HARVARD COLLEGE OBSERVATORY.

CIRCULAR 225.

FIFTY-ONE NEW VARIABLE STARS.

A systematic comparison of photographs of the Milky Way, taken with the 1-inch Cooke Telescope, for the purpose of detecting new stars, has been carried on at this Observatory for the past two years. Besides the discovery of eight novae, as already announced in the Bulletins, a number of new variable stars have been found, several of which have been included in recent Circulars. The others are given in Table I, together with a few which have been found during various other photographic investigations. All suspected objects have been omitted. The variation of all the stars included in this Table has been confirmed by Miss Cannon or Miss Leavitt. The form of the Table is the same as that of Table I in H. C. 201. The ninth column gives the most probable class to which the variable belongs as determined by the observations already made. The Remarks contain additional facts, including the class of spectrum for all stars included in the Henry Draper Catalogue, and also for a few fainter stars. Attention may be called to the peculiarities of the variables, 044930b, and *065911*, which are described in the Remarks.

TABLE I.

FIFTY-ONE NEW VARIABLE STARS.

Des.	H. V.	Constellation.	DM.	R.A. 1900.	Dec. 1900.	Bright.	Faint.	Class.	Discoverer.
				h. m. s.	° ′				
001973	3549	Cepheus	..	0 19 17	+73 22.0	10.3	12.0	IV	J. C. Mackie
012360	3550	Cassiopeia	246	1 23 0	+60 27.4	9.4	10.7	V	J. C. Mackie
015427	3551	Triangulum	318	1 54 52	+27 24.0	9.1	10.9	V	A. D. Walker
034238	3552	Perseus	811	3 42 57	+38 39.5	9.0	10.5	V	M. D. Applegate
040246	3553	Perseus	..	4 2 17	+46 18.6	11.0	12.2	IV?	J. C. Mackie
044930b	3554	Auriga	741	4 49 23	+30 24.0	7.0	8.9	III	M. D. Applegate
051950	3555	Auriga	..	5 19 15	+50 1.6	10.6	<13.6	..	M. D. Applegate
052238	3556	Auriga	1168	5 22 6	+38 58.0	11.0	12.1	IV	M. D. Applegate

Des.	H. V.	Constellation.	DM.	R.A. 1900.	Dec. 1900.	Bright.	Faint.	Class.	Discoverer.
				h. m. s.	° ′				
*053004*h	3557	Orion	..	5 30 45	− 4 28.8	13.6	15.3	III?	M. D. Applegate
*053205*b	3558	Orion	..	5 32 32	− 5 27.3	15.4	16.3	..	M. D. Applegate
060623	3559	Gemini	..	6 6 0	+23 31.6	9.7	10.5	..	J. C. Mackie
060620	3560	Lepus	1314	6 6 40	−20 11.5	9.2	10.3	V	I. E. Woods
063201	3561	Monoceros	..	6 32 27	− 1 18.3	9.6	<13.5	II	I. E. Woods
063832	3562	Gemini	1393	6 38 52	+32 24.9	10.3	11.2	IV?	J. C. Mackie
064537	3563	Puppis	3101	6 45 30	−37 9.7	9.5	10.5	..	I. E. Woods
064601	3564	Monoceros	..	6 46 25	− 1 15.0	10.6	11.8	IV	A. D. Walker
065911	3565	Canis Major	1760	6 59 2	−11 23.7	8.9	11.0	III	A. D. Walker
072005	3566	Monoceros	..	7 20 46	− 5 38.9	8.4	<13.2	II	I. E. Woods
074802	3567	Monoceros	2331	7 48 18	− 2 46.7	9.0	10.9	V	M. D. Applegate
075343	3568	Puppis	..	7 52 58	−43 52.6	9.2	<13.6	II	I. E. Woods
081213	3569	Puppis	..	8 12 37	−13 29.8	9.5	<13.1	II?	I. E. Woods
081542	3570	Puppis	4112	8 15 25	−42 26.4	9.3	10.3	..	M. D. Applegate
082509	3571	Hydra	..	8 25 2	− 9 4.1	10.7	<13.6	V	J. C. Mackie
084934	3572	Pyxis	5361	8 49 26	−34 26.2	8.6	11.0	III?	M. D. Applegate
090908	3573	Hydra	..	9 8 58	− 8 54.4	9.9	11.3	..	I. E. Woods
093139	3574	Antlia	5653	9 31 38	−39 27.1	9.3	10.9	..	M. D. Applegate
095727	3575	Leo	..	9 57 0	+27 10.6	11.4	<15.4	II	M. Harwood
102059	3576	Carina	2101	10 20 54	−59 40.9	8.8	10.1	..	I. E. Woods
105060	3577	Carina	2370	10 50 3	−60 33.6	9.6	11.0	..	M. D. Applegate
123053	3578	Centaurus	*5714*	12 30 32	−53 3.0	9.8	10.7	..	I. E. Woods
131016	3579	Virgo	3627	13 10 1	−16 56.8	9.0	<12.1	V	I. E. Woods
142043	3580	Lupus	9051	14 19 58	−43 41.8	10.4	11.8	..	I. E. Woods
145534	3581	Centaurus	10231	14 54 59	−34 5.1	10.4	<13.5	..	I. E. Woods
155240	3582	Lupus	..	15 52 43	−40 4.9	10.6	12.1	..	I. E. Woods
161931	3583	Corona	2847	16 19 9	+31 3.5	9.9	11.0	IV?	J. C. Mackie
162754	3584	Ara	7757	16 27 20	−54 32.6	10.1	<11.9	V	I. E. Woods
174058	3585	Pavo	..	17 40 7	−58 42.4	10.5	<13.5	II	I. E. Woods
174028	3586	Sagittarius	13577	17 40 46	−28 7.1	9.6	10.6	IV	I. E. Woods
*174734*c	3587	Scorpius	..	17 47 32	−34 19.2	12.3	15.2	II	M. D. Applegate
182621	3588	Hercules	3459	18 26 2	+21 47.6	7.4	9.0	IV	M. D. Applegate
184520	3589	Hercules	3950	18 45 43	+20 36.4	9.5	11.0	V	M. D. Applegate
193746	3590	Cygnus	2753	19 37 54	+46 32.7	9.3	10.4	..	J. C. Mackie
194044	3591	Sagittarius	..	19 40 14	−44 42.9	10.5	<13.5	..	I. E. Woods
194500	3592	Aquila	..	19 45 53	− 0 50.5	13.2	14.9	..	M. D. Applegate
194727	3593	Vulpecula	3536	19 47 25	+27 11.9	7.7	9.6	IV?	J. C. Mackie
200033	3594	Cygnus	3718	20 0 37	+33 49.6	8.9	10.7	IV	J. C. Mackie
211546	3595	Cygnus	3267	21 15 21	+46 35.1	9.2	10.8	III?	J. C. Mackie
213822	3596	Pegasus	*4603*	21 38 9	+22 0.9	10.0	10.9	..	J. C. Mackie
225134	3597	Lacerta	4794	22 51 19	+34 39.6	9.5	11.0	..	M. D. Applegate
233647	3598	Andromeda	*4128*	23 36 35	+47 2.5	10.3	11.4	IV	M. D. Applegate
233724	3599	Pegasus	..	23 37 14	+24 22.2	11.4	12.2	IV	M. D. Applegate

