

A FINDING LIST OF STARS OF SPECTRAL TYPE A7 AND EARLIER IN REGIONS AT HIGH GALACTIC LATITUDES. IV. 3 HLF 4

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SUMARIO

Se ha realizado una búsqueda con prisma objetivo de estrellas de tipo espectral A7 o más temprano sobre una región de 45 grados cuadrados en el área 3 HLF 4 ($l^{\text{II}} = 0^\circ$, $b^{\text{II}} = -45^\circ$) como parte de una investigación de la estructura galáctica en la dirección perpendicular al plano de la galaxia. La presente investigación fue realizada con el prisma 4° de la cámara Schmidt en Cerro Tololo. Se presenta una lista con las coordenadas y tipos espectrales para ~~146~~ 146 estrellas; y para aquellas que son tan débiles que no aparecen en el catálogo Bonner Durchmusterung, se incluyen mapas de identificación.

ABSTRACT

An objective prism survey has been made of stars of spectral type A7 and earlier in a 45 square degree region in the 3 HLF 4 area ($l^{\text{II}} = 0^\circ$, $b^{\text{II}} = -45^\circ$) as part of an investigation of galactic structure perpendicular to the galactic plane. The survey reported here was made with the 4° prism on the Michigan Curtis Schmidt telescope at Cerro Tololo. A finding list containing positions and spectral types for 146 stars is presented with finding charts for the stars too faint to be included on the Cordoba Durchmusterung charts.

I. Introduction

This survey is a continuation of the general survey of regions at high galactic latitude. In this paper we present spectral types, positions, and V magnitudes for 146 stars in a 45 square degree region in 3 HLF 4 ($l^{\text{II}} = 0^\circ$, $b^{\text{II}} = -45^\circ$).

II. Observations

The survey was made with the 4° objective prism on the Michigan Curtis Schmidt telescope at Cerro Tololo Inter-American Observatory. Some spectral plates were obtained at Tonantzintla Observatory. One hour exposures were made on Ila-0 emulsion which reached an average limiting magnitude of $V = 14.0$. Short exposures were also made in order to classify the bright stars. The dispersion of the spectra is 280 Å/mm at H_δ . The plates were searched independently by each author and all stars of spectral class A7 or earlier were classified according to the criteria set up by Nassau and Seyfert (1946). The spectral classifications of the 3 HLF 4 stars are plotted versus the HD spectral types in figure one.

The magnitudes listed for the stars are intended primarily for identification purposes. A photoelectric sequence, set up by Drilling, was used to calibrate the photographic V magnitudes for all the stars in the catalogue. The mean error of these measures is ± 0.1 magnitudes.

III. The Finding List

The stars are listed in Tables 1 and 2. Table 1 lists the stars appearing in the Cordoba Durchmusterung and which are plotted on the CD charts. The catalogue number is listed in column one, the CD and HD numbers are listed in columns two and three; the right ascension and declination (Equinox 1950) are listed in columns four and five, the spectral type is listed in column six, and the V magnitude in column seven. Table 2, which lists the stars that are too faint to be plotted on the CD charts, has a similar format, except that column three (the HD number) is missing. An asterisk following the number indicates a note at the end of the table.

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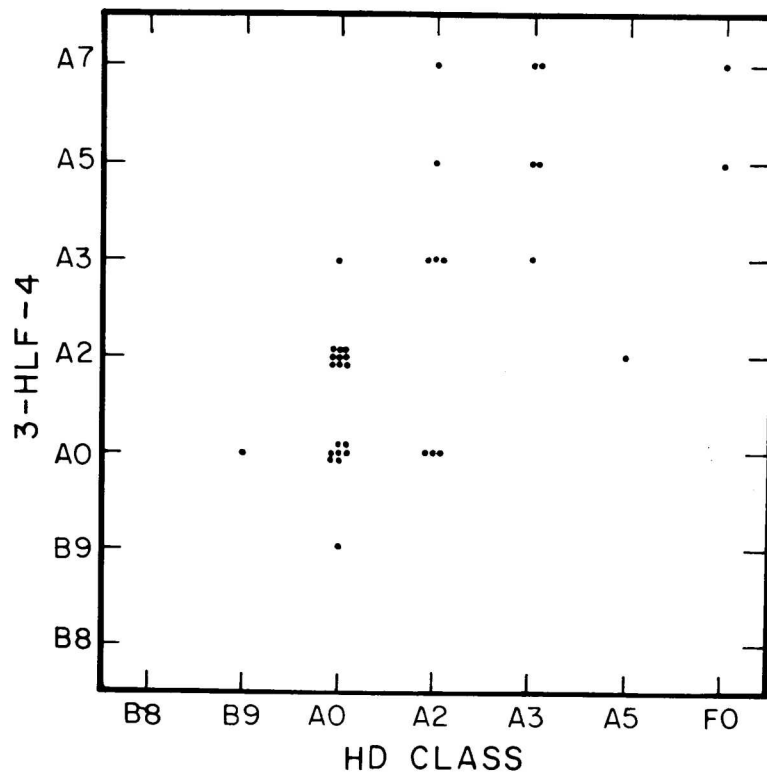


Fig. 1.—3 HLF 4 spectral types versus HD spectral types.

