

A FINDING LIST OF F STARS OF HIGH LUMINOSITY

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Received February 4, 1952

ABSTRACT

A list of 111 stars which are probably F-type supergiants is given for a galactic belt 12° wide and extending over the northern sky from $l = 333^\circ$ to $l = 202^\circ$. The classification was made from objective-prism plates of the Warner and Swasey Observatory.

The objective-prism plates obtained for the Case survey for early-type stars of high luminosity have now been used for a survey of F0–G2 stars of luminosity classes I and II on the system of the Yerkes spectral atlas. The area covered is a belt extending in galactic latitude from $+6^\circ$ to -6° and between galactic longitudes 333° and 202° .¹ For the sake of completeness, all objects found to be within this range of spectral type and luminosity have been included; cepheids and known F-type supergiants are therefore listed.² The data are given in Table 1. When two spectral types are listed for the same star, they refer to estimates on plates of different exposure; the range in the types gives an idea of their uncertainty, except in the case of the cepheids, where spectral variations occur.

The classification of low-dispersion objective-prism spectra near F0 is especially difficult, because of the occurrence of peculiar stars similar to β Coronae Borealis. The segregation of high-luminosity stars should be most definite in the range F5–F8, since peculiar objects are not often encountered and some complications met with in the G and K stars are not present.

It should be emphasized that the types are, of necessity, only approximate; slit-spectrograms are now being obtained for all of the stars with the 40-inch refractor at Yerkes by Dr. W. P. Bidelman.

¹ J. J. Nassau and W. W. Morgan, *Ap. J.*, 113, 141, 1951.

² Spectra of hopelessly overexposed bright stars have not been considered.

TABLE 1
A FINDING LIST OF F-TYPE SUPERGIANTS

HD or BD No.	α (1900)	δ (1900)	m	HD Sp.	Case Sp.	Name
371.....	0 ^h 3 ^m 3	+62° 39'	6.59	G5	G2 II, cG+A:	.....
611.....	0 5.4	+60 15	8.56	K0	G0 Ib:	.....
725.....	0 6.5	+56 43	7.12	F5	F0 Ib or F0p	.....
1142.....	0 10.6	+60 27	6.62	G5	G0 II:	.....
4362.....	0 40.9	+59 2	6.49	G5	G2 I: or G2p:	HR 207