REMARKS.

012360. The spectrum is of an early division of Class B. Two photographs taken on October 20, 1919, $14^h\ 53^m$ and $15^h\ 53^m$, G.M.T. show the star at minimum, but at $17^h\ 4^m$ on the same night, the light had commenced to increase. The star was bright on November 18 and 24, 1919.

015427. H. D. 12211. Spectrum A0.

034238. The spectrum is of Class A.

044930b. H. D. 31293. Spectrum A0. To confirm the variation, an examination was made by Miss Applegate of 150 photographs, taken between 1914 and 1921. Only three minima were found. The star was faint from November 26 to 28, 1914, from March 4 to April 8, 1916, and from September 14 to 19, 1917. The variation appears to be irregular, although the class of spectrum suggests a variable of the Algol type. This star precedes the known variable, SU Aurigae, $13^s.6$, and is south 0′.4.

053004. Bond No. 773 in the Orion Nebula. The variation was found while observing the variable stars in the nebula.

053205. Found while observing variables in the Orion Nebula.

060620. The star is faint on 6 out of 50 photographs examined. Spectrum, Class A.

065911. H. D. 53179. Spectrum Bp. The light of this star has been measured by Miss Walker on 275 photographs taken between 1899 and 1921. The variation is irregular and the light curve bears some resemblance to that of R Coronae Borealis. During long periods the light is constant or subject only to minor fluctuations. At least two deep minima have occurred since 1899. The first lasted from February 1908 to April 1909. The last minimum occurred in November, 1920, magn. 11.4, and maximum light was not reached until about the middle of April, 1921. The spectrum has the lines Hβ and Hγ bright and contains numerous dark lines, some of which are due to helium. The spectrum during minimum is shown on several plates. It is faint, but Hγ appears to remain bright during that phase.

074802. The spectrum is of Class B8 on a photograph taken December 23, 1895. The variation is probably of the Algol type.

075343. A period of 338^d satisfies the observations already made.

081542. H. D. 70196. Spectrum F0. The period is short.

082509. The star is faint on about ten plates out of 150 which were examined.

084934. H. D. 76181. Spectrum K2.

093139. H. D. 83199. Spectrum Mc.

095727. This was a comparison star for measuring Eros on plates taken in 1900. Period about 307^d, determined by Miss Harwood.

102059. H. D. 90382. Spectrum Mb.

105060. H. D. 94599. Spectrum Ma.

123053. H. D. 109576. Spectrum Mb.

131016. H. D. 115122. Spectrum A2.

142043. H. D. 126387. Spectrum Mb.

145534. A star of the twelfth magnitude follows the variable $5^s.6$, south 0′.8.

162754. The spectrum is of Class A, and probably A0.

174028. Spectrum F5.

*174734*c. The variation was found during observations of *174734*b, Nova Scorpii, No. 2, which preceded 4^s, and was south 0′.5. Estimates of the magnitude on 180 photographs by Miss Applegate show that the period is probably long.

182621. Spectrum F8.

184520. Spectrum F.

194500. The variation was found during a search for Asteroid 1903 NF.

194727. Spectrum K0 at maximum, changing to K5 or Ma at minimum.

200033. The period is probably short. Spectrum K5?

211546. Spectrum K2.

213822. Spectrum Mb.

225134. Spectrum K2.

233724. The variation was found while measuring Eros on photographs taken in 1914.

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MAY 2, 1921.