HARVARD COLLEGE OBSERVATORY

BULLETIN 790

Fifteen New Variable Stars.— The following new variable stars were found by Miss Leavitt on Harvard photographs in the years 1916 to 1919. The variability has been confirmed in all cases by Miss Walker and Miss Fairfield.

Harvard Variable	DM.	R.A. 1900 h m	Dec. 1900 ° ′	Maximum	Minimum
3664	..	0 56.2	+37 34	10.9	11.7
3665	+26° 199	1 8.3	+26 37	10.0	10.7
3666	+23° 159	1 8.9	+23 53	9.9	10.5
3667	..	1 11.8	+38 26	9.7	10.9
3668	..	1 14.1	+30 40	11.5	12.4
3669	+21° 188	1 18.8	+21 21	10.8	12.0
3670	..	1 20.2	+20 52	11.5	[12.7
3671	+41° 376	1 50.8	+41 36	9.7	10.5
3672	+27° 433	2 40.4	+27 27	10.4	11.7
3673	−24°2096	4 2.2	−23 56	12.0	12.6
3674	..	7 51.3	+21 35	11.7	[14.0
3675	− 2°3280	10 58.5	− 2 40	10.2	11.0
3676	+37°2480	13 55.2	+37 41	9.9	10.8
3677	..	14 0.1	− 9 41	11.7	13.5
3678	−14°5604	19 53.0	−14 13	11.9	[12.5

Nos. 3664 to 3672 and 3676 were discovered in the systematic examination of Harvard Maps 11 and 17, on plates made with the 1-inch Cooke lens. Nos. 3673, 3675, and 3678 were found on plates taken with the 8-inch Bache telescope, and 3674 and 3675 on plates taken with the 16-inch Metcalf telescope. The magnitudes are based on a provisional scale.

Apparently Nos. 3671 and 3672 are eclipsing variables, and 3669 and 3670, long period variables. The period of 3668 is probably short, and 3666 appears to be a cluster type variable, according to fifty observations by Miss Leavitt. The spectrum of No. 3675 is Mc.

First List of Suspected Objects.— In the systematic examination of Harvard photographs, an apparently genuine image is frequently found that is not confirmed on preceding or succeeding plates. The comparison plates, however, may be separated by days, weeks, or months from the single plate that shows the

image. At least some of these are probably the images of objects that have changed conspicuously in position or magnitude. The positions and approximate magnitudes of a few, which have been noted by Miss Woods on plates made with the 16-inch Metcalf telescope, are given below.

The object at $18^h\ 48^m.0$, $+35°\ 37'$ does not appear on a photograph taken two days later, which shows stars three magnitudes fainter than the suspected object; it is in Lyra near the Milky Way where faint novae might be expected. The first and third objects in the list are near the positions of the asteroids (675) Ludmilla and (472) Roma on the corresponding dates.

Date	R.A. 1855 h m	Dec. 1855 ° ′	Approximate Magnitude	Object
Aug. 28, 1922	0 56.3	+21 53	12	Variable
Dec. 28, 1920	1 29.9	+31 3	13	Asteroid
Dec. 19, 1922	1 37.3	−12 31	11	Asteroid
Sept. 26, 1922	2 36.1	+28 16	11	Asteroid
Sept. 14, 1921	3 32.4	+ 3 12	14	Variable
May 6, 1919	13 50.0	+26 34	13	Variable
June 21, 1919	17 24.2	+24 38	12	Asteroid
June 21, 1919	17 33.3	+21 16	13	Nova or Variable
July 17, 1923	18 48.0	+35 37	13	Nova

A well-defined variable nebulosity, for which the position for 1925 is $14^h\ 42^m$, $+24°\ 27'$, appears on photographs made with the 16-inch Metcalf telescope in February, 1919, and May and July, 1923, but is missing from both earlier and later plates made with the same and other telescopes. The reality of the object, which resembles known variable galactic nebulae, has not yet been proved or disproved, but the high galactic latitude and large magnitude variation count against it. Several observatories were asked to observe the region, and recent observations communicated from the Yerkes, Lowell, and Mount Wilson Observatories confirm the latest Harvard photographs in showing no further trace of the suspected object. A long exposure photograph made by Dr. Hubble with the 100-inch reflector shows more than one hundred faint nebulous objects within half a degree of the above position, but apparently none is of the galactic type.