TABLE 1

Stars of type A7 and earlier in 3 HLF 4 which are plotted on the CD charts

No.	CD	HD	RA (1950)	Dec.	SP	V
1	-42°15087	197788	20 ^h 44 ^m 1	-42°25'	A5	9.1
2	-44 14170	198490	20 48.9	-44 04	A0	8.6
3	-41 14294		20 51.8	-41 36	B2	9.6
4	-44 14196	198987	20 52.3	-44 40	A3	9.1
5	-45 14120	199340	20 54.8	-45 07	A2	9.6
6	-43 14302	199639	20 56.7	-43 13	A3:	7.3
7	-43 14310	199757	20 57.3	-42 51	A3	9.3
8	-41 14339	199863	20 58.0	-40 49	A0	9.3
9	-41 14346	199963	20 58.6	-41 08	A2	9.5
10*	-41 14349	200057	20 59.2	-41 02	A5	9.6
11	-41 14359	200261	21 00.5	-40 53	A0	8.7
12	-41 14375	200610	21 02.5	-41 18	B9	10.5
13	-43 14391	201151	21 05.9	-43 29	A2	8.9
14	-41 14397	201150	21 05.9	-40 59	A7	9.8
15	-43 14402	201317	21 06.9	-43 35	A0:	6.8
16	-42 15289	201537	21 08.4	-41 50	A2	10.0
17	-42 15290	201554	21 08.5	-42 25	A5	10.1
18	-40 14223	201853	21 10.3	-40 21	A7	10.3
19	-44 14356	201965	21 11.1	-44 02	A2	8.9
20	-43 14428	201964	21 11.1	-43 00	A2	8.4
21	-43 14433	202042	21 11.7	-43 36	A5	9.3
22	-42 15331		21 13.0	-42 35	A7	10.5

TABLE 1 (Continued)

No.	BD	HD	RA (1950) Dec		SP	V
23	-44 14397	202650	21 15 . 4	-44 32	A0	9.4
24	-44 14414	202872	21 16 . 9	-43 48	A0	8.9
25	-44 14417	202946	21 17 . 3	-43 47	A0:	8.6
26	-41 14475	203006	21 17 . 6	-41 02	A0:	4.8
27	-40 14320	203463	21 20 . 4	-40 28	A7	7.8
28	-41 14498	203546	21 20 . 9	-40 41	A3	10.2
29	-40 14329	203554	21 21 . 0	-40 07	A3	10.3
30	-41 14503	203585	21 21 . 2	-41 13	A2:	5.8
31	-44 14457	203676	21 21 . 9	-44 16	A0	9.9
32	-41 14517	203866	21 22 . 9	-41 17	A0	10.0
33	-40 14389		21 28 . 8	-40 19	A5	10.2

