

No. 112 UBVRIJKL LIGHT CURVES OF CLASSICAL CEPHEIDS

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ABSTRACT

Observations of classical Cepheids are presented. Analyses will be published separately.

We have made multicolor photoelectric observations on the UBVRIJKL system (Johnson, Mitchell, Iriarte and Wisniewski 1966) for 20 classical Cepheid variable stars. For 18 of these stars, the observations extend from the ultraviolet to 2.2μ or 3.4μ in the infrared; for two, the data are limited to the UBVRI filters.

The individual observations are listed in Table 1. This table is divided into two parts; the first, contains the UBVRI data and the second, the JKL data. Since the photometric apparatus was the same as that used on the bright star program, the probable errors listed by Johnson, et al., (1966) also apply to the data of Table 1.

The data of Table 1 are sufficient to define light curves for these stars as wavelengths ranging from the ultraviolet to the infrared. Figures 1–20 show the observed light curves. The UBV data listed by Mitchell, Iriarte, Steinmetz and Johnson (1964) were also plotted, thereby increasing the weights of the UBV curves.

The light curves shown in Figures 1–20 exhibit the well-known shift of phase with wavelength. For example, the times of maximum and minimum light for T Mon shift to later and later phases as one progresses from U to L (from 0.36μ to 3.4μ). On the other hand several stars (SU Cas, DT Cyg and SZ Tau) seem not to show much phase shift. These same three stars are also almost constant in light output at 2.2μ and 3.4μ (K and L magnitudes).

Another group of stars (η Aql, U Aql, W Gem, S Sge and U Sge) exhibit another effect. These stars have secondary “bumps” on the visual light curves; as we proceed to the longer wavelengths these secondary “bumps” become the primary maxima. We suggest that this effect may be related to the phase shifts exhibited by stars with asymmetrical light curves; for example, T Mon and X Cyg.

We are preparing, for separate publication, analyses of the data given here in terms of the bolometric light curves and effective temperature curves. The combination of our data with the known radial velocity curves enables us to compute the absolute magnitude for each of these Cepheid variable stars. Our absolute magnitude determinations are entirely empirical and do not depend upon stellar model computations. The results of these analyses will be published in the near future.

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REFERENCES

- Johnson, H. L., Mitchell, R. I., Iriarte, B. and Wisniewski, W. Z. 1966, *Comm. Lunar and Planet. Lab.*, 4, 99.
- Mitchell, R. I., Iriarte, B., Steinmetz, D. and Johnson, H. L. 1964, *Bol. Obs. Tonantzintla y Tacubaya*, 3, 153.

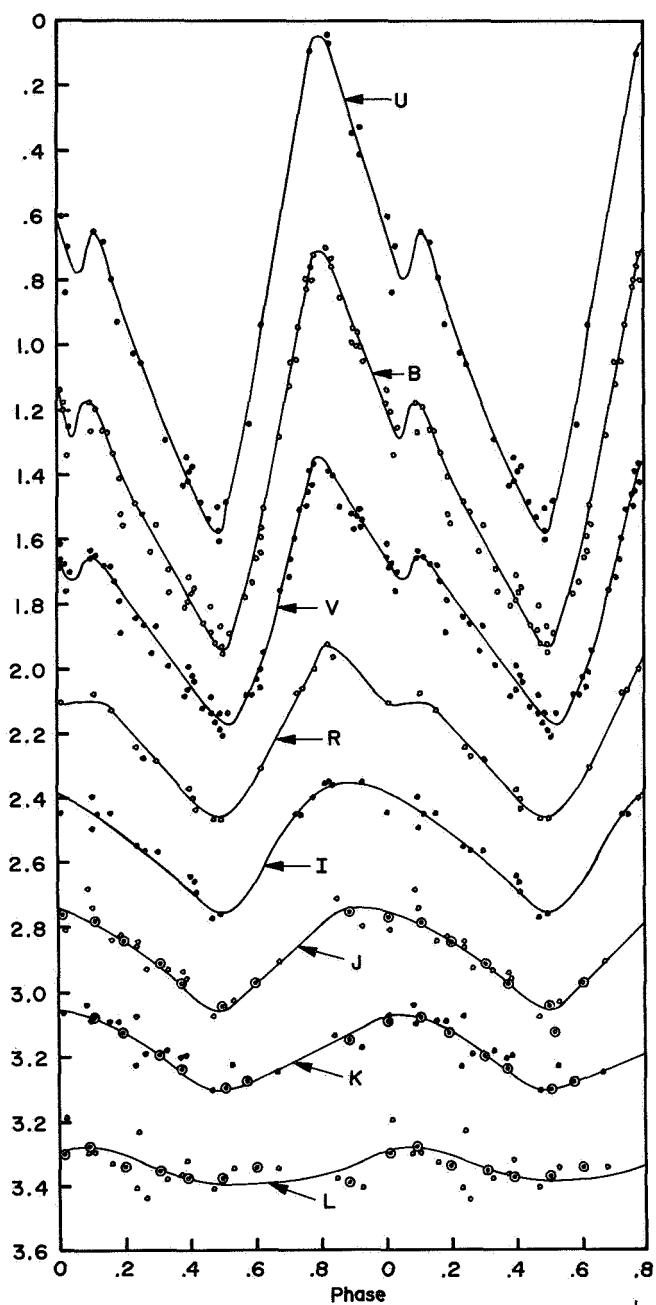


Fig. 1 The light curves for U Aql. Vertical scale gives magnitude differences with arbitrary zero point.

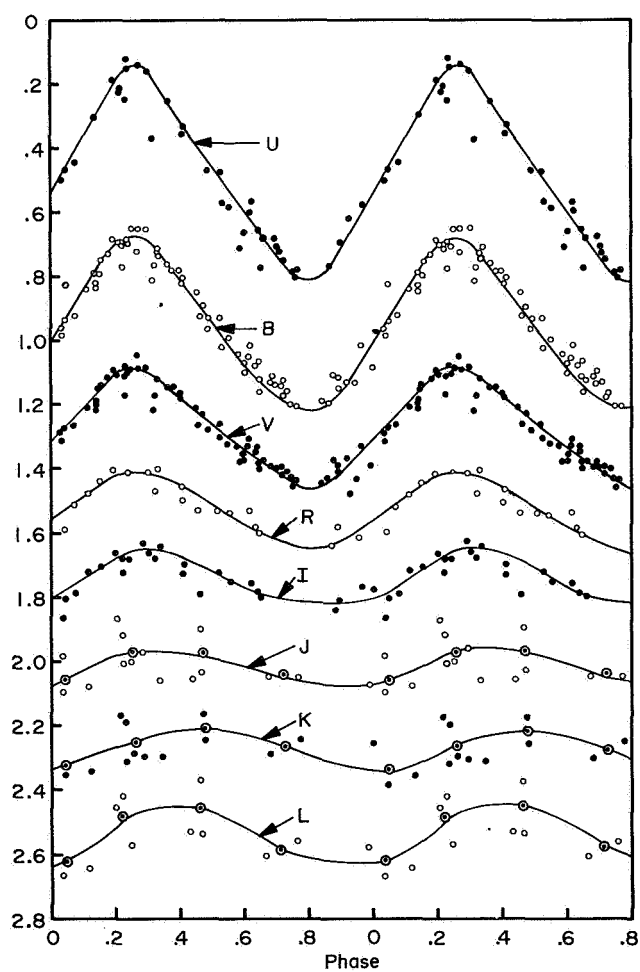


Fig. 2 The light curves for FF Aql.

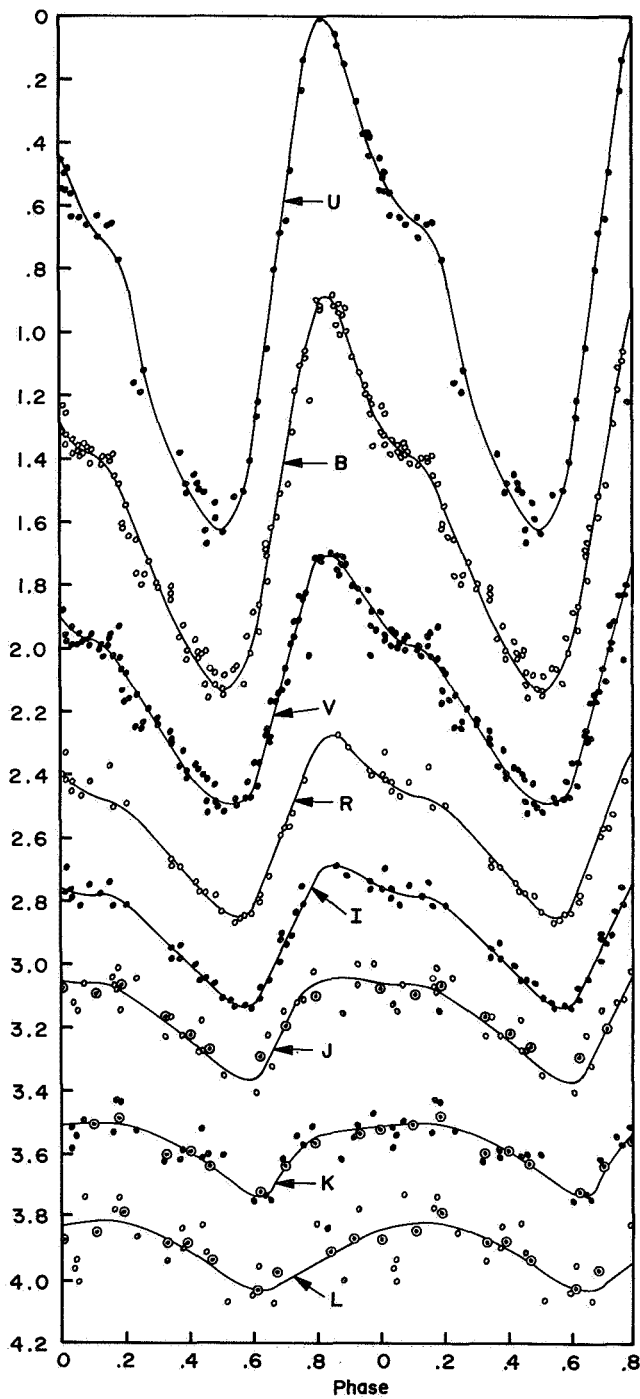


Fig. 3 The light curves for η Aql.

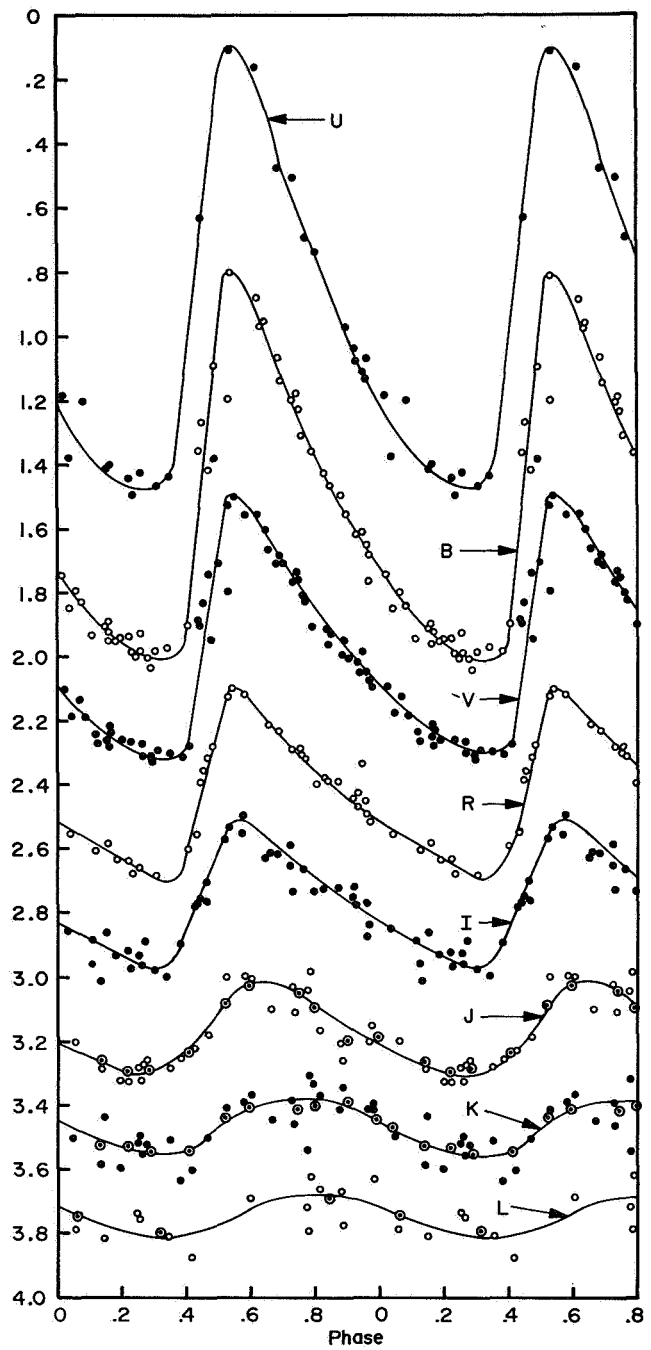


Fig. 4 The light curves for RT Aur.

