

HARVARD COLLEGE OBSERVATORY.

CIRCULAR 167.

STARS HAVING PECULIAR SPECTRA. 31 NEW VARIABLE STARS.

A LIST of the variable stars and other objects having peculiar spectra discovered, by the late Mrs. Fleming, from an examination of the photographs of the Henry Draper Memorial, is probably completed in the present Circular. Similar objects recently found by other observers are also included.

Table I contains a list of the variable stars. The designation, the number, as assigned in the list of variables discovered at this Observatory, the constellation, the Durchmusterung number, the right ascension for 1900, and the declination for 1900, are given in the first six columns. The brightest and faintest observed magnitude, the difference, or range, the class of spectrum derived from the photographs, the number of photographs examined, and the name of the discoverer are given in the following six columns.

TABLE I.

NEW VARIABLE STARS.

Des.	H. V.	Constellation.	DM.	R. A. 1900.	Dec. 1900.	Bright.	Faint.	Range.	Spect.	No. Plates.	Discoverer.
<i>011556</i>	3316	Phoenix	-56° 277	<i>h. m.</i> 1 15.9	-56 26	8.5	16.0	7.5	Md	19	Fleming
<i>023238</i>	3317	Perseus	+38° 525	2 32.1	+38 44	11.0	<14.0	>3.0	N	25	Cannon
<i>023530</i>	3318	Triangulum	+30° 428	2 35.0	+30 47	10.0	11.5	1.5	Mc5	29	Leland
<i>023534</i>	3319	Perseus	+33° 490	2 35.4	+34 5	8.5	9.1	0.6	Mc5	41	Fleming
<i>034025</i>	3320	Fornax	..	3 40.3	-25 32	9.8	<13.0	>3.2	..	17	Mackie
<i>044336</i>	3321	Caelum	-36° 1884	4 43.8	-36 23	8.7	10.3	1.6	N	33	Fleming
<i>051532</i>	3322	Auriga	+32° 957	5 15.3	+32 24	9.2	10.6	1.4	Md	32	Fleming
<i>054046</i>	3323	Pictor	-46° 1969	5 40.4	-46 30	11.0	<15.0	>4.0	N	19	Wells
<i>065041</i>	3324	Auriga	+41° 1556	6 50.3	+41 14	9.6	12.6	3.0	N	17	Fleming
<i>070207</i>	3325	Monoceros	- 7° 1742	7 2.1	- 7 24	12.8	14.0	1.2	..	13	Wells

Des.	H. V.	Constellation.	DM.	R.A. 1900.	Dec. 1900.	Bright.	Faint.	Range.	Spect.	No. Plates.	Discoverer.
094641	3326	Vela	-41° 5381	<i>h. m.</i> 9 46.0	<i>° '</i> -41 34	9.2	10.5	1.3	Mc5	23	Fleming
111819	3327	Crater	-19° 3254	11 18.9	-19 22	9.2	10.2	1.0	Mc5	22	Fleming
131044	3328	Centaurus	-44° 8539	13 10.7	-44 10	9.0	9.6	0.6	Pec.	14	Fleming
181021	3329	Sagittarius	..	18 10.7	-21 36	11.8	<15.0	>3.2	..	260	Breslin
182216	3330	Sagittarius	..	18 22.3	-16 50	10.9	<15.0	>4.1	Md	16	Fleming
182604	3331	Ophiuchus	+ 4° 3779	18 26.4	+ 4 19	14.0	15.0	1.0	N	23	Wells
183242	3332	Coron. Austr.	-42° 13488	18 32.9	-42 41	12.2	15.5	3.3	..	24	Mackie
185200	3333	Aquila	+ 0° 4064	18 52.5	+ 0 19	9.6	11.0	1.4	..	48	Wells
185414	3334	Aquila	+14° 3729	18 54.0	+14 14	9.6	11.6	2.0	..	33	Wells
191117	3335	Sagittarius	..	19 11.9	-17 39	10.0	14.0	4.0	..	9	Mackie
191632	3336	Sagittarius	-32° 15116	19 16.3	-32 19	10.3	14.0	3.7	..	10	Mackie
192118	3337	Sagittarius	..	19 21.2	-18 43	9.4	15.0	5.6	Md	15	Fleming
200020b	3338	Sagitta	+20° 4417	20 0.7	+20 22	10.0	12.0	2.0	N	28	Wells
201737	3339	Cygnus	+37° 3903	20 17.9	+37 13	11.5	12.5	1.0	..	15	Wells
203246	3340	Indus	-47° 13487	20 32.2	-46 57	10.3	11.1	0.8	Md?	27	Fleming
205833	3341	Microscop.	..	20 58.4	-33 40	9.3	<15.0	>5.7	Md	18	Fleming
210415	3342	Pegasus	..	21 4.3	+15 38	10.1	<14.0	>3.9	Md	25	Cannon
212545	3343	Grus	-45° 14361	21 25.3	-45 29	9.8	14.0	4.2	..	38	Mackie
224930	3344	Piscis Austr.	-30° 19355	22 49.8	-30 9	8.4	9.7	1.3	Mc5	29	Fleming
225745	3345	Andromeda	+45° 4121	22 57.2	+45 21	11.5	12.2	0.7	..	14	Wells
234860	3346	Cassiopeia	+60° 2634	23 48.0	+60 27	11.0	11.7	0.7	Mc	24	Wells