Notes to Table 1

10 Metallic lines visible.

TABLE 2

Stars of type A7 and earlier in 3 HLF 4 which are not plotted on the CD charts

No.	Name	CD	RA (1950) Dec.		SP	V
1	-45° 14028 W1		20 ^h 42 ^m 6	-45 11	A0:	14.6
2	-44 14121 N1		20 42 . 8	-43 49	A0	12.7
3	-43 14178 E1		20 43 . 1	-43 11	A3:	13.1
4	-43 14187 S1		20 43 . 4	-43 38	A0:	14.4
5	-41 14206 E1		20 44 . 2	-41 00	A0	13.3
6*	-42 15087 N1		20 44 . 6	-42 15	A3:	13.3
7	-40 14040 S1		20 45 . 1	-40 27	A5	12.9
8	-44 14143 S1		20 45 . 3	-44 33	A0	13.5
9	-41 14245 S1		20 45 . 6	-41 18	A3	12.9
10	-41 14246 N1		20 45 . 6	-40 50	A0	13.9
11	-43 14203 E1		20 45 . 7	-43 35	A0:	14.6
12*	-45 14054 S1		20 46 . 9	-45 13	A5	12.0
13		-42°15112	20 47 . 0	-42 24	A5	11.1
14	-41 14250 N1		20 47 . 2	-40 29	A2	14.3
15	-41 14257 S2		20 47 . 9	-41 47	A2	14.1
16	-41 14257 S1		20 47 . 9	-41 43	A0	13.1
17		-41 14259	20 48 . 0	-40 46	A3	10.1
18	-42 15121 E1		20 49 . 7	-42 06	A0:	14.9
19		-43 14241	20 50 . 0	-42 52	A2	11.6
20	-41 14280 E1		20 50 . 6	-41 15	A0	14.3
21	-41 14288 W1		20 50 . 7	-41 20	A7	13.4
22*		-44 14185	20 50 . 8	-44 17	A2	11.4
23	-43 14256 W1		20 51 . 2	-43 04	A2	13.6
24*		-44 14192	20 51 . 8	-44 31	A2	11.7
25	-45 14102 S1		20 51 . 9	-45 09	A2:	14.8
26	-45 14099 N1		20 52 . 0	-45 26	A0	13.4
27		-41 14298	20 52 . 1	-41 29	A7	10.9
28	-44 14196 N1		20 52 . 4	-44 28	A0	14.3
29*		-44 14198	20 52 . 6	-44 06	A7	10.7
30	-45 14105 E1		20 53 . 0	-44 47	A0	13.9

TABLE 2 (Continued)

No.	Name	CD	RA (1950) Dec.	SP	V	
31		-41 14309	20 53.7	-41 18	A2	10.8
32	-44 14205 E1		20 54.0	-43 52	A2:	14.9
33		-43 14281	20 54.0	-43 39	A2	11.9
34	-41 14312 S1		20 54.6	-42 10	A0	14.1
35	-41 14310 E1		20 54.7	-41 18	A2:	15.1
36	-41 14312 N1		20 55.2	-41 35	A0	14.2
37		-41 14319	20 55.3	-41 09	A0	11.2
38	-41 14316 E1		20 55.8	-41 05	A5	12.8
39		-43 14300	20 56.6	-42 44	B2	11.7
40	-40 14130 S1		20 56.7	-40 35	A0	14.6
41	-41 14332 W1		20 56.8	-41 24	A0	12.5
42	-43 14302 S1		20 56.9	-43 16	A3:	15.0
43	-41 14330 S1		20 57.3	-41 46	A0:	13.8
44		-42 15193	20 58.0	-42 23	A3	12.3
45	-41 14347 S1		20 58.3	-41 47	A0	13.1
46	-41 14349 W1		20 58.6	-41 00	A3:	14.5
47	-42 15204 W1		20 58.8	-42 12	A2:	14.8
48*		-45 14155	20 59.3	-45 34	A3	12.5
49		-45 14159	20 59.8	-44 59	A2	12.3
50	-45 14186 W1		21 00.1	-45 24	A0	13.7
51	-40 14142 E1		21 00.5	-40 36	A2	14.2
52	-42 15253 W2		21 03.1	-42 26	A0	14.6
53	-42 15243 N1		21 03.3	-41 56	A0	13.0
54	-45 14186 E1		21 03.4	-45 08	A0	13.0
55		-44 14292	21 03.8	-44 04	A0	11.7
56	-42 15253 W1		21 04.0	-42 28	A0	13.9
57	-40 14176 S1		21 04.1	-40 13	A0	13.9
58*	-40 14167 E1		21 04.3	-40 18	B2	13.1
59	-44 14296 S1		21 04.4	-44 44	A0	14.0
60*		-41 14385	21 04.4	-40 43	A2	10.8
61	-43 14391 N1		21 05.0	-43 06	A0	12.6
62	-43 14391 S1		21 05.4	-43 33	A7	12.2
63	-44 14314 W1		21 05.6	-44 36	A3	12.7
64	-44 14311 N1		21 06.3	-43 54	A0	14.3
65*		-41 14403	21 06.4	-41 12	A2	10.9
66		-45 14227	21 07.0	-44 52	A5	11.1
67	-42 15277 S1		21 07.0	-42 30	A2	13.3
68		-44 14320	21 07.2	-43 50	A5	11.3
69	-41 14406 E1		21 07.8	-41 27	A2	13.9
70	-43 14407 N1		21 08.0	-43 08	A2:	14.6
71*	-42 15294 W1		21 08.3	-42 15	A7	13.4
72	-43 14407 E1		21 08.4	-43 27	A0	13.8
73	-45 14240 E1		21 08.6	-44 45	A0:	14.6
74		-45 14247	21 09.5	-45 24	A2	12.6
75*		-42 15303	21 09.6	-42 18	A0	11.1
76	-42 15290 S1		21 09.7	-42 41	A0	14.0
77		-43 14426	21 10.6	-43 27	A7	11.8
78	-43 14425 S1		21 10.7	-43 26	A0	14.3
79		-45 14261	21 10.9	-44 48	A0	11.3
80	-43 14433 W1		21 11.2	-43 40	A2:	14.6

