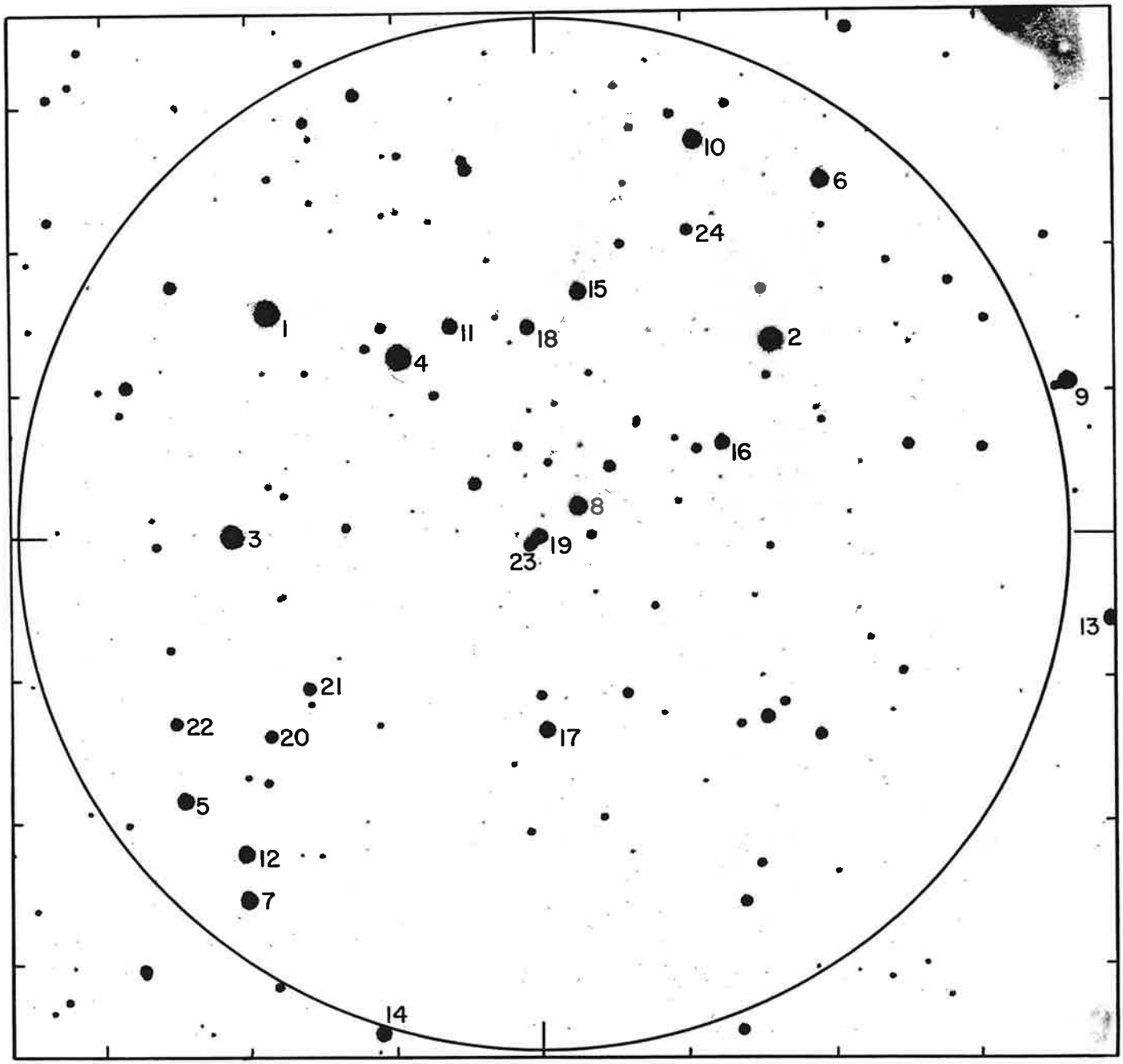
Col. 6: Al = G. Alter (see "Col. 3" above)

Radial Velocity Measurements

Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectrograph	p.e.
3	24717.820	+14.7	.5	I 12	
	5388.964	+ 2.3		I 12	
	6236.692	-31.8		I 12	
	7285.750	-15.0		II 6	
	30133.987	+ 0.6		II 6	
	Mean	- 5.8	4.5		± 5.4
4	24785.685	+ 4.1		I 12	
	5880.641	+ 2.0		I 12	
	6971.643	+ 9.5		I 12	
	8309.987	- 9.7		II 6	
	30188.821	+ 4.7		II 6	
	0589.736	- 1.5		II 6	
	Mean	+ 1.5	6.0		± 2.0
5	25392.978	-12.1		I 12	
	5454.713	+10.8		I 12	
	5854.737	- 7.8		I 12	
	9044.977	+ 6.5		II 6	
	9761.985	- 5.8	.7	II 6	
	9763.994	-17.2	.7	II 6	
		- 3.5	5.4		
	GCSRV 10989	- 2.0	8.1		
	Mean	- 2.6	13.5	14 pl.	± 1.9
6	25780.928	- 4.7		I 12	
	6525.882	+11.9	.5	I 12	
	6944.738	-24.9		I 12	
	7320.704	-10.3		II 6	
	30188.843	-29.6		II 6	
	0589.705	+ 0.6		II 6	
	Mean	-11.4	5.5		± 4.0
7	25481.701	-10.4		I 12	
	8042.676	-23.8		II 6	
	8430.649	+ 6.0	.7	II 6	
	30259.625	-12.8	.7	II 6	
	Mean	-11.5	3.4		± 4.0
8	27285.712	+ 7.4		II 6	
	8317.949	+ 0.3		II 6	
	9071.925	- 1.7		II 6	
	30188.859	-25.9		II 6	
	Mean	- 5.0	4.0		± 4.9

Radial Velocity Measurements

Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectrograph	p.e.
11	26153.885	- 5.8		I 12	
	6958.658	- 1.9		I 12	
	7574.977	-20	.4	II 3-1/2	
	8386.794	+ 4.1		II 6	
	30517.980	+ 5.1		II 6	
	0589.719	-25.8		II 6	
	Mean	- 6.0	5.4		± 3.5
14	26949.703	+ 6.5		I 12	
	7285.804	-19	.5	II 3-1/2	
	8388.730	-11.3		II 6	
	9427.906	-16.2		II 6	
	30134.987	+ 6.0	.4	II 3-1/2	
	Mean	- 7.2	3.9		± 2.5
15	26951.705	+50.6		I 12	
	7331.665	-36.8		II 6	
	8033.745	-10.7		II 6	
	9094.819	-31.0		II 6	
	30259.643	-20.8		II 6	
	Mean	-10	5.0		±11
16	26930.751	-11.5		I 12	
	6937.728	+ 3.4		I 12	
	7574.953	0	.4	II 3-1/2	
	9423.874	+ 4.2		II 6	
	30517.957	+ 2.7		II 6	
	Mean	- 0.3	4.4		± 2.4
17	28386.719	- 4.2		II 6	
	9069.880	-14.0		II 6	
	9762.986	0	.4	II 3-1/2	
	30552.809	+ 4.1		II 6	
	Mean	- 4.2	3.4		± 2.7



NGC 6664

NGC 6664

α $18^h33^m.8$ δ $-8°16'$ (1950.0) l^{II} $23°.9$ b^{II} $-0°.4$

Diameter 20' Class IV 2m; 1-2b4 Radial velocity -0.4 km/sec

Limit of completeness: m_{pg} = 13.0, within a radius of 6' from star 19.

