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VARIABLE STARS IN MILTON FIELD 3

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Thirty stars are tabulated for the present field, which covers the area between 1^h30^m and 4^h30^m, and +45° and +75°. About thirty-six thousand observations are discussed.

Variable Stars in Field 3

Star	*Designation*	*Type*	*Period*	*Range*	*Spectrum*	*Obs.*
UX And	022645	Semiregular	233±41 7000	9.40-[11.77	M5-M6	1039
U Cam	033362	Semiregular	435.45,223.17 3000	11.00-12.78	N5	763
RV Cam	042257	Semiregular	90±14 1000:	9.28-10.63	M4-M6	1742
RW Cam	034658	Cepheid	16.41257753	9.15 - 9.98	G4v	1393
RX Cam	035658	Cepheid	7.911978	8.20 - 9.42	G7v	1870
RY Cam	042164	Semiregular	127±12 78±12	9.23-11.39	M3-M4	1509
SZ Cam	035962	Eclipsing	2.7013337	7.3 - 7.5	O9.5	35
RX Cas	025867	Eclipsing	32.315 517.6	10.13*-11.02* 9.98-10.30	gG3 + gA5e	2037
RZ Cas	023969	Eclipsing	1.19523065*	6.26 - 7.70	A2	2853
SU Cas	024368	Cepheid	1.9493*	6.35 - 6.86	F1.7-F4.8	1600
TW Cas	023765	Eclipsing	(2.856656)	8.56 - 9.23	B9	145
TX Cas	024462	Eclipsing	2.926870	8.83 - 9.30	A	1483
WX Cas	014760	Semiregular?	...	[11.9	..	55
CC Cas	030659	Eclipsing	3.36897	7.30 - 7.41	O8 + O8	96
S Per	021558	Semiregular	810,916	10.58-12.91	M5	964
T Per	021258	Semiregular	326±50	11.09-12.00	M0	1213
U Per	015254	Long-period	318.09 167	9.78-13.83	M6e-M7e	1156
V Per	015556	Nova (1887)	...	(9.0-[16.1)	Q	...
W Per	024356	Semiregular	380±40 3060	11.42-13.20	M9	840
RR Per	022150	Long-period	391.16	9.54-[14.0	M6e	837
RS Per	021556	Semiregular	152±22	10.79-12.38	M3-M4	1374
RY Per	023947	Eclipsing	6.8635663	8.47-10.66	B6k+F8	5908
SU Per	021556	Semiregular	470±49	9.91-11.13	M3-M4	1768
TT Per	014453	Semiregular	82±13	9.22-10.63	M5-M6	1284
UU Per	133952	Semiregular?	...	11.15-[12.5	..	340
YZ Per	023156	Semiregular	378±55	10.95-11.92	M1	1573
AD Per	021356	Semiregular	320±37	10.43-11.21	M1-M3	1538
AX Per	013053	Semiregular	675	9.75-12.50	gM3+Q	561
AY Per	030350	Eclipsing	11.7764	9.72-10.50	B9	204
b Per	041050	Elliptical?	(1.53)	(4.8 - 4.9)	A2	...
						36180

*Variable.

The Long-Period Variables

The field contains only two long-period variables.

Long-Period Variables in Field 3

Star	*Designation*	*Period*	*Spectrum*	*Range*	*Median Maximum*	*Median Minimum*
U Per	015254	318.09	M6e-M7e	9.78-13.83	10.32±0.14 (35)	12.33±0.22 (18)
		167			10.75±0.33*(27)	10.77±0.22*(17)
RR Per	022150	391.16	M6e	9.54-[14.0	10.92±0.34 (20)	... ..

*Secondary.

U Persei. - The variability was first pointed out and studied by Mrs. Fleming (E. C. Pickering, AN 126, 165, 1891; HA 47, 128, 1912). The maxima have long been known to display a variety of forms, and secondary humps appear at various parts of the light curve. The minima, which are rather sharp, define the period better than the maxima. The phases in the table are derived from the period of $318^d.09$ given by Sterne and Campbell (HA 105, 465, 1936), which was determined from the maxima.

Our own minima lead to the slightly longer period $319^d.37$. The impression is received from the changing form of the light curve that two series of maxima occur, one with a period about half the other. The light curve corresponding to the longer period has by far the greater amplitude. The two periods deduced from the phases of maxima are $318^d.09$ and $\frac{1}{2}(333^d.99) = 167^d$. These periods are also deduced from the fact that doubled maxima of the main light curve alternate cyclically with pointed maxima; doubled maxima occurred near the dates JD 16400, 18300, 20800, 23700, 26300, and 28900. The mean interval between series of doubled maxima is about 2500 days, or about eight of the main periods. If we consider that it embraces fifteen of the shorter periods, we obtain again the value 167 days. Moreover, unusually shallow primary minima seem to occur at intervals of about 2500 days; such minima occurred at JD 17570, 22350, and 24910, with a mean interval of 2450 days.