TABLE 2 (Continued)

No.	Name	CD	RA (1950) Dec.	SP	V	
81	-41 14429 N1		21 11.3	-41 28	A0:	14.8
82	-44 14364 N1		21 12.1	-44 03	A0	13.5
83		-45 14276	21 12.4	-44 46	A2	12.1
84	-41 14447 S1		21 13.7	-40 57	A0	12.4
85	-42 15347 W1		21 13.8	-42 34	A3	12.9
86	-40 14248 E1		21 14.2	-40 33	A2	12.4
87	-42 15348 S1		21 14.3	-42 28	A7	14.0
88*		-42 15358	21 15.3	-42 37	A7:	12.8:
89	-43 15352 E1		21 15.3	-42 15	A0:	13.9
90		-43 14477	21 16.3	-43 38	A2	12.4
91		-44 14410	21 16.5	-44 23	A0	12.2
92	-44 14412 N1		21 16.6	-44 18	A2	14.2
93		-43 14481	21 17.0	-43 21	A5	12.4
94	-41 14475 N1		21 17.9	-40 50	A3	14.0
95	-40 14320 W1		21 19.6	-40 22	A2	12.2
96		-42 15420	21 20.5	-42 05	A5	12.6
97	-40 14324 W1		21 20.5	-40 03	A3:	15.4:
98		-45 14323	21 20.7	-44 45	A0	11.3
99*		-43 14529	21 22.3	-43 26	A2	10.4
100	-40 14335 S1		21 22.4	-40 39	A2	14.5
101	-40 14335 E1		21 22.8	-40 24	A0:	14.8:
102		-42 15453	21 23.8	-42 38	A2	12.1
103	-44 14466 E1		21 24.0	-43 44	A2	13.6
104	-44 14477 N1		21 24.3	-44 03	A2	14.3
105	-40 14358 S1		21 25.3	-40 21	A3:	14.9:
106	-44 14486 E1		21 26.3	-44 37	A3	13.3
107	-44 14505 W1		21 26.4	-43 42	A0	14.2
108	-44 14506 S1		21 26.6	-44 24	A0	13.2
109		-41 14533	21 26.9	-41 21	A3	11.3
110	-44 14509 W1		21 27.0	-44 29	A2	13.8
111	-40 14379 N1		21 27.0	-40 12	A5	13.3
112	-42 15469 E1		21 27.8	-42 00	A3	14.3
113		-43 14579	21 28.4	-43 05	A7	11.7

Notes to Table II

- 6 NE component.
- 12 G band visible.
- 22 Faint companion.
- 24 SE Component.
- 29 HD 199031.
- 48 Faint companion.
- 58 H lines broad.
- 60 HD 200886.
- 65 HD 201244.
- 71 Possible variable; spectral class ranges from A2 to F8 on different plates.
- 75 HD 201728.
- 88 SW component.
- 99 HD 203756; H lines weak.

A colon after the spectral type indicates that the classification is doubtful, usually because of faintness, but sometimes because of overlap. Finding charts for the stars which are not plotted on the Cordoba Durchmusterung charts will be found in Figures 2 through 6. The catalogue stars are indicated by a number and dash on either side of the star. Stars from Table 1 are indicated by a single dash without a number. The direct plates did not cover exactly the same area as the spectral plates; therefore, a few stars from Table 2 are not shown in figures 2 through 5. Individual charts are shown in Figure 6 for these stars.