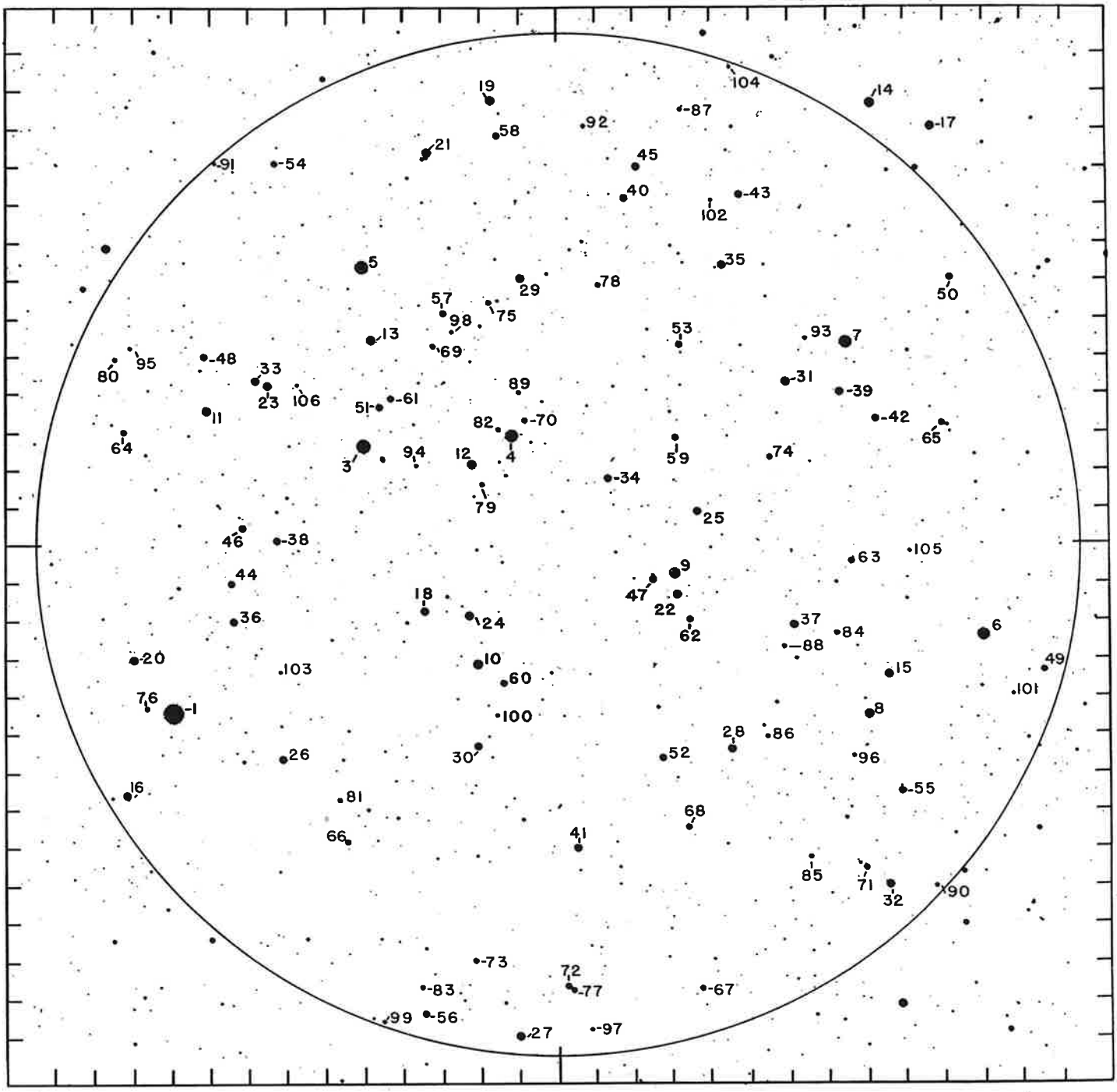
No.	Coordinates x	Coordinates y	m_{pg}	Spectral Type	Radial velocity p.e. (km/sec)		Other designations BD
(1)	(2)		(3)	(4)	(5)		(6)
1	+185"	+156"	10.9	B8*	- 1.7	±3.0	-8°4654
2	-160	+138	11.3	B4*	+ 4.5	±3.2	-8°4646
3	+212	+ 1	11.4	B8*	- 3.9	±3.5	-8°4655
4	+ 92	+127	11.4	gF6*	+13.3	±2.6	-8°4652
10	-108	+274	12.2				-8°4647
8	- 27	- 21	12.3				
6	-195	+246	12.4				
7	+200	-251	12.4				
9	-359	+105	12.4				-8°4644
5	+245	- 83	12.4				
12	+203	-221	12.5				
13	+388	- 59	12.7				
15	- 29	+170	12.7				-8°4649
14	+109	-345	12.8				
11	+ 59	+147	12.8				
17	- 6	-134	12.8				-8°4650
16	-128	+ 64	13.1				
18	+ 5	+145	13.1				
19	0	0	13.1				
20	+184	-139	13.4				
21	+158	-105	13.5				
22	+250	-130	13.5				
23	+ 6	- 6	13.8				
24	-103	+213	14.0				

Col. 3: Magnitudes based on a polar comparison and a plate taken with the 20-inch Astrograph.

Col. 5: In the calculation of the mean radial velocity of the cluster, star 4 was omitted. Its physical membership is doubtful because of its spectral type and radial velocity.

Radial Velocity Measurements

Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectro-graph	p.e.
1	28047.698	-23	.4	II 3-1/2	
	8370.831	- 2	.4	II 3-1/2	
	9432.941	+10	.4	II 3-1/2	
	30224.734	- 7.6		II 6	
	1266.875	+18.1	.5	II 6	
	Mean	- 1.7	2.7		± 3.0
2	28420.705	- 8	.4	II 3-1/2	
	9433.924	+ 8	.4	II 3-1/2	
	30174.883	+ 7.3	.6	II 6	
	0585.762	+ 6.3		II 6	
	Mean	+ 4.5	2.4		± 3.2
3	29756.946	0	.4	II 3-1/2	
	30134.934	+ 4	.4	II 3-1/2	
	0176.859	-10.3	.3	II 6	
	0525.882	- 6.7		II 6	
	Mean	- 3.9	2.1		± 3.5
4	28419.705	+ 4	.4	II 3-1/2	
	0518.931	+23.3		II 6	
	0588.746	+ 7.0		II 6	
	Mean	+13.3	2.4		± 2.6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IC 4756

IC 4756

α $18^h36^m.0$ δ +5°20' (1950.0) l^{II} 36°.3 b^{II} +5°.3

Diameter 50' Class III 1 m; 2 b 9 Radial velocity -24.4 km/sec

Limit of completeness: m_{pg} = 12.3, within a radius of 22'.5 from the center.

No.	Coordinates x	y	m_{pg}	Spectral Type T	Bgd	Radial velocity p.e. (km/sec)		Other designations HD,BD	B	K	G
(1)	(2)		(3)	(4)		(5)		(6)			
1	+1001"	- 446"	7.3	gF9*	G0	-20.0	±1.2	172365	175	145	118
2R	+ 143	-1913	7.7	gK0*	gG5:	- 0.6	±2.8			95	84
3	+ 505	+ 256	9.0	cB9*	B7	-24.2	±2.2	172248	151	117	101
4	+ 119	+ 283	9.0	A3*	A6	-23.8 var	±5.3	172189	115	93	83
5	+ 510	+ 726	9.1	A0*	B9	-22.4	±2.0	172271	152	118	102
6	-1103	- 242	9.3	A0*	B8	-21.8	±3.0	171931	28	40	39
7	- 749	+ 526	9.4	B9*	B9	-18.5 p.v.	±3.6	172012	56	58	55
8	- 804	- 451	9.4	gK2*	gG9:	-26.4	±2.3	5°3840	48	52	50
9	- 304	- 79	9.6	A1*	A5:	-19.5 p.v.	±4.6	172110	83	74	67
10	+ 209	- 317	9.9	A4*	A9	-21.3	±2.2	5°3869	128	102	90
11	+ 913	+ 350	9.9	A4*	A3:	-23.1	±2.1	5°3889	171	142	116
12	+ 224	+ 208	9.9	A2*	A1	-30.0 var	±3.3	5°3870	132	103	94
13	+ 486	+ 535	10.0	A8*	F4	-25.2	±2.2	5°3877	149	116	100
14	- 812	+1154	10.0		B7			5°3841		50	51
15	- 856	- 345	10.0	gF8*	G0	-24.8	±2.2	5°3847	46	48	47
16	+1123	- 661	10.0		gG6:			5°3894		148	120
17	- 972	+1093	10.1		F2			5°3834		43	43
18	+ 348	- 177	10.1	gG5*	dG6	-28.0	±2.3	5°3873	139	109	95
19	+ 173	+1164	10.1		A4			5°3867		100	88
20	+1105	- 304	10.1		F9			5°3892		146	119
21	+ 338	+1027	10.2		A0			5°3874		107	96
22	- 312	- 135	10.2	A9*	A5:	-24.4	±2.2	5°3852	81	72	66
23	+ 755	+ 415	10.3	A2				5°3885	165	130	109
24	+ 231	- 189	10.3	A5	A8			5°3871	133	104	92
25	- 364	+ 83	10.3	gG8*	dG3	-26.5	±2.5	5°3850	77	69	63
26	+ 718	- 567	10.3		G5:			5°3882		125	106
27	+ 104	-1297	10.3		A3			4°3822		92	81
28	- 452	- 542	10.3	A8	A8			5°3848	72	67	60
29	+ 97	+ 696	10.3	A3	A8			5°3863	113	91	82
30	+ 209	- 533	10.3	gG9*	G5:	-24.2	±2.3	5°3868	127	101	89