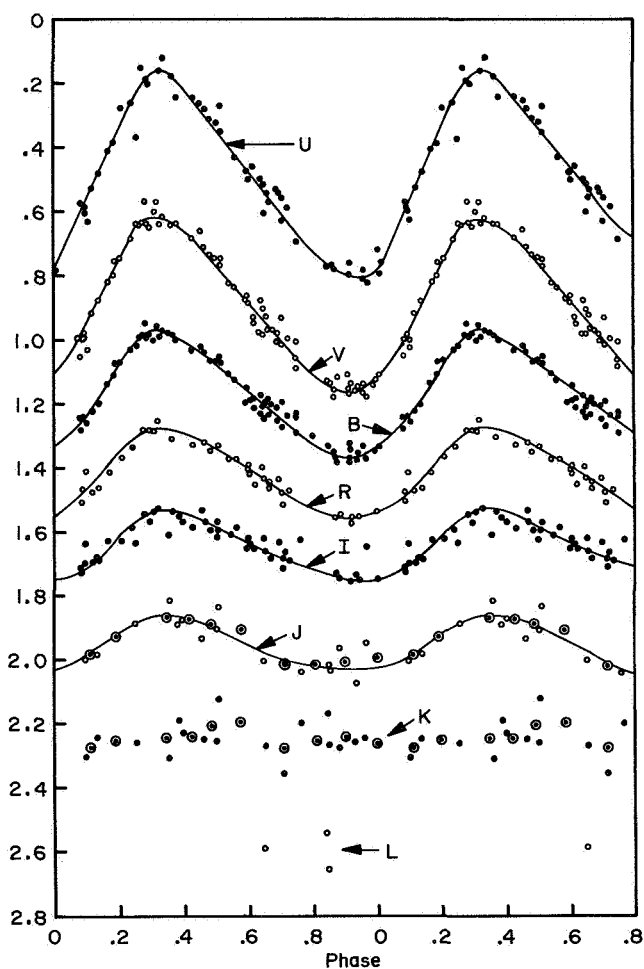


Fig. 5 The light curves for SU Cas.

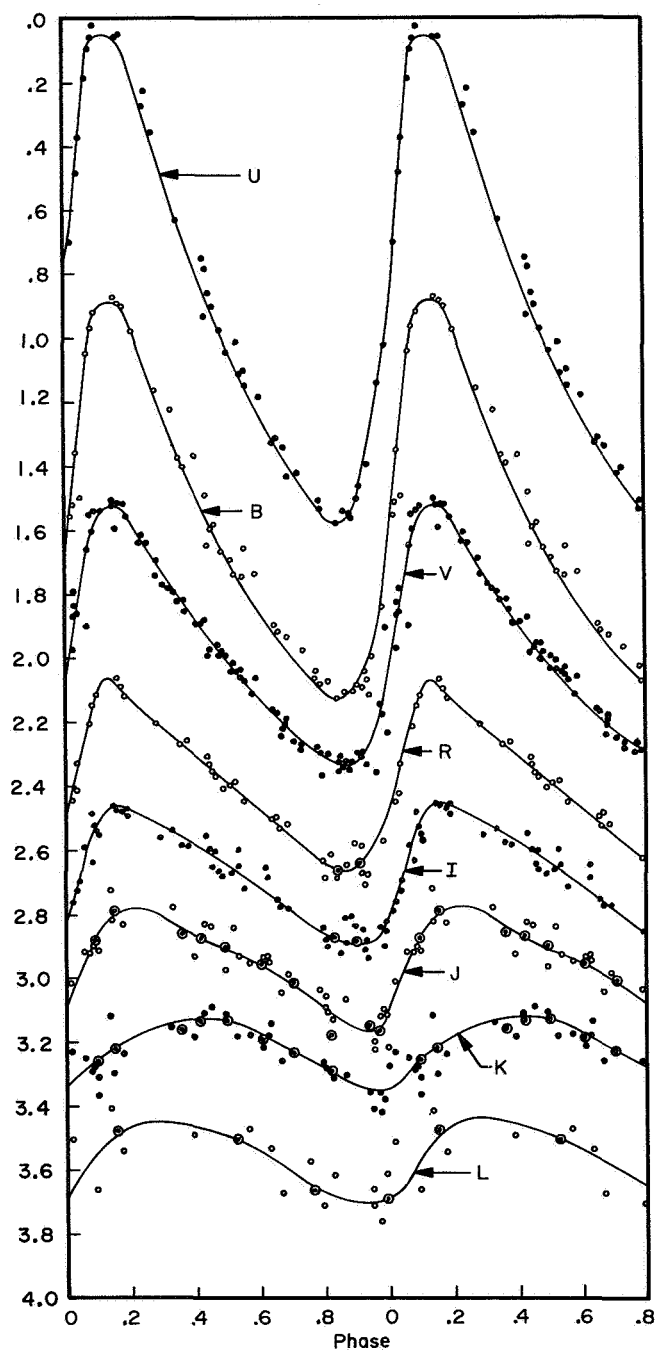


Fig. 6 The light curves for δ Cep.

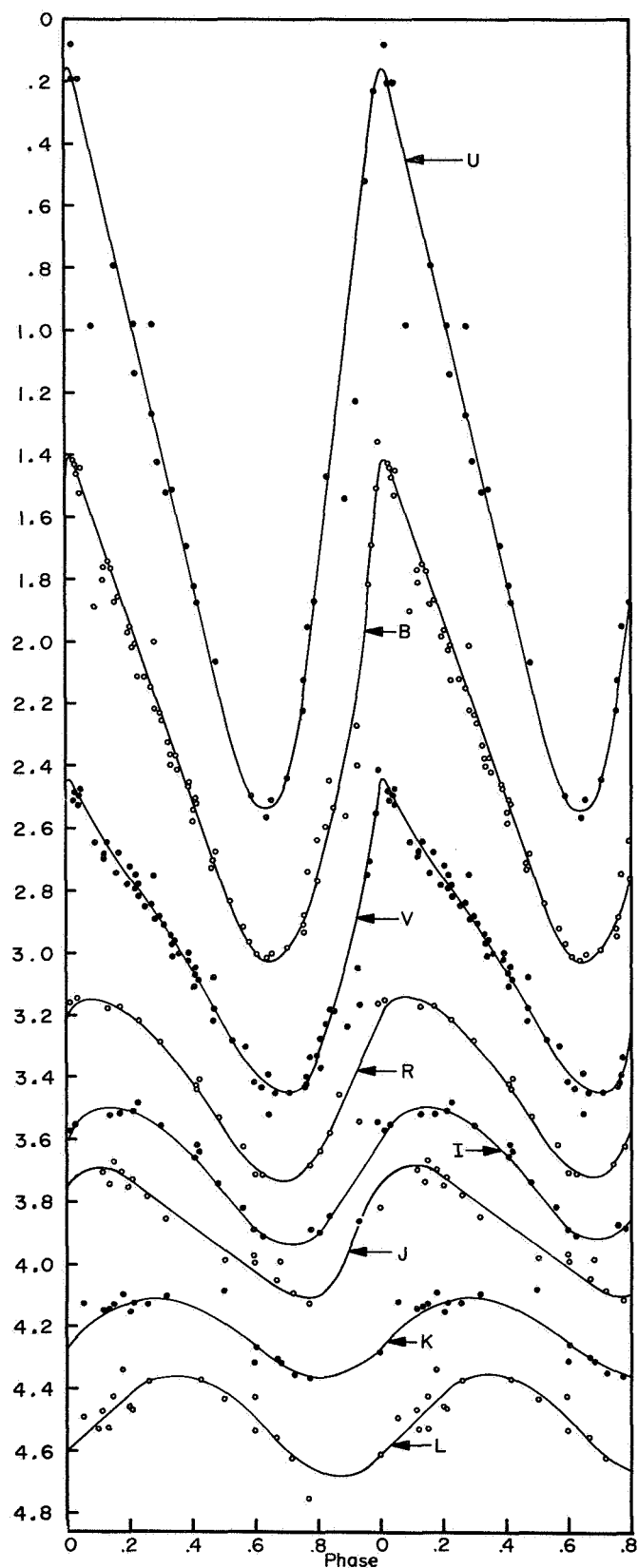


Fig. 7 The light curves for X Cyg.

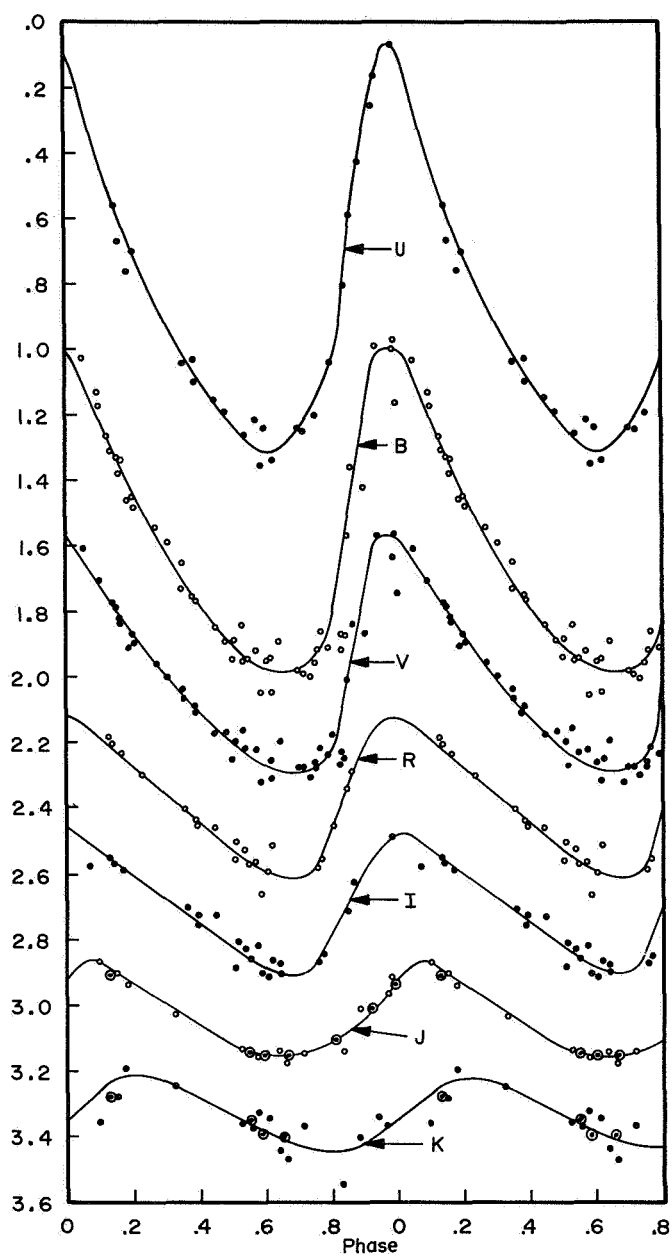


Fig. 8 The light curves for SU Cyg.

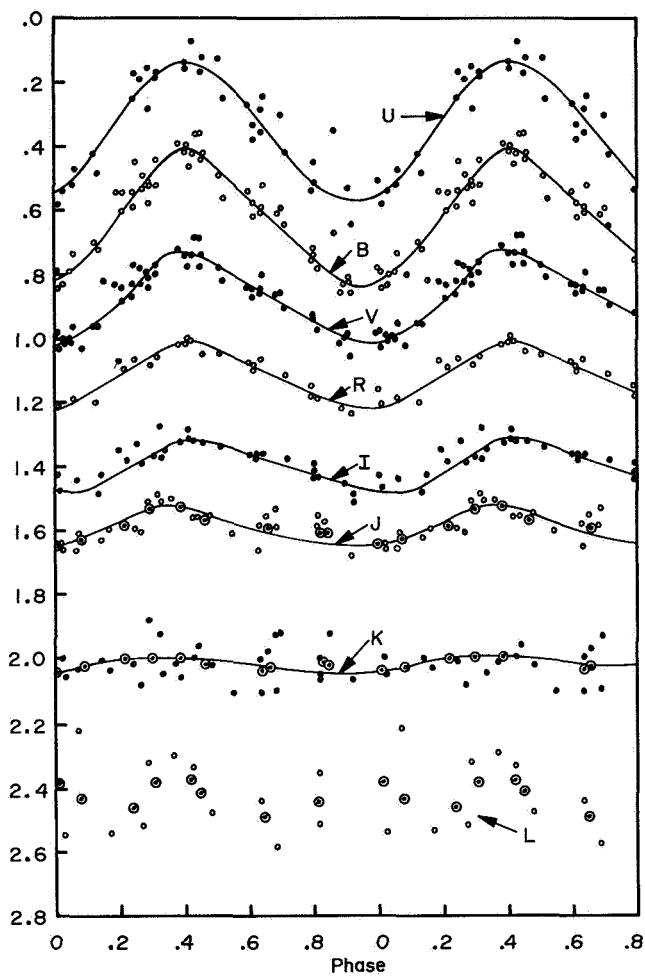


Fig. 9 The light curves for DT Cyg.

