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VARIABLE STARS IN MWF 189

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Milky Way Field 189 (17^h39^m, $-26°.2$; galactic longitude 330°, latitude 0°.0) has recently been examined for variable stars. A comparison of twenty-six plates with five glass positives has resulted in the discovery of eighty-six new variables. There are, in addition, thirty-two variables that have already been published.

The plate material in this field consists of six MF plates (10-inch Metcalf telescope) taken in 1924 and 1925, fifty B plates (8-inch Bache) taken from 1930 to 1939, and twenty-nine A plates (24-inch Bruce) taken in 1926. The A plates cover the central area of twenty-five square degrees, and beyond this area the discovery of variables on the B plates is not very effective; therefore the edges of the field have not been as thoroughly examined as in a similar investigation of MWF 186 (H.A., **90**, No. 8). For the determination of the magnitudes there were available plates of overlapping Milky Way fields, which contributed over a hundred more observations on many of the variables. In addition, patrol plates of the RB series, and early B plates extending back to 1889, were used; and for variables brighter than $12^m.5$, AM patrol plates also were measured. The magnitudes are based on a sequence derived from Selected Area 157 (17^h25^m, $-30°10'$), which was extrapolated to $16^m.5$.

Table I lists the known variables for which no new information was obtained.* In Table II appear the new variables as well as those previously known for which further information can now be published. The form of the table is the same as that of Table II, Harvard Annals, **90**, No. 8. Initial epochs are given for observed maxima of long-period, Cepheid, and cluster-type variables, and for minima

TABLE I

TWELVE VARIABLES OF PREVIOUSLY KNOWN PERIOD AND TYPE IN MWF 189

Name	R.A. (1900)			Dec.		Max.	Min.	Type	Period	Spectrum	Reference
	h	m	s	°	′	m	m		d		
H.V. 7901	17	23	28	−28	52.8	13.0	13.8	Cluster	0.309	...	H.A., **90**, No. 8
H.V. 7906		25	42	−29	55.7	13.2	14.0	Irregular	...	...	H.A., **90**, No. 8
H.V. 7908		27	37	−29	45.5	14.6	15.7	Eclipsing	0.775	...	H.A., **90**, No. 8
H.V. 7913		30	48	−29	46.4	12.3	13.5	Eclipsing	2.705	...	H.A., **90**, No. 8
H.V. 7920		35	40	−28	14.9	13.2	[16.5	Eclipsing	27.848	...	H.A., **90**, No. 8
H.V. 7923		39	42	−29	37.6	12.7	13.8	Eclipsing	1.238	...	H.A., **90**, No. 8
X Sgr		41	15	−27	48.1	4.8	5.9	Cepheid	7.012	F8	B.A.N., **7**, No. 288
V 732 Sgr		49	50	−27	20.5	6.7	[12.0	Nova, 1936.32	...	Pec.	P.A.S.P., **49**, 342; H.B.907
Nova 2 Sgr		54	26	−27	32.8	7.8	16.3	Nova, 1910	...	Pec.	H.A., **84**, 201
WY Sgr		54	55	−23	01.1	9.7	10.8	Eclipsing	4.670	B9	H.R.68
KY Sgr		55	08	−26	24.0	10.6	[16.5	Nova, 1926	...	...	H.B.861
W Sgr		58	38	−29	35.0	4.7	6.1	Cepheid	7.59	G0.5v	H.A., **90**, 49

of eclipsing binaries and RV Tauri-type variables. Miss Cannon determined the spectra assigned in the Remarks. The color indices (derived in the same manner as those for MWF 186) are very approximate, but they serve to show the relative redness of some of the variable stars.

Light curves for sixteen eclipsing binaries are given in Figure 1. Figure 2 shows the light curves of two cluster-type, four Cepheid, and two RV Tauri-type variables; and Figure 3 gives the observations

*Among Luyten's variables (Minn. Pub., **2**, 102–104) there are seven that, from the published positions, should fall in this region, but the right ascensions are in error by an hour. Dr. Luyten has written me that instead of 17 hours the right ascensions should read 16 hours, and that the stars are thus identical with previously known variables, as shown below:

H.V.9126=AE Sco
9147=KX Oph
9180=ER Oph
H.V.9182=EU Oph
9196=FK Oph
H.V.9199=FN Oph
9200=FL Oph