5851.....	0 55.0	+59 49	8.0	F5	F5 II	.....
6474.....	1 0.7	+63 15	8.4	K2p	G0 I	.....
7927.....	1 13.8	+57 42	5.25	F5p	F5 Ia:, F2 Ia	φ Cas
8906.....	1 22.7	+59 31	7.24	F5	F0 I:, F2 II:	.....
8992.....	1 23.5	+58 15	7.6	G5	F5 I:	.....
9250.....	1 25.9	+63 4	7.30	K0	G0 I:, G0 I	.....
9973.....	1 32.4	+60 34	7.11	G0	F2 I, F2 Ia	.....
10494.....	1 37.3	+61 21	7.46	G5	F2 I-comp.: cF+A:	.....
11544.....	1 48.3	+56 5	6.99	G5	G2 II:	.....
12399.....	1 56.5	+63 46	7.8	K5	G0 I	.....
14662.....	2 16.9	+54 55	6.46	G0p	F5 I	HR 690
17306.....	2 41.6	+53 44	7.8	K0	G0 I: +B:	.....
17971.....	2 48.2	+59 59	7.81	F5	F2 Ib:, F2 I	.....
18391.....	2 52.2	+57 16	7.46	K5	G0 Ia	.....
22451.....	3 31.6	+52 30	7.96	G5	F5 Ib, F5 II	.....
23359.....	3 39.5	+48 29	8.4	F5	F8 Ib:	.....
25056.....	3 53.8	+53 35	7.35	G5p	G0 I, G0 Ib	.....
26673-4.....	4 8.1	+40 14	4.89	G0	G2 I+B	52 Per
31913.....	4 54.5	+39 49	Var.	G5	G0 I, F5p	RX Aur
32655.....	4 59.7	+43 2	6.21	F2	F2 II	HR 1644
33503.....	5 5.6	+32 47	7.58	F5	F2 II	.....
36891.....	5 29.8	+40 7	6.18	K0	G0 Ib:	HR 1884
38232.....	5 39.2	+29 16	7.40	F2	F2 II	.....
38503.....	5 41.2	+35 7	6.60	G0	F8 II, F5 I	.....
39455.....	5 47.6	+18 8	7.4	F5	F2 II	.....
39949.....	5 50.8	+27 18	7.7	G5	G0 II	.....
43210.....	6 9.9	+12 8	8.5	F8	F2 II	.....
E 254429.....	6 11.2	+12 7	9.3*	G5	F8 II	.....
44990.....	6 19.8	+ 7 8	Var.	G5p	G0 Ib, G5 Ip	T Mon
48616.....	6 39.2	+ 3 15	7.3	G0	F2 II	.....
-19°1823.....	7 15.8	-19 16	9.7	.....	F2 Ib	.....
58526.....	7 20.9	- 5 35	6.08	G0	G0 I	HR 2833
59693.....	7 26.0	- 9 34	Var.	G5	G0p or G0 I	U Mon
165405.....	18 0.7	-19 5	9.1	G0	F5 I	.....
165553.....	18 1.4	-21 12	8.3	G5	G0 I:	.....
167516.....	18 10.5	+ 1 20	8.4	F8	F5 Ib:	.....
168393.....	18 14.3	-11 20	7.45	F8	F0 I	.....
168608.....	18 15.5	-18 54	Var.	F5p	F8 I	Y Sgr
170764.....	18 26.0	-19 12	Var.	F8	F5 Ia	U Sgr
172365.....	18 34.7	+ 5 10	6.30	G0p	F8 Iap	HR 7008
175580.....	18 50.9	+ 7 3	6.76	G5	G2 I	.....
176155.....	18 53.8	+17 14	5.37	F5	F8 Ia, F5 Ia	FF Aql
178332.....	19 3.1	+15 21	8.3	F8	F8 Ib:	.....
178359.....	19 3.2	+ 1 9	Var.	G5	F5 I	TT Aql
178695.....	19 4.5	+10 23	8.5	K0	F2 I	.....
180028.....	19 9.8	+ 5 52	7.24	F8p	F5 I, F2 Ia	.....
180583.....	19 12.0	+27 45	6.06	F8p	F5 Iab, F5 Ia	HR 7308
181214.....	19 14.5	+ 6 58	7.7	F5	F2 I	.....