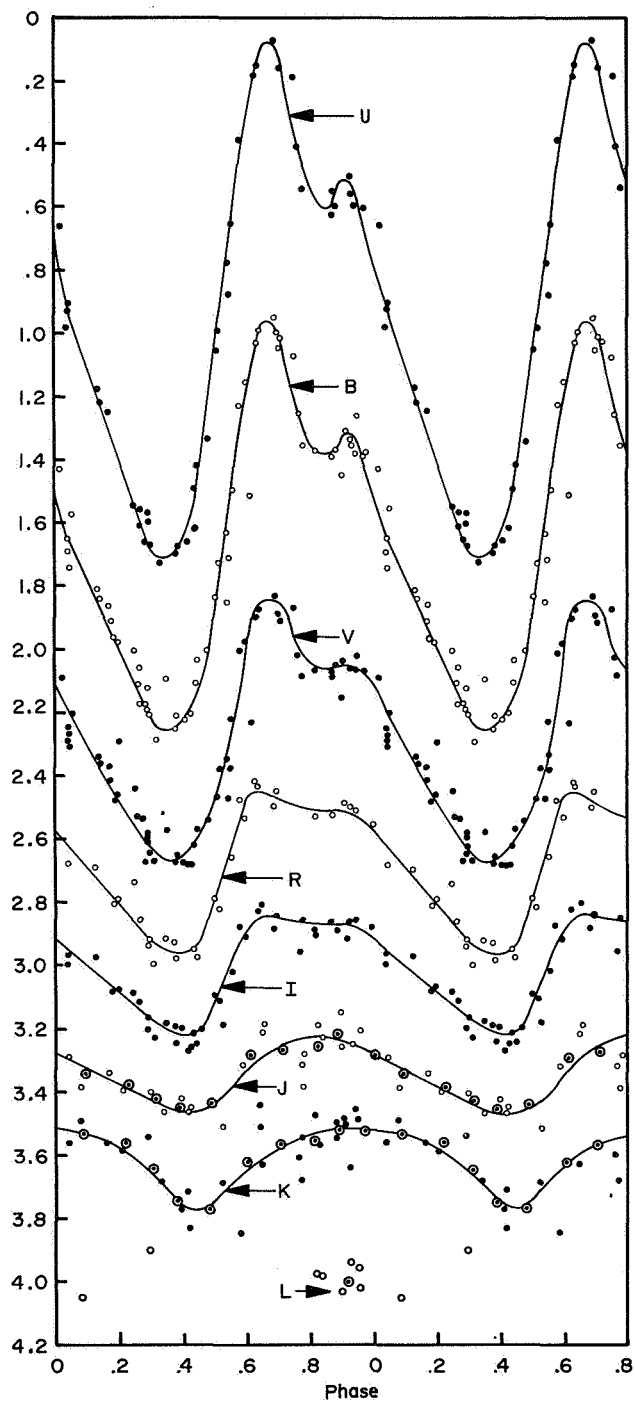


Fig. 10 The light curves for W Gem.

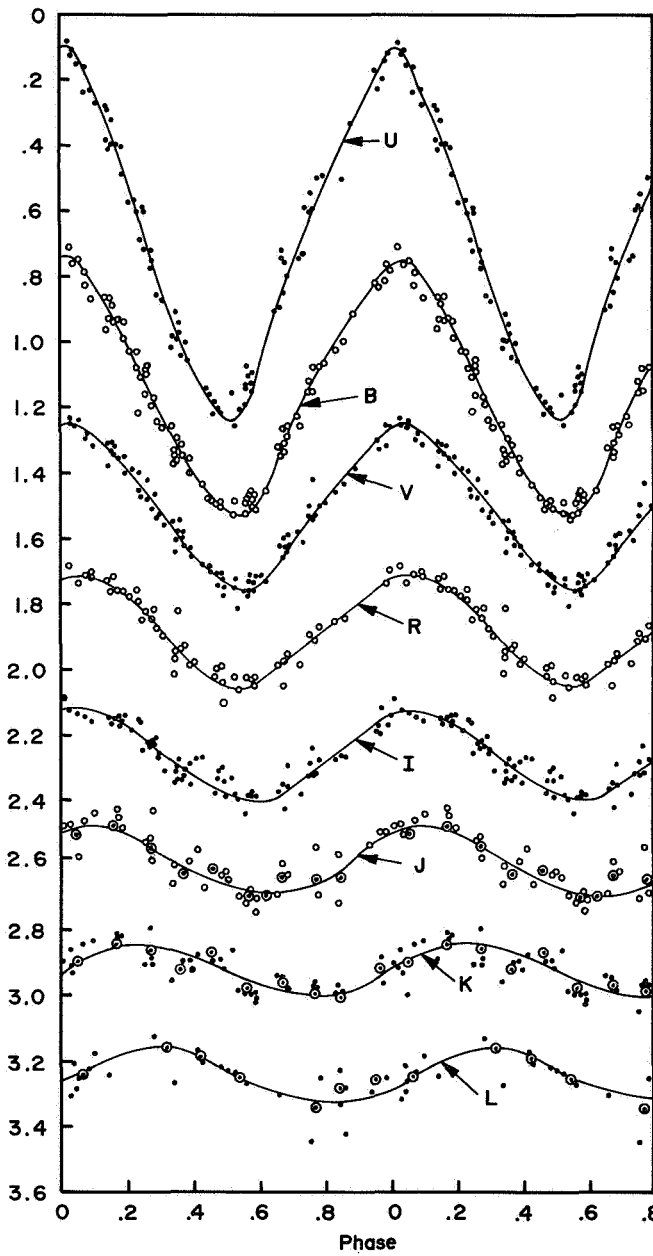


Fig. 11 The light curves for z Gem.

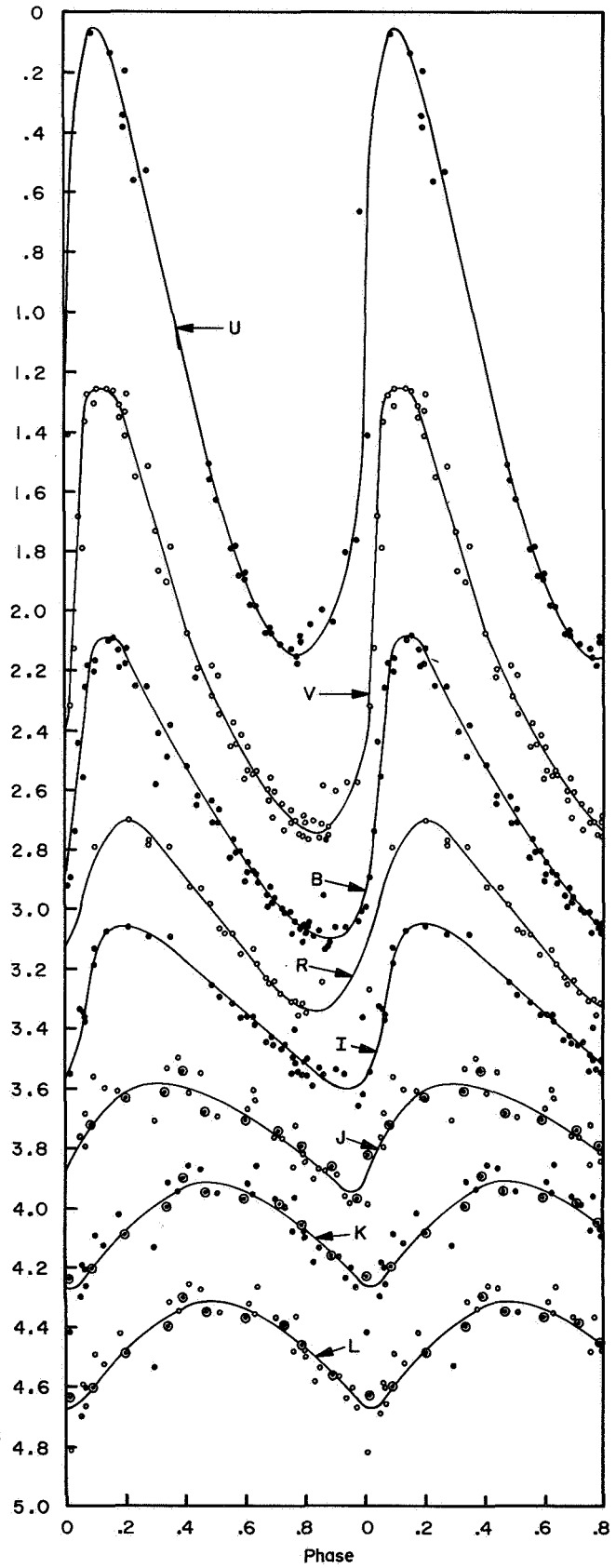


Fig. 12 The light curves for T Mon.

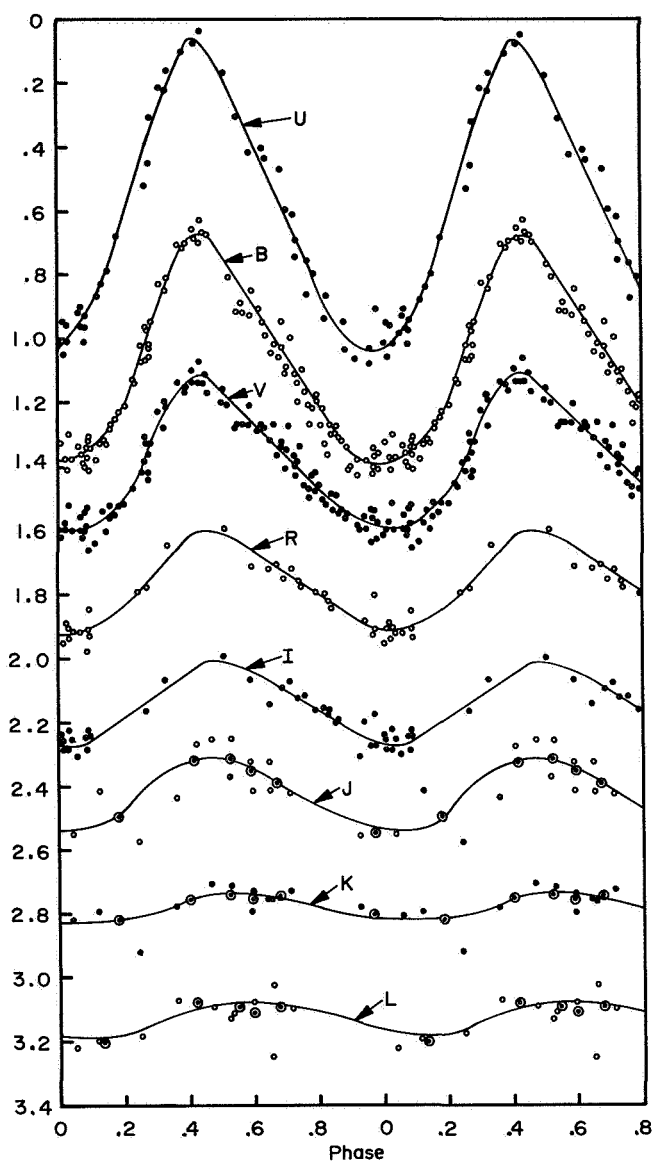


Fig. 13 The light curves for Y Oph.

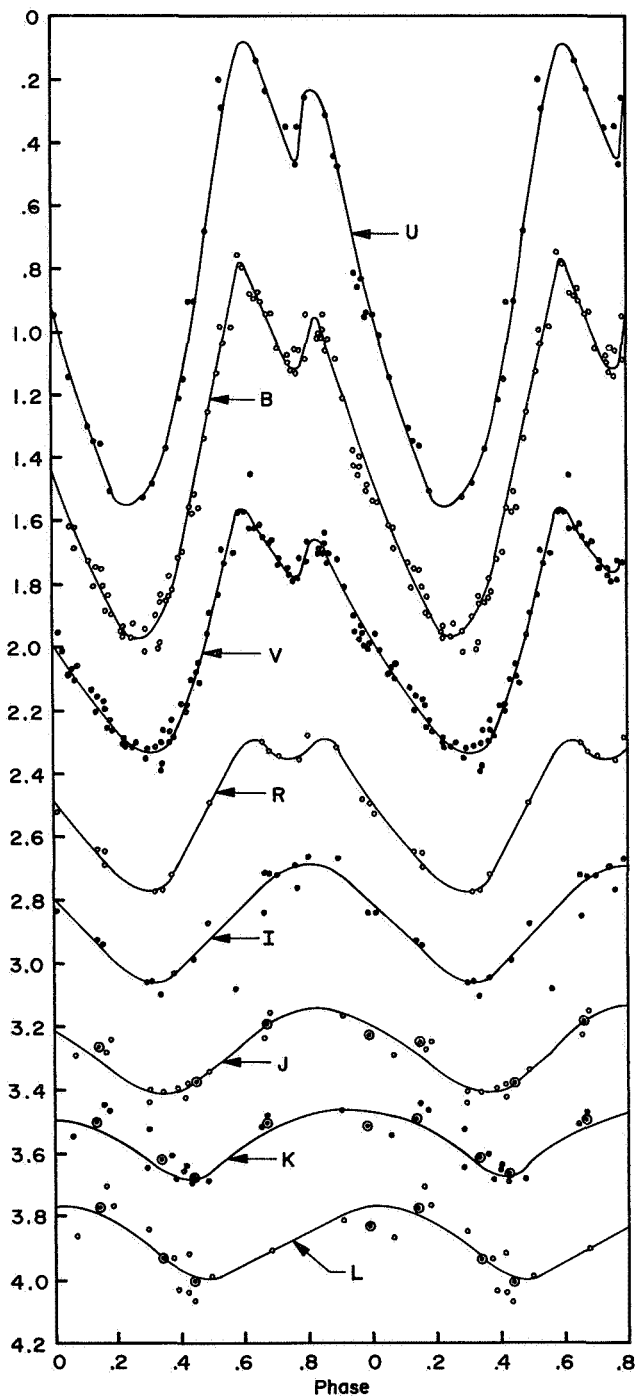


Fig. 14 The light curves for S Sge.