No.	Coordinates x	Coordinates y	m_{pg}	Spectral Type T	Spectral Type Bgd	Radial velocity (km/sec)	p.e.	Other designations HD, BD	B	K	G
(1)	(2)		(3)	(4)		(5)		(6)			
31	- 591"	+ 423"	10.4		A1			5°3847	64	63	59
32	- 856	- 898	10.4		F0			5°3836	45	47	46
33	+ 786	+ 426	10.4	A4					166	131	111
34	- 131	+ 171	10.4	gG6*	gG6:	-25.5	±2.3	5°3858	100	81	74
35	- 429	+ 729	10.4		F0			5°3849	73	68	62
36	+ 845	- 204	10.4	A0	F3:			5°3886	168	137	113
37	- 613	- 216	10.4	A5	F2			5°3845	63	61	57
38	+ 730	+ 8	10.5	A5	A8				163	127	107
39	- 732	+ 396	10.5		A3:			5°3844	57	59	56
40	- 175	+ 906	10.5	gG3*	dG7	-25.8	±2.4	5°3857	94	80	73
41	- 49	- 802	10.5		A9			5°3860	105	84	76
42	- 825	+ 325	10.6	gK0*	G8	-29.2	±1.9	5°3839	47	49	49
43	- 474	+ 914	10.6		A5				71	66	61
44	+ 850	- 104	10.6		G2:			5°3888	169	139	115
45	- 207	+ 988	10.6		F0			5°3856		78	72
46	+ 819	+ 42	10.6		A9				167	133	112
47	- 247	- 96	10.7		A1			5°3854	89	77	69
48	+ 919	+ 492	10.7					5°3890	172	143	117
49	-1261	- 334	10.7		dK0			5°3829	18	38	38
50	-1020	+ 696	10.7		A4			5°3832	36	41	41
51	+ 464	+ 359	10.8		G0:				148	115	99
52	- 273	- 565	10.8		F2				87	75	68
53	- 318	+ 521	10.8		F0			5°3851	80	71	65
54	+ 736	+ 999	10.8		G5			5°3884		128	108
55	- 887	- 652	10.8		G5			5°3835	44	44	44
56	+ 349	-1237	10.9		A5					110	
57	+ 297	+ 605	10.9		A3			5°3872	137	105	93
58	+ 157	+1072	10.9		A3			5°3866		97	87
59	- 307	+ 278	10.9		A0::				82	73	
60	+ 143	- 367	10.9		F6:				117	94	
61	+ 435	+ 381	11.0		A5			5°3875	145	114	97
62	- 344	- 200	11.0		F0::				78	70	64
63	- 759	- 48	11.0		G0				54	56	54
64	+1130	+ 295	11.1		A5					149	
65	- 995	+ 313	11.1						39		
66	+ 549	- 784	11.2		A::			5°3880	154	120	103
67	- 375	-1175	11.3								
68	- 338	- 748	11.3						79		
69	+ 324	+ 519	11.4		F:				138	106	94
70	+ 89	+ 320	11.4						111		
71	- 794	- 854	11.4		G0				50	53	52
72	- 21	-1165	11.4		A:			4°3821		88	78
73	+ 216	-1091	11.4								
74	- 550	+ 223	11.5						67		
75	+ 182	+ 637	11.6						124		

No.	Coordinates x	Coordinates y	m_{pg}	Spectral Type T	Spectral Type Bgd	Radial velocity p.e. (km/sec)	Other designations HD,BD	B	K	G
(1)	(2)		(3)	(4)		(5)	(6)			
76	+1074"	- 425"	11.6							
77	- 37	-1176	11.6					87		
78	- 107	+ 678	11.6		G5:			102	82	75
79	+ 198	+ 153	11.7					125		
80	+1154	+ 489	11.8				5°3893			
81	+ 570	- 676	11.8					156		
82	+ 157	+ 297	11.8					120		
83	+ 351	-1167	11.9							
84	- 722	- 240	11.9					58		
85	- 654	- 825	12.0					60		
86	- 543	- 512	12.0					68		
87	- 318	+1135	12.0							
88	- 586	- 270	12.0							
89	+ 104	+ 400	12.0					14		
90	- 980	- 905	12.1					40		
91	+ 895	+ 996	12.1							
92	- 68	+1103	12.1							
93	- 638	+ 539	12.2					61		
94	+ 362	+ 203	12.2					141		
95	+1113	+ 515	12.3						147	
96	- 765	- 558	12.3					53		
97	- 83	-1273	12.3							
98	+ 277	+ 553	12.3					134		
99	+ 453	-1249	12.3							
100	+ 160	- 447	12.4					121		
101	-1181	- 400	12.4					27		
102	- 399	+ 900	12.4					76		
103	+ 720	- 340	12.4					162		
104	- 447	+1248	12.4							
105	- 912	- 18	12.5					41		
106	+ 681	+ 415	12.5					160		

IC 4756

Col. 1: Remarks (R)

2, outside the limits of our chart. ADS 11526A, has companion of magnitude 10 at separation of 1".2. The radial velocity leaves no doubt that this star is not a cluster member.

Col. 3: Magnitudes based on a polar comparison and two cluster comparisons.

Col. 4: Spectral types listed under Bgd were estimated by A. A. Wachmann and published by

E. Kopff (A.N. 274, 69, 1943).

Col. 5: In the calculation of the mean radial velocity of the cluster, star 2 was omitted as a nonmember, and stars 4 and 9 each received weight 1/2 because of velocity variation.

Col. 6: B = R. D. Bannister (A.J. 31, 165, 1918)

K = E. Kopff (see "Col. 4" above)

G = K. Graff (A.N. 217, 311, 1922)