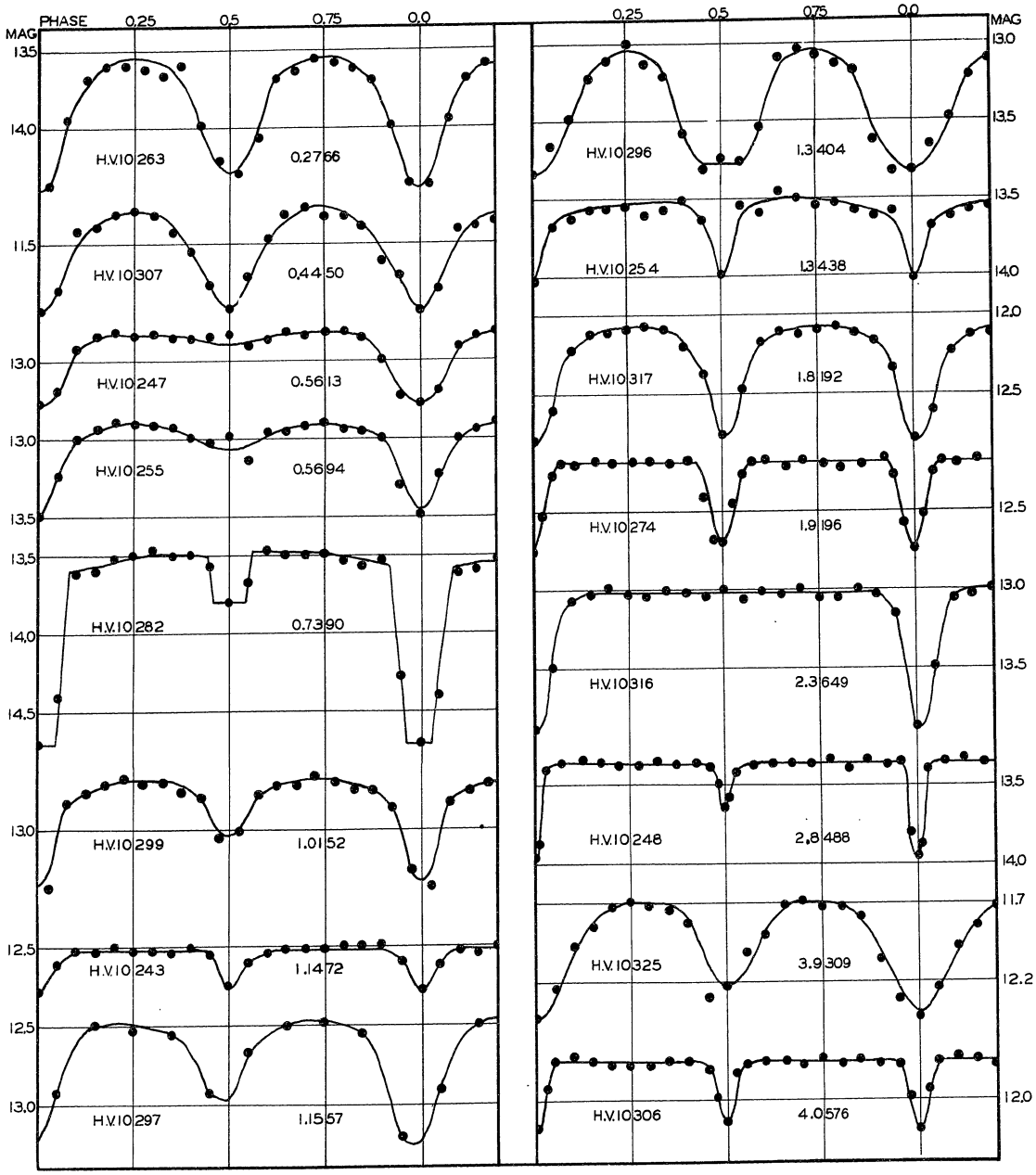

FIGURE 1

of SV and KW Sagittarii and SVS 457 from 1889 to 1939. The photographic chart is similar to the one published for MWF 186.†

The numbers and percentages of the different types are given below:

	Milky Way Field 189						
	Long	Cluster	Cepheid	Nova	Eclipsing	Misc.	Total
Number	15	4	6	5	61	27	118
Per cent	13	3	5	4	52	23	100
Mean Maximum Magnitude	13.8	13.7*	11.0*	–	12.9	12.7	12.7

*Mean median magnitudes. The mean median magnitude for four of the Cepheids (excluding X and W Sgr) is 13.8.

†The galactic equator for the chart in Harvard Annals, 90, No. 8, was computed with the use of 1875 positions instead of 1900, and hence should be shifted to the right by ninety-five seconds in right ascension.