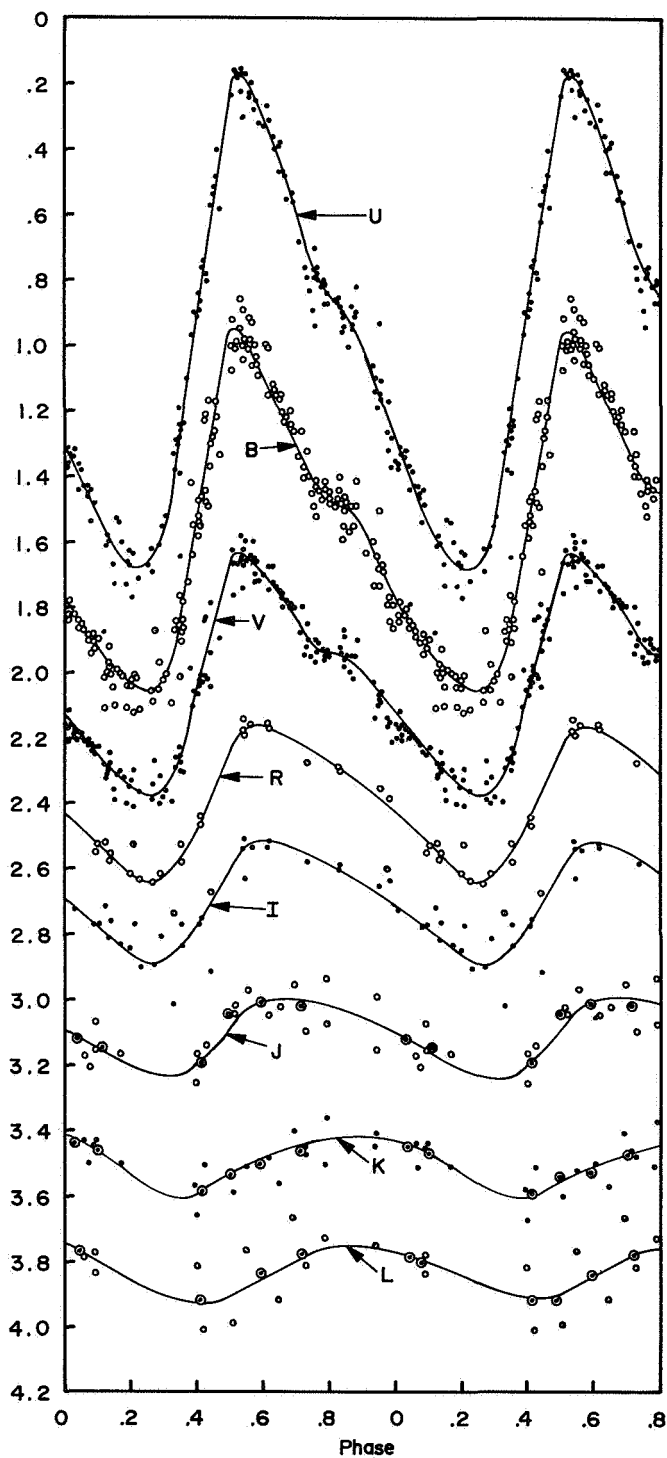


Fig. 15 The light curves for U Sgr.

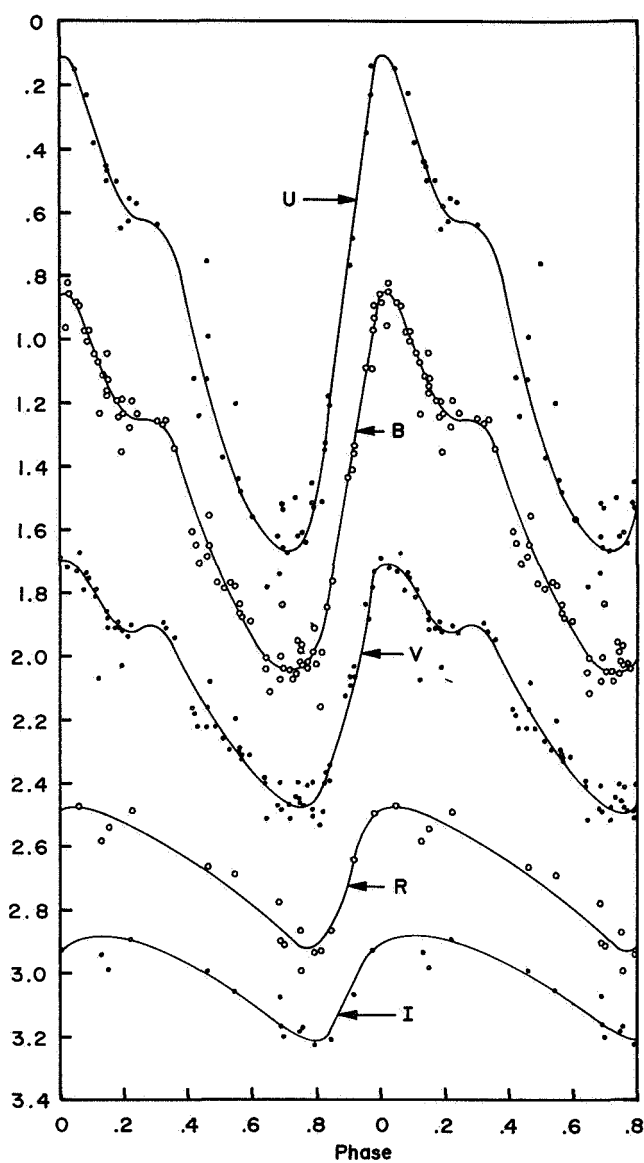


Fig. 16 The light curves for W Sgr.

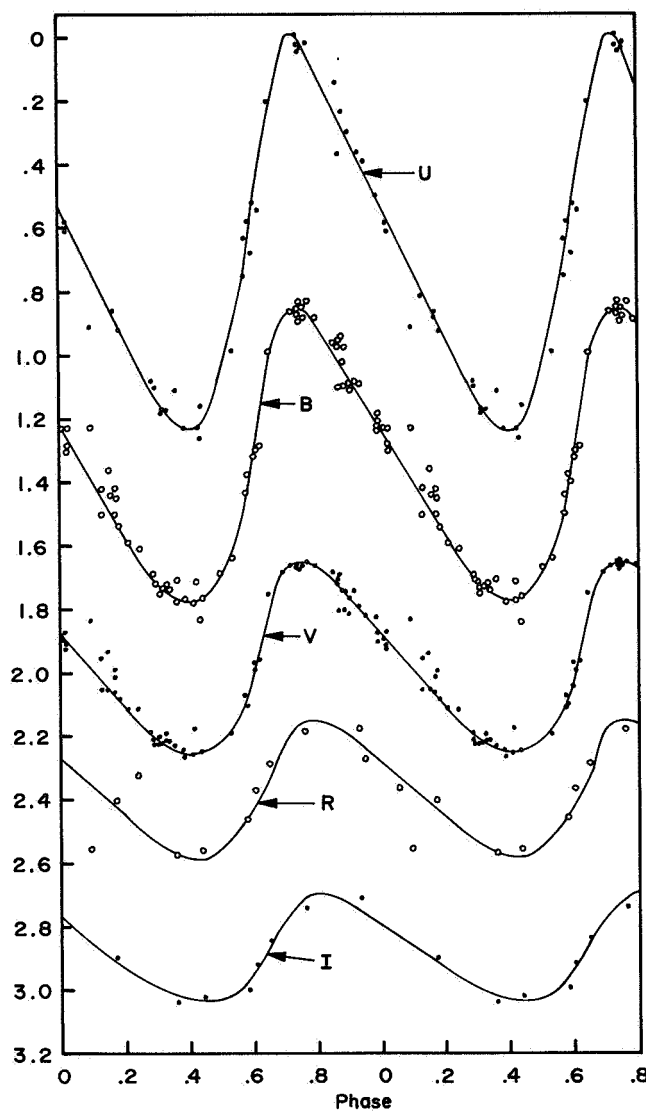


Fig. 17 The light curves for X Sgr.

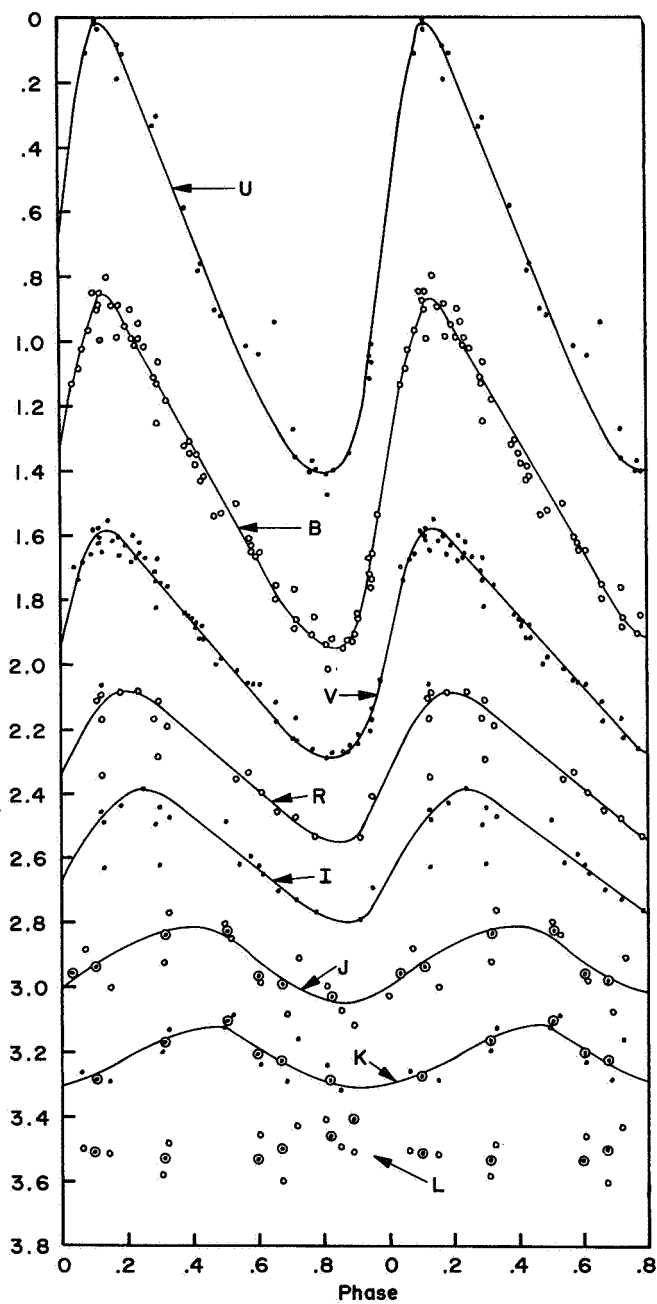


Fig. 18 The light curves for Y Sgr.