Maxima and Minima of U Persei

Maxima						Minima		
JD	*IPg*	*Phase*	*JD*	*IPg*	*Phase*	*JD*	*IPg*	*Phase*
11690	9.94	36.751	18960	10.51	59.606	12460	12.86	39.171
12000:	10.26	37.725:	20190:	9.78	63.473:	14690	12.98	46.182
13810*	10.94	43.415*	20500*	10.39	64.447*	15030	12.82	47.251
13890	10.51	43.667	20575	10.26	64.683	15710*	11.31	49.388*
14210	10.34	44.673	20800*	10.51	65.390	16120*	10.60	50.677*
15430*	10.92	48.508*	20880	10.39	65.642	16425*	10.69	51.636*
15660	10.34:	49.231	21150	9.90	66.491	16750*	10.51	52.658*
15770	10.30	49.577	21230*	10.51	66.742*	17250	13.06	54.230
16080	10.34	50.552	21490	10.30	67.559	17570*	11.68	55.236*
16160*	10.51	50.803*	21800	10.01	68.534	18300*	10.60	57.531*
16380*	10.34	51.495*	21880*	10.80	68.785*	18630*	10.76	58.568*
16470	10.04	51.778	22270*	11.27	70.011*	19760	13.06	62.121
16720*	10.51	52.564*	22600*	11.67	71.049*	20100	12.90:	63.190
16790	10.18	52.784	22740	10.84	71.489	20540*	10.55	64.573*
17060	10.34	53.633	22930*	11.60	72.086*	20840*	10.84	65.516*
17200*	11.88	54.073*	23065	10.10	72.511	22240*	11.39	69.917
17520*	11.56	55.079*	23415	10.18	73.611	22350	12.00	70.263
17980	10.34	56.525	23720*	10.69	74.570*	22660	12.43	71.238
18270*	10.42	57.436*	23775	10.64	74.743	22975	13.83:	72.228
18340	10.34	57.657	24060	10.60	75.639	23750*	10.80	74.664*
18590	10.51	58.442	24130*	10.69	75.859*	24100*	10.76	75.765*
18670*	10.56	58.694*	24380	10.73	76.645	24440*	11.56	76.833*

Maxima

JD	IPg	Phase	JD	IPg	Phase
24470*	11.24	76.928*	28960	9.94	91.043
24750	11.39	77.808	29210*	10.14	91.829*
25470*	10.94	80.072*	29380	9.85	92.364
25650	10.30	80.637	29600	9.90	93.055
25970	10.51	81.643			
26270*	10.42	82.587*			
26350	10.39	82.838			
26590*	10.92	83.593*			
26660	10.42	83.813			
26900*	10.84	84.567*			
26980	10.26	84.819			
27290:	10.01	85.793			
28180*	11.56	88.591*			
28900*	10.04	90.855*			

Minima

JD	IPg	Phase
24910	12.27	78.311
25220	12.82	79.286
25540	12.34	80.292
26305*	10.84	82.697*
26620*	10.99	83.687*
26940*	11.03	84.693*
27130	12.94	85.290
27450	12.90	86.296
27780	12.82	87.334
28090	12.78	88.308
28400:	[13.45	89.283
28780	12.94	90.477
28925*	10.18	90.933*
29240*	10.21	91.924*

*Secondary.

RR Persei. - The period for this well-known long-period variable is taken from Sterne and Campbell (HA 105, 465, 1936).

Maxima of RR Persei

JD	IPg	Phase	JD	IPg	Phase	JD	IPg	Phase
15290	10.88	39.089	21130	10.51	54.019	26630	11.04	68.080
16040	11.11	41.006	21520	10.51	55.016	27030	9.54	69.102
16440	10.28	42.029	21930	11.04	56.064	27410	12.04	70.074
16840	11.04	43.051	22310	10.43	57.036	27830	10.88	71.147
17240	11.70	44.074	22740	11.34	58.135	28200:	11.85	72.093:
17620	10.43	45.046	25480	...	65.140	28580	10.74	73.065
20760:	11.04:	53.073:	26240	10.51	67.083	28960	11.04	74.036

The Semiregular Variables

The field is rich in interesting semiregular variables; thirteen are tabulated.

Semiregular Variables in Field 3

Star	Designation	Period	Spectrum	Range	Median Maximum	Median Minimum
UX And	022645	233±41 7000	M5-M6	9.40-[11.77	9.97±0.23 (27)	10.92±0.26 (27)
U Cam	033362	435.45 223.17 3000	N5	11.00-12.78	11.60±0.36 (17)	12.50±0.28 (21)
RV Cam	042257	90 1000	M4-M6	9.28-10.63	9.79±0.15 (83)	10.18±0.13 (66)
RY Cam	042164	127±12(53) 78±12(38)	M3-M4	9.23-11.39	9.90±0.13 (83)	10.96±0.23 (73)
S Per	021558	810,916	M5	10.58-12.91	12.00±0.16 (24)	... ..
T Per	021258	326±50	M0	11.09-12.00	11.36±0.14 (31)	11.86±0.06 (14)
W Per	024356	380±40(23) 3060	M9	11.42-13.20	12.05±0.27 (16)	12.63±0.16 (25)
RS Per	021556	152±22(56)	M3-M4	10.79-12.38	11.22±0.17 (45)	11.81±0.18 (36)
SU Per	021556	470±49(29)	M3-M4	9.91-11.13	10.27±0.13 (28)	10.84±0.17 (30)
TT Per	014453	82±13(50)	M5-M6	9.22-10.63	9.94±0.12 (53)	10.21±0.14 (50)

Star	Designation	Period	Spectrum	Range	Median Maximum	Median Minimum
YZ Per	023156	378±55(32)	M1	10.95-11.92	11.28±0.19 (27)	11.62±0.20 (36)
AD Per	021356	320±37(37)	M1-M3	10.43-11.21	10.74±0.09 (21)	10.99±0.09 (28)
AX Per	013053	675	gM3+Q	9.75-12.50	... ..	... ..