Radial Velocity Measurements

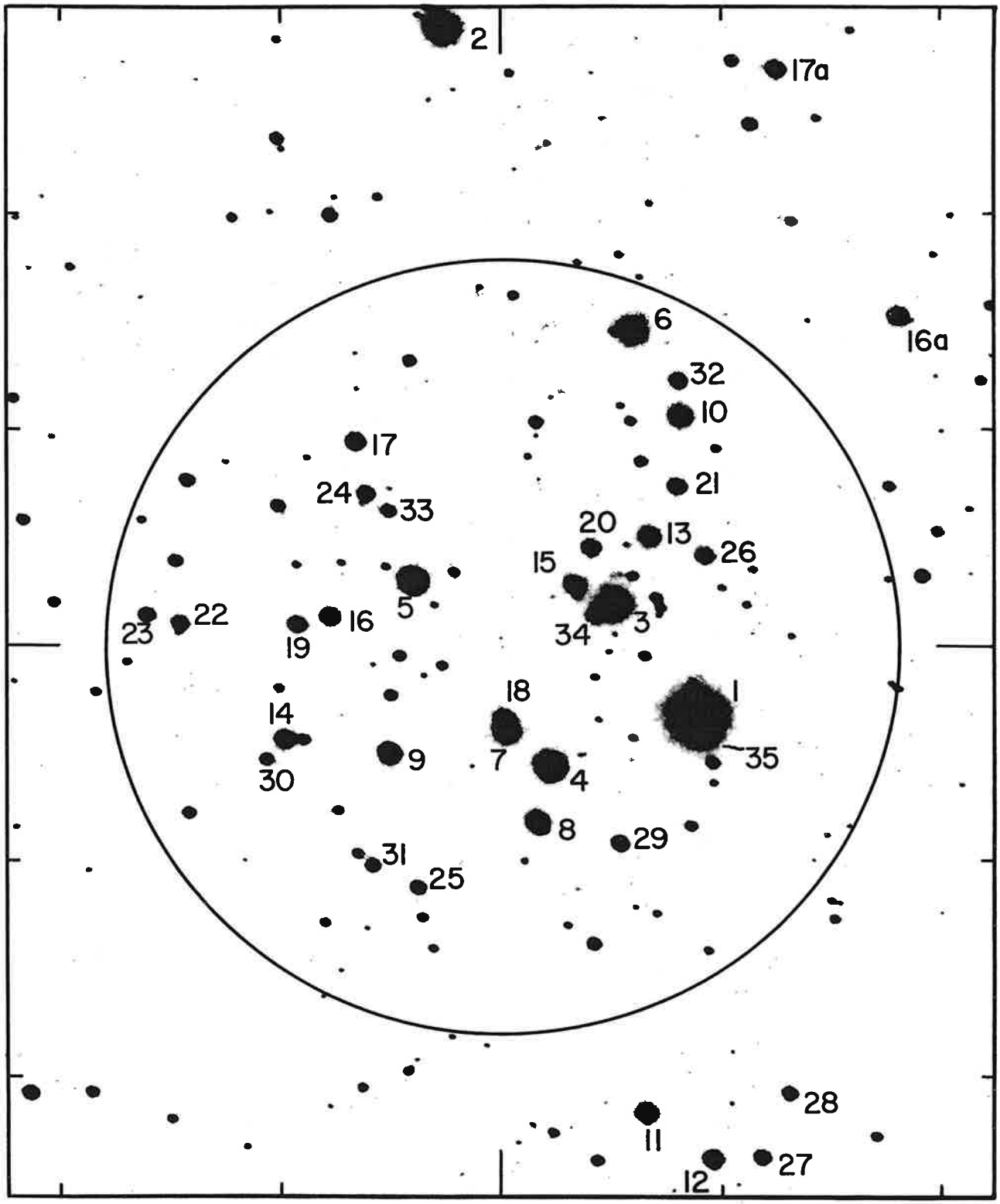
Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectrograph	p.e.
1	24255.026	-21.2		I 12	
	4274.008	-23.9		I 12	
	7497.046	-28.7		II 6	
	8713.971	-16.4		II 6	
		-22.6	4.0		
	GCSRV 11110	-18.5	7.0		
	Mean	-20.0	11.0	11 pl.	± 1.2
3	24345.924	-34.2		I 12	
	5045.961	-12.8		I 12	
	6960.681	-21.4		I 12	
	8653.956	-20.6		II 6	
	8717.966	-31.8		II 6	
	Mean	-24.2	5.0		± 2.2
5	24357.863	-22.2		I 12	
	4416.675	-24.6		I 12	
	7288.787	-24.8		II 6	
	8653.993	-15.6		II 6	
	8717.929	-10.3		II 6	
	9755.873	-37.0		II 6	
	Mean	-22.4	6.0		± 2.0
4	24044.665	-36.4		I 12	
	5042.948	- 3.9		I 12	
	7288.821	- 6.2		II 6	
	9069.965	-31.5		II 6	
	9754.984	-41.1		II 6	
	Mean	-23.8	5.0		± 5.3
8	24414.672	-22.5		I 12	
	4775.662	-28.0		I 12	
	7523.983	-28.8		II 6	
	Mean	-26.4	3.0		± 2.3
6	24372.816	-18.7	.5	I 12	
	4711.858	-20.2	.5	I 12	
	5053.921	-12.8		I 12	
	9066.896	-38.2	.7	II 6	
	Mean	-21.8	2.7		± 3.0

Radial Velocity Measurements

Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectrograph	p.e.
7	24330.944	-17.6		I 12	
	4678.945	+ 4.1		I 12	
	7524.024	- 8.9		II 6	
	7618.956	-22.3		II 6	
	9428.760	-28.1		II 6	
	9930.612	-21.6		II 6	
	30195.873	-35.1		II 6	
	Mean	-18.5	7.0		± 3.6
9	24342.877	- 3.5		I 12	
	5003.946	- 3.7		I 12	
	7671.747	-25.8		II 6	
	8743.875	-27.2		II 6	
	30133.831	-37.5		II 6	
	Mean	-19.5	5.0		± 4.6
10	24363.853	-26	.3	DI 6	
	4730.705	-22.1		I 12	
	5087.766	-18.1		I 12	
	9053.808	-22.3		II 6	
	Mean	-21.3	3.3		± 2.2
11	27513.038	-20.5		II 6	
	7634.854	-22.9	.7	II 6	
	8033.823	-25.0		II 6	
	8753.847	-24.1		II 6	
	Mean	-23.1	3.7		± 2.1
13	24706.834	-29.3		I 12	
	5027.905	-26.2		I 12	
	8388.833	-17.4	.7	II 6	
	9414.783	-25.8	.7	II 6	
	Mean	-25.2	3.4		± 2.2
18	24376.784	-25.7		I 12	
	5061.913	-29.4		I 12	
	8270.990	-28.8		II 6	
	Mean	-28.0	3.0		± 2.3
15	24754.775	- 8	.3	DI 6	
	5072.852	-24.5		I 12	
	8400.709	-28.6		II 6	
	30222.784	-26.3		II 6	
	Mean	-24.8	3.3		± 2.2

Radial Velocity Measurements

Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectrograph	p.e.
12	27986.950	- 9.2		II 6	
	8713.906	-27.2		II 6	
	9068.830	-47.4		II 6	
	9408.810	-33.7		II 6	
	9900.653	-42.0		II 6	
	30133.863	-34.8		II 6	
	0229.798	-36.4		II 6	
	2001.726	- 9.6		II 6A	
	Mean	-30.0	8.0		± 3.3
25	24754.691	-29	.3	DI 6	
	5034.856	-22.4		I 12	
	7535.996	-24.9		II 6	
	31289.774	-51	.2	II 3-1/2	
	Mean	-26.5	2.5		± 2.5
30	25029.895	-10	.3	DI 6	
	5059.884	-24.7		I 12	
	8405.692	-20.9		II 6	
	30195.895	-34.5	.7	II 6	
	Mean	-24.2	3.0		± 2.3
22	25029.895	- 7.6	.5	I 12	
	5059.884	-22.4		I 12	
	9048.821	-27.6	.7	II 6	
	9439.944	-32.7		II 6	
	Mean	-24.4	3.2		± 2.2
34	24702.912	-36.5		I 12	
	5116.736	-15.9		I 12	
	8741.875	-24.1		II 6	
	Mean	-25.5	3.0		± 2.3
40	24758.709	-28	.3	DI 6	
	5090.774	-19.3		I 12	
	8008.786	-28.3		II 6	
	31646.966	-34	.4	II 3-1/2	
	Mean	-25.8	2.7		± 2.4
42	25110.757	-40.4		I 12	
	5439.791	-27.5		I 12	
	9059.946	-23.1		II 6	
	9440.904	-34.5		II 6	
	9782.806	-12.1	.5	II 6	
	Mean	-29.2	4.5		± 1.9
2	25079.896	- 2.0		I 12	
	5086.891	+ 0.8		I 12	
	Mean	- 0.6	2.0		± 2.8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NGC 6694

NGC 6694

(M 26)

α $18^h42^m.5$ δ $-9°27'$ (1950.0) l^{II} $23°.9$ b^{II} $-2°.9$

Diameter 9' Class II2m; 2b8 Radial velocity -11.4 km/sec

Limit of completeness: m_{pg} = 13.7, within a radius of 3' from the center.