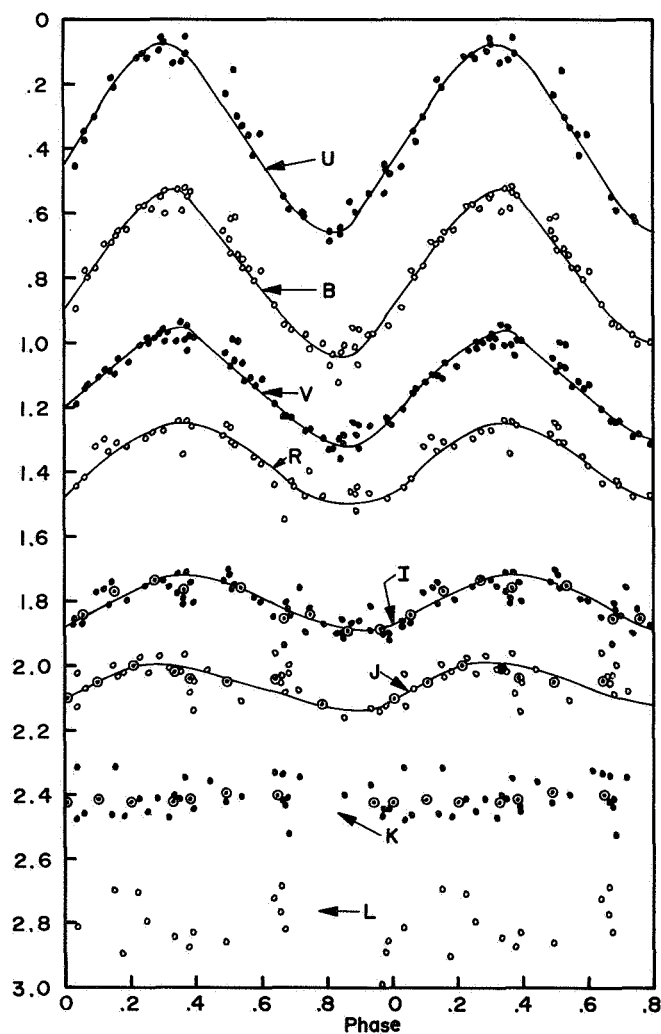


Fig. 19 The light curves for SZ Tau.

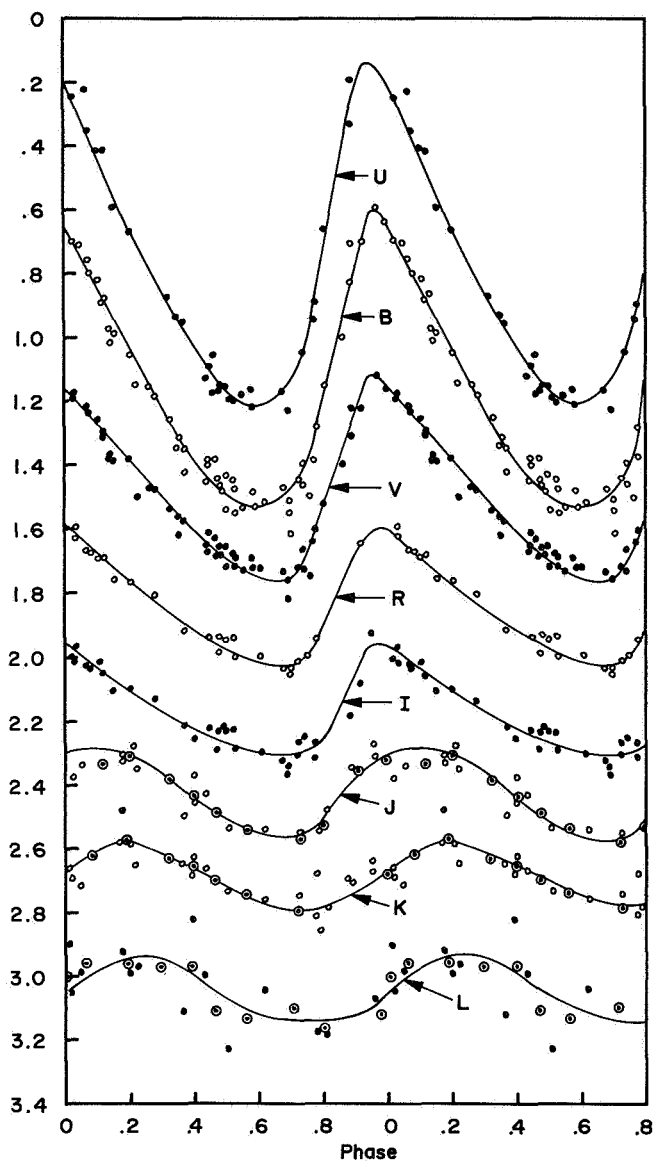


Fig. 20 The light curves for T Vul.

TABLE 1A

UBVRI CEPHEID MAGNITUDES

JD2430000+	V	B	U	R	JD2430000+	V	B	U	R	I
		U AQL					FF AQL			
8658.6819	6.209	7.140		5.462	9028.6638	5.284	6.017	6.554	4.707	4.228
8674.6014	6.314	7.337		5.500	9029.6093	5.414	6.215	6.769	4.737	4.258
8675.6604	6.385	7.465		5.530	9035.6264	5.432	6.212	6.780	4.813	4.268
8676.6531	6.570	7.755		5.678	9037.6249	5.284	6.003	6.532	4.664	4.199
8679.6402	6.299	7.245		5.469	9038.6398	5.447	6.276	6.855	4.785	4.287
8930.9055	6.839	8.070	9.002	5.869	9040.5978	5.366	6.120	6.641	4.718	4.289
8932.8651	6.131	6.998	7.593	5.399	9041.5968	5.188	5.847	6.350	4.614	4.161
9028.6748	6.742	7.949	8.878	5.832	9042.6010	5.361	6.129	6.676	4.736	4.221
9035.6406	6.719	7.960	8.887	5.801	9045.6055	5.194	5.882	6.389	4.613	4.165
9038.6497	6.102	6.956	7.563	5.362	9066.5908	5.501	6.311		4.784	4.310
9040.6079	6.353	7.392	8.146	5.500	9068.5770	5.218	5.919		4.595	4.139
9041.6180	6.563	7.714	8.554	5.672	9069.5591	5.423	6.189	6.782	4.740	4.250
9042.6246	6.696	7.911	8.844	5.770	9281.8972	5.374	6.134	6.666	4.798	4.305
9045.6161	6.092	6.933	7.538	5.337	9376.6646	5.204	5.896		4.617	4.183
9066.5975	6.055	6.901		5.324	9377.6422	5.367	6.121		4.733	4.292
9068.5827	6.332	7.363		5.466			ETA AQL			
9069.5654	6.544	7.682	8.520	5.638						
9281.9046	6.784	8.006		5.858	8209.8687	3.616	4.412	4.871	3.092	2.634
9377.6500	6.355	7.466		5.500	8496.9658	3.727	4.459	4.940	3.103	2.664
		FF AQL			8506.9990	4.177	5.171	5.885	3.395	2.883
7592.6268	5.228	5.898	6.413		8515.9797	4.233	5.143	5.769	3.504	3.012
8658.6745	5.484	6.319		4.804	8517.9670	3.542	4.194	4.652	3.014	2.620
8659.6973	5.476	6.309		4.821	8518.9789	3.789	4.585	5.129	3.123	2.691
8670.6167	5.275	5.969		4.675	8522.9687	4.274	5.222	5.903	3.540	3.039
8678.6268	5.309	6.037		4.680	8526.9639	3.766	4.603	5.160	3.077	2.641
					8536.9699	4.278	5.267	6.017	3.571	3.036
9000.7069	5.251	5.992		4.646	8655.6994	3.756	4.575		3.123	2.652

JD2430000+	V	B	U	R	I	JD2430000+	V	B	U	R	I
ETA AQL						RT AUR					
8658.7072	4.294	5.330		3.534	3.007	8367.8963	5.331	5.869	6.225	4.858	4.552
8670.6227	3.824	4.657		3.204	2.714	8368.7729	5.181	5.665	6.069	4.728	4.415
8681.6113	3.876	4.641		3.268	2.829	8369.7750	5.548	6.267	6.750	4.941	4.543
8699.5909	3.882	4.750		3.196	2.713	8370.7686	5.764	6.542	7.041	5.136	4.726
8712.5934	3.762	4.527	5.051	3.119	2.672	8408.8685	5.402	5.961	6.247	4.884	4.573
8724.5963	3.934	4.718	5.184	3.295	2.825	8410.8084	5.563	6.231	6.612	4.980	4.578
8910.9235	4.096	4.990	5.551	3.427	2.949	8468.6707				4.777	
8930.9173	4.225	5.232	5.999	3.475	2.952	8469.6837				4.788	
8931.8919	4.282	5.317	6.001	3.547	3.029	8658.9837	5.031	5.410		4.627	4.374
8932.8867	3.903	4.685	5.143	3.270	2.841	8676.9376	5.804	6.575	7.034	5.200	4.802
9028.6986	3.787	4.593	5.135	3.172	2.715	8679.9793	5.714	6.497		5.083	4.667
9031.6825	4.236	5.283	6.042	3.484	2.961	8682.9863	5.556	6.279		4.957	4.574
9035.6659	3.734	4.538	5.060	3.153	2.658	8723.9125	5.492	6.213	6.711	4.833	4.557
9038.6687	4.215	5.211	6.007	3.473	2.943	9037.9928	5.769	6.556		5.135	4.734
9040.6247	3.783	4.519	4.992	3.224	2.809	9041.9010	5.790	6.590	7.090	5.179	4.774
9041.6380	3.508	4.114	4.555	2.980	2.588	9045.8966	5.791	6.587	7.067	5.185	4.782
9042.6447	3.684	4.433	4.952	3.104	2.659	9067.0111	5.597	6.360		5.018	4.636
9045.6350	4.173	5.180	5.948	3.446	2.905	9098.9560	5.001	5.408	5.709	4.600	4.332
9066.6104	4.090	5.048		3.373	2.850	9100.8293	5.684	6.453	6.972	5.052	4.659
9068.5948	4.160	5.063	5.714	3.476	2.972	9148.6948	5.497	6.170		4.887	4.527
9069.5795	3.644	4.288	4.739	3.123	2.715	9148.8872	5.551	6.250		4.978	4.580
9281.9181	4.067	5.012		3.390	2.879	9150.7660	5.388	5.945	6.282	4.921	4.598
9377.6637	3.942	4.718		3.295	2.895	9151.6763	5.209	5.697			
						9151.8503	5.268	5.813		4.786	4.455
						9154.6134	5.241	5.723		4.814	4.506
7668.7426	5.513	6.212	6.640	4.974	4.555	9159.5902	5.411	6.037		4.896	4.535
8108.6994	5.496	6.216	6.677	4.924	4.525	9159.7156	5.467	6.053		4.887	4.509

TABLE 1A UBVR I CEPHEID MAGNITUDES

JD2430000+	V	B	U	R	I	JD2430000+	V	B	U	R	I
RT AUR						SU CAS					
9173.6665	5.059	5.456		4.622	4.358	9035.8059	5.784	6.440	6.880	5.207	4.738
9174.6128	5.414	6.059		4.879	4.528	9036.7865	6.160	6.976	7.478	5.456	4.924
9175.6856	5.772	6.581		5.104	4.691	9037.8815	5.831	6.485	6.943	5.231	4.787
9177.6800	5.164	5.622		4.711	4.430	9038.8309	6.181	6.966	7.491	5.465	4.955
9178.6649	6.343	7.148		5.579	4.869	9041.8546	5.835	6.511	6.979	5.226	4.768
9468.9180	5.327	5.908	6.286	4.814	4.471	9042.7274	6.173	6.958	7.463	5.471	4.954
						9045.7875	5.864	6.534	7.011	5.248	4.790
						9045.9346	5.924	6.639	7.130	5.276	4.786
						9066.6829	5.869	6.547	6.978	5.267	4.822
7592.7799	6.040	6.786	7.293	5.316	4.834	9068.6999	5.830	6.483	6.962	5.226	4.780
7597.7843	5.986	6.723	7.236			9069.6397	6.034	6.796	7.289	5.375	4.882
8367.6409	5.995	6.681	7.171	5.309	4.847	9098.7681	6.031	6.768	7.268	5.365	4.877
8367.7442	6.007	6.706	7.215	5.335	4.859	9099.5872	6.040	6.802	7.279	5.407	4.922
8368.6558	6.037	6.732	7.236	5.368	4.885	9100.5889	5.944	6.662		5.299	4.821
8369.6007	6.005	6.698	7.212	5.308	4.826	9100.8023	6.071	6.815	7.326	5.379	4.878
8370.6416	6.008	6.682	7.183	5.365	4.886						
8371.5817	5.983	6.729	7.160	5.355	4.847	9154.6046	5.803	6.402		5.186	4.735
8408.6634	5.977	6.681	7.199	5.299	4.819	9159.6148	6.182	6.920		5.450	4.940
8410.7360	5.991	6.729	7.246	5.415	4.906	9159.7329	6.174	6.957		5.452	4.945
						9173.6595	6.077	6.853		5.376	4.912
8658.8733	6.145	6.929	7.420	5.438	4.946	DEL CEP					
8674.7998	5.938	6.623	7.111	5.315	4.827						
8680.8546	5.784	6.436		5.184	4.744						
8682.8851	5.756	6.373		5.153	4.724						
8700.7914	5.865	6.544	7.021	5.237	4.769	7592.7544	4.327	5.204	5.851	3.580	3.145
8720.6548	6.050	6.806	7.238	5.337	4.830	8368.5873	3.958	4.670	5.196	3.362	2.971
9004.9639	5.902	6.626		5.274	4.808	8369.5924	4.161	4.986	5.625	3.482	3.053
9028.9927	6.167	6.981		5.460	4.929	8370.6230	4.356	5.236	5.877	3.686	3.239
9031.7725	5.786	6.451	6.899	5.185	4.770	8371.5731	4.004	4.652	5.088	3.451	3.068
						8408.5811	4.338	5.190	5.817	3.595	3.155