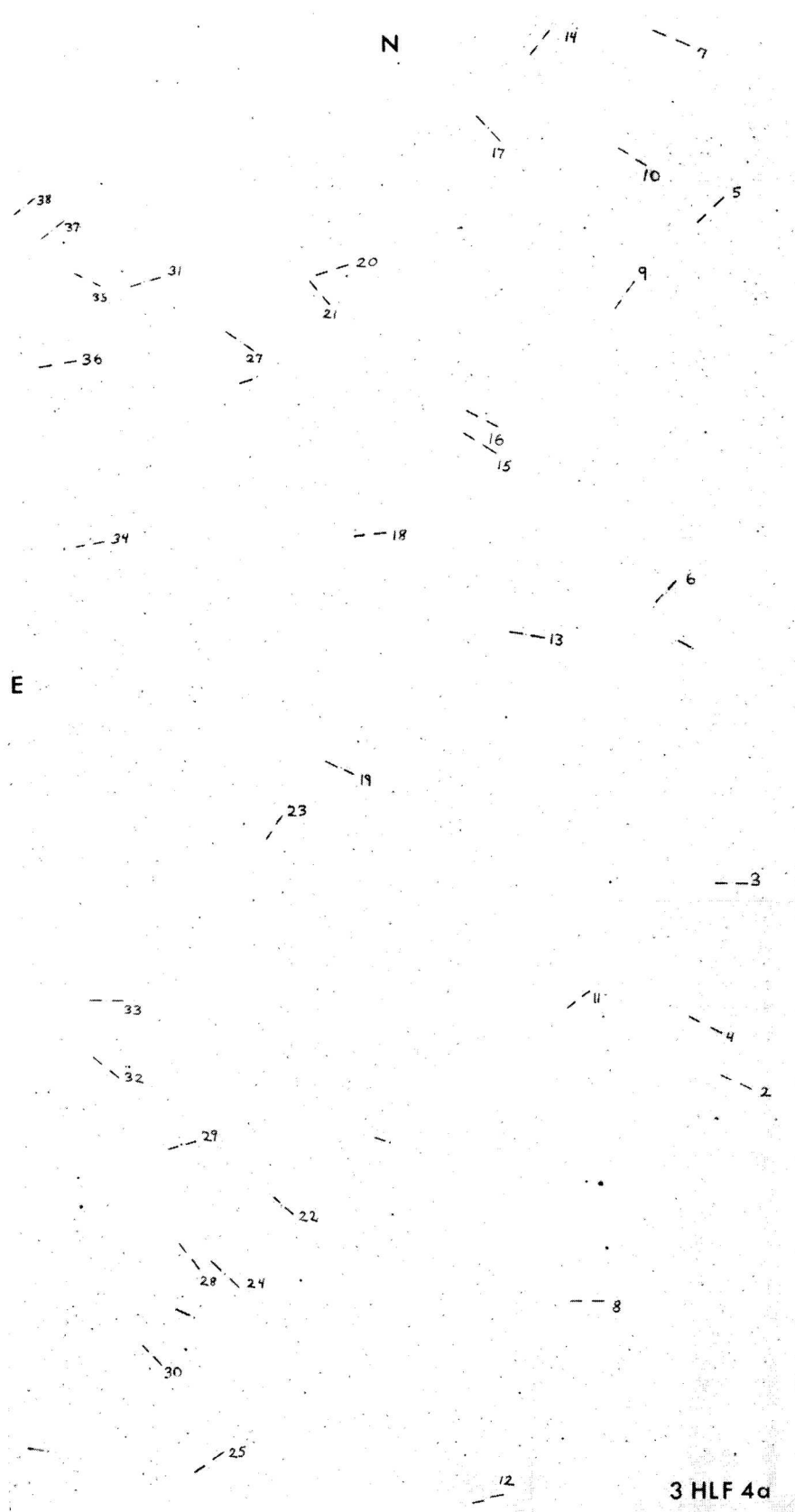


Fig. 2.—W portion of 3 HLF 4a. The plate is 5 degrees across.

