Variables in Milky Way Field 167. — In continuance of the general program of surveying the southern Milky Way, MWF 167, centered at $13^h\ 31^m$, $-53°.8$ has been examined on MF plates taken with the 10-inch Metcalf telescope, and in addition on A plates (centered on the cluster N.G.C. 5286) taken with the 24-inch Bruce telescope. Forty two MF plates were compared with six positive contacts and seven A plates with one contact. One hundred twenty four new variables were discovered. Those found on the A plates were on the whole fainter than those found on the MF plates. Since the region covered by the Bruce plates (8 × 10 inches) is only one eighth of the entire region, the rest of the field has probably not been exhausted for very faint variables.

Besides the new variables the accompanying table includes the twenty five variables found by Mr. Waterfield (H.B. 863) and AF and AU Centauri for which types or periods had not been previously determined. There are eleven other stars in the region which have been published as variables. For three of these, AG, AH and AI Centauri no variation was found on the Harvard plates. Periods had already been determined for RV and XX Centauri. The other six stars are too bright to measure on MF plates.

The first six columns of the table give respectively the name or Harvard variable star number, position, magnitude at maximum and minimum, and the type of variation. The magnitudes for all the variables were estimated on eighty two MF plates using the RV Centauri sequence extrapolated to magnitude 16.5. The last column contains elements and notes. The Julian day given refers to the best determined maximum for long period and cluster type variables and to the best determined minimum for the eclipsing type, usually a recent epoch.

The notes contain the number of observed epochs for long period variables (for which in addition to the MF plates, from one to one hundred fifty early Harvard plates of the A and B series were used). Professor Bailey's subclass (H.A., **38**, 132, 1902) is given for cluster type variables. For the eclipsing stars for which only a rough estimate of period could be made a quantity m/n is given, where m is the smallest observed interval between minima, and n, a small integer. For these variables the number of minima observed is also recorded.

Of the one hundred fifty one variables listed, 30% are long period, 22% cluster type Cepheids, 19% short period variables of undetermined type, 21% eclipsing

TABLE I

VARIABLES IN MWF 167

H.V. or Name	R.A. (1900)	Dec. (1900)	Max.	Min.	Type	Elements and Notes
	h m s	° ′	m	m		
AF Cen	12 58 11	−55 48	11.5	16.1	Long period	2425758 + 284 E, 50 epochs
BL Cen	13 00 37	−54 52.8	13.3	<16.5	Long period	2425390 + 226.8 E, 62 epochs
4717	01 26	−55 23.4	14.0	<16.5	Long period	2425378 + 237.5 E, 62 epochs
4718	01 40	−55 59.7	14.3	15.5	Short period?	
4719	02 02	−54 57.4	11.7	12.5	Eclipsing	2425328.461 + 6.3017 E
4720	03 45	−57 10.5	13.8	<16.5	Long period	2425305 + 180.5 E, 81 epochs
4721	03 51	−56 26.3	13.8	16.4	Long period	2425305 + 177 E, 83 epochs
4722	04 03	−57 44.7	10.3	13.0	Eclipsing	2425438.206 + 16.394 E; C.P.D. −57°5924
4723	04 50	−56 15.5	15.5	15.0:	Eclipsing?	
4724	05 32	−56 27.8	14.7	16.6	Long period	2425305 + 150 E, 57 epochs
4725	05 52	−54 33.0	14.3	15.2	Short period	
4726	06 07	−56 27.4	13.5	14.6	Eclipsing	Period = 6/n, three minima
4727	06 14	−52 20.9	13.3	16.1	Eclipsing	2424317.519 + 1.34832 E
4728	06 44	−51 59.2	13.4	15.2	Long period	
4729	06 56	−54 49.6	13.9	14.6	Short period	
4730	06 58	−52 41.3	14.4	15.8	Eclipsing	Period = 1.0/n, six minima
4731	07 05	−56 36.9	12.7	14.3	Irregular	
4732	07 12	−50 41.0	12.4	16.4	Long period	2425325 + 185 E, 77 epochs
4733	07 28	−48 45.6	14.4	15.3	Eclipsing	Period = 2/n, five minima
4734	09 01	−55 26.5	11.8	12.3	Eclipsing	
BM Cen	10 23	−55 46.6	13.2	16.0	Eclipsing	2425305.452 + 4.370 E
4735	11 08	−57 51.7	12.0	12.7	Eclipsing	
4736	11 25	−56 17.2	14.4	15.3	Cluster	
BN Cen	12 27	−57 03.8	14.8	<16.3	Long period	2413717 + 258 E, 55 epochs
BO Cen	12 30	−53 33.7	13.0	<16.5	Long period	2425438 + 282.5 E, 50 epochs
BP Cen	13 12	−49 23.9	12.2	16.0	Eclipsing	2424644.722 + 2.17042 E
4737	13 22	−53 51.0	14.8	16.4:	Long period	2414139 + 132.8 E, no early observations
4738	14 04	−57 30.6	13.8	14.6	Cluster	
4739	14 07	−50 16.6	15.4	16.0	Cluster?	
BQ Cen	14 19	−50 06.1	12.0	13.1	Short period	
4740	14 34	−51 38.0	14.0	14.7	Eclipsing	2425357.379 + 5.121 E
4741	15 03	−51 36.4	13.3	16.2	Long period	2425624 + 263.5 E, 54 epochs
4742	15 03	−57 39.5	14.6	15.7	Short period?	
4743	15 41	−49 46.0	14.9	15.8	Cluster	
4744	16 42	−54 20.4	12.0	12.6		Red star
4745	17 26	−54 58.4	15.0	16.1	Eclipsing	Period = 1/n, five minima
4746	18 07	−52 58.0	13.1	13.5	Eclipsing	