TABLE 1A UBVR I CEPHEID MAGNITUDES

JD2430000+	V	B	U	R	I	JD2430000+	V	B	U	R	I
		DEL CEP						DEL CEP			
8410.5580	3.691	4.257	4.655	3.204	2.865	9151.5804	3.824	4.493		3.267	2.893
8655.7872	4.183	4.936	5.420	3.571	3.167	9154.5697	4.324	5.172		3.711	3.246
8677.7534	3.655	4.136	4.498	3.209	2.895	9159.5829	4.342	5.203		3.661	3.204
8679.7104	3.877	4.581		3.309	2.905	9377.8025	4.016	4.831		3.388	2.959
8699.6627	3.521	3.967		3.075	2.780						
						X CYG					
8722.7145	3.973	4.688	5.156	3.360	2.911	8224.8599	6.449	7.560	8.424	5.644	5.063
8724.5809	4.372	5.277		3.691	3.211	8555.8999	6.047	7.039		5.278	4.717
8931.9296	3.987	4.744	5.234	3.335	2.956	8655.7359	6.181	7.307		5.320	4.676
8939.9428	4.340	5.220	5.758	3.668	3.245	8658.7384	6.469	7.835		5.524	4.854
9004.8617	3.973	4.612	5.002	3.426	3.039	8678.6542	6.837	8.302		5.815	5.111
9028.7674	3.991	4.762	5.272	3.412	2.986	8681.6250	6.676	7.925		5.740	5.094
9031.7304	3.865	4.453	4.833	3.331	3.006	9028.7435	5.950	6.806	7.428	5.265	4.743
9035.7694	4.296	5.175	5.812	3.640	3.161	9031.6999	6.078	7.154	7.989	5.276	4.716
9036.7625	4.197	4.953	5.444	3.567	3.153	9035.7137	6.448	7.798	9.022	5.539	4.815
9037.8003	3.516	3.982	4.356	3.092	2.786	9038.6985	6.816	8.261	9.694	5.813	5.088
9038.8064	3.824	4.467	4.932	3.269	2.888	9041.6568	6.738	8.028	9.151	5.785	5.088
9041.8197	4.313	5.179	5.768	3.674	3.223	9042.6946	6.581	7.740	8.668	5.684	5.047
9042.7142	3.600	4.060	4.397	3.152	2.844	9066.6360	6.286	7.525	8.618	5.386	4.753
9045.7989	4.170	5.013	5.615	3.530	3.085	9068.6099	6.484	7.810	9.075	5.503	4.833
9066.6752	4.058	4.839	5.408	3.451	3.028	9069.5940	6.573	7.972	9.268	5.630	4.937
9068.6651	4.322	5.140	5.772	3.628	3.190	SU CYG					
9069.6164	3.540	4.010	4.362	3.116	2.818						
9098.6612	4.038	4.786	5.339	3.389	2.981	8655.6922	7.119	7.761		6.554	6.146
9099.5943	4.196	5.030	5.642	3.520	3.092	8658.6951	7.137	7.844		6.570	6.158
9100.5823	4.347	5.233	5.882	3.649	3.198	8681.6058	7.098	7.785		6.504	6.104
						8931.8811	7.226	7.951	8.255	6.633	6.203
9148.5866	4.299	5.167		3.621	3.172	8932.8768	6.914	7.467	7.703	6.340	6.012
9150.5828	3.518	3.989		3.124	2.799						

TABLE 1A UBVR I CEPHEID MAGNITUDES

JD2430000+	V	B	U	R	I	JD2430000+	V	B	U	R	I
SU CYG						DT CYG					
9028.6890	7.165	7.814	8.095	6.586	6.169	9004.8495	5.905	6.530		5.421	5.049
9031.6728	7.122	7.848	8.159	6.523	6.129	9028.7547	5.675	6.141	6.468	5.242	4.928
9035.6550	7.126	7.821	8.116	6.563	6.113	9029.6199	5.841	6.416	6.749	5.335	5.015
9038.6596	6.971	7.631	7.938	6.401	6.003	9031.7213	5.752	6.306	6.654	5.265	4.969
9040.6175	6.745	7.260	7.488	6.284	5.919	9035.7407	5.668	6.147	6.468	5.259	4.927
9041.6293	6.662	7.167	7.449	6.183	5.853	9038.6297	5.645	6.115	6.435	5.197	4.888
9042.6346	6.990	7.655	7.929	6.437	6.029	9041.6071	5.739	6.241	6.570	5.270	4.967
9045.6260	6.734	7.279	7.563	6.230	5.883	9042.6149	5.885	6.479	6.805	5.360	5.032
9066.6039	7.153	7.843		6.511	6.162	9042.7627	5.861	6.437	6.771	5.387	5.042
9068.5885	6.677	7.201		6.194	5.859	9066.6501	5.745	6.276	6.629	5.288	4.978
9069.5732	7.009	7.665	8.000	6.451	6.052	9068.6258	5.636	6.097	6.453	5.209	4.916
9100.5489	7.074	7.745	8.050	6.458	6.029	9069.6100	5.830	6.439	6.811	5.378	5.038
9281.9125	7.163	7.851		6.593	6.219	9099.5797	5.832	6.453	6.835	5.347	5.000
9377.6574	7.149	7.844		6.557	6.184	9100.5763	5.733	6.238		5.267	4.950
						9375.7663	5.742	6.280	5.585	5.281	4.976
DT CYG						W GEM					
8367.5879	5.960	6.557	6.942	5.434	5.117	7597.8595	6.767	7.673	8.305		
8368.5787	5.661	6.134	6.475	5.250	4.974	8108.7063	7.077	8.022	8.684	6.316	5.708
8369.5760	5.802	6.346	6.737	5.298	4.968	8367.9069	7.232	8.359	9.257	6.352	5.719
8370.6080	5.862	6.402	6.722	5.398	5.086	8368.7806	7.375	8.509	9.392	6.427	5.796
8371.5626	5.681	6.194	6.426	5.245	4.942	8369.7819	7.173	8.132	8.756	6.286	5.696
8655.7499	5.744	6.247		5.288	4.983						
8658.7580	5.674	6.159		5.212	4.926	8370.7769	6.598	7.330	7.882	5.914	5.427
8671.7442	5.771	6.321	6.675	5.293	4.970	8408.8747	7.269	8.333	9.115	6.474	5.847
8674.7451	5.873	6.481		5.383	5.036	8410.8171	6.527	7.244	7.778	5.993	5.485
8677.7323	5.876	6.490		5.401	5.067	8468.6756				6.049	5.483
8678.6657	5.621	6.091		5.216	4.927	8469.6773				6.191	5.576

TABLE 1A UBVR I CEPHEID MAGNITUDES

JD2430000+	V	B	U	R	I	JD2430000+	V	B	U	R	I
W GEM						ZET GEM					
8658.9893	7.004	8.041		6.176	5.593	8143.6327	3.802	4.586	5.189	3.159	2.738
8674.0277	6.761	7.671	8.294	6.009	5.460	8147.6229	4.136	5.075	5.827	3.448	3.007
8676.9463	7.365	8.586		6.496	5.833	8367.9144	3.866	4.765	5.450	3.215	2.807
8680.9553	6.763	7.670		6.024	5.490	8368.7934	4.014	4.939	5.735	3.320	2.890
8723.9315	7.147	8.303	9.248	6.236	5.683	8369.7884	4.137	5.102	5.931	3.380	2.924
9038.0023	6.759	7.650		5.995	5.459	8369.8951	4.107	5.082	5.898	3.372	2.894
9041.9947	7.318	8.400	9.187	6.447	5.820	8370.7835	4.138	5.074	5.830	3.426	2.986
9042.9506	6.921	7.790	8.353	6.152	5.620	8371.8949	4.030	4.932	5.417	3.449	3.023
9045.9054	6.747	7.653	8.260	6.016	5.468	8376.9809	3.758	4.526	5.095	3.155	2.772
9067.0170	6.680	7.453		6.029	5.509	8378.9056	3.992	4.941	5.672	3.338	2.896
9098.9643	6.573	7.295	7.853	5.927	5.429	8379.9302	4.113	5.107	5.917	3.424	2.977
9100.8361	6.775	7.685	8.324	6.020	5.463	8380.9785	4.118	5.064	5.772	3.445	3.007
9148.6076	6.733	7.605		5.980	5.439	8381.8637	4.026	4.915	5.602	3.387	2.974
9151.6586	7.310	8.484		6.432	5.799	8397.8254	3.798	4.624	5.267	3.154	2.753
9154.8581	6.587	7.349		5.949	5.443	8431.7905	4.123	5.053	5.799	3.429	2.987
9159.5985	7.343	8.499		6.416	5.769	8441.8147	4.179	5.088	5.842		
9174.5937	7.175	8.263		6.298	5.677	8443.8127	3.884	4.672	5.244	3.313	2.926
9174.6323	7.165	8.274		6.293	5.676	8449.7746	4.005	4.940	5.692	3.367	2.938
9175.8476	7.272	8.390		6.414	5.781	8461.7298	4.123	5.085	5.854	3.419	2.982
9177.6875	6.709	7.523	8.090	5.973	5.474	8469.6901	3.958	4.856	5.571	3.297	2.910
9468.9452	7.356	8.512	9.374	6.479	5.843	8480.6503	4.054	4.997	5.757	3.383	2.950
						8481.6745	4.172		6.128	3.488	3.060
						8482.6394	4.118	5.060	5.796	3.424	2.983
						8483.6307	3.992	4.852	5.456	3.350	2.957
8080.7593	3.672	4.379	4.815	3.094	2.745	8498.6163	3.745	4.528	5.095	3.114	2.749
8108.7136	3.935	4.750	5.283	3.289	2.885						
8113.6326	3.855	4.677	5.301	3.189	2.761	8499.6307	3.877	4.757	5.415	3.218	2.828
8142.6444	3.715	4.462	4.930	3.102	2.755	8509.6412	3.871	4.702	5.387	3.249	2.849

TABLE 1A UBVRI CEPHEID MAGNITUDES

JD2430000+	V	ZET GEM				I	JD2430000+	V	T MON				R	I
		B	U	R	I				B	U	R	I		
8510.6310	4.043	4.968	5.715	3.413	2.944		8369.7682	6.581	8.004	9.260	5.491	4.783		
8658.9956	3.707	4.418	4.872	3.147	2.793		8370.7597	6.550	7.983	9.236	5.516	4.815		
8671.0208	3.780	4.554	5.082	3.126	2.746		8408.8598	5.626	6.568	7.332	4.907	4.364		
8675.0154	4.216	5.213	5.958	3.458	2.998		8410.8007	5.757	6.816	7.665	4.977	4.389		
8676.9584	4.014	4.856	5.445	3.389	2.984		8468.6659				5.122	4.505		
8678.0174	3.860	4.619		3.254	2.877		8469.6885				5.134	4.499		
8679.9853	3.632	4.307	4.783	3.080	2.729		8674.0204	6.394	7.614	8.549	5.470	4.851		
8699.8893	3.660	4.360	4.840	3.136	2.781		8682.9807	5.883	7.081		4.992	4.392		
8723.9389	3.946	4.903	5.696	3.217	2.876		8723.8714	6.454	7.878	9.130	5.442	4.854		
9038.0094	3.937	4.837	5.556	3.272	2.846		9037.9503	6.133	7.482	8.645	5.186	4.556		
9041.9104	3.995	4.857	5.441	3.378	2.960		9041.9846	6.383	7.828	9.125	5.384	4.688		
9042.9733	3.901	4.670	5.199	3.267	2.878		9042.9297	6.449	7.896	9.206	5.430	4.747		
9045.9242	3.696	4.423	4.935	3.110	2.743		9045.8878	6.567	8.045	9.315	5.552	4.847		
9067.0235	3.736	4.524	5.110	3.156	2.769		9067.0046	6.263	7.671	8.925	5.286	4.622		
9098.9710	3.929	4.839	5.554	3.279	2.857		9151.6998	6.459	7.900	9.210	5.445	4.756		
9129.9113	4.008	4.928	5.682	3.345	2.914		9154.6203	6.579	8.003		5.547	4.866		
9148.8413	3.790	4.622	5.274	3.177	2.785		9159.6618	6.504	7.780	8.805	5.561	4.928		
9151.7265	4.150	5.108	5.916	3.438	2.990		9173.7886	6.212	7.641	8.763	5.267	4.593		
9159.6697	3.912	4.788	5.473	3.245	2.837		9207.6478	6.539	7.999	9.288	5.507	4.819		
9174.6198	3.906	4.712	5.289	3.313	2.928		9391.9840	6.307	7.712	9.020	5.350	4.665		
9175.7333	3.835	4.591	5.204	3.241	2.865		9392.9952	6.376	7.843	9.115	5.337	4.666		
9177.6957	3.642	4.347	4.851	3.136	2.735		9470.9422	6.164	7.514					
T MON														
8108.6928	5.705	6.603	7.204	4.993	4.492									
8367.8854	6.423	7.854	9.189	5.449	4.734		8510.9334	6.401	7.873	9.110	5.116	4.151		
8368.7660	6.500	7.942	9.247	5.466	4.750		8518.9611	5.962	7.264	8.263	4.796	3.892		