REMARKS.

070207. Spectrum Type IV, according to Espin. No trace of spectrum seen on several good photographs.
181021. This is a variable star of the Algol type. It is faint on 6 of the 260 photographs examined by Miss Breslin.
185200. Spectrum Type IV, according to Espin. Too faint on the photographs to classify.
185414. Spectrum Type IV, according to Vogel. Spectrum is barely seen on the best photographs, and is too faint to classify.
201737. See 185200.
210415. This is a variable star of long period. The formula for times of maximum, J.D. 2410088 + 122^d E, was found by Miss Cannon from an examination of 25 photographs.
225745. See 185200.
234860. Spectrum Type IV, according to Espin.

In addition to these new variable stars, the three stars, -19° 4644, +43° 3425, and +41° 3632, which have previously been announced by Espin and Backhouse to be variable, have been found independently by Miss L. D. Wells, and their variability has been confirmed on from 11 to 24 photographs.

Table II contains a list of the stars having peculiar spectra. The Durchmusterung number, the right ascension for 1900, the declination for 1900, the Durchmusterung magnitude, the class of spectrum, a brief description of the spectrum, and the name of the discoverer are given in the successive columns.

TABLE II.
PECULIAR SPECTRA.

DM.	R.A. 1900.		Dec. 1900.		Magn.	Spectrum.	Description.	Discoverer.
	<i>h.</i>	<i>m.</i>	<i>°</i>	<i>'</i>				
+41° 1556	6	50.3	+41	14	9.3	N	Normal fourth type	Fleming
-11° 1760	6	59.0	-11	24	9.0	O	Bright lines	Fleming
-58° 1865	10	1.2	-58	11	9.0	R	H β bright	Fleming
-61° 3787	13	26.4	-61	50	9.7	O	Bright lines	Fleming
-32° 12518	17	9.0	-32	32	8.0	B 8p	H β bright	Cannon
	17	53.3	-38	49	..	P	Bright lines. Gaseous nebula	Fleming
+57° 2374	21	39.3	+57	17	7.2	Bp	H β bright	Cannon

REMARKS.

<i>h. m.</i>		<i>h. m.</i>
6 59.0. Galactic longitude, 192° 16'; galactic latitude, -1° 13'.		13 26.4. Galactic longitude, 275° 27'; galactic latitude, -0° 20'.
10 1.2. H β is a well marked bright line. Spectrum otherwise is nearly continuous.		17 53.3. Galactic longitude, 321°; galactic latitude, -9°.

EDWARD C. PICKERING.

SEPTEMBER 20, 1911.