UX Andromedae. - This variable was discovered by Deichmüller (AN 145, 253, 1898), and has been very little studied, the only series of observations being a short visual list by Doberck (JO 7, 64, 1924). The variation is well marked and distinctive; there is a wide range of cycles, and both the amplitude and the maximum and minimum magnitudes fluctuate in a well-marked cycle of 7000 days. The median short cycle, $233^d \pm 41$, is close to the period of 235 days given by Müller and Hartwig (GuL I, 1, 68, 1918). The cycle has a tendency to double when the range is large. The observations of Doberck, made at a time of small range, indicate a range of less than a magnitude; the extreme photographic range is, however, much larger.

Miss Cannon classified the spectrum as M5 (HB 897, 1934); Keenan gives M6 (ApJ 95, 461, 1942).

Maxima and Minima of UX Andromedae

Maxima						Minima					
JD	IPg	JD	IPg	JD	IPg	JD	IPg	JD	IPg	JD	IPg
15030	10.28	20490	9.99	25180	9.65	11770:	11.24:	22650	10.28	27430	11.00
15410	10.23	20770	10.23	25260*	9.94	15710*	10.76	23050	9.99	28880*	10.12
16070	10.20	20920	10.23	25600	9.40	16420	10.41	23480	[10.92	29560	10.70
16330:	10.08:	21150	9.90	26020	10.08	16830	10.92	23710	10.50		
16520	9.65	21580	10.23	26260	10.36	17050:	11.24:	24160	10.66		
16730	9.70	21940	10.50	26660*	10.92	17960	11.33	24850	10.50		
16940:	10.41:	22320	10.08	27060	10.92	18620	10.80	25230*	10.03		
17170	9.65	22520:	9.83:	27320	9.65	19330:	[11.50	25500	10.92:		
17570	10.08:	22760:	9.48:	27660:	9.94	19760	[11.77	25890	10.87		
17850	9.48	22920	9.48	28030	9.94	20598**	...	26200	11.24		
18280	9.48	23360	10.08	28420	9.61	20847**	11.33	26320	11.00		
18530:	10.15:	23630:	]9.65	28850*	10.08	21035**	...	26630	11.13		
18690	9.65	23770	10.16	28930	9.99	21290	11.09	26690*	11.09		
18950	10.41	24040	9.40	29230	9.70	21520*	10.50	27020	11.09		
20050	9.65	24390	9.83	29630***	...	21770:	[11.33	27070	11.18		

*Secondary. **Hoffmeister. ***Loreta.

U Camelopardalis. - Discovered by Birmingham (AN 77, 301, 1871), this star has proved to be a difficult object because of its great redness. Jacchia deduced the elements: Maximum = JD 25306 + $418^d.7E$ (Bol Publ 2, 236, 1933); Himpel (AN 272, 228, 1942) gave a period of 421 days. The light curve shows a double wave, with a suggestion of an approximately halved period superimposed upon the main period. On this supposition we have derived a value of $435^d.45$ for the main period, $223^d.17$ for the secondary period; the minima give a period very near to that derived by Jacchia. In addition to the cycle just mentioned, the light curve undergoes a slow fluctuation with a cycle of about 3000 days.

The spectrum, N5, is taken from Sanford (ApJ 82, 206, 1935). The intensities of the lines of lithium and sodium are given by McKellar and Stilwell (JRASC 38, 237, 1944).

Maxima and Minima of U Camelopardalis (Short Cycle)

Maxima						Minima					
JD	IPg	JD	IPg	JD	IPg	JD	IPg	JD	IPg	JD	IPg
11370:	11.33:	20110	12.31	21850	11.52	11660:	12.68:	16890	12.52	21990	12.31
11850	11.99	20470:	12.12:	22040	11.20	12150	12.78:	17190:	12.58:	22670	12.04
15790	11.92	21120	12.22	22260	11.00	16000:	[12.68	17920	12.71:	23380	12.69
16140	11.40	21600	11.63	22550	...	16430	12.46	19770	12.60	24500	12.35

Maxima						Minima					
JD	*IPg*	*JD*	*IPg*	*JD*	*IPg*	*JD*	*IPg*	*JD*	*IPg*	*JD*	*IPg*
22750	11.28	25350	11.00	29140	11.40	25180	11.92	27790	12.52	28830	12.09
23600	...	27400	11.92	29290	11.92	25580	12.16	28100:	12.52:	29300	11.99:
24850	11.56					25990	12.68	28520	12.12	29640	11.92
						27200:	12.68:				

Maxima and Minima of U Camelopardalis (Long Cycle)

Maxima				Minima			
From Maxima of Short Cycle		*From Minima of Short Cycle*		*From Maxima of Short Cycle*		*From Minima of Short Cycle*	
JD	*IPg*	*JD*	*IPg*	*JD*	*IPg*	*JD*	*IPg*
11200	11.34	16600	12.41	20400	12.31	20500:	12.68:
16400	11.16	22400:	11.99:	27200	11.99:	23800	[12.56
22400	11.00	25200	11.92			27000	[12.49
25300	11.00	29200	11.92				

RV Camelopardalis. - Suspected by Espin (AN 121, 33, 1889), and substantiated by Mrs. Fleming (E. C. Pickering, HC 124, 1907), RV Camelopardalis shows well-marked semiregular variations. The published visual observations agree well with our data on the deduced times of maxima and minima. A long cycle of about 1000 days is suggested.