Y OPH

TABLE 1A UBVR I CEPHEID MAGNITUDES

JD2430000+	V	B	U	R	I	JD2430000+	V	B	U	R	I
		Y OPH						S SGE			
8522.9370	6.186	7.599	8.784	4.959	4.017	8567.9187	5.885	6.910		5.186	
8526.9259	6.342	7.872	9.128	5.009	4.068	8658.7133	5.691	6.591		4.992	4.533
8528.9382	6.385	7.863	9.065	5.045	4.120	8678.6477	5.932	6.880		5.217	4.735
8658.6415	6.068	7.520		4.904	3.992	9028.7082	5.854	6.849	7.647	5.138	4.627
8674.5898	6.011	7.351		4.911	3.961	9031.6912	5.589	6.362		4.986	4.567
8676.6075	6.076	7.500		4.922	3.965	9035.6917	5.635	6.501	7.132	4.982	4.471
8680.5731	6.359	7.882		5.080	4.098	9038.6778	6.013	7.006	7.774	5.272	4.756
8937.7937	6.367	7.904	9.168	5.129	4.167	9041.6475	5.372	6.045	6.528	4.820	4.417
8938.7725	6.393	7.911	9.152	5.136	4.177	9042.6546	5.363	6.055	6.554	4.779	4.362
8939.7929	6.380	7.873	9.109	5.148	4.177	9045.6440	5.868	6.857	7.655	5.146	4.641
9014.6245	5.916	7.178				9066.6160	5.350	6.003		4.795	4.416
9018.6211	6.128	7.532		4.947	3.998	9068.6019	5.422	6.184	6.745	4.800	4.361
9019.6119	6.138	7.598		4.968	4.015	9069.5869	5.653	6.640	7.245	5.017	4.532
9025.6028	6.348	7.841		5.127	4.144	9100.5617	5.423	6.156		4.835	4.417
9028.5984	6.106	7.465		4.984	4.063	9281.9236	6.008	6.940		5.263	4.801
9029.5990	6.009	7.309	8.319	4.845	3.961	9377.6723	5.421	6.158		4.849	4.462
9037.6136	6.221	7.693	8.892	4.988	4.056				U SGR		
9038.6203	6.296	7.777		5.041	4.095						
9040.5873	6.342	7.846	9.125	5.114	4.167	8224.7839	6.724	7.838	8.591	5.839	5.169
9041.5864	6.321	7.799	9.053	5.105	4.124	8510.9520	6.652	7.758	8.579	5.699	4.987
9042.5909	6.343	7.810	9.036	5.112	4.144	8522.9600	6.375	7.298	7.967	5.562	4.934
9175.0232	6.308	7.824		5.007	4.056	8526.9563	6.996	8.307	9.337	5.925	5.172
9238.8901	6.082	7.414	8.398			8527.9563	7.000	8.311	9.345	5.925	5.176
9246.9052	6.373	7.875	9.043	5.091	4.184						
9280.8805	6.420	7.824	9.109	5.150	4.138	8528.9530	6.363	7.301	7.933		
						8553.8769	7.048	8.342	9.368	6.013	5.247
9281.8801	6.353	7.835	9.075	5.120	4.202	8559.9323	6.929	8.199		5.948	5.170
9377.6031	6.122	7.547		4.917	4.039	8655.6464	7.020	8.270		6.015	5.208

TABLE 1A UBVR I CEPHEID MAGNITUDES

JD2430000+	V	B	U	R	I	JD2430000+	V	B	U	R	I
Y SGR						SZ TAU					
8526.9487	5.935	6.864	7.510	5.109	4.599	8408.7139	6.635	7.556	8.164	5.862	5.264
8528.9470	5.473	6.266	6.804	4.813	4.346	8410.7450	6.383	7.211	7.755	5.719	5.145
8553.8530	5.864	6.851	7.540	5.095	4.550	8469.6007				5.666	
8655.6366	5.422	6.145		4.780	4.286	8680.9496	6.335	7.123		5.638	5.113
8682.5798	6.049	7.048		5.236	4.693	8681.8847	6.578	7.485		5.836	5.252
8937.8161	5.376	6.061	6.509	4.810	4.360	8720.7431	6.628	7.549	8.065	5.880	5.318
8938.7946	5.518	6.317	6.832	4.866	4.398	9004.9885	6.379	7.183		5.674	5.125
9018.6417	5.389	6.051		4.806	4.360	9029.0023	6.712	7.669		5.924	5.292
9025.6135	5.559	6.382		4.889	4.377	9037.9406	6.666	7.575	8.208	5.876	5.294
9246.9327	5.917	6.959		5.156	4.609	9038.8753	6.597	7.494	8.056	5.846	5.263
9264.9293	6.237	7.054	7.902	5.230	4.670	9041.8766	6.632	7.539	8.135	5.876	5.294
9280.8893	5.819	6.706		5.052	4.520	9042.8577	6.389	7.138	7.654	5.671	5.129
9281.8877	5.968	6.970	7.775	5.174	4.631	9045.8444	6.382	7.176	7.706	5.695	5.149
9376.6429	5.450	6.199		4.866	4.389	9068.9302	6.524	7.403	8.013	5.752	5.185
9377.6198	5.626	6.453		4.988	4.525	9098.7845	6.538	7.379	7.943	5.818	5.234
SZ TAU						9099.7502	6.419	7.119	7.651	5.646	5.111
7592.8938	6.654	7.607	8.218	5.801	5.222	9100.7552	6.618	7.555	8.187	5.824	5.244
7594.0033	6.505	7.365	7.899	5.719	5.169	9148.5950	6.676	7.610		5.867	5.285
7594.8342	6.384	7.187	7.725	5.744	5.195	9148.7443	6.647	7.575		5.863	5.287
7595.8181	6.622	7.543	8.145	5.946	5.329	9151.5963	6.686	7.620		5.896	5.295
7597.8041	6.364	7.132	7.672			9154.5906	6.685	7.600		5.877	5.269
8367.6915	6.701	7.625	8.258	5.885	5.310	9154.7730	6.677	7.610	8.240	5.899	5.297
8367.8597	6.640	7.553	8.195	5.843	5.258	9159.6218	6.374	7.137		5.657	5.136
8368.6743	6.447	7.255	7.811	5.710	5.165	9173.6508	6.751	7.649		5.884	5.299
8369.7611	6.463	7.282	7.830	5.651	5.104	9174.5797	6.487	7.293		5.737	5.207
8370.7495	6.713	7.635	8.283			9174.7538	6.457	7.251		5.722	5.189
						9175.6699	6.425	7.256		5.687	5.137

TABLE 1A UBVRI CEPHEID MAGNITUDES

JD2430000+	V	B	U	R	I	JD2430000+	V	B	U	R	I
		SZ TAU						T VUL			
9175.7457	6.381	7.215		5.662	5.115	8711.5966	5.493	5.993	6.345	5.022	4.715
9177.6701	6.478	7.289		5.694	5.156	8720.6446	5.514	6.053	6.323	5.063	4.730
9392.9839	6.449	7.326		5.704	5.153	8930.9437	5.955	6.763	7.261	5.337	4.931
9468.8229	6.505	7.376	7.948	5.776	5.200	8931.9028	6.050	6.845	7.332	5.437	5.040
						9028.7321	5.989	6.771	7.295	5.396	4.984
		T VUL				9031.7102	5.683	6.352	6.769	5.158	4.800
						9035.7276	5.555	6.117	6.509	5.089	4.715
8367.5777	5.985	6.741	7.268	5.386	4.986	9038.7088	5.904	6.581	6.994	5.346	4.964
8368.5712	6.072	6.818	7.338	5.448	5.056	9041.6797	5.914	6.681	7.191	5.338	4.924
8370.6005	5.688	6.282	6.691	5.155	4.805	9042.7037	6.035	6.768	7.266	5.434	5.023
8371.5549	5.871	6.647	7.051	5.315	4.913						
8658.7462	5.595	6.188		5.087	4.751	9066.6429	5.537	6.097	6.450	5.068	4.732
						9068.6182	5.976	6.736	7.290	5.329	4.921
8671.6882	5.475			4.995	4.669	9069.6037	5.962	6.697	7.144	5.396	4.952
8678.6597	6.023	6.812		5.397	4.998	9099.5728	5.957	6.728	7.250	5.345	4.926
8681.6380	5.778	6.483		5.202	4.831	9100.5705	6.020	6.745		5.412	5.003

(I)JKL CEPHEID MAGNITUDES

→

JD2430000+	I	J	K	L	JD2430000+	I	J	K	L
U AQL					ETA AQL				
8558.9134			4.060		9274.9144		2.467	2.009	1.829
8640.7446		4.425	3.785		9391.6713		2.527	2.128	2.040
8674.6673		4.405	3.758	3.592	9393.6762		2.367	1.945	1.838
8675.6679		4.439	3.783	3.726	9425.6410	2.836	2.526	1.987	1.893
8694.5708		4.308	3.826	3.774					
					RT AUR				
9041.6612		4.523	3.886	3.833	8339.9878	4.679	4.398	3.909	
9061.5864		4.338	3.784	3.694	8368.9258	4.392	4.229	3.882	
9062.5744		4.444	3.771	3.638	8370.9382	4.765	4.470	4.047	
9063.5659		4.553	3.891	3.718	8378.8221	4.699	4.450	4.130	
9064.5849		4.625	3.921	3.747	8379.8659	4.417	4.299	3.942	
9072.5876		4.507	3.940	3.744	8392.8312	4.818	4.481	4.081	
9273.8910		4.531	3.875	3.777	8396.7753		4.522	4.093	
9274.8930		4.669	3.998	3.803	8397.7844	4.569	4.380	3.997	
9391.6343		4.281	3.733	3.777	8398.7735	4.531	4.308	3.959	
9392.6317		4.458	3.925	3.804	8400.7883	4.690	4.458	4.025	
9393.6438		4.536	3.893	3.767	8431.7587	4.297	4.191	3.885	
9425.6213	4.751	4.397	3.863	3.808	8482.6141	4.735	4.525	4.035	
					8739.9766		4.481	4.014	3.835
FF AQL					8740.9866		4.192	3.909	
8320.6069	4.365	3.993	3.575		8771.7779		4.178	3.802	3.890
8339.5961	4.132	3.874	3.492						
8558.9086		3.959	3.490		9060.9738		4.479	4.004	3.905
8669.7056		3.979	3.543	3.443	9061.9030		4.205	3.862	3.787
8674.6570		3.906	3.506	3.216	9062.9350		4.405	3.909	3.865
					9063.9466		4.454	3.931	3.910
8676.6587		3.949	3.480	3.403	9140.8533		4.233	4.039	3.817
8693.6376		3.931	3.440	3.331					
9061.5744		3.945	3.430	3.359	9184.6745		4.640	4.103	4.040
9062.5649		3.970	3.449	3.371	9185.6337		4.175	3.831	3.719
9063.5535		3.768	3.363	3.249	9185.7326		4.364	3.863	3.761
					9227.6561		4.396	3.995	3.886
9072.5727		3.817	3.388	3.275	9424.9489	4.700	4.350	3.905	3.731
9273.8856		3.900	3.482	3.364					
9386.6196		3.795	3.355	3.168	9425.9892	4.728	4.518	3.990	3.850
9393.6363		3.880	3.522	3.460	9448.9695		4.426	4.009	3.977
					9461.8835		4.458	3.840	3.770
ETA AQL									
8301.6618	2.655	2.411	1.969		SU CAS				
8494.9656	2.803	2.448	2.022		8323.7783	4.897	4.594	4.198	
8497.0069		2.299	1.874		8323.8424	4.881	4.576	4.143	
8521.9722	2.951	2.568	1.999		8339.8759	4.808	4.406	4.203	
8523.9773	2.735	2.422	1.943		8343.8297	4.754	4.474	4.084	
					8377.6057	4.867	4.610	4.251	
8558.9339		2.707	2.143	1.954					
8564.8931		2.473	1.921	1.822	8378.6612	4.839	4.478	4.158	
8669.6788		2.420	1.981	1.935	8379.6509	4.822	4.630	4.093	
8669.7280		2.447	1.942	2.005	8395.5822	4.933	4.665	4.155	
8670.6390		2.310	1.831	1.734	8396.6114	4.732	4.527	4.145	
					8397.5879	4.848	4.538	4.140	
8671.7247		2.523	2.022	1.934					
8675.6995		2.457	2.013	2.002	8398.6431	4.797	4.421	4.017	
8694.5840		2.648	2.201	2.065	8400.5911	4.811	4.499	4.152	
9035.6343		2.423	1.915	1.958	8430.5729	4.941	4.555	4.167	
9036.5885		2.367	1.932	1.768	8431.5795	4.767	4.468	4.123	
					8669.8854		4.590	4.167	3.983
9038.6010		2.569	2.008	1.916					
9061.6463		2.620	2.141	2.071	8693.6708		4.622	4.163	4.049
9062.6081		2.320	1.915	1.818	8771.6360		4.615	4.066	3.935
9063.5981		2.298	1.908	1.768					
9064.6084		2.358	1.896	1.730					
					DEL CEP				
9072.6070		2.446	1.835	1.780	8298.7316	2.823	2.643	2.187	
9273.9115		2.340	1.927	1.848	8315.7095	2.963	2.737	2.316	