H.V. or Name	R.A. (1900) h m s	Dec. (1900) ° ′	Max. m	Min. m	Type	Elements and Notes
4747	13 18 18	−52 10.5	15.0	15.8	Cluster	
BR Cen	18 33	−51 48.8	11.8	14.0	Long period	
BS Cen	18 34	−56 32.8	13.2	13.9	Cluster	2425304.505 + 0.56326 E, Bailey's subclass a
4748	19 16	−55 04.5	15.5	<16.0		Preceding of two stars. Too close to be separated on most plates.
4749	19 20	−53 43.5	12.0	<16.4	R Coronae	257 observations. Well determined minima in 1897, 1901, 1924, 1929
4750	19 43	−50 09.4	15.2	16.4	Long period	2425658 + 223 E, 54 epochs
4751	20 54	−57 27.1	12.3	14.2	Long period	Period approximately 198 days. Variation $0^m.5\pm$ at maximum and at minimum.
BT Cen	20 57	−53 27.8	14.5	15.5	Cluster?	
4752	21 04	−54 22.7	15.0	15.8	Cluster?	
4753	21 27	−50 50.2	14.5	<16.5	Long period	2425302 + 282.7 E, 47 epochs
4754	22 46	−54 13.7	12.9	13.7	Eclipsing	Period = 20/n, six minima
4755	23 24	−54 33.9	14.9	16.2	Eclipsing	Period = 2/n, three minima
4756	23 25	−57 34.2	14.8	<16.5	Long period	2423900 + 280 E, 38 epochs
BU Cen	23 33	−49 28.9	12.4	14.2	RV Tauri?	Period = 85.5 days for MF Plates does not fit early observations
4757	24 03	−56 24.1	12.3	12.7	Eclipsing	
4758	24 08	−49 16.5	14.3	15.3	Cluster	2425410.293 + 0.599935 E, Bailey's subclass a
4759	24 16	−54 37.3	14.7	15.6	Eclipsing	Period = 3/n, eight minima
4760	25 14	−57 52.4	11.0	13.1	Eclipsing	2425410.198 + 9.426 E
4761	25 20	−57 02.8	11.3	12.5	Eclipsing	
BV Cen	25 25	−54 33.0	10.5	14.0	SS Cygni	Four maxima observed: JD 2411164, 15114, 24644, 25705
4762	26 04	−52 01.6	14.4	15.2	Cluster	2424644.722 + 0.256845 E, Bailey's subclass c
BW Cen	26 53	−50 17.8	13.5	≦16.5	Long period	2425325 + 229.2 E, 57 epochs
4763	27 01	−55 00.9	14.9	15.6	Cluster?	
4764	27 14	−51 21.3	14.5	<16.5	Long period	2423900 + 173.6 E, 74 epochs
BX Cen	27 34	−50 19.7	13.7	<16.5	Long period	2425302 + 208 E, 63 epochs
BY Cen	27 36	−50 44.4	15.0	<16.5	Long period	2424296 + 191.5 E, few early observations
4765	28 33	−56 21.0	14.3	<16.5	Long period	2424300 + 260 E, 55 epochs
4766	28 43	−50 58.9	15.0	15.5	Short period	Preceding of two
BZ Cen	29 20	−50 20.8	14.5	15.4	Cluster	2424644.655 + 0.5457 E, Bailey's subclass a
4767	29 43	−52 55.4	14.5	15.0	Short period	
CC Cen	30 54	−53 11.2	14.0	<16.5	Long period	2425740 + 246 E, 52 epochs