The spectrum is given by Keenan as M4 (ApJ 95, 461, 1942) and by Joy as M5-6 (ApJ 96, 344, 1942).

Maxima and Minima of RV Camelopardalis

Maxima						Minima					
JD	*IPg*	*JD*	*IPg*	*JD*	*IPg*	*JD*	*IPg*	*JD*	*IPg*	*JD*	*IPg*
14650	9.96	21120:	9.54	25540	9.71	14965	10.33	21270	10.16	27460	9.93
15000	10.09	21220	9.64	25620	9.68	15070	10.43	21480	10.37	27740	10.16
15100	9.96	21310	9.75	25890	9.54	15390	10.43	21600	10.50	27800	9.89
15410	10.04	21540	10.04	26010	9.48	15700	10.30	21950	9.89	28110	10.23
15780	10.00	21660	10.02	26230	9.54	16040	10.19	22200*	...	28200	10.16
16065	10.02	21910	9.64	26350	9.62	16110	10.16	22280	10.18	28500	10.09
16150	10.02	22050	9.54	26600	9.58	16190:	10.43	22390	10.37	28570	10.04
16380	9.96	22150*	...	26690	9.58	16425	10.09	22630	9.89:	28830	10.16
16480	9.83	22230	9.75	26800	9.62	16540:	10.09	22740	9.75	28910	10.13
16720:	9.83	22320	10.04	26930	9.62	16780	10.43	22970	9.83	29230	10.13
16820	10.04	22600	9.86	27000	9.93	16890	10.37	23060	10.09	29590	10.43
16930	9.83	22690	9.58	27130	9.83	17110	10.09	23390	9.96	29650	10.23
17150	9.89	22780	9.48	27430	9.89	17210	10.13	23440	9.96		
17260	9.93	22910	9.45	27490	9.68	17500	10.26	24070	9.93		
17530	10.09	23000	9.54	27710	9.62	17560	10.30	24130	10.04		
17610	9.89	23340	9.75	27780	9.75	17860	10.26	24460	10.23		
17950	9.96	23410	9.62	27850	9.28	18610	9.96	25140	10.23		
18330	9.89	23490	9.71	28170	10.02	18690	10.00	25580	9.93		
18580	9.89	23670:	9.75	28230	9.89	19030	10.16	25660	10.00		
18650	9.86	24050	9.64	28460	9.89	19320	10.02	25980	10.02		
18730	9.75	24090	9.86	28530	9.86	19410	10.09	26060	10.23		
18930	9.62	24180	9.75	28890	9.89	19750	10.00	26290	10.02		
19060	9.89	24390	9.83	28950	9.42	20140	10.37	26410	10.43		
19360	9.58	24500	9.62	29140	9.42	20340:	10.43	26640	10.23		
19690	9.54	24730*	...	29290	9.62	20485	10.16	26750	10.13		
19800	9.79	24860	9.71	29520	9.96	20830	10.63	27040	10.26		
20070	9.83	25200	9.51	29630	10.16	20940	10.43	27380	10.23		
20770	10.02	25300	9.68	29680:	9.42	21170	10.02	*Visual.			
20890	10.09										

RY Camelopardalis. - Discovered by Miss Leavitt (E. C. Pickering, HC 127, 1907), this star shows well marked semiregular variations. Period from 112 days (GuL I, 1, 111, 1918) to $135^d.4$ Beyer, (Erg AN 8, C 25, 1930) have been assigned to it. Our median cycle, $127^d \pm 12$, is compatible with this period, but, as Beyer suggests, the variation is probably complicated with an overlying period, for which he gives the value 154 days. The distribution of our cycles would be compatible with a short cycle of $78^d \pm 12$, or about half Beyer's second period.

The spectrum is given as M3 by Keenan (ApJ 95, 461, 1942), and as M3-4 by Joy (ApJ 96, 344, 1942).