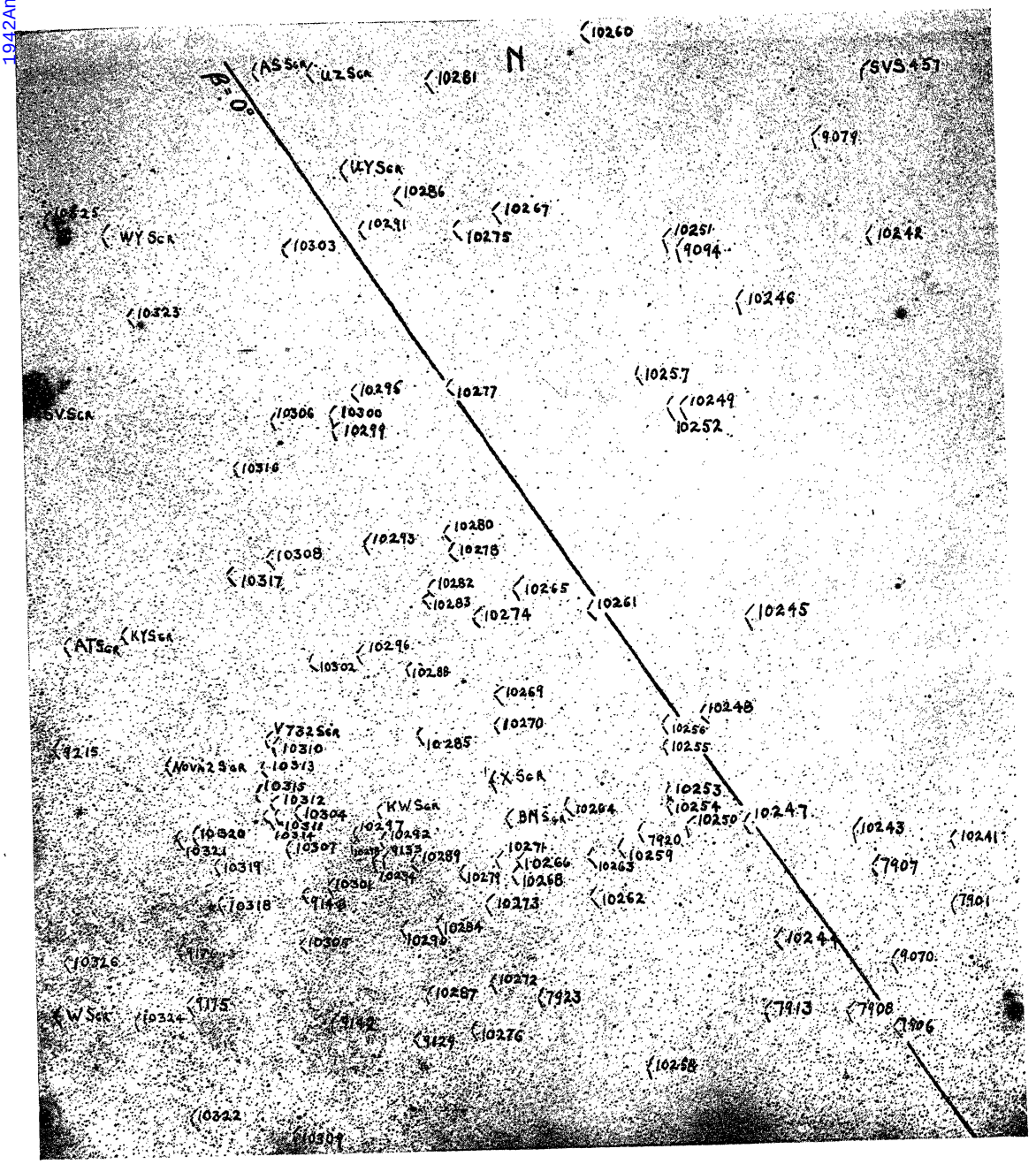

TABLE II

ONE HUNDRED AND SIX VARIABLES IN MWF 189

H.V.	R.A. (1900) h m s	Dec. ° ′	Max. m	Min. m	Type	Epoch J.D. 2420000+	Period d	Remarks
10241	17 23 27	-28 19.5	13.2	[15.5	Eclipsing	9052.45	3.06845	Note 1
9070	25 48	-29 21.4	11.3	13.6	Eclipsing	7959.505	6.055259	Note 1; spectrum A
10242	26 38	-23 13.1	14.8	[16.0	Eclipsing	8392.32	3.69039	Note 1
SVS 457	26 42	-21 47.4	12.6	[15.5	Eclipsing			Figure 3
7907	26 53	-28 33.9	13.2	13.8	Eclipsing	6089.57	3.48979	Note 1; sec. min. 13^m.6
10243	27 18	-28 15.9	12.5	12.8	Eclipsing	9396.475	1.14718	Note 2; Figure 1
9079	28 33	-22 22.4	14.5	[17.0	Long	9050	257.7	Note 3
10244	30 25	-29 10.6	12.8	13.2	Eclipsing			
10245	31 23	-26 26.0	13.5	15.2	Eclipsing	8432.300	1.44658	Note 1
10246	31 31	-23 45.6	14.0	15.6	Cepheid	8693.5	29.533	Note 4; Figure 2
10247	31 31	-28 11.5	12.8	13.3	Eclipsing	6923.390	0.561309	Note 2; Figure 1
10248	33 04	-27 15.9	13.4	14.0	Eclipsing	9161.25	2.84885	Note 2; Figure 1
10249	33 37	-24 39.7	14.0	[17.0	Long	9360	253.8	
9094	33 42	-23 18.1	14.0	[17.0	Long	6505	223	
10250	33 45	-28 11.6	13.9	15.7	Eclipsing	4026.54	4.82975	Note 1
10251	34 10	-23 13.3	14.6	[17.0	Long	9370	166.4	
10252	34 11	-24 38.7	14.5	16.0	Irregular:			Color index +3^m.0
10253	34 30	-27 56.0	14.6	15.4	Eclipsing			
10254	34 31	-28 01.4	13.5	14.0	Eclipsing	7903.53	1.343804	Note 2; Figure 1
10255	34 35	-27 32.6	12.9	13.5	Eclipsing	9458.27	0.569383	Note 2; Figure 1
10256	34 36	-27 20.5	9.0	9.4	Irregular			H.D. 160408, Ma
10257	35 17	-24 23.5	13.7	14.8	Eclipsing			
10258	35 28	-30 14.8	12.3	12.8	Eclipsing			
10259	36 26	-28 22.8	10.6	11.3	Irregular			C.P.D. -28°5778; spec. K7
10260	36 51	-21 27.1	12.6	14.5	Cepheid	9053.40	14.865	Note 4; Figure 2
10261	37 24	-26 21.9	13.8	15.5	Irregular			Color index +2^m.9
10262	37 34	-28 47.2	15.0	15.7	Eclipsing			
10263	37 36	-28 26.9	13.6	14.4	Eclipsing	6564.21	0.276636	Note 2; Figure 1
10264	38 25	-28 01.5	13.0	14.6	Long	4670	199	Notes 3, 5
10265	40 12	-26 09.7	9.4	9.7	Eclipsing	9412	936.07	H.D.161387, K2; see H.B.914
10266	40 25	-28 27.4	14.1	14.6	Eclipsing			Note 3
10267	40 31	-22 58.2	13.6	[17.0	Long	9210	375	Note 6
10268	40 35	-28 34.8	14.0	16.0	Irregular			Color index +2^m.4
BN Sgr	40 46	-28 07.6	9.8	10.5	Eclipsing	7874.605	2.51966	Sec. min. 9^m.9; see H.B.914
10269	41 05	-27 03.3	15.0	16.5	Eclipsing	6858.58	4.93218	Note 1
10270	41 06	-27 19.1	13.9	14.3	Eclipsing	6562.27	1.73358	Note 1
10271	41 10	-28 26.5	14.2	14.8	Short			
10272	41 32	-29 29.8	12.9	14.0	Eclipsing	8696.30	5.89431	Note 1
10273	41 38	-28 49.1	14.9	16.2	Eclipsing	4705.70	11.826	Note 1
10274	41 43	-26 23.5	12.2	12.8	Eclipsing	3914.865	1.919606	Note 2; Figure 1
10275	41 57	-23 06.1	14.5	[17.0	Long	8960	314.7	
10276	42 22	-29 53.6	12.7	13.2	Irregular			Color index +1^m.9
10277	42 25	-24 26.7	13.5	13.8	Eclipsing			
10278	42 34	-25 51.0	13.5	16.0	Eclipsing	6915.435	2.14008	Note 1
10279	42 39	-28 33.2	13.2	13.7	Cluster:			
10280	42 45	-25 41.1	12.7	13.1	Eclipsing			
10281	42 48	-21 50.7	11.7	12.8	Cluster	9434.54	0.523970	Notes 3,4;Fig.2;spec. F5?
10282	43 25	-26 08.7	13.5	14.7	Eclipsing	8799.23	0.738988	Note 2; Figure 1
10283	43 35	-26 14.8	15.7	16.5	Eclipsing			
10284	43 38	-28 59.0	13.2	14.8	Irregular			Color index +3^m.7
10285	44 03	-27 23.1	13.6	16.0	Irregular			Note 7
10286	44 07	-22 49.0	12.0	13.6	RV Tauri	7987.40	45.28	Notes 4,8;Fig.2;CoD.-22°12266
10287	44 08	-29 35.2	12.5	13.4	Eclipsing	9434.58	1.43335	Note 1; sec. min. 12^m.6
10288	44 22	-26 48.1	13.8	14.2	Eclipsing:			
10289	44 28	-28 27.5	13.5	14.0	Eclipsing			
9129	44 38	-29 55.8	13.0	[17.0	Long	6860	444	Note 9
10290	45 01	-29 00.4	13.5	[17.0	Long	9380	168	Note 10
10291	45 28	-23 05.3	13.0	[17.0	Long	8765	267.4	
9133	45 33	-28 24.3	12.7	[16.5	Eclipsing	7524.63	4.12507	Note 1
10292	45 36	-28 15.1	11.0	12.9	Eclipsing	6566.70	147.105	Note 1