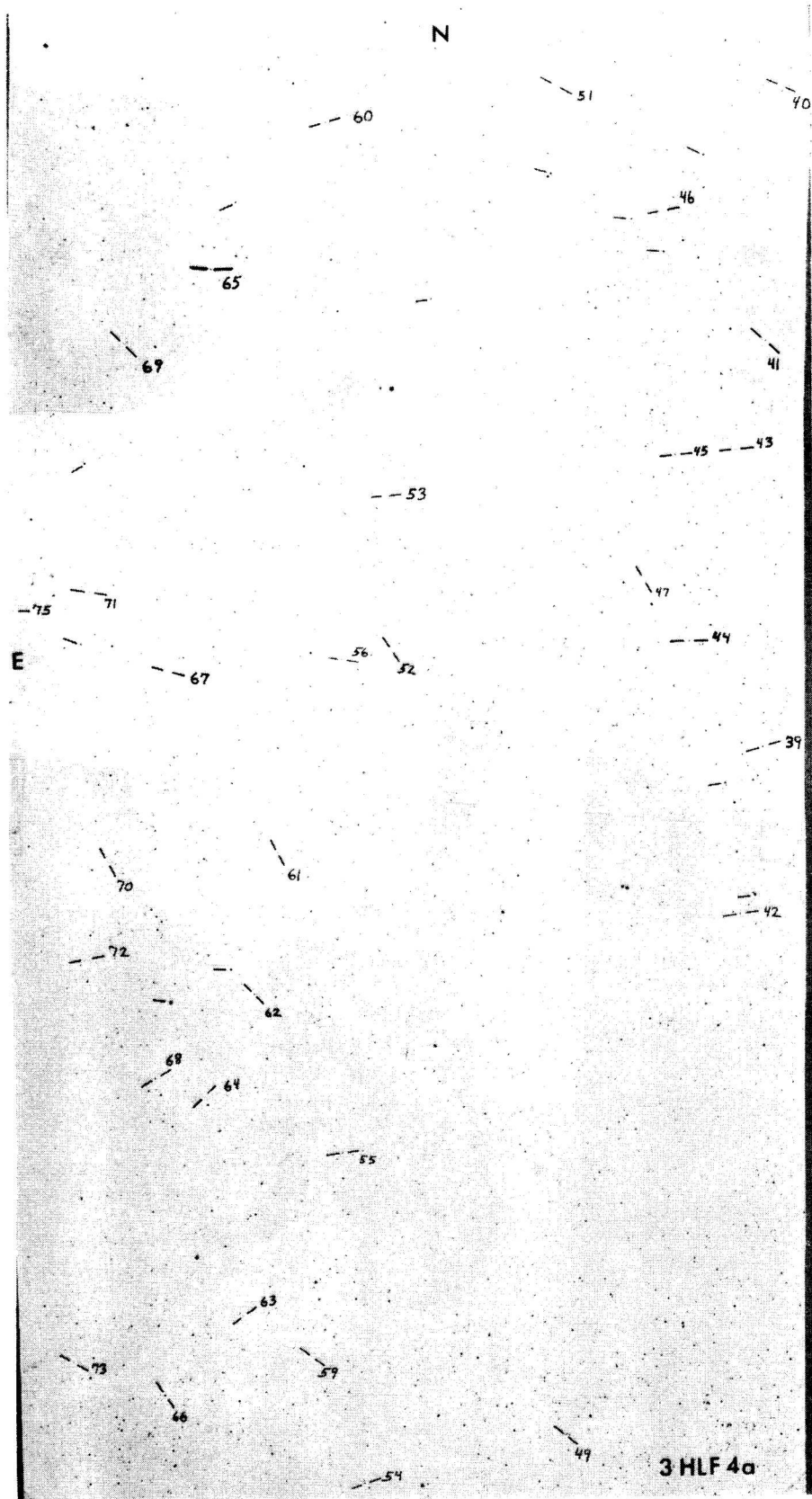


Fig. 3.—E portion of 3 HLF 4a.