Maxima and Minima of RY Camelopardalis

Maxima						Minima					
JD	*IPg*	*JD*	*IPg*	*JD*	*IPg*	*JD*	*IPg*	*JD*	*IPg*	*JD*	*IPg*
12080	10.17	19780	10.17	25240	10.17	12470	11.14	19680	11.00	26020	10.53
12560	9.61	20150	9.84	25350:	10.04:	12595	10.61	19760	10.54	26260	10.81
12620:	9.61:	20460	10.09	25530	9.50	12900:	10.85:	20090	11.00	26410	11.30
14580	9.84	20530:	...	25670	9.76	14630	11.00	20490	10.54	26700	11.39
14680:	9.84:	20830	9.97	25940	9.97	14740	11.30	20870	10.85	26830:	...
14990	9.93	20930	10.08	26070:	9.93	15030	11.30	21550	11.19	26980	...
15090	9.70	21510	9.97	26210	9.84	15440	11.30	21950	10.74	27100	10.77
15360	9.70	21620	10.04	26360	9.70	15710	10.77	22210	10.77:	27230:	11.00
15650	9.89	21890	10.17	26620	9.39	15890:	11.00	22280	10.70	27360	11.30
15800	9.61	22010	9.77	26750	9.61	16150	11.00	22350	11.04	27435	10.12
16050	9.70	22240	10.24	27020	9.53	16410	11.07	22635	11.00	27510	11.00
16320	9.84	22310	9.97	27160	9.56	16540	11.00	22750:	10.53:	27660:	11.00
16460	9.93	22400:	...	27320	9.70	16740:	10.54:	22940	10.16	27800	11.30
16770	10.17	22600	10.00	27410	9.80	16830	10.74	23015	[11.00	28060	10.70
16890	9.77	22680	9.89	27460	9.89	16940:	10.62:	23400	10.47:	28180	11.30
17100	9.93	22920	10.04	27700*	10.04	17140	11.00	23680:	11.14	28470	11.26
17160	9.73	22970	9.73	27750	9.77	17220	11.00	24110	10.70	28590	10.39
17280	10.09	23085	9.80	28120	9.84	17510	11.19	24250	11.00	28880	10.61
17560	9.80	23360	9.77	28250:	9.84:	17640	11.00	24400	10.77:	29000:	10.70:
17850	9.93	23480	9.84	28400:	9.84:	17940:	...	24480	10.70	29120	11.23
17970	9.84	23750	9.80	28520	9.65	18040:	...	24570	10.77	29210	10.42
18260	9.77	24030:	9.93:	28810	9.53	18190	11.07	24780	[10.70	29270	11.00
18360	9.70	24160	9.73	28930	9.70	18230	11.30	24920	11.19	29540	10.61
18530	10.00	24435	9.93	29180	9.89	18610	11.30	25200	11.19	29590	10.16
18650	9.77	24510	10.27	29230	10.24	18690	10.77	25310	10.85	29700:	...
18730:	...	24860	9.93	29310	9.89	18800	11.39	25400	11.14		
18950	10.04	24970	10.08	29570	10.08	18990	11.39	25590	11.14		
19030	10.20	25100:	9.23	29640	9.73	19060	11.23	25730	11.30		
19720	9.84	25160*	10.53			19420	...	25870	11.23		

*Inflection.

S Persei. - The variations observed for this remarkable semiregular star are similar to those reported by other observers. No analysis of the variations is attempted in the present paper.

Maxima and Minima of S Persei

Maxima										Minima	
JD	*IPg*	*JD*	*IPg*	*JD*	*IPg*	*JD*	*IPg*	*JD*	*IPg*	*JD*	*IPg*
11680	10.58	16230	11.61:	18190:	11.90	21610	12.03	25650	12.18	14640	12.12
12830	11.90	16890	12.24	19000	11.70	22960	11.93	28870	11.85	17600	12.91
13750	11.93	17240	12.06	19850	11.30	24000:	12.08	29180	12.36	21180	12.70
14010*	12.24	17550	12.24	20850	11.98	24810	11.93	29650:	11.61	25100	12.81
15430	11.08	17930	12.09	20860	12.18	25280	12.97				

*Inflection.

T Persei. - Announced as variable by Safarik (AN 101, 21, 1882), T Persei varies in an erratic manner. Rather rapid oscillations are superimposed on a well-defined slow fluctuation, and there are intervals of comparative quiescence, such as the one from JD 13710 to 14000 ($11^m.21$). The tabulated maxima and minima have been obtained by a more than usually arbitrary disregard of small fluctuations. The large dispersion of the cycles, and the nearness of the median cycle to a year, further emphasize the uncertainty. The long cycle of 2800 days is better determined than the short cycle.

The spectrum is from Keenan (ApJ 95, 461, 1942).

Maxima and Minima of T Persei (Short Cycle)

Maxima						Minima			
JD	*IPg*	*JD*	*IPg*	*JD*	*IPg*	*JD*	*IPg*	*JD*	*IPg*
14030	11.09	20850	11.32	25050:	11.09	12850	11.53	27000	11.75
16090	11.24	21500	11.32	25270	11.32	14670	11.88	27690	12.00
16350	11.56	21970	11.49	25580:	11.13	15010	11.96	28920	11.80
16760	11.49	22310	11.64	25880	11.09	22240	12.00	29230	11.45
18250:	11.56:	22740	11.56	26280	11.21	22640	11.96		
18610:	11.49	23050	11.40	26620	11.21	22970	11.88		
18920	11.40	23360	11.37	27070	11.24	24120	11.88		
19380:	11.72:	23730	11.37	27370:	11.60	24400	11.88		
19740	11.72	24000	11.09	28820	11.32	24880	11.88		
20500	11.40	24800	11.69	29580	11.21	25160	11.80		
20780	11.45								

Maxima and Minima of T Persei (Long Cycle)

Maxima				Minima			
JD	*IPg*	*JD*	*IPg*	*JD*	*IPg*	*JD*	*IPg*
17500	11.49	26000	11.24	16600	11.88	25000	11.72
21000	11.49	29300	11.40	19500	11.72	27600	11.72
23800	11.52			22500	11.80		

W Persei. - Discovered by Espin (MN 54, 101, 1894), this semiregular variable is of unusually late spectral type. Its photographic range is large but variable, and there are long-term fluctuations of considerable amplitude.