TABLE II (Continued)

H.V.	R.A. (1900) h m s	Dec. ° '	Max. m	Min. m	Type	Epoch J.D. 2420000+	Period d	Remarks
KW Sgr	17 45 42	-28 00.8	11.0	13.2	Irregular			Note 11; Fig.3; spec.Mp
10293	45 45	-25 44.5	14.4	15.0	Short			Note 3
10294	45 57	-28 24.9	12.3:	13.0:	Eclipsing			Note 3
10295	45 59	-24 27.8	14.7	15.1	Short			
UY Sgr	46 03	-22 35.3	14.5	[17.0	Long	9120	266.3	Note 12
10296	46 14	-26 40.6	13.0	13.8	Eclipsing	9434.51	1.340447	Note 2; Figure 1
10297	46 38	-28 12.0	12.5	13.3	Eclipsing	4681.735	1.155664	Note 2; Figure 1
10298	46 45	-28 16.4	13.7	14.5	Irregular			Note 3; color index $+3^{m}.0$
10299	46 47	-24 46.6	12.7	13.4	Eclipsing	8995.57	1.015247	Note 2; Figure 1
UZ Sgr	47 08	-21 44.6	12.5	[17.0	Long	9430	222	Note 13
10300	47 19	-24 45.2	8.3	8.8	Irregular			Note 14; H.D.162718, B0
10301	47 45	-28 38.0	12.8	13.3	Eclipsing			
9142	47 50	-29 47.7	14.0	15.3	Irregular			
10302	48 03	-26 44.2	13.6	14.7	Cepheid	9348.60	5.74828	Notes 4,15; Figure 2
10303	48 22	-23 12.9	12.5	13.9	Irregular			Color index $+3^{m}.3$
9148	48 46	-28 40.7	14.9	16.4	Cluster	6122.47	0.462705	Note 4; Figure 2
10304	48 56	-27 59.6	10.6	11.1	Irregular			CoD -27°12102; spec.M0
10305	48 56	-29 06.8	12.0	[17.0	Long	9150	380.2	Note 16
10306	49 04	-24 40.7	11.7	12.2	Eclipsing	7516.54	4.057602	Note 2; Figure 1
AS Sgr	49 06	-21 43.5	14.0	[16.5	Irregular			
10307	49 18	-28 16.9	11.3	12.0	Eclipsing	9102.41	0.445034	Note 2; Fig.1; spec.F8
10308	49 29	-25 50.6	12.8	13.6	Eclipsing	9107.45	0.86031	Note 1; sec. min. $12^{m}.9$
10309	49 33	-30 41.6	11.3	12.0	Short			Spectrum F
10310	49 36	-27 24.8	12.7	13.2	Eclipsing			
10311	49 39	-28 01.0	12.5	14.0	Irregular			H.B.908; spectrum N0
10312	49 48	-27 53.5	13.0	13.7	Eclipsing			
10313	50 04	-27 36.7	12.0	12.4	Eclipsing:			
10314	50 08	-28 00.7	11.9	12.4	Eclipsing			
10315	50 20	-27 48.7	12.4	13.2	Eclipsing	8638.54	2.529897	Note 1
10316	50 33	-25 03.7	13.0	13.9	Eclipsing	8392.35	2.36494	Note 2; Figure 1
10317	50 59	-25 57.8	12.1	12.8	Eclipsing	7141.62	1.81916	Note 2; Figure 1
10318	52 01	-28 42.9	12.6	13.8	Irregular			Color index $+2^{m}.1$
10319	52 03	-28 24.0	12.7	13.7	Eclipsing			One minimum
10320	52 53	-28 08.0	11.8	13.5	Eclipsing	9159.3	155.90	Note 1
9175	53 28	-29 33.3	13.5	16.5	SS Cygni			Notes 3,17
10321	53 55	-28 09.0	11.9	13.0	Eclipsing	6858.61	5.10470	Note 1; sec. min. $12^{m}.5$
10322	53 36	-30 30.0	9.5	[16.5	Nova			Spec.Pec:; see H.B.913
9176	53 43	-29 06.7	15.8	[18.0	Long	8385	199.6	
10323	54 11	-23 44.8	13.5	16.0	Irregular			Color index $+0^{m}.9$
10324	55 31	-29 40.4	13.8	15.0	Eclipsing	8696.30	1.59324	Note 1
10325	57 01	-22 51.9	11.7	12.4	Eclipsing	8807.27	3.930956	Notes 2,18; Figure 1
SV Sgr	57 11	-24 29.8	13.5	[16.0	Irregular			Note 19; Figure 3
AT Sgr	57 16	-26 28.6	11.0	[16.5	Nova			See H.B.913
9215	57 58	-27 19.5	14.8	18.0:	Long	9100	195	Notes 3,20
10326	58 07	-29 08.5	12.4	15.6	RV Tauri	8395	175.2	Notes 4,21; Figure 2
AV Sgr	58 45	-22 44.0	11.8	13.4	Cepheid	9083.30	15.4107	Note 4; Figure 2

NOTES TO TABLE II

1. Duration of eclipse and constant phase of totality are given below in terms of the period for eclipsing binaries for which light curves are not given in Figure 1.