No.	Coordinates x	y	m_{pg}	Spectral Type	Radial velocity p.e. (km/sec)		Other designations HD, BD
(1)	(2)		(3)	(4)	(5)		(6)
1R	- 90"	- 32"	9.3	cB9*	- 8.8	±3.0	173348
2	- 28	+286	11.1	B8			-9°4822
3	- 51	+ 20	11.3	cB7*	-15.8	±3.0	-9°4820
4	- 23	- 55	11.3	gF8*	- 8.4	±2.5	-9°4821
5	+ 40	+ 30	11.6	gG7*	-12.7	±2.7	-9°4823
6	- 60	+148	11.6	A0			
7	- 3	- 40	12.2	B9			
8	- 18	- 82	12.4	B9			
9	+ 50	- 50	12.4	B9			
10	- 82	+108	12.5	B9			
11	- 68	-216	12.6	B9:			
12	- 97	-238	12.7	B9			
13	- 69	+ 50	12.7	B9			
14	+ 97	- 42	12.8	A0			
15	- 36	+ 28	12.9	B9			
16	+ 78	+ 13	13.0	A0			
16a	-181	+153	13.0	K			
17	+ 65	+ 95	13.0	A0			
17a	-125	+268	13.1	A0			
18	- 2	- 35	13.2				
19	+ 92	+ 10	13.3	A0			
20	- 41	+ 45	13.3	A			
21	- 80	+ 74	13.4				
22	+145	+ 10	13.4				
23	+161	+ 15	13.4	A			
24	+ 60	+ 70	13.5	A			
25	+ 38	- 12	13.5				
26	- 92	+ 41	13.5				
27	-119	-236	13.5	A1			
28	-132	-208	13.6	K5			

No.	Coordinates x	Coordinates y	m_{pg}	Spectral Type	Radial velocity p.e. (km/sec)	Other designations HD, BD
(1)	(2)		(3)	(4)	(5)	(6)
29	- 55"	- 92"	13.6			
30	+108	- 52	13.7			
31	+ 59	-102	13.7			
32	- 80	+122	13.8			
33	+ 50	- 62	13.9			
34	- 42	+ 13	13.9			
35	- 93	- 45	14.0			

NGC 6694

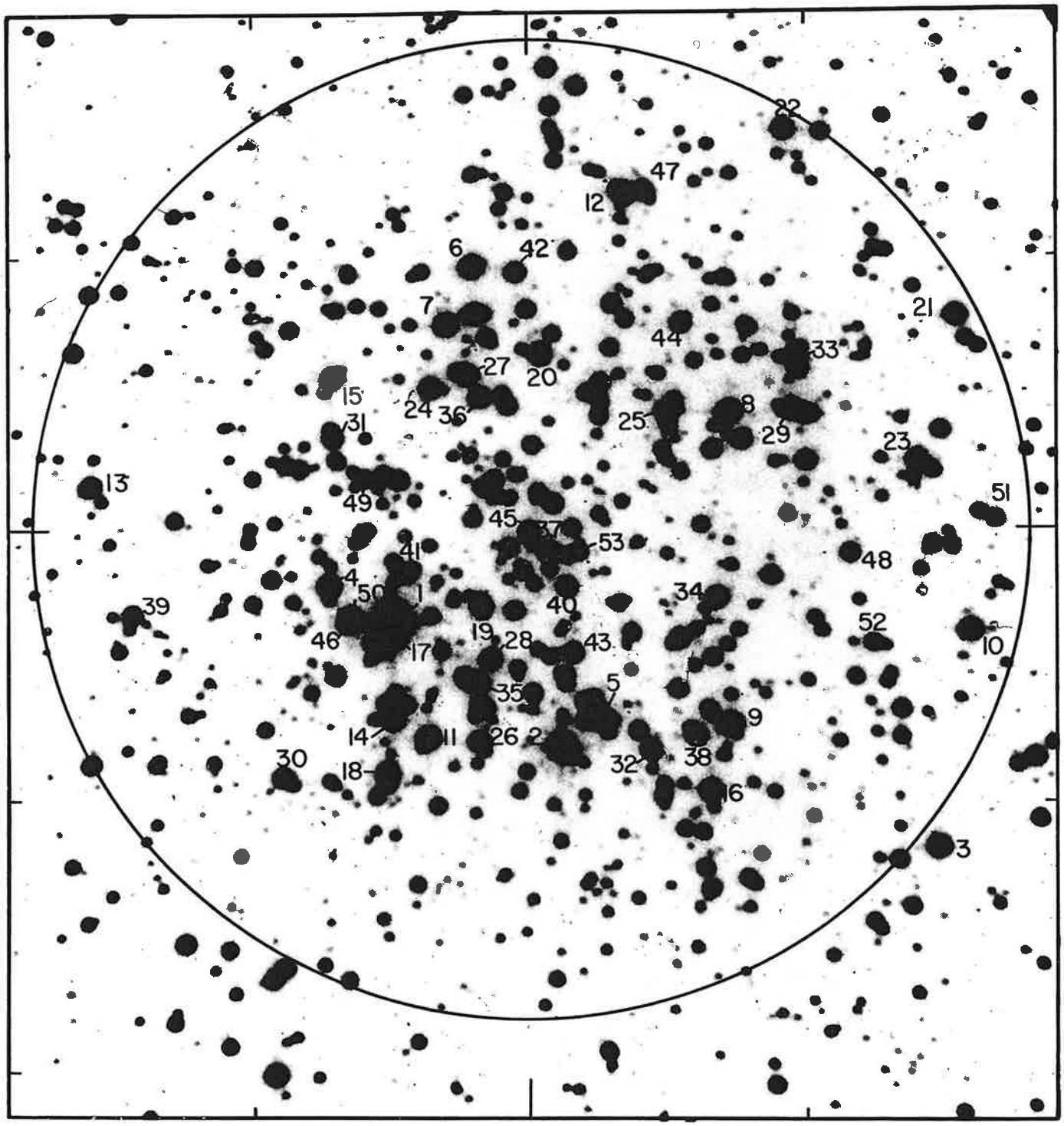
Col. 1: Remarks (R)

1, GCSRV 11189. Si II lines strong.

Col. 3: Magnitudes based on a polar comparison.

Radial Velocity Measurements

Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectrograph	p.e.
1	26526.836	-13.6	.5	I 12	
	6536.776	- 0.2		I 12	
	7603.956	- 9.4	.6	II 6	
	9056.953	-18.6	.6	II 6	
	Mean	- 8.8	2.7		± 3.0
3	27252.912	-19	.5	II 3-1/2	
	7280.809	-10	.4	II 3-1/2	
	8727.810	-32	.4	II 3-1/2	
	9426.921	+ 9	.4	II 3-1/2	
	31642.859	-19.9		II 6A	
	Mean	-15.8	2.7		± 3.0
4	27243.939	0	.4	II 3-1/2	
	8367.815	0	.4	II 3-1/2	
	9081.877	+2	.4	II 3-1/2	
	30140.917	-10	.7	II 6	
	1615.850	-21.8	.7	II 6A	
	Mean	- 8.4	2.6		± 2.5
5	28395.742	-18	.4	II 3-1/2	
	8721.824	-24	.4	II 3-1/2	
	9084.858	-20	.4	II 3-1/2	
	30497.950	- 3.2		II 6	
	Mean	-12.7	2.2		± 2.7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NGC 6705

NGC 6705

(M 11)

α 18^h 48^m.4 δ -6°20' (1950.0) l^{II} 27°.3 b^{II} -2°.8

Diameter 12'.5 Class II 2 r; 1 b 5 Radial velocity +19.1 km/sec

Limit of completeness: m_{pg} = 12.5 within a radius of 3' from star 45.