H.V. or Name	R.A. (1900) h m s	Dec. (1900) ° ′	Max. m	Min. m	Type	Elements and Notes
CD Cen	13 31 01	−53 18.3	11.5	16.2	Long period	2425390 + 178 E, 81 epochs
CE Cen	31 03	−53 05.9	14.8	<16.4	Long period	2424390 + 464, sharp rise to maximum; 28 epochs
4768	31 26	−51 51.3	15.9	<16.5	Cluster?	
4769	31 52	−55 29.7	14.8	<16.5	Long period	2424667 + 314 E, 38 epochs
4770	33 05	−48 54.5	14.2	16.3	Long period	2425378 + 236 E, few observations. 54 epochs
4771	33 36	−49 44.6	14.9	15.4		
4772	33 36	−50 40.5	15.3	16.0	Cluster	2424643.736 + 0.39553: E, large magnitude scattering; Bailey's subclass c
4773	33 53	−49 45.6	14.8	16.3	Cluster	2425327.436 + 0.46095 E, Bailey's subclass a
4774	34 28	−51 10.3	14.2	<16.4	Long period	2424285 + 191 E, 69 epochs
CF Cen	34 37	−52 13.4	14.5	<16.0	Long period?	Maxima observed for 1900 and 1925 only
4775	34 40	−52 00.7	15.3	15.9	Short period	
4776	35 22	−55 56.4	13.3	15.0	Eclipsing	2425378.375 + 22.14 E
4777	35 37	−50 02.4	15.8	16.4	Cluster?	
4778	36 05	−49 31.3	15.2	<16.7	Long period	2423918 + 267 E, 42 epochs
4779	36 17	−50 51.1	14.0	14.6	Short period	
4780	36 43	−51 33.3	16.1	<16.6	Short period?	
4781	37 11	−52 22.5	15.8	<16.6	Short period	
4782	37 18	−49 54.5	15.3	16.4	Cluster	2425438.206 + 0.52399 E, Bailey's subclass a
4783	37 24	−49 09.9	15.2	16.3	Cluster	
CG Cen	37 34	−54 49.1	13.6	15.3	Short period	
4784	37 48	−51 21.8	15.3	15.8	Cluster	
4785	37 59	−51 13.6	16.0	<16.5	Cluster	
CH Cen	38 09	−54 33.4	14.0	14.9	Short period	
4786	38 22	−50 36.7	15.6	16.2	Short period?	
CI Cen	38 26	−49 34.0	14.6	16.5	Long period	2425705 + 140.1 E, 70 epochs
4787	38 37	−56 01.6	15.4	<16.5	Long period	
4788	38 46	−55 51.2	12.4	12.9	Eclipsing	
4789	38 57	−53 03.2	14.5	15.4	Cluster	
4790	39 09	−51 35.2	16.2	<16.7		Too faint to determine type
4791	39 43	−51 22.9	15.5	16.2	Short period	
4792	39 44	−49 45.9	15.5	16.3	Cluster?	
4793	39 58	−51 05.8	15.9	16.6	Cluster	2424644.620 + 0.45082 ± E, fairly large magnitude scattering
4794	40 02	−50 49.7	16.2	<16.7	Short period	Too near NGC 5286 on most plates to determine magnitudes