In addition to the objects that appear on only one photograph, occasionally a star, otherwise of constant magnitude, shows a single conspicuous brightening or diminution of light, which is, no doubt, sometimes real and sometimes the result of a superposed but unrecognizable photographic defect.

A wide variety of photographic defects that resemble the images of stars, comets, nebulae, asteroids, and meteors are, of course, readily recognized. For

one reason or another they appear frequently on the photographs, but peculiarities of form and texture permit easy recognition of their spurious character.

Variable Stars.— The bi-monthly compilation of current data on variable stars of long period by Mr. Campbell shows that the following variables will be brighter than magnitude 8.0 on September 1, 1923.

001620	*043562*	*082405*	100860	*133155*	160325	*184205* *	201647
011272	*051533*	094211	*103212*	*133633*	163266	*195142*	210868 D
021403 D	054920 I	*094622*	122001	142539	164715	*201121*	213244
025050 I	*071044*	*100661* I	123307	154428 *	*165030*		

The following variables will be between magnitudes 8.0 and 10.0.

001755 I	*035124*	061647	*093014*	*140959* D	*165208*	*191017* D	210812
001909 I	041619	*065208* D	093178 D	143227 I	*170215* I	*191033* I *	*210903*
004435 I	043065 D	065355 D	*095458*	*150605*	170627	192928 I	213678 I
013338 I	043274 I	*070772* I	*101153*	151714	171723 D	193311	214024
015354 D	045307	073723 I	*104620*	*151822* D	*172486*	193449 D	215605 I
021558 I	*045514* I	*074241*	*104628*	154536 I	172809	193509	*221321* D
022000 I	*051247*	074323	*115058*	154639	*174162*	194048 I	*221938*
022426	052034	081617 D	122532	*155823*	180531 I	194632 I *	222439
022813 D	053068 I	*082476*	*122854*	*161122*a D	181031 I	200715a	*222867*
023133 D	053531	084803 I	124606	*162112*	181136	200938	*223463*
024356	054319 *	085120	*132422*	162807	183308	203816	*233815*
031401 D	*054331* D	*091868*	*134236* I	163172	190108 D	*203905*	*235150* D
032043 I	*054629* D	*092962*	*134536*	*164844* D	*190819*a	*204102*	

The following variables will be between magnitudes 10.0 and 12.0.

001046 I	*043263* D	081112	141567	161138 I	182224 I	195553 D	*215717*
001862 D	*052404* I	*085008* I	144918	162119 D	184300 D	*200822* *	*215828* D
002546 D	*053005*	093934 D	*145971*	*162319*	*185437*a	*200906* I	215934 D
004435 D	054615a	*094023* I	*150018* D	163137 I	*190819*b	*201139* I	220412 D
004958 D	055353	*094953*	*151520* D	*164319* D	*190907*	201437b	*221948*
011712 I	060450 D	095421 D	*152849* I	*165636* D	190925 I	*202622* D	*225120* D
012502 D	063308	103769 D	*153020*	171401 I	190933a I	203847 I	230759 D
013238 D	064030 I	110506 I	153378 D	*173543* I	*191319*	*204104* D	231425 I
014958 I	070109 I	*114441* I	*153654* I	*174406*	191350	*210221*	231508 D
021143a I	070122a I	115919 D	*154736*	*174551* D	191637	*210504*	232848
022980 D	070310 I	123961 D	155229 I	175458a I	194348 I	*210516*	233335
025751 I	071201 I	*131283* I	*160021*	175458b	*194659* D	*211615* D	235053 I
042209 D	071713	133273 D	*160519*	*180363* D	*194929* I	*212814* *	*235209* I
042215 D	072708 D	*134677* D	160625 D	181103 I	*195202* D	213843 *	235939 D
042309 D	073508	140113 I	*161122*b I	*182133* D	*195308* I	*214247* I	