H.V.	Duration of Eclipse P	Duration of Totality P	H.V.	Duration of Eclipse P	Duration of Totality P
10241	0.09	0.03	10278	0.08	0.01
9070*	0.082	0.025	10287	0.11	0.09
10242	0.07	0.04:	9133	0.12	?
7907	0.09	0.0	10292	0.06	0.05
10245	0.12	0.06	10308	0.14	0.08
10250	0.10	0.02:	10315	0.055	0.045
10269	0.09	0.04	10320	0.045	0.030
10270	0.08	0.0	10321	0.030	0.015
10272	0.09	0.05	10324	0.09	0.06
10273	0.08	?			

* The declination given in Minn. Pub., 2, 102, 1938 is incorrect.

NOTES TO TABLE II (Continued)

2. The table below gives the normal points for eclipsing variables. The normal point at zero phase is not necessarily the mid-point of eclipse but the initial epoch given in Table II is the mid-point. The phases for H.V. 10263, 10296, and 10299 have been shifted by +0.025 in Figure 1.

Median Phase P	H.V.10243 Obs.	Mag.	H.V.10247 Obs.	Mag.	H.V.10254 Obs.	Mag.	H.V.10255 Obs.	Mag.	H.V.10263 Obs.	Mag.	H.V.10282 Obs.	Mag.	H.V.10296 Obs.	Mag.	H.V.10297 Obs.	Mag.	H.V.10299 Obs.	Mag.
0.000	18	12.78	23	13.27	13	14.02	11	13.49	6	14.37	1	14.70	12	13.83			17	13.36
0.050	16	12.61	19	13.19	11	13.68	7	13.23	6	13.95	2	14.40	14	13.66	11	12.91	10	12.83
0.100	13	12.53	25	12.93	6	13.63	9	13.00	7	13.69	7	13.61	18	13.49			20	12.76
0.150	14	12.54	26	12.85	4	13.57	7	12.94	7	13.60	3	13.60	18	13.22	8	12.50	21	12.71
0.200	17	12.51	20	12.82	13	13.56	15	12.90	8	13.60	4	13.52	10	13.11			21	12.67
0.250	15	12.53	12	12.86	12	13.56	8	12.91	10	13.62	3	13.50	11	13.00	12	12.52	16	12.71
0.300	17	12.53	16	12.83	7	13.61	7	12.92	4	13.67	3	13.47	17	13.14			13	12.70
0.350	15	12.54	12	12.86	13	13.58	18	12.93	6	13.60	10	13.51	8	13.21	8	12.56	24	12.76
0.400	19	12.52	23	12.86	10	13.52	9	12.99	9	13.99	9	13.50	13	13.58			12	12.80
0.450	12	12.55	15	12.86	15	13.63	6	13.02	10	14.23	4	13.57	10	13.81	11	12.92	24	13.05
0.500	13	12.75	19	12.84	11	13.98	9	12.99	8	14.30	2	13.80	11	13.74			12	13.01
0.550	19	12.61	19	12.91	7	13.54	9	13.14	6	14.07	2	13.68	10	13.76	9	12.67	14	12.78
0.600	16	12.55	18	12.87	11	13.60	8	12.96	8	13.69	6	13.48	15	13.54			13	12.73
0.650	15	12.52	16	12.82	6	13.45	8	12.96	8	13.64	7	13.50	8	13.09	12	12.50	10	12.72
0.700	16	12.52	16	12.84	9	13.49	7	12.93	12	13.56	1	13.50	16	13.04			13	12.66
0.750	17	12.52	21	12.83	8	13.54	9	12.91	9	13.58	6	13.50	13	13.07	15	12.47	31	12.69
0.800	19	12.51	20	12.82	12	13.53	15	12.94	11	13.62	5	13.54	12	13.13			10	12.75
0.850	16	12.50	28	12.86	11	13.58	9	12.96	4	13.70	6	13.57	9	13.18	10	12.55	13	12.75
0.900	16	12.49	25	12.99	8	13.62	11	13.00	7	14.00	7	13.54	22	13.63			16	12.86
0.950	25	12.60	23	13.22	12	13.59	9	13.31	8	14.36	3	14.27	9	13.83	8	13.21	19	13.26
	328		396		199		191		154		91		256		104		319	