No.	Coordinates x	y	m_{pg}	Spectral Type T	L	Radial velocity p.e. (km/sec)	Other designations S	K	GCSRV
(1)	(2)		(3)	(4)		(5)	(6)		
1R	+ 50"	- 33"	8.5	cB8*	A5	+ 23.2 p.v. ±3	545	462	11305
2	- 11	- 79	10.7	B5*	A0	+ 17.2 ± 3.0	437	336	11303
3	-147	-116	11.7	B9	A0		237	134	
4	+ 72	- 20	11.6	A0*	A0	+ 8.7 ± 2.6	581	506	11306
5	- 26	- 69	11.4	A1	A0		407	308	
6	+ 20	+ 97	11.7	A1*		+ 19.7 ± 3.1	501	414	11302
7	+ 30	+ 76	11.8	A1*		+ 23.0 ± 3.7	516	425	
8	- 71	+ 44	11.8	A0*	A0	+ 15.4 ± 3.7	336	233	11296
9	- 73	- 71	11.9	A0*	A0	+ 26.3 ± 3.7	331	227	11297
10	-158	- 36	11.8	A1	A0		227	123	
11R	+ 36	- 76	11.6		A0		525	436	
12R	- 34	+124		B8			395	293	
13	+157	+ 17		A5	dA5		663	594	
14	+ 49	- 70	11.8	A5			544	461	
15	+ 71	+ 57		A5			577	499	
16	- 66	- 95	12.0	B9	A0		345	243	
17R	+ 48	- 39					540	460	
18R	+ 51	- 89	11.8		A0		548	464	
19	+ 17	- 28			A0		491	402	
20	- 4	+ 65	12.0	A0			456	358	
21	-152	+ 80	12.1	A0	A0		232	128	
22	- 91	+148	12.1	A1			300	197	
23	-139	+ 26	12.1	B9	A0		245	141	
24	+ 35	+ 53	12.0	A2			523	434	
25	- 50	+ 44	12.1	A1	A0		375	272	
26	+ 18	- 78			A0		494	405	
27R	+ 22	+ 58					507	417	
28	+ 14	- 47	12.2		A2		487	394	
29	- 94	+ 45	12.2		A0		297	193	
30	+ 89	- 91	12.2		A0		599	528	

No.	Coordinates x	Coordinates y	m_{pg}	Spectral Type T	Spectral Type L	Radial velocity p.e. (km/sec)	Other designations S	Other designations K
(1)	(2)		(3)	(4)		(5)	(6)	
31R	+ 71"	+ 34"					576	502
32	- 45	- 81	12.3	A0	A0		381	280
33R	- 95	+ 64	12.1				293	191
34	- 67	- 24	12.3		A0		341	238
35R	+ 19	- 56					495	410
36	+ 18	+ 49	12.3	B9			493	404
37	- 7	- 8	12.3	A0			452	355
38	- 60	- 75	12.4	A0	A0		356	254
39	+142	- 31	12.4	A1	A0		647	580
40	- 14	- 21	12.5				431	332
41R	+ 44	- 16	12.2				534	448
42	+ 5	+ 95	12.5				471	378
43	- 16	- 45	12.5		A2		425	328
44	- 55	+ 77	12.6		gG8		364	263
45	0	0	12.6	A8	A0		462	366
46R	+ 66	- 34	12.3	A0	A0		571	491
47	- 42	+126	12.5	B5			385	283
48	-115	- 8	12.9	A0	A0		273	170
49	+ 59	+ 19	12.8	A4:			563	480
50R	+ 64	- 32		A0	A0		568	490
51	-166	+ 5	13.1	B6	A0		221	116
52	-123	- 41	13.2	F0	A0		267	163
53	- 18	- 8	13.2	K2	gK2		423	326

Col. 1: Remarks (R)

1, GCSRV 11305, listed as double line spectroscopic binary, spectral type cA3. Double lines noted on some plates. HD 174512.

11, companion of magnitude 14.1, 4" s.f.

12, companion of magnitude 14.0, 3" n.f.

17, located 6".5 s.p. of star 1.

18, companion of magnitude 12.7, 4" s.

27, close double star.

31, companion of magnitude 14.3, 3".5 n.f.

33, companion of magnitude 12.6, 5".5 s.p.

35, s.p. of 3 stars close together.

41, companion of magnitude 14.7, 4" n.f.

46, 50, close together.

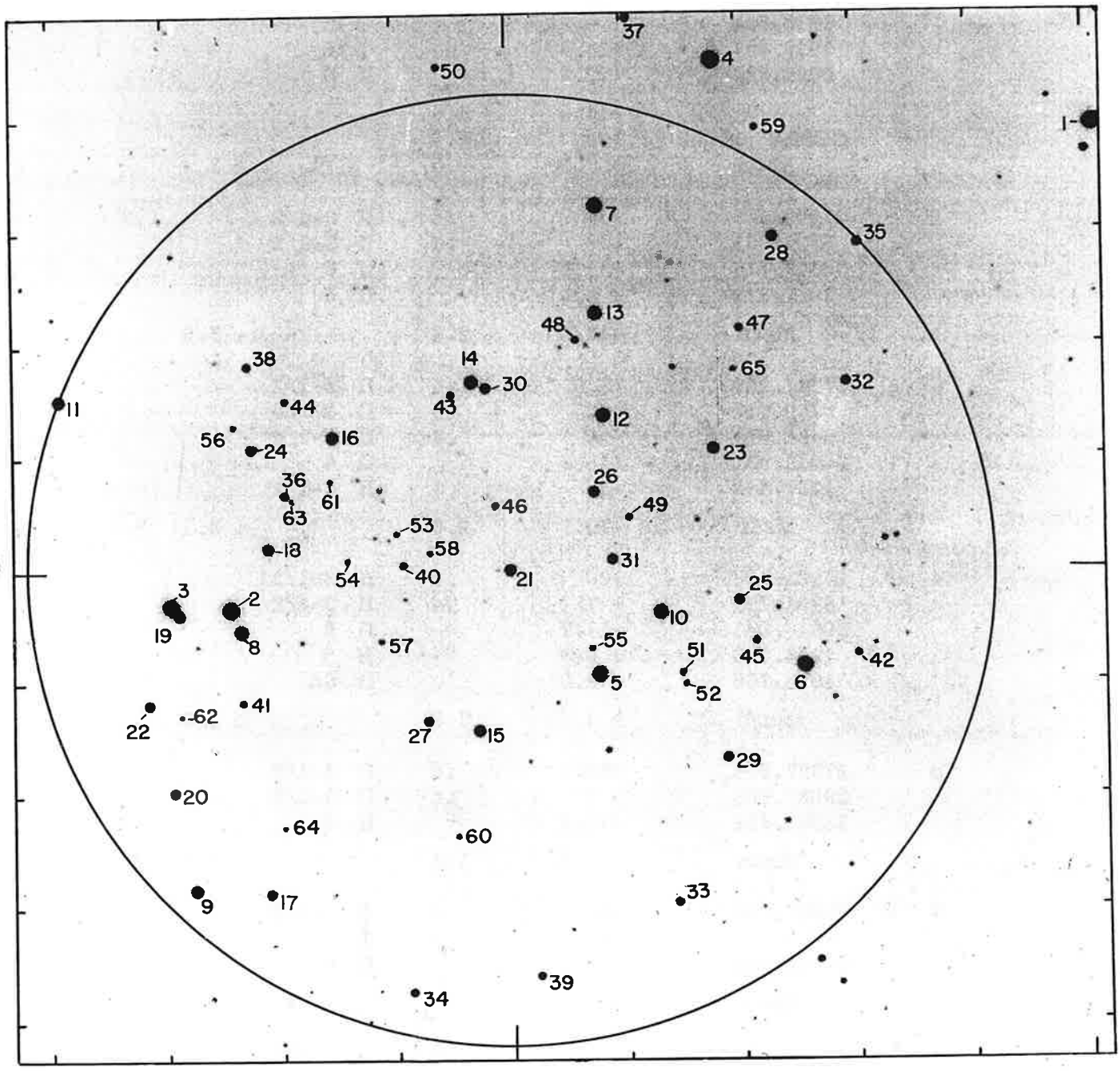
Col. 3: Magnitudes (except star 1) are those published by H. L. Johnson, A. R. Sandage and H. D. Wahlquist (Ap.J. 124, 81, 1956).