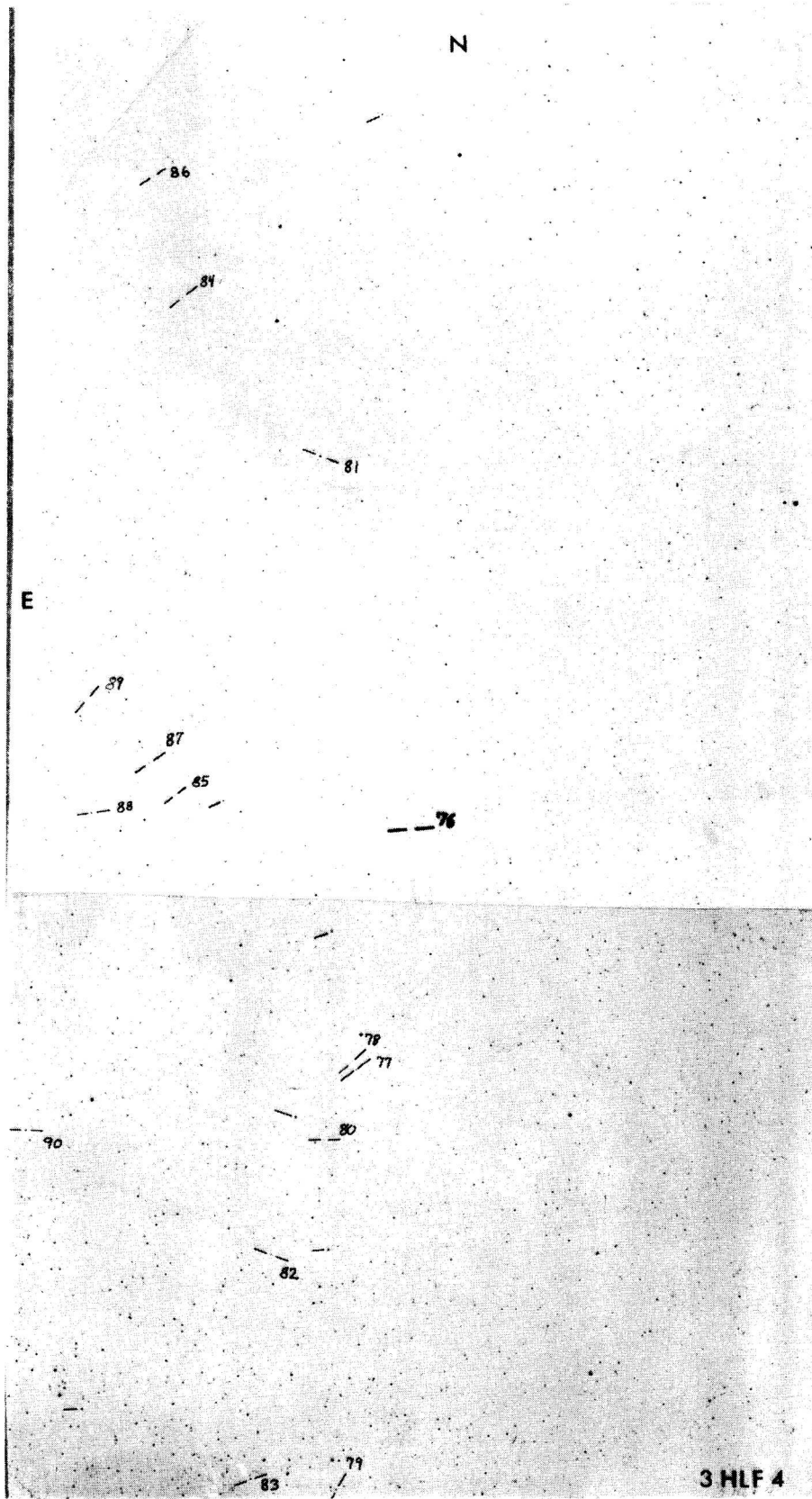


Fig. 4.—W portion of 3 HLF 4.