Median Phase P	H.V.10307 Obs.	Mag.	H.V.10316 Obs.	Mag.	H.V.10317 Obs.	Mag.	H.V.10325 Obs.	Mag.	Median Phase P	H.V.10248 Obs.	Mag.	Median Phase P	H.V.10274 Obs.	Mag.	Median Phase P	H.V.10306 Obs.	Mag.
0.000	21	11.93	18	13.88	12	12.79	13	12.42	0.000	..	13.95	0.000	8	12.75	0.000	10	12.18
0.050	21	11.79	14	13.49	17	12.61	21	12.24	0.012	7	13.87	0.025	12	12.52	0.025	13	11.93
0.100	20	11.41	12	13.06	15	12.23	13	11.97	0.037	4	13.40	0.050	5	12.26	0.050	39	11.76
0.150	23	11.39	19	13.03	13	12.13	12	11.85	0.075	8	13.35	0.075	10	12.19	0.100	18	11.73
0.200	23	11.31	14	12.99	16	12.12	19	11.73	0.125	11	13.33	0.112	15	12.20	0.150	27	11.75
0.250	24	11.29	15	13.03	18	12.09	11	11.69	0.175	10	13.35	0.162	15	12.17	0.200	28	11.78
0.300	19	11.32	9	13.04	23	12.08	19	11.71	0.225	12	13.37	0.212	19	12.19	0.250	21	11.78
0.350	15	11.42	10	13.00	15	12.09	15	11.73	0.275	10	13.37	0.262	19	12.18	0.300	27	11.78
0.400	24	11.55	10	13.02	16	12.20	18	11.83	0.325	17	13.34	0.312	13	12.18	0.350	17	11.75
0.450	24	11.77	12	13.04	13	12.37	10	12.29	0.375	16	13.36	0.362	15	12.19	0.400	27	11.75
0.500	25	11.92	11	13.00	15	12.76	9	12.23	0.425	15	13.35	0.412	16	12.17	0.450	15	11.81
0.550	26	11.71	7	13.06	12	12.47	13	12.01	0.462	8	13.39	0.450	7	12.41	0.475	12	11.98
0.600	22	11.48	7	13.01	14	12.17	11	11.90	0.488	8	13.49	0.475	7	12.68	0.500	11	12.13
0.650	21	11.31	6	13.03	17	12.10	18	11.71	0.500	..	13.64	0.500	5	12.70	0.525	14	11.81
0.700	21	11.27	11	12.99	19	12.12	19	11.69	0.512	5	13.58	0.525	2	12.45	0.550	36	11.77
0.750	25	11.32	17	13.06	17	12.09	13	11.72	0.537	5	13.42	0.550	7	12.27	0.600	25	11.75
0.800	19	11.33	7	13.06	15	12.07	14	11.72	0.575	11	13.37	0.575	5	12.18	0.650	26	11.75
0.850	19	11.39	8	13.00	17	12.12	14	11.79	0.625	17	13.36	0.612	14	12.18	0.700	27	11.76
0.900	28	11.62	9	13.04	12	12.16	15	12.06	0.675	14	13.36	0.662	16	12.22	0.750	19	11.73
0.950	31	11.70	14	13.16	16	12.34	19	12.31	0.725	18	13.36	0.712	14	12.18	0.800	33	11.76
	451		230		312		296		0.775	22	13.33	0.762	21	12.20	0.850	23	11.74
									0.825	7	13.39	0.812	12	12.23	0.900	28	11.76
									0.875	13	13.33	0.862	9	12.20	0.950	11	11.77
									0.925	15	13.36	0.912	9	12.16	0.975	17	11.99
									0.962	6	13.35	0.950	7	12.27		524	
									0.988	7	13.80	0.975	9	12.58			
										266			291				

3. The following variables have close companions:

H.V.		H.V.	
9079	south following a $15^{m}.0$ star	10294	northern of close double and following by $0^{s}.5$ a $12^{m}.4$ star
10264	following by $0^{s}.3$ a $13^{m}.5$ star	10298	south preceding by $0^{s}.3$ a $14^{m}.1$ star
10266	following by $0^{s}.3$ a $13^{m}.7$ star	9175	north preceding by $0^{s}.1$ a $15^{m}.5$ star
10281	following by $0^{s}.5$ a $12^{m}.8$ star	9215	south by $0^{s}.3$ a $14^{m}.0$ star, preceding by $0^{s}.2$ a $15^{m}.5$ star
10293	following by $0^{s}.7$ C.P.D. $-25°6128$		

NOTES TO TABLE II(Continued)

4. Normal points for the mean light curves of the Cepheid, cluster and RV Tauri type variables. The early and late observations of H.V. 10326 have been combined to form the normal points.

Median Phase P	H.V.10246 Obs.	Mag.	H.V.10260 Obs.	Mag.	H.V.10281 Obs.	Mag.	H.V.10286 Obs.	Mag.	H.V.10302 Obs.	Mag.	H.V. 9148 Obs.	Mag.	H.V.10326 Obs.	Mag.	AV Sgr Obs.	Mag.
0.000	11	13.91	15	12.65	12	11.68	11	13.55	17	13.65	15	14.95	16	15.56	15	11.75
0.050	7	14.09	23	12.66	13	11.85	10	12.96	15	13.65	9	15.07	22	15.06	16	12.07
0.100	13	14.06	10	12.87	12	11.86	12	12.17	18	13.66	8	15.08	11	13.93	19	12.08
0.150	11	14.15	10	13.41	18	11.98	7	12.04	17	13.94	11	15.16	17	13.22	20	12.32
0.200	10	14.30	19	13.58	7	12.21	12	12.02	9	13.95	10	15.62	24	12.76	13	12.62
0.250	7	14.39	6	13.62	12	12.28	18	12.20	17	14.09	8	15.43	21	12.28	14	12.54
0.300	7	14.54	14	13.71	13	12.39	10	12.48	17	14.14	7	15.96	18	12.46	16	12.84
0.350	9	14.37	8	13.88	12	12.53	14	12.63	15	14.35	11	16.15	19	13.26	11	12.82
0.400	6	14.43	8	13.96	11	12.52	12	13.14	18	14.42	5	16.30	16	13.83	4	13.10
0.450	3	14.90	5	14.04	11	12.65	14	13.42	13	14.52	7	16.20	13	14.14	10	13.16
0.500	..	...	12	14.22	20	12.69	17	13.36	13	14.49	8	16.31	13	14.50	15	13.15
0.550	..	...	6	14.50	19	12.74	11	12.78	9	14.57	9	16.25	17	14.36	11	13.25
0.600	1	15.30	4	14.50	13	12.72	15	12.15	16	14.61	9	16.32	19	14.35	12	13.30
0.650	..	...	5	14.36	9	12.80	12	12.07	16	14.66	12	16.28	23	12.99	9	13.32
0.700	4	15.35	3	14.70	11	12.70	14	12.06	13	14.68	8	16.30	19	12.42	7	13.36
0.750	6	15.67	8	14.41	10	12.76	12	12.14	21	14.74	7	16.36	16	12.58	5	13.28
0.800	4	15.55	9	14.18	12	12.78	9	12.29	15	14.66	4	16.22	21	12.45	5	13.20
0.850	13	15.39	8	13.68	13	12.78	10	12.96	10	14.65	7	16.46	29	13.33	16	13.01
0.900	11	15.13	12	13.24	9	12.59	6	13.25	15	14.25	9	16.31	19	13.95	22	12.89
0.950	14	14.66	11	12.91	9	11.87	11	13.58	14	13.90	10	15.67	12	14.57	15	12.42
	137		196		246		237		298		174		365		255	

5. H.V. 10264. The elements in the table are for observations since 1916. Observations from 1889 through 1904 fit a period of 200 days. Between 1904 and 1916 observations are few and fit neither period.