Col. 4: L = B. Lindblad (Contr. Mt. Wilson Obs. 228, 1921)

Col. 6: S = H. Shapley (Contr. Mt. Wilson Obs. 126, 1917)
K = F. Küstner (Veröff. Bonn No. 18, 1923)

Radial Velocity Measurements

Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectro-graph	p.e.
1	23926.982	+22.2		I 12	
	6515.928	- 4.2		I 12	
	6520.857	+26.4		I 12	
	9094.863	+22.0		II 6	
		+16.6	4.0		
	GCSRV 11305	+28	5.5		
	Mean	+23.2	9.5	15 pl.	± 3
2	27246.929	+18	.4	II 3-1/2	
	8725.881	+10	.4	II 3-1/2	
	30608.716	+31.4		II 6	
	1267.872	+ 5.5		II 6	
	Mean	+17.2	2.8		± 3.0
6	27241.900	+34	.4	II 3-1/2	
	8782.717	+ 4	.4	II 3-1/2	
	9434.911	+26	.4	II 3-1/2	
	30519.931	+40.8		II 6	
	1287.842	-38	.4	II 3-1/2	
	Mean	+19.7	2.6		± 3.1
4	27223.908	+20	.4	II 3-1/2	
	8391.799	+ 1	.4	II 3-1/2	
	30616.681	+11.7		II 6	
	1318.728	+ 0.8		II 6	
	1673.765	+12.0		II 6A	
	Mean	+ 8.7	3.8		± 2.6
8	27627.858	+31	.4	II 3-1/2	
	29082.853	+ 7	.4	II 3-1/2	
	30903.898	+12.6		II 6	
	Mean	+15.4	1.8		± 3.7
7	27298.746	+23	.4	II 3-1/2	
	8755.782	+43	.4	II 3-1/2	
	30520.939	+14.9		II 6	
	Mean	+23.0	1.8		± 3.7
9	27281.779	+37	.4	II 3-1/2	
	8397.748	+ 6	.4	II 3-1/2	
	30904.904	+30.2		II 6	
	Mean	+26.3	1.8		± 3.7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NGC 6709

NGC 6709

α $18^h\,48^m.9$ δ +10°16′ (1950.0) l^{II} 42°.1 b^{II} +4°.7

Diameter 12′ Class II2p; 1-2b9 Radial velocity -12.9 km/sec

Limit of completeness: m_{pg} = 13.8, within a radius of 7′ from star 21.

No.	Coordinates x	y	m_{pg}	Spectral Type	Radial velocity (km/sec)	p.e.	Other designations HD, BD	GCSRV	Vg
(1)	(2)		(3)	(4)	(5)		(6)		
1R	−506″	+392″	10.0	B9*	+ 6.8	±2.8	10°3682	11301	1
2	+243	− 33	10.0	A0*	−11.7 p.v.	±4.0	174715	11319	55
3	+297	− 30	10.0	B9*	−15 var.	±9	174734	11320	60
4R	−180	+450	10.1	A3*	+ 3.5	±2.1	10°3690	11311	12
5	− 77	− 94	10.4	gG9*	− 6.7 p.v.	±3.7	10°3694	11316	28
6	−255	− 88	10.5	A0*	−12.0 p.v.	±3.6	10°3689	11310	5
7R	− 78	+321	10.6	A0*	+13.8	±3.4	10°3693		27
8	+235	− 54	10.8	gG8*	−13.0	±2.3	10°3697	11318	54
9	+276	−283	10.8	B9					56
10	−130	− 39	10.8	A0*	−15.8	±2.3	10°3691		21
11	+391	+152	11.0	B9					62
12	− 82	+136	11.0	A0*	−25 var	±8	10°3692		25
13	− 78	+226	11.0	B9					30
14	+ 31	+167	11.2	A0*	−14.1	±3.4	10°3696		38
15	+ 29	−142	11.2	A0					37
16	+152	+118	11.3	B9*	−11.4	±3.2			45
17	+210	−288	11.6	A0					50
18	+210	+ 20	11.6	A0					49
19	+290	− 40	11.6	A0					58
20	+295	−197	11.7						59
21	0	0	11.7	A0					33
22	+315	−119	11.7	A0					61
23	−178	+105	11.8	A0					13
24	+224	+108	11.8	A0					51
26	− 74	+ 69	11.8						29
25	−198	− 28	12.0	A0					10
27	+ 72	−132	12.0	A0					27
30	+ 19	+161	12.0	A1					35
31	− 90	+ 8	12.0	A1					31
28	−230	+294	12.0	A0					28

No.	Coordinates x	Coordinates y	m_{pg}	Spectral Type	Radial velocity p.e. (km/sec)	Other designations HD, BD	GCSRV	Vg
(1)	(2)		(3)	(4)	(5)	(6)		
29	-188"	-168"	12.0	A:				11
32	-295	+165	12.3	A1				4
33	-144	-298	12.3	K2				17
34	+ 89	-374	12.4	A1				
35	-304	+289	12.4	A2				2
37	-107	+488	12.6	A1				
38	+229	+181	12.6	A:				52
36	+196	+ 67	12.6	A0				48
39	- 22	-359	12.8	A2				
40	+ 93	+ 3	13.0	A2				43
41	+233	-117	13.0					53
42	-300	- 76	13.0					
43	+ 50	+155	13.0	A2				40
44	+195	+150	13.1	A:				47
45	-213	- 63	13.1	A3				8
46	+ 12	+ 57	13.3	A8				34
47	-200	+212	13.3	A0				9
48	- 59	+202	13.4	G5				32
49	-103	+ 46	13.5	B9				23
50	+ 59	+447	13.5	F2				
51	-148	- 92	13.5	A7				15
52	-150	-102	13.7	A5				14
53	+ 99	+ 31	13.7	A3				44
54	+141	+ 9	13.7	A3				
55	- 70	- 70	13.7	G				31
56	+240	+128	13.8	A				
57	+112	- 62	13.8	A3				
58	+ 70	+ 16	13.8	A3				42
59	-218	+390	13.8	A7				
60	+ 48	-237	13.9	G0				39
61	+155	+ 79	13.9					46
62	+288	-128	14.0					
63	+190	+ 61	14.2					
64	+199	-228	14.2	F0				
65	-197	+176	14.3					

Col. 1: Remarks (R)

1, 4, 7, probably not cluster members; all three differ considerably in radial velocity from the other stars; stars 1 and 4 are also outside the limiting circle.

Col. 3: Magnitudes based on a polar comparison, three cluster comparisons, and a plate taken with the 20-inch Astrograph.

Col. 5: In the calculation of the mean radial velocity of the cluster, stars 1, 4, 7 were omitted as nonmembers; stars 3 and 12 received weight 0.3 because of large probable error due to velocity variation.

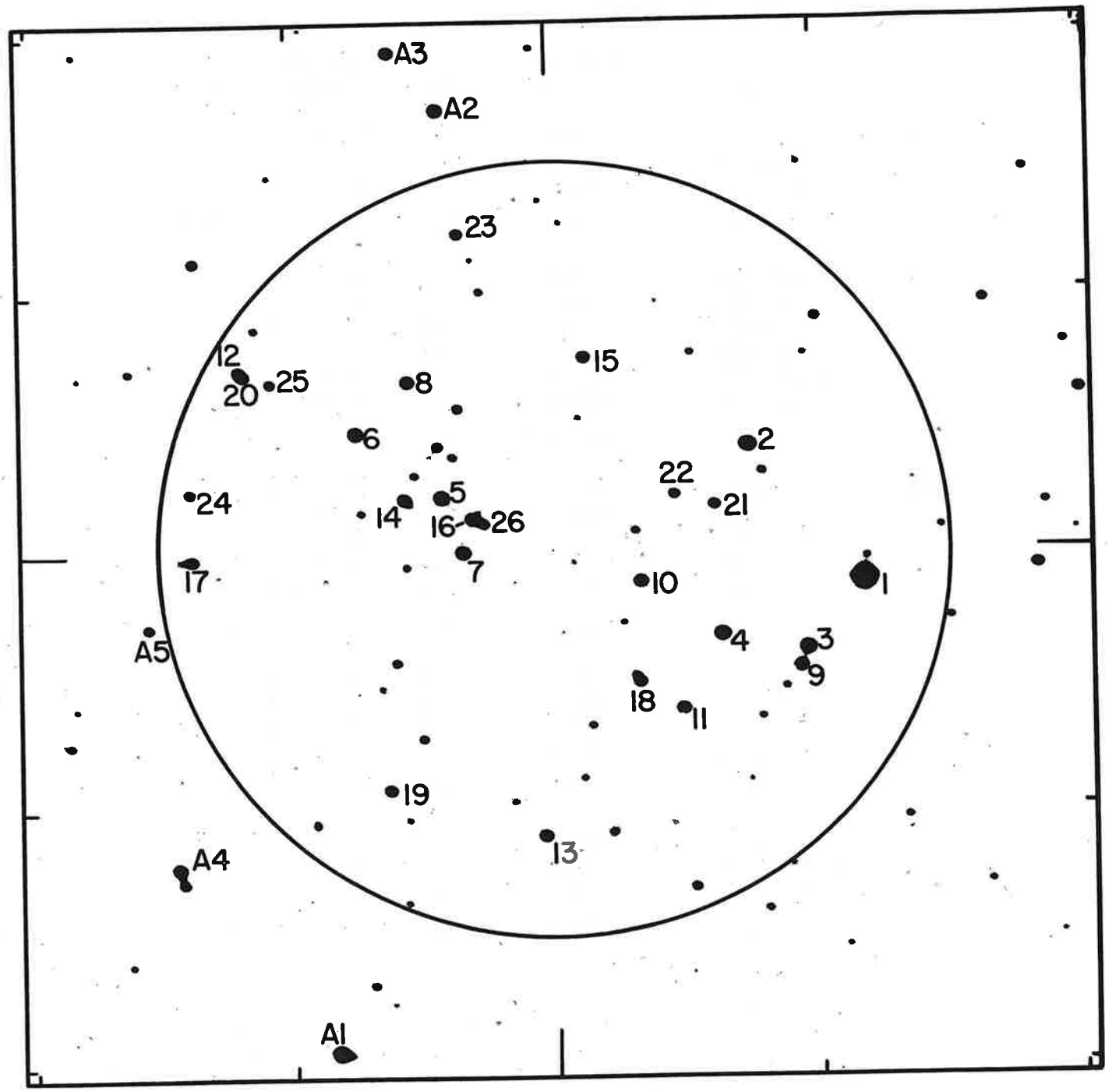
Col. 6: Vg = H. C. Vogel (Beob. Sternw. Leipzig 1, 1876), gives positions of 62 stars.