The dispersion of the individual cycles is large; our median cycle is 380 ± 40 days, a value that has little significance except in showing that the short cycle is unusually long. The long cycle has apparently increased steadily, during the interval studied, from 2500 to 3700 days. We have adopted a mean value of 3060 days for the long cycle.

Maxima and Minima of W Persei (Short Cycle)

Maxima				Minima					
JD	*IPg*	*JD*	*IPg*	*JD*	*IPg*	*JD*	*IPg*	*JD*	*IPg*
11750	11.86	25250	12.36:	11630:	13.08	20500	12.50	25050	...
15550:	11.99:	25890	11.95	14650:	12:85:	20850	12.50	25540	13.20
16000	12.43	26350	11.42	15000:	12.65:	22300	12.79	26690	12.96
16460	12.53	26900:	11.51:	15300:	12.70:	23000	12.46	27100	12.50
17660	11.51	27340:	11.51:	15800	12.88	23400	12.70	27700	12.58
18280	12.13	29200	12.50	16800	13.02	23750:	12.43:	28050	12.43
21590	12.13	29520:	12.10	17160	12.70	24080	12.50	28530	12.43
23100	11.67:			17580	12.58	24470	12.43	28850	12.58
24230	11.95			17820	12.79	24830	12.36		

Maxima and Minima of W Persei (Long Cycle)

Maxima				Minima			
JD	*IPg**	*JD*	*IPg**	*JD*	*IPg**	*JD*	*IPg**
15100	11.90	23600	11.67	16500	12.54	25400	12.58
17600	11.59	27000	11.51	19200:	...	29100	12.50
20500	11.59			21800:	...		

*Mean maximum.

RS Persei. - This star was discovered by W. Ceraski (AN 165, 125, 1904). Where our material overlaps that of Plummer (MN 74, 687, 1914), the agreement between the light curves is close.

The spectral class M3 is from Keenan (ApJ 95, 461, 1942), and M4 from Joy (ApJ 96, 344, 1942).

Maxima and Minima of RS Persei

Maxima						Minima					
JD	*IPg*	*JD*	*IPg*	*JD*	*IPg*	*JD*	*IPg*	*JD*	*IPg*	*JD*	*IPg*
11690	10.98	18980	11.30	23730	11.06	13930	11.34	21230	11.54	25900	11.44
13860	10.90	19440	11.26	24460	11.26	14650	11.86	21810:	11.54	26230	11.40
13990	11.06	19740	11.69	24800	11.44	16050	12.38	21960	11.78	27060	11.44
15400	10.94	19990	11.53	25130	11.40	16410	11.78	22180	11.80	28100	11.78
16150:	11.72:	20370:	11.18	25280	11.26	16520	12.33	22300	11.34	29260	11.34
16360	11.53	20500	10.79	25550	10.94	16800	11.78	22640	11.68	29550	11.72
16440	11.69	20890	11.02	25870	11.26	17110	12.10	22940	11.80		
16760	11.62	21160	11.26	26050	10.84	17570	11.86	23060	11.62		
16870	11.53	21580	11.02	26290	11.06	17950	12.00	23380	11.62		
17210	11.44	21860	11.34	26580	10.90	18450	11.50	24080	11.54		
17860	11.44	22240	11.18	26950	11.18	18610	11.68	24400	11.62		
18020:	10.90	22710	11.44	27120	11.30	19080	12.00	24520	11.54		
18350	10.84	23010	11.44	27430	11.21	19310	12.00	24880	11.62		
18520	10.79	23320	11.06	28900	11.18	20100	12.19	25190	12.00		
18860	11.21	23410	11.12	29190	11.21	20790	12.00	25450	11.54		

SU Persei. - Discovered by Miss Leavitt (E. C. Pickering, HC 127, 1907), SU Persei has a well-marked cycle, with secondary fluctuations superimposed upon it. Our median cycle, 470 ± 49 days, is in good agreement with the mean cycle of 472 days, derived from twelve complete consecutive cycles between minima at JD 17120 and 22780. The "Plummer" entries in the table are derived from the observations published by him (MN 74, 687, 1914). There was a quiescent interval from JD 25850 to 26100 ($10^{m}.44$).

The spectrum M3 is given by Keenan (ApJ 95, 461, 1942), and M3-4 by Joy (ApJ 96, 344, 1942).

Maxima and Minima of SU Persei

Maxima						Minima					
JD	*IPg*	*JD*	*IPg*	*JD*	*IPg*	*JD*	*IPg*	*JD*	*IPg*	*JD*	*IPg*
13880	10.50	18780*	10.39:	21470	10.08	11290	10.75	17960	10.81	20350	11.00
16120*	10.26	19040	10.08	21590*	10.28	12460	10.67	18240*	10.50	20790	10.88
16280	10.01	19250**	...	21980	10.31	13710:	10.88	18480:	[10.94	21100*	10.50:
16800	10.44	19530**	...	22330	10.47	14140	11.00	18700*	10.56	21340	[10.75
17300	10.31	19720*	10.60	22950	10.47	14680	10.94	18950	10.97	21560*	10.31
17750:	10.31:	20070	10.63	23390	10.04	15680	10.63:	19140**	...	21720:	...
18150*	10.40	20490	10.56	25230	10.44	16600:	[10.63	19410	10.94	22200	11.02
18330	10.35	20950	10.08	26300	9.98	17120	10.94	19680*	10.88	22780	11.06
18610	10.28	21210*	10.44	27040	9.91	17510	11.06	19820	11.00	23050*	10.69

Maxima		Minima					
JD	*IPg*	*JD*	*IPg*	*JD*	*IPg*	*JD*	*IPg*
27770	10.31	23760	10.54	27430*	10.60	28840	10.40
28450	10.26	24460	10.60	27700	11.13	29200	10.44
29590	10.26	24850	10.91	28120	10.94		

*Secondary. **Plummer.