TABLE 1—Continued

HD or BD No.	α (1900)	δ (1900)	m	HD Sp.	Case Sp.	Name
E 231195.....	19 ^h 16 ^m 1	+14° 14'	9.2*	G0p	F8 I	.....
182101.....	19 18.0	+ 9 43	6.25	F8	F2 II	HR 7354
182296.....	19 18.9	+ 8 28	7.08	K0	G2 Ib:	.....
182900.....	19 21.8	+12 49	5.77	F5	F5 Ib	HR 7389
+20°4166.....	19 26.0	+21 5	9.3	.....	F5 I	.....
183864.....	19 26.5	+24 54	8.1	G0	G0 Ib	.....
185059.....	19 32.3	+20 7	Var.	G5	F2 I, F8 I	U Vul
185353.....	19 33.6	+22 34	7.7	G0	G2 II	.....
185758.....	19 35.6	+17 47	4.37	G0	G0 Ib	α Sge
186688.....	19 40.8	+29 1	Var.	F2p	F5 Ib, F2 I, F5 II	SU Cyg
187321-2.....	19 44.3	+18 37	7.05	G0	G0 I+B8:, G2 I+B	.....
187428.....	19 44.8	+19 33	7.9	A	.....	.....
187505.....	19 45.2	+16 8	7.8	G5	F8 I or F8p	.....
187921.....	19 47.4	+27 12	Var.	K0	G2 Ib:	.....
E 226223.....	19 48.1	+38 30	9.8*	G0	F8 I	SV Vul
188121.....	19 48.5	+28 17	8.6	G0	F2 I:	.....
189378.....	19 54.6	+33 0	7.12	A5	F8 I	.....
190004.....	19 57.8	+24 39	5.32	F0	F2 I-II:	.....
+31°3907.....	19 59.3	+31 38	8.0	.....	F2 Ib or F0p	16 Vul
190446.....	19 59.9	+39 59	8.44	F2	G0 I	.....
+24°4008.....	20 3.4	+24 19	8.7	.....	F2 Ib:	.....
191546.....	20 5.4	+43 46	8.5	G0	F2 II	.....
191897.....	20 7.1	+36 45	8.0	G5	F2 Ib:	.....
E 228380.....	20 9.6	+34 45	9.9*	F8	F8 I, G0 I-II	.....
193370.....	20 14.8	+34 40	5.18	F5p	F5 I:	.....
193701.....	20 16.6	+45 2	7.02	F5	F2 I:	35 Cyg
194069.....	20 18.5	+40 48	6.43	G5	F2 Ib:	.....
194708.....	20 22.0	+42 17	6.79	F5	G2 I:, G0 I-II	HR 7795
195100.....	20 24.2	+42 44	7.54	K0	F2 II	.....
195405.....	20 26.0	+41 59	8.2	G5	G2 Ib:	.....
195593.....	20 27.2	+36 36	6.30	F8p	G0p, G0 I	.....
197376.....	20 38.2	+41 39	8.1	G0	F2 Ip, F2 I, F2p	44 Cyg
+46°3014.....	20 38.9	+46 50	8.5	.....	F5 II	.....
198797.....	20 47.7	+39 1	8.0	F2	F5 II	.....
200031.....	20 55.8	+38 25	6.69	G5	F2 I:	.....
200102.....	20 56.3	+44 36	6.79	G5	G2 Ib:	.....
200406.....	20 58.2	+47 6	7.7	F8	G2 Ib, G2 II	.....
203918.....	21 20.1	+50 4	8.17	F8	F5 II	.....
204022.....	21 20.7	+50 1	7.77	K0	F8 II	.....
205114-5.....	21 28.1	+52 11	6.20	K0	G0 Ib	.....
206121.....	21 34.9	+49 20	7.07	A3	G2 I: +B9:	HR 8242
209329.....	21 57.5	+47 49	7.9	G5	G2 Ib: or G2p	.....
213482.....	22 26.6	+56 20	8.6	F5	F0 Ib or F0p	.....
214847.....	22 35.9	+55 38	8.7	G5	F8 Ib	.....
214975.....	22 36.9	+56 19	Var.	K	F8 Ib:	.....
215807.....	22 42.7	+53 25	8.7	F5	G2 I	Z Lac
217476.....	22 55.9	+56 24	5.48	F5	F2 II	.....
218375.....	23 2.4	+60 55	6.74	G0p	G0 Ia	HR 8752
218600.....	23 4.2	+56 23	8.7	F5	F2 II	.....
219135.....	23 8.5	+56 0	7.6	G5	F2 Ib	.....
+61°2575.....	23 53.1	+62 4	9.0	.....	G0 I:	.....
					F8 Ib:	.....

* Photographic magnitude.

For the stars having slit spectra available, there are six of unusual interest because of high luminosity; these stars are listed in Table 2, together with 44 Cygni, which had

TABLE 2
NEW F5-G0 STARS OF LUMINOSITY CLASS Ia

HD or BD No.	α (1900)	δ (1900)	m	Sp.	Remarks
6474.	1 ^h 0 ^m 7	+63° 15'	8.4	G0 Ia	1
10494.	1 37.3	+61 21	7.46	F5 Ia	
17971.	2 48.2	+59 59	7.81	F5 Ia	
18391.	2 52.2	+57 16	7.46	G0 Ia	
E 231195.	19 16.1	+14 14	8.1	F5 Ia	2
+31°3907.	19 59.3	+31 38	8.0	F8 Ia	
195593.	20 27.2	+36 36	6.30	F5 Iab	44 Cyg

NOTES TO TABLE 2

1. See W. P. Bidelman, *Ap. J.*, **113**, 304, 1951.
2. See A. J. Cannon, *Pub. A.A.S.*, **5**, 6, 1922.

been classified as F5 Ia by Morgan and Roman.³ Since three other objects of the same spectral type have now been found whose luminosity appears definitely higher than 44 Cygni, the classification of the latter has been changed from F5 Ia to F5 Iab.

We are indebted to Dr. W. P. Bidelman for discussions and some unpublished data. This work was supported by a grant from the Office of Naval Research.

³ *Ap. J.*, **112**, 362, 1950.