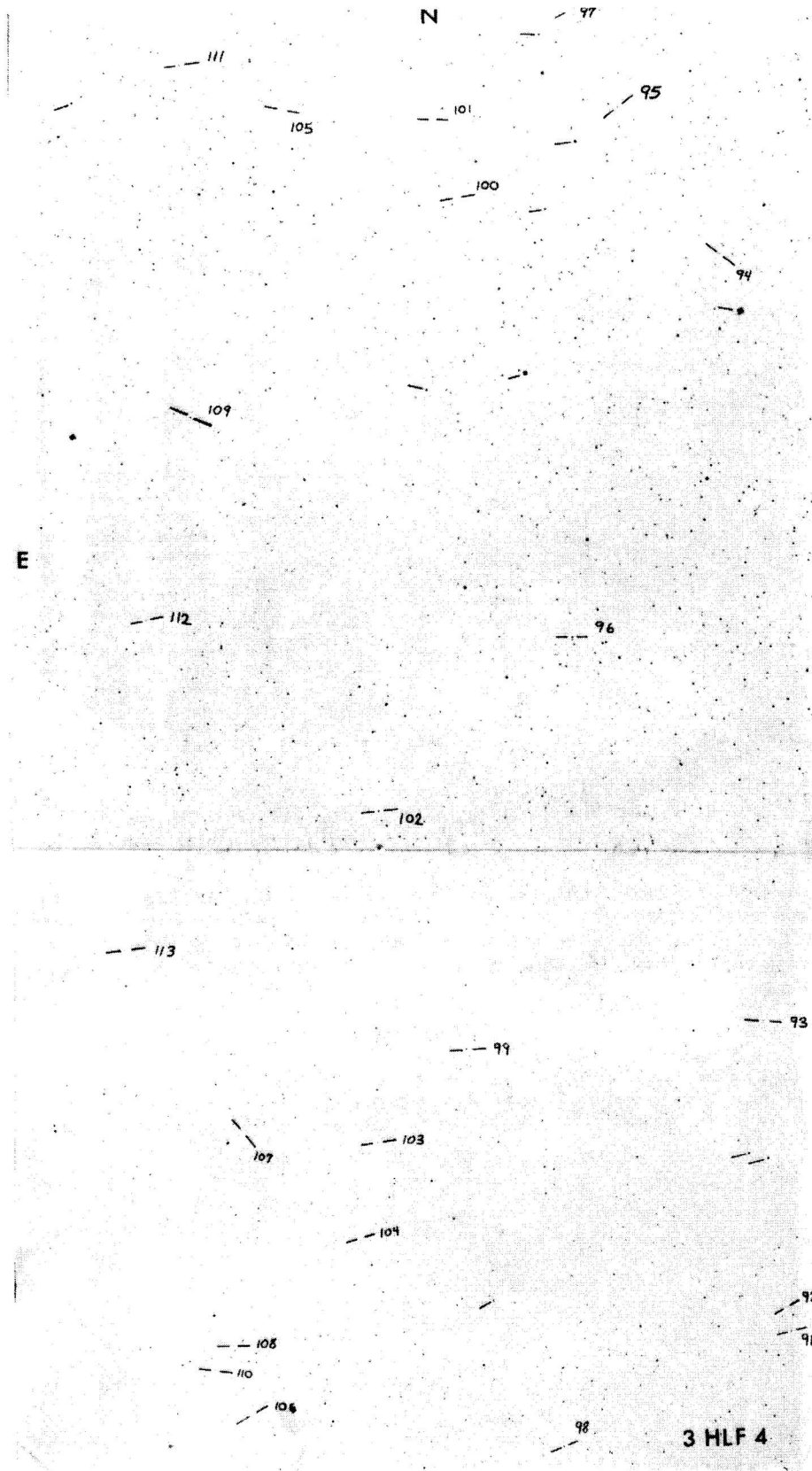


Fig. 5.—E portion of 3 HLF 4.

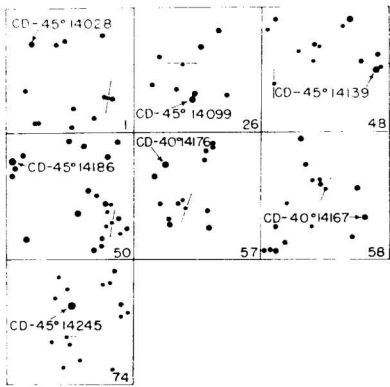


Fig. 6.—Individual charts for stars not shown in Figures 2-5. The charts are $30'$ on a side; North is up and East is to the left. The catalogue star is marked by a dash on either side.

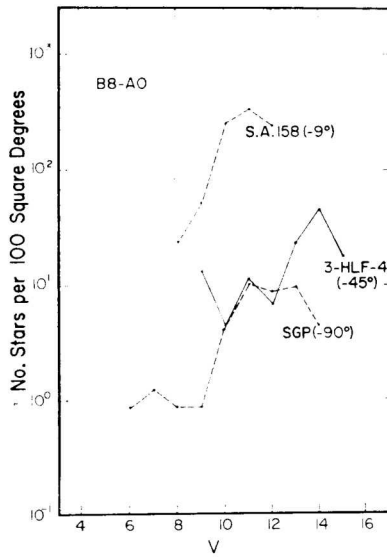


Fig. 7.—The number of stars per unit interval in apparent magnitude per 100 square degrees versus V magnitude for spectral classes B8-A0. The dashed lines indicate the distributions for the SGP and S. A. 158 regions; the solid line marks the distribution for 3 HLF 4.

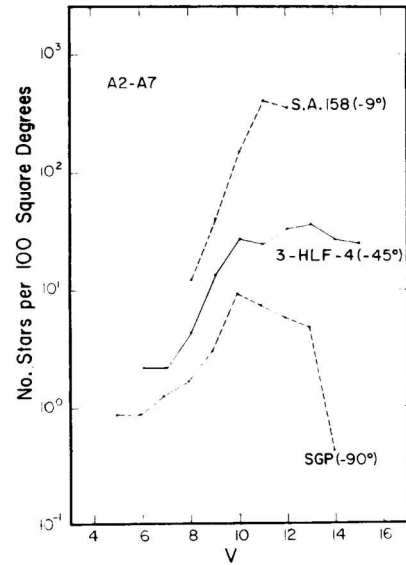


Fig. 8.—The number of stars per unit interval in apparent magnitude per 100 square degrees versus V magnitude for spectral classes A2-A7. The dashed lines indicate the distributions for the SGP and S. A. 158 regions; the solid line marks the distribution for 3 HLF 4.

IV. Remarks

The distribution of spectral type with apparent magnitude is shown in Figure 7 for spectral classes B8-A0 and in Figure 8 for classes A2-A7. The distributions found in the other areas investigated so far are also indicated in the graphs (SGP: Philip and Sanduleak 1968; S. A. 158: McCuskey 1964).

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REFERENCES

- McCuskey, S. W. 1964, *A. J.*, **69**, 104.
 Nassau, J. J., and Seyfert, C. K. 1946, *Ap. J.*, **103**, 117.
 Philip, A. G. D., and Sanduleak, N. 1968, *Bol. Obs. Tonantzintla y Tacubaya*, **4**, 253.