TT Persei. - The variable was discovered by Mrs. Fleming (E. C. Pickering, HC 158, 1910). Spectral class M5 is given by Keenan (ApJ 95, 461, 1942), M6 by Joy (ApJ 96, 344, 1942).

Maxima and Minima of TT Persei

Maxima						Minima					
JD	*IPg*	*JD*	*IPg*	*JD*	*IPg*	*JD*	*IPg*	*JD*	*IPg*	*JD*	*IPg*
14620	10.10	22140	10.29	25640	9.72	15040	9.86	22180	10.52	26280	10.20
15000	9.43	22220	10.10	25880	9.22	16150	10.63	22260	10.23	26350	10.23
16340	9.95	22340	9.90	26250	10.10	16400	10.16	22540	10.29	26650	9.95
16440	9.95	22600	9.92	26330	9.76	16480	10.16	22640	10.06	26730	9.90
16530	9.84	22660	9.99	26590	9.64	16770	10.02	22710	10.13	27350	10.23
16740	9.87	22740	10.10	26700	9.49	16840	10.02	23000	10.36	27440	10.29
16800	9.70	23040	10.02	26760	9.56	16915	10.29:	23780	10.39	28060	10.36
16880	9.92	24060	9.76	27310	9.95	17090	10.63	24080	9.84	28130	10.26
17115	10.16	24100	9.76	27400	9.92	17160	10.36	24140	9.99	28410	10.20
17210	10.02	24170	9.84	27490	9.84	17250	10.20	24410	10.36	28490	10.36
17880	10.06	24430	10.10	28100	9.99	17500	10.10	24750	10.10	29170	10.23
18270	9.90	24520	10.02	28170	9.95	17910	10.36	24880	10.10	29260	10.36
18330	9.90	24780	10.02	28460	9.90	18300	10.02	25150	9.84	29550	10.63
18980	9.95	24830	9.90	29130	9.78	18910	10.36	25220	10.02	29650	10.43
21520	9.84	24930	9.70	29220	9.95	21560	10.10	25600	10.13		
21590	9.84:	25120	9.43	29490	10.10	21650	10.10	25680	9.86		
21870	10.23	25190	9.43	29610	10.29	21820	10.36	25850	9.90		
22000	10.29	25550	9.84			21940	10.43	26220	10.36		

YZ Persei. - The star was discovered by Miss Walker (E. C. Pickering, HC 231, 1922).

Maxima and Minima of YZ Persei

Maxima						Minima					
JD	*IPg*	*JD*	*IPg*	*JD*	*IPg*	*JD*	*IPg*	*JD*	*IPg*	*JD*	*IPg*
11640	11.40	19780	11.29:	24880	11.43	12870	11.76	18930	11.50	24530	11.59
13750	11.54	19980	11.04	25250	11.34	13980	11.81	19060:	11.70:	25110	11.59
14140	11.40	20400	11.20	29550	11.23	16030	11.63	20220	11.63	25980	11.63
14590	11.20	20770	10.95			16140	11.70	20600	11.50:	26320	11.81
15000	11.10	20860	11.04			16400	11.70	20740	11.34	26610:	11.59
15310	11.43	20950	11.04			16480	11.73	20820	11.38	27050	11.43
16090	11.49	22360	11.38			16780	11.86	20900	11.29	27450	11.34
16340	11.54	22610:	11.29			17150	11.86	21160	11.50	27760	11.50
16430	11.54	23020	11.23			17530	11.86	21860	11.92	28150	11.63
16730	11.54	23300:	10.95			17880	11.73	22200:	11.81	28600:	11.50
16850	11.43	23750	10.95			18280	11.67	22810	11.92:	28900	11.38
18990	11.16	24370	10.95			18600	11.92	24160	11.43	29350	11.54

AD Persei. - The star was discovered by van der Bilt and confirmed by Miss Leavitt (HB 625, 1917). Martin and Plummer gave the elements: Maximum = JD 18884 + 704.^{d}E (MN 77, 651, 1917). Our median

cycle is rather less than half the period given by Martin and Plummer. Kopal considered the variation doubtful (AN 252, 133, 1934), and Oosterhoff found no variability (Leid Ann 17, 42, 1937). Our measured variation is small but seems definite.