6. H.V. 10267 sometimes has a secondary maximum of $14^m.0$ on the ascending branch, 100 days before the principal maximum. The secondary minimum is about $14^m.8$, 70 days before the maximum. When the secondary maximum is omitted, the rise then occurs at the time of the secondary minimum.

7. H.V. 10285. There is one observation at $13^m.6$ on J.D. 2424402, one at $14^m.4$ on J.D. 2413083; otherwise the star varies between $15^m.0$ and $16^m.0$.

8. H.V. 10286. Elements in table are for observations since 1911. The elements for observations from 1894 to 1911 are J.D. 2414059.5 + $45^d.10$. The spectrum determined by Miss Cannon is K5. Approximate color index at maximum is $+1^m.2$, at minimum $+2^m.1$.

9. H.V. 9129. Elements in table are for observations since J.D. 2422860. Elements that fit the observations from 1889 to 1921 are J.D. 2414100 + 461 days. The maximum at J.D. 2422860 fits either period.

10. H.V. 10290. The elements in the table fit observations since 1900. The observations before 1900 indicate that there should be either a shift in initial epoch, or change in period.

11. KW Sgr. Indications of cycles of 670 days; resembles Z Andromedae.

12. UY Sgr. Brightness of the different maxima varies from $14^m.0$ to $16^m.0$.

13. UZ Sgr. The 200 observations from 1889 to 1939 fit a period of 222 days and not 154 days as given in H.B.861.

14. H.V. 10300. In Mount Wilson Contributions 621, this star has a spectrum of BOne and a color index of $+0^m.2$; on the International scale it has a color excess of $+0^m.63$. The redness is apparent on the Harvard photo-red plate.

15. H.V. 10302 lies in a heavily obscured region; its color index is about $+3^m.0$.

16. H.V. 10305. Elements for observations between 1889 and 1911 are J.D. 2416560 + $385^d.1$; the break occurs at J.D. 2419260.

17. H.V. 9175. Cycles of 20 and 30 days; resembles Z Camelopardalis.

18. H.V. 10325 is close to the following edge of the Trifid nebula (Messier 20).

19. SV Sgr. Variation is probably extrinsic, due to the nebulosity of NGC 6523 (Messier 8).

20. H.V. 9215.- Apparently a shift in epoch occurred between 1912 and 1923. The early elements are J.D. 2412610 + 195 days.

21. H.V. 10326. The elements in the table are for observations since 1924. The elements for 109 observations from 1889 to 1924 are:

Minimum = J.D. 2413723 + 173.48 days.

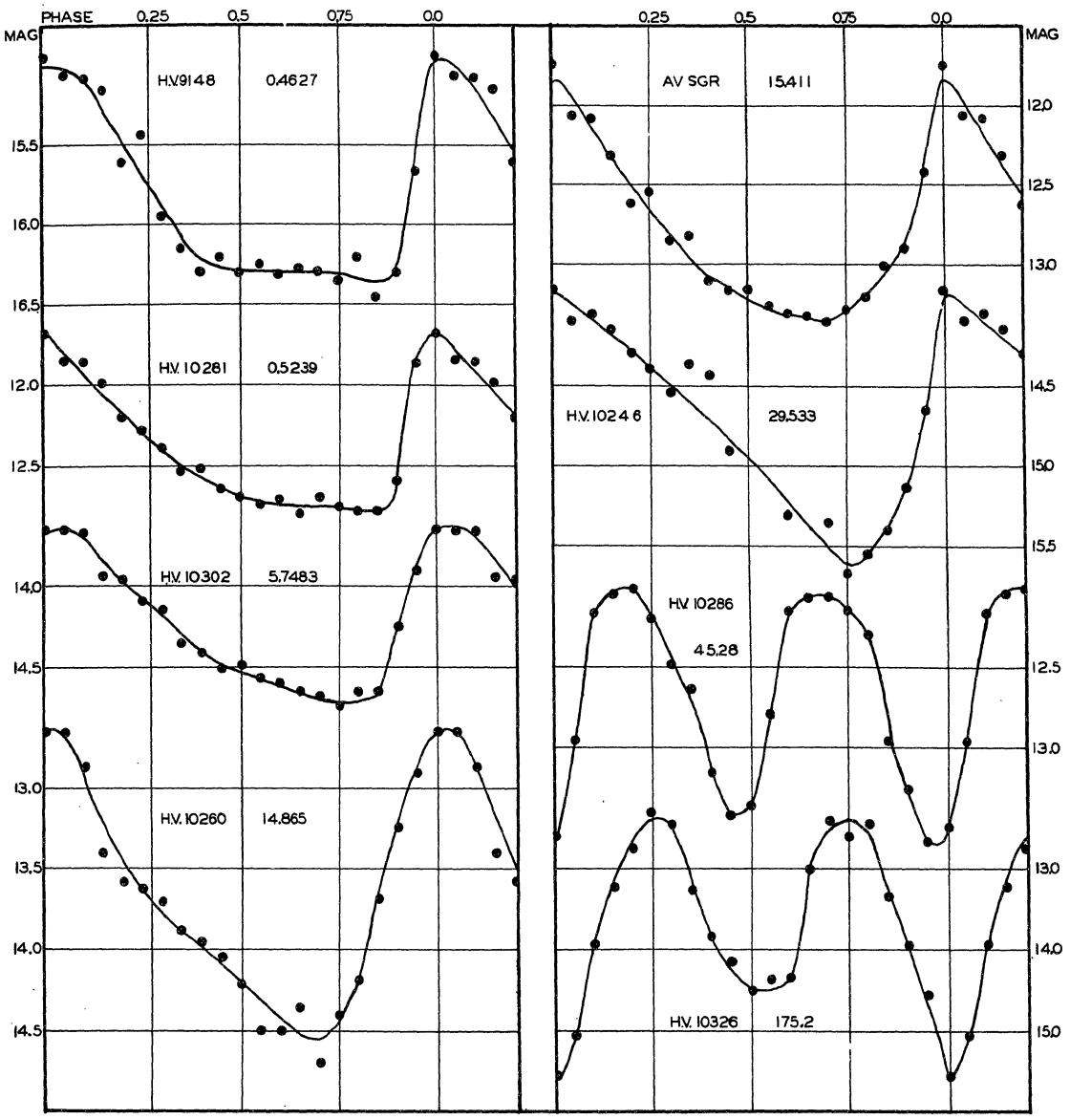

FIGURE 2

The distribution is similar to that in MWF 186. The mean maximum magnitude is 12.7, which compares with 13.2 for MWF 186; and, as in MWF 186, a relatively large number (22 per cent) are brighter than the twelfth magnitude.