H.V. or Name	R.A. (1900) h m s	Dec. (1900) ° ′	Max. m	Min. m	Type	Elements and Notes
4795	13 40 06	−49 05.9	13.6	15.0	Cluster	2424643.736 + 0.6599, Bailey's subclass b. Large magnitude scattering
4796	40 42	−50 20.5	16.0	<16.6		Too faint to determine type
4797	40 48	−56 56.5	14.3	15.0	Short period	
4798	40 49	−51 15.7	15.5	16.4	Short period	
4799	41 10	−50 07.4	15.8	<16.5	Cluster?	
CK Cen	41 11	−57 12.2	12.3	16.3	Long period	2425385 + 198 E, 74 epochs
4800	41 14	−50 27.8	15.5	16.2	Eclipsing?	
CL Cen	41 20	−54 37.4	15.2	≦16.5	Long period	2425325 + 273 E, sharp rise to maximum, 42 epochs
4801	41 41	−51 40.3	15.3	15.8	Short period?	
4802	42 05	−50 35.5	16.1	<16.7	Cluster	
4803	42 55	−50 28.6	14.7	<16.5	Long period	2425328 + 253.5 E, 47 epochs
4804	43 04	−50 30.5	15.4	16.3		Maxima observed for 1922 only
4805	43 38	−50 18.3	15.9	<16.5	Cluster	
4806	43 51	−54 04.2	15.1	<16.5	Long period	
4807	44 06	−48 47.9	14.1	15.3	Cluster	
4808	44 12	−57 10.5	14.0	16.0	Eclipsing	2425326.501 + 5.5765 E
CM Cen	44 28	−55 03.5	12.2	<16.5	Long period	
4809	44 37	−50 32.5	14.5	15.1	Eclipsing	2424653.650 + 1.5916 E
4810	44 56	−53 32.0	14.9	15.7	Short period	
4811	45 06	−52 00.5	14.9	15.4	Short period	
4812	45 07	−51 36.5	15.3	16.4	Cluster	2424644.688 + 0.55515 E, Bailey's subclass b
4813	45 09	−50 44.3	13.4	14.8	Eclipsing	Period = 7/n, seven minima
4814	45 14	−50 55.5	15.9	<16.5	Cluster?	
4815	45 20	−51 43.6	14.9	<16.5	Long period	2424317 + 209.7 E
AU Cen	45 32	−51 52.9	12.5	<16.5	Long period	2423918 + 261.5 E, 55 epochs
4816	45 55	−50 36.8	15.2	15.8	Cluster	
4817	46 01	−51 05.0	16.0	<16.6	Short period	
4818	46 03	−51 00.1	15.2	16.4	Cluster	2424644.756 + 0.56495 E, Bailey's subclass b
4819	46 11	−55 59.7	12.5	13.3	Short period	
4820	46 15	−51 09.1	14.4	15.1	Cluster	
4821	46 18	−52 02.6	15.4	15.9	Irregular?	
4822	46 40	−50 36.7	15.3	16.5	Cluster	2424301.641 + 0.51911 E, Bailey's subclass a
4823	47 12	−50 03.7	14.4	15.1	Short period	
4824	47 20	−56 12.8	13.7	15.3	Long period	2423914 + 286 E, 40 epochs
4825	47 58	−50 18.5	16.2	<16.7	Short period	
4826	48 32	−51 17.7	15.5	16.1	Eclipsing?	

H.V. or Name	R.A. (1900)	Dec. (1900)	Max.	Min.	Type	Elements and Notes
	h m s	° ′	m	m		
4827	13 50 11	−56 25.7	12.4	<16.0	Long period	2425360 + 311 E, 47 epochs
4828	50 47	−52 51.2	15.0	15.5	Short period	
4829	51 00	−55 23.5	15.5	16.4	Eclipsing	
4830	51 04	−52 22.0	15.2	<16.5	Long period	2423900 + 301.5 E, 39 epochs
4831	51 21	−51 47.5	14.6	15.2	Short period	
4832	51 43	−55 24.7	13.7	14.9		Period = 49.2 fits observations since JD 2419200 but not earlier
4833	52 44	−51 41.5	14.6	<16.0	Eclipsing	
4834	52 54	−55 39.5	15.4	<16.5	Long period	2425414 + 242 E, few early observations; 7 epochs
4835	53 44	−55 10.8	14.5	<16.5	Long period	2425390 + 188.5 E, 61 epochs
4836	53 50	−52 09.1	15.1	<16.5	Long period	2424643 + 260 E, 46 epochs
4837	53 50	−53 50.7	12.7	15.7	Eclipsing	
4838	55 05	−54 58.1	15.3	16.0	Eclipsing	
4839	56 09	−55 28.6	14.0	14.6	Cluster	
4840	14 00 36	−56 13.1	12.9	14.2	Short period	

binaries, and 8% irregular or undetermined. The percentage of eclipsing stars in this region is larger than that for other Southern Milky Way fields so far investigated.

The greatest frequency for magnitudes at maximum for all types of variables is at $14^m.5$ with a secondary maximum at $12^m.0$. This is also the maximum frequency for long period variables. The median magnitudes for cluster type appear to have their maximum at $15^m.5$.

The thirty eight long period variables for which periods have been determined show no relation between period and magnitude at maximum, as may be seen from the following table. The periods were arranged according to length and grouped in tens.

TABLE II

RELATION OF BRIGHTNESS TO PERIOD FOR LONG PERIOD VARIABLES

Number of Variables		Mean Maximum Magnitude	Mean Period
			d
10		13.9	170
10		14.2	220
10		14.4	262
8		13.7	316
38	Mean	14.1	238

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