Maxima and Minima of AD Persei

Maxima						Minima					
JD	*IPg*	*JD*	*IPg*	*JD*	*IPg*	*JD*	*IPg*	*JD*	*IPg*	*JD*	*IPg*
13770	10.53	19570	...	26650	10.57	13960	10.97	19400	10.87	25660	10.84
14080:	10.84	20510	10.61	26920	10.43	15460:	11.15	19730	10.97	25940	10.90
15800	10.65	20850	10.72:	28480*	10.78	16050	11.05	20030:	10.84	26240	10.90
16850	10.84	21310	10.78	28820	10.65	16460	11.15	20330	10.97	27050	10.84
17130*	10.87	21980	10.81			16770	11.03	20710	10.94	27710	11.03
17890*	10.90	22380	10.72			17210	11.03	21500	11.12	28090	10.97
18050:	...	22680	10.75			17640:	11.21:	22200	11.09	28530*	11.09
18560	10.78	24120	10.57			17940*	11.05	23400	10.90	29240	10.90
18900:	10.78	24400	10.69			18210	10.97	23680	10.97		
19260	...	25600*	10.75			18730	10.97	25500	11.09		

*Secondary.

The Cepheid Variables

Three Cepheid variables are included in the field.

Cepheid Variables in Field 3

Star	*Designation*	*Period*	*Range*	*Max.*	*Phase Med.*	*Min.*	*Spectrum*
RW Cam	034658	16.41257753	9.15-9.98	.988	.902	.660	G4v
RX Cam	035658	7.911978	8.20-9.42	.230	.118	.980	G2-K2
SU Cas	024368	1.9493*	6.35-6.86	...	...	...	F1.5-F6.2

*Variable.

RW Camelopardalis. - The period has been slightly corrected to $16^{d}.41257753$.

Mean Light Curve of RW Camelopardalis

Phase	*IPg*	*Obs.*	*Phase*	*IPg*	*Obs.*	*Phase*	*IPg*	*Obs.*
.017	9.17	50	.379	9.65	100	.817	9.63	50
.053	9.20	50	.447	9.77	100	.848	9.61	50
.106	9.29	100	.517	9.90	100	.882	9.51	50
.173	9.38	100	.608	9.96	100	.910	9.45	50
.238	9.46	100	.684	9.98	100	.955	9.23	50
.308	9.57	100	.756	9.77	100	.988	9.15	43

RX Camelopardalis. - The period used in the formation of the light curve is that given by Robinson (HB 872, 1930).

Mean Light Curve of RX Camelopardalis

Phase	*IPg*	*Obs.*	*Phase*	*IPg*	*Obs.*	*Phase*	*IPg*	*Obs.*
.027	9.36	100	.232	8.20	50	.438	8.49	100
.073	9.14	100	.261	8.22	50	.479	8.49	50
.132	8.68	100	.289	8.24	50	.507	8.45	50
.180	8.55	100	.333	8.32	100	.538	8.45	50
.201	8.28	50	.384	8.44	100	.564	8.58	50

Phase	*IPg*	*Obs.*	*Phase*	*IPg*	*Obs.*	*Phase*	*IPg*	*Obs.*
.605	8.78	100	.760	9.14	100	.933	9.41	100
.656	8.92	100	.818	9.30	100	.978	9.42	70
.705	9.00	100	.879	9.39	100			

SU Cassiopeiae. - The variations of this well-known Cepheid have been discussed elsewhere (C. Payne-Gaposchkin, Proc Amer Phil Soc 81, 201, 1939). The period and probably the light curve are variable. The mean photographic light curve (average of 80 points to a mean) and the mean curve of spectral changes (Mrs. Margaret Mayall) are tabulated.

Mean Light Curve of SU Cassiopeiae

Phase	*IPg*	*Phase*	*IPg*	*Phase*	*IPg*	*Phase*	*IPg*
.000	6.83	.250	6.54	.500	6.38	.750	6.66
.050	6.86	.300	6.46	.550	6.42	.800	6.67
.100	6.83	.350	6.39	.600	6.50	.850	6.68
.150	6.74	.400	6.35	.650	6.58	.900	6.73
.200	6.65	.450	6.35	.700	6.64	.950	6.79

Mean Spectral Curve of SU Cassiopeiae

*Phase**	*Spectrum*	*Obs.*	*Phase**	*Spectrum*	*Obs.*	*Phase*	*Spectrum*	*Obs.*
.200	F 3.70	10	.450	F 2.50	10	.880	F 4.75	10
.230	F 3.60	10	.520	F 2.80	10	.000	F 5.30	10
.260	F 2.80	10	.640	F 3.15	10	.050	F 6.19	8
.290	F 2.35	10	.690	F 3.60	10	.150	F 4.20	10
.350	F 1.50	10	.750	F 4.35	10			
.410	F 1.70	10	.800	F 4.15	10			

*Phase of maximum is .500.

The Eclipsing Stars

Eight eclipsing stars are tabulated.

Eclipsing Stars in Field 3

Star	*Designation*	*Period*	*Spectrum*	M_1	M_2	m_1	m_2
SZ Cam	035962	(2.7013337)	O9.5	(7.3)	(7.3)	(7.5)	...
RX Cas	025867	32.315* 517.6	gG3+gA5c	10.13	10.13	11.02	10.27
RZ Cas	023969	1.19523065*	A2	6.26	6.26	7.70	...
TW Cas	023765	(2.856656)	B9	(8.29)	(8.29)	(8.91)	(8.86)
TX Cas	024462	2.926870	A	8.83	8.83	9.30	8.96
CC Cas	030659	(3.36897)	O8+O8	(7.30)	(7.30)	(7.41)	...
RY Per	023947	6.8635663	B6K+F8	8.47	8.47	10.66	8.49
AY Per	030350	11.7764	B9	9.72	9.72	10.50	...