The center and preceding half of MWF 189 is covered by a dense cloud of obscuring material, in consequence of which the variable-star population appears to be scant: twenty-five variables on the north side of the galactic equator compared with ninety-three on the south side. In the south following corner of the field is an edge of the Sagittarius star cloud, and along its border the novae are found. Probably more variables would have been discovered in this corner if the plate material had been more satisfactory. It is interesting to note that H.V. 10302, a Cepheid variable with a period of 5.7 days and a median magnitude of 14.2, has a color excess of over two magnitudes.

June, 1940

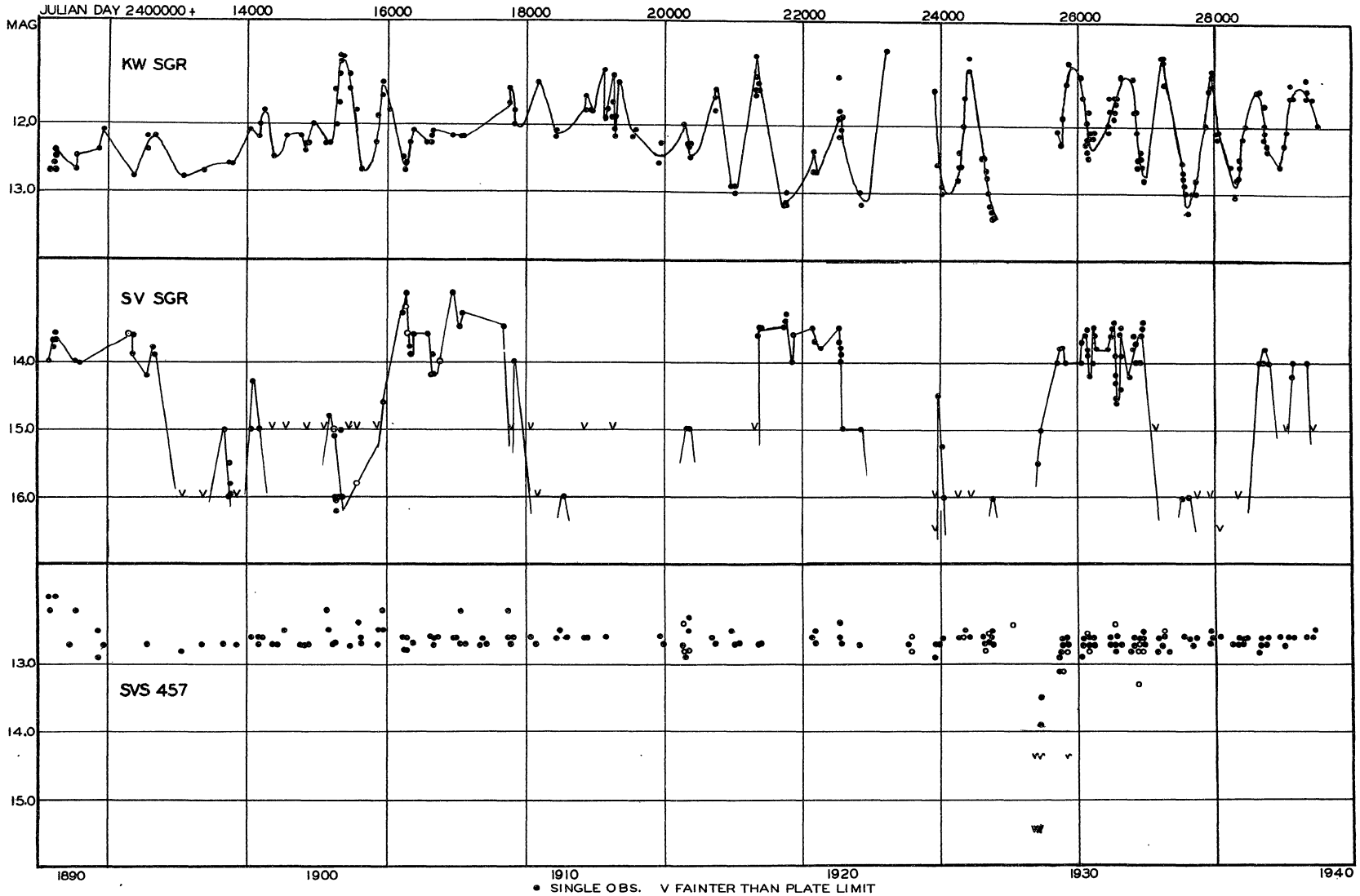

FIGURE 3.- SV SAGITTARII: OPEN CIRCLES REFER TO WOLF'S OBSERVATIONS (A.N., 163, 29, 1903) AND HARTWIG'S (G. u L., 2, 111, 1920) CORRECTED BY TWO MAGNITUDES. SVS 457: OPEN CIRCLES AND CHECKS WITH HOOKS REFER TO OBSERVATIONS OF SHAJN (V.F.P.A., 4, 300, 1933). HIS "a" OR [14^{m}4 OBSERVATIONS ON J.D. 2425830 MAY POSSIBLY BE IN ERROR; OTHERWISE SVS 457 RESEMBLES AN ECLIPSING BINARY WITH A PERIOD OF 6000 DAYS OR LONGER.