Radial Velocity Measurements

Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectro-graph	p.e.
1	25506.718	+16.9		I 12	
	5510.695	+ 5.9		I 12	
	9087.760	+ 4.3	.6	II 6	
	9427.964	- 6.3	.6	II 6	
	Mean	+ 6.8	3.2		± 2.8
2	25423.918	- 7.4		I 12	
	5740.942	+ 3.5		I 12	
	7254.946	-32.0		II 6	
	7653.815	-14.4	.6	II 6	
	9454.847	- 9.5		II 6	
	Mean	-11.7	4.6		± 4.0
3	25446.893	0		I 12	
	5730.928	-42.6	.5	I 12	
	6160.911	+ 5.9		I 12	
	7715.700	- 4.5	.6	II 6	
	9455.919	+19.4		II 6	
	31268.724	-67.8		II 6	
	Mean	-15	5.1		± 9
4	25837.733	+ 5.3		I 12	
	6217.774	+ 0.6	.5	I 12	
	8080.668	- 6.1		II 6	
	9087.809	+12.6		II 6	
	Mean	+ 3.5	3.5		± 2.1
5	25172.639	- 1.7		I 12	
	5495.716	- 3.2		I 12	
	7235.920	+ 4.4		II 6	
	9482.820	- 5.6		II 6	
	30259.727	-27.4		II 6	
	Mean	- 6.7	5.0		± 3.7
6	25759.873	+ 6.2		I 12	
	6543.844	-32.3	.5	I 12	
	7354.671	-27.5	.5	II 6	
	9423.950	-14.9		II 6	
	9756.859	- 6.2	.4	II 3-1/2	
	30175.736	-23.0		II 6	
	0636.631	- 1.0		II 6	
	Mean	-12.0	5.4		± 3.6
7	27183.954	+17.7		II 6	
	7627.967	+ 2.8	.4	II 3-1/2	
	9081.966	-11.2	.2	II 3-1/2	
	9425.943	+23.0	.6	II 6	
	Mean	+13.8	2.2		± 3.4

Radial Velocity Measurements

Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectrograph	p.e.
8	25388.858	-13.4		I 12	
	5802.900	-12.5		I 12	
	7301.802	-13.1		II 6	
	Mean	-13.0	3.0		± 2.3
10	27324.756	-33.3		II 6	
	7610.920	- 5.8		II 6	
	8015.809	+ 1	.4	II 3-1/2	
	9079.958	-11	.4	II 3-1/2	
	30259.675	-15.3		II 6	
	0526.746	-17.5		II 6	
	Mean	-15.8	4.8		± 2.3
12	28395.843	-62	.4	II 3-1/2	
	8721.956	-36	.4	II 3-1/2	
	9075.913	- 3.6		II 6	
	9755.977	+ 2	.4	II 3-1/2	
	31286.846	-27	.4	II 3-1/2	
	Mean	-25	2.6		± 8
14	28418.677	-10	.4	II 3-1/2	
	9049.954	-34	.4	II 3-1/2	
	9085.953	+ 4	.4	II 3-1/2	
	9144.714	-15.0		II 6	
	Mean	-14.1	2.2		± 3.4
16	30883.912	-25.7		II 6	
	1023.639	+ 1.2		II 6	
	1267.746	- 7	.4	II 3-1/2	
	Mean	-11.4	2.4		± 3.2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NGC 6755

NGC 6755

α $19^h 05^m.3$ δ +4° 09' (1950.0) l^{II} 38°.6 b^{II} -1°.7

Diameter 15' Class IV 2 m; 1 b 2 Radial velocity +18.2 km/sec

Limit of completeness: m_{pg} = 14.0 ., within a radius of 2!5 from the center.

No.	Coordinates x	Coordinates y	m_{pg}	Spectral Type	Radial velocity (km/sec)	p.e.	Other designations BD
(1)	(2)		(3)	(4)	(5)		(6)
1	-118"	- 12"	10.9	B2s*	+15.1	±2.8	+3°3907
2	- 75	+ 39	12.5	B9*	+24.3	±4.6	
A1	+ 83	-195	12.5	gK0			
3	- 96	- 40	12.9	B9			
4	- 62	- 35	12.9	B9			
5	+ 43	+ 21	12.9	B9			
6	+ 76	+ 45	12.9	B8			
A2	+ 42	+171	12.9	B9			
7	+ 35	- 1	13.0	B9			
A2	+ 61	+193	13.0	A0			
8	+ 55	+ 65	13.1	A0			
A4	+144	-122	13.1	G:			
9	- 93	- 47	13.2	K5			
10	- 32	- 13	13.3	A0			
11	- 49	- 62	13.3	A0			
12R	+119	+ 70	13.3	B9			
13	+ 5	-111	13.4	B9			
14	+ 57	+ 20	13.5	A0			
15	- 13	+ 73	13.5	A0			
16	+ 31	+ 12	13.6	A0			
17	+138	- 3	13.6	G5			+4°3981
18R	- 32	- 52	13.7				
19	+ 63	- 92	13.5	A0			
20R	+117	+ 69	13.8				
A5	+155	- 28	13.9	A0			
21	- 62	+ 18	13.9				
22	- 47	+ 22	13.9				
23	+ 36	+123	13.9	A0			
24	+139	+ 24	14.1				
25	+108	+ 65	14.2	A			
26	+ 27	+ 10	14.4				

Col. 1: Remarks (R)

12, 20, visual double star; star 20 is at position angle 215°, separation 2".

18, double star; brighter (s.p.) component.

Col. 3: Magnitudes based on a cluster comparison.

Col. 5: In the calculation of the mean radial velocity of the cluster, star 2 was given weight 1/2.

Radial Velocity Measurements

Star	J. D. 24...	Rad. vel. (km/sec)	Wt.	Spectro-graph	p.e.
1	27277.812	- 2	.5	II 3-1/2	
	7625.902	+18.1		II 6	
	8416.728	+21.4		II 6	
	30176.953	+14.1	.6	II 6	
	Mean	+15.1	3.1		± 2.8
2	28398.785	+15	.4	II 3-1/2	
	9435.890	+20	.4	II 3-1/2	
	31648.868	+38	.4	II 3-1/2	
	Mean	+24.3	1.2		± 4.6