JD2430000+	I	J	K	L	JD2430000+	I	J	K	L
DEL CEP					SU CYG				
8315.7769	2.990	2.734	2.283		9061.6266		5.735	5.246	5.292
8316.6708	3.155	2.838	2.362		9062.5843		5.862	5.327	
8316.7385	3.192	2.857	2.375		9063.5785		5.848	5.546	
8317.6758	3.201	2.919	2.523		9064.5969		5.570	5.361	
8317.7359	3.141	2.922	2.481		9072.5955		5.645	5.196	
8320.6477		2.732	2.277		9273.9033		5.837	5.359	5.131
8323.6380	2.849	2.702	2.375		9391.6540		5.610	5.281	5.239
8323.6879	2.856	2.717	2.466		9393.6600		5.885	5.473	5.452
8339.6656	2.947	2.718	2.393		9425.6314	5.785	5.620	5.359	5.320
8377.5957	2.765	2.620	2.398						
8378.5924	2.853	2.583	2.237		DT CYG				
8379.5877	2.902	2.639	2.236		8340.6457	5.023	4.825	4.393	
8395.5718	2.964	2.770	2.209		8343.6182	4.950	4.707	4.447	
8396.6036	3.053	2.793	2.317		8377.5883	5.089	4.876	4.458	
8397.5809	3.123	2.868	2.401		8378.5852	4.878	4.683	4.317	
					8556.8773		4.752	4.372	
8398.5921	2.899	2.719	2.351						
8400.5734	2.866	2.631	2.214		8556.9648		4.729	4.315	
8638.8298		2.928	2.411	2.312	8557.9150		4.807	4.422	4.119
8669.6715		2.756	2.282	2.169	8564.8453		4.769	4.319	
8741.6434		2.899	2.469	2.460	8638.8156		4.757	4.357	
					8640.8280		4.788	4.405	
8747.6220		2.694	2.409	2.360					
9061.7424		2.749	2.240	2.230	8669.7465		4.894	4.457	
9062.6637		2.898	2.382	2.410	8674.7455		4.782	4.443	4.417
9063.6800		3.023	2.376	2.307	8676.7918		4.856	4.500	4.347
9064.6563		2.630	2.343	2.239	8725.6079		4.789	4.425	4.440
					8738.6087		4.700	4.411	4.194
9072.6734		2.846	2.366	2.373					
9385.7720		2.813	2.328	2.204	8741.5648		4.803	4.501	
9390.7904		3.000	2.441	2.366	9061.6947		4.780	4.396	4.351
9424.6858	2.927	2.668	2.338	2.267	9062.6561		4.842	4.391	
					9063.6691		4.755	4.388	4.235
					9064.6469		4.749	4.397	4.255
X CYG									
8558.9398		4.456	3.697		9072.6617		4.856	4.445	4.445
8646.8088		4.596	3.919		9385.7356		4.703	4.272	4.219
8671.7390		4.352	3.753	3.659	9391.7315		4.784	4.496	4.485
8676.6914		4.588	3.686	3.633	9393.7166		4.748	4.417	4.382
8694.5938		4.575	3.913	3.626	9425.6838	4.987	4.802	4.481	4.419
9038.7372		4.597	3.864	3.731					
9040.7021		4.694	3.953	3.822	W GEM				
9061.6680		4.421	3.883	3.809	8368.9403	5.798	5.322	4.860	
9062.6298		4.181	3.723	3.690	8370.9534	5.404	5.103	4.606	
9063.6429		4.303	3.741	3.670	8377.8760	5.784	5.403	4.781	
					8378.8291	5.347	5.104	4.536	
9064.6260		4.301	3.691	3.537	8379.8743	5.459	5.279	4.776	
9072.6458		4.656	3.902	3.758					
9385.7140		4.729	3.962	3.955	8392.8439	5.863	5.359	4.808	
9391.6990		4.340	3.739	3.726	8396.7818	5.519		4.600	
9393.6944		4.383	3.726	3.573	8397.8005	5.563	5.189	4.657	
					8398.7797	5.894	5.236	4.653	
9424.6542		4.272	3.730	3.627	8400.7952	5.858	5.347	4.925	
9425.6566	4.706	4.324	3.727	3.664					
					8482.6536	5.569	5.212	4.698	
SU CYG					8483.6691	5.489	5.037	4.645	
8320.6186	6.172	5.848	5.440		8692.9448		5.360	4.782	5.957
8558.9286			5.346		8771.7905		5.298	4.637	4.400
8671.7152		5.698	5.340	5.322	9060.9841		5.126	4.665	4.479
8674.7046		5.850	5.367	5.111					
8675.6891		5.672	5.368		9061.9282		5.102	4.582	4.522
					9062.9452		5.282	4.587	4.552
9035.6009		5.833	5.371	5.334	9063.9558		5.292	4.680	
9040.6874		5.717	5.407	5.353	9140.8635		5.146	4.736	4.440
					9185.6431		5.209	4.942	

JD2430000+	I	J	K	L	JD2430000+	I	J	K	L
W GEM					T MON				
9227.6650		5.151	4.594	4.536	8377.8585	4.641	4.263	3.695	
9391.9673		5.079	4.726		8378.8146	4.437	4.058	3.588	
9392.9622		5.170	4.642		8379.8573	4.371	4.100	3.621	
9424.9392	5.498	5.085	4.568	4.476	8392.8184	4.662	4.168	3.423	
9425.9980	5.491		4.547	4.461	8396.7695	4.853	4.360	3.580	
ZET GEM					8397.7733	4.857	4.315	3.587	
8315.9850	2.744	2.427	2.007		8398.7681	4.892	4.398	3.680	
8316.0243	2.742	2.451	2.023		8400.7809	4.844	4.387	3.668	
8316.9714	2.835	2.516	2.038		8431.7503	4.638	4.293	3.794	
8317.0089	2.817	2.576	1.991		8482.6236	4.852	4.457	3.735	
8317.9688	2.935	2.637	2.104		8483.6451	4.964	4.443	3.769	
8318.0047	2.925	2.645	2.092		8727.7924		4.480	3.914	3.851
8323.9943	2.775	2.550	2.149		8771.7690		4.136	3.362	3.184
8324.0213	2.796	2.518	2.150		9060.9626		4.030	3.417	3.364
8339.9957	2.995	2.693	2.181		9061.8903		3.995	3.443	3.324
8369.9408	2.903	2.628	2.090		9062.9266		4.109	3.361	3.230
8370.9809	2.982	2.701	2.206		9063.9380		4.040	3.371	3.318
8427.7765	2.755	2.482	2.017		9140.8397		4.204	3.633	3.458
8431.7674	2.980	2.683	2.192		9185.6210		4.478	3.702	3.718
8476.7744	2.686	2.480	2.097		9227.6445		4.193	3.449	3.306
8480.6207	2.888	2.587	2.090		9392.9523		4.107	3.458	3.327
8481.6629	2.941	2.624	2.115		9394.9570		4.258	3.473	3.356
8482.6369	2.981	2.745	2.221		9425.9784	4.839		3.634	3.439
8483.6173	2.891	2.633	2.183		9461.8766		4.103	3.518	3.440
8493.6179	2.948	2.592	2.141		Y OPH				
8494.6303	2.836	2.545	2.150		8320.5834	4.203	3.557	2.685	
8496.6733	2.718	2.503	2.080		8565.8297		3.582	2.821	2.583
8499.6014		2.526	2.103		8670.5926		3.439	2.679	2.469
8502.6192	3.040	2.716	2.193		8674.5856		3.422	2.698	2.477
8505.6383	2.865	2.616	2.189		8675.5930		3.422	2.663	2.424
8669.9720		2.575	2.128	2.086	8676.6106		3.430	2.634	2.395
8670.9810		2.560	2.086	2.040	9041.5812		3.556	2.729	2.623
8739.9608		2.539	2.028	2.089	9270.8512		3.282	2.651	
8740.9992		2.510	2.108	2.009	9272.8018		3.261	2.617	2.510
8771.7990		2.465	2.042	2.028	9273.8544		3.330	2.646	2.483
8773.8767		2.570	2.085	1.921	9274.8279		3.329	2.655	2.654
9036.0168		2.443	2.030	1.971	9385.5681		3.419	2.697	2.597
9060.9943		2.694	2.186	2.062	9391.5858		3.263	2.612	2.488
9061.9477		2.687	2.138	2.097	9392.5850		3.376	2.663	2.525
9062.9533		2.702	2.241	2.237	S SGE				
9063.9623		2.642	2.149	2.076	8317.6449	4.753	4.419	3.733	
9140.8735		2.662		1.998	8320.6296	4.542	4.211	3.719	
9185.6523		2.567	2.164	2.018	8670.6514		4.358	3.863	3.836
9197.7443		2.477	2.056	2.107	8674.7281		4.144	3.675	3.607
9227.6715		2.502	2.160	2.049	8693.6287		4.262	3.653	3.498
9424.9578	2.872	2.550	2.068	1.964	9061.6556		4.272	3.756	3.658
9426.0066	2.930	2.642	2.058	2.031	9062.6200		4.223	3.676	3.560
9448.9877		2.688	2.171	2.044	9063.6070		4.387	3.853	3.640
9461.8899		2.573	2.199	2.052	9064.6139		4.405	3.854	3.709
T MON					9072.6198		4.386	3.819	3.732
8323.9793	4.676	4.294	3.762		9273.9241		4.373	3.893	3.829
8324.0146	4.650	4.181	3.700		9391.6795		4.365	3.903	3.863
8368.9097	4.761	4.263	3.492		9393.6842		4.133	3.691	3.699
8369.9562	4.704	4.222	3.469		9425.6477	4.572	4.320	3.897	3.787
8370.9112	4.811	4.347	3.597						

JD2430000+ I J K L

U SGR

8317.6193	5.232	4.667	3.998	
8320.5954	4.920	4.544	3.981	
8557.8656		4.575	3.991	
8558.8727		4.650	3.939	3.390
8640.7060		4.706	3.999	

8667.5952		4.671	3.929	3.895
8670.6240		4.543		
8674.5956		4.657	3.935	3.936
8676.6231		4.754	4.160	
9256.8799		4.642	3.998	4.112

9258.9403		4.597	3.965	3.917
9272.8349		4.428	3.855	3.828
9273.8656		4.491	3.901	3.851
9274.8590		4.568	3.947	3.882
9298.8741		4.519	4.056	4.017

9385.6065		4.519	4.083	4.091
9391.6044		4.667	4.069	3.921
9392.6029		4.468	4.004	3.871
9393.6028		4.450	3.896	3.763

W SGR

8670.6038		3.515	2.844	2.805
9270.8629		3.505	2.984	2.881
9272.8198		3.343	3.001	2.966
9273.8493		3.130	2.835	2.699
9274.8411		3.157	2.609	2.604

9274.8469		3.139	2.759	2.719
9391.5783		3.187	2.700	2.590
9393.5862		3.497	3.098	3.053

X SGR

9270.8576		2.978	2.528	2.418
9272.8112		3.159	2.665	2.630
9273.8441		3.147	2.634	2.566
9386.5563		3.123	2.651	2.727
9391.5707		2.903	2.424	2.355

9392.5716		3.154	2.616	2.547
9393.5799		3.363	2.765	2.825

Y SGR

8339.5872	4.387			
8557.8550		4.123	3.602	3.682
8564.8333		4.049	3.491	
8694.6081		4.228		
9270.8690		4.200	3.644	3.507

9272.8280		4.206	3.694	3.617
9273.8602		3.969	3.531	3.584
9274.8522		4.006	3.528	
9385.5953		4.287	3.696	3.702
9386.5994		4.270	3.723	3.591

9391.5943		4.113	3.566	3.529
9392.5937		4.324	3.813	3.610
9393.5949		4.084	3.666	3.601
9425.5802	4.529	4.179	3.641	3.555

JD2430000+ I J K L

SZ TAU

8323.8918	5.211	4.930	4.265	
8343.8809	5.134	4.770	4.312	
8377.7290	5.257	4.826	4.216	
8378.7552	5.186	4.763	4.244	
8379.7380	5.205	4.825	4.303	

8396.6967	5.270	4.876	4.352	
8397.7430	5.205	4.939	4.343	
8398.6602	5.218	4.796	4.418	
8400.6519	5.149	4.809	4.368	
8430.6737	5.247	4.960	4.297	

8431.5977	5.134	4.796	4.354	
8480.6035	5.154	4.873	4.239	
8482.6039	5.172	4.821	4.310	
8674.9419		4.811		3.991
8727.7808		4.773	4.309	4.106

8769.7089		4.905	4.300	
8771.6463		4.837	4.207	4.092
9041.8690		4.901	4.338	4.252
9045.8543		4.824	4.352	4.192
9060.9197		4.929	4.373	4.209

9061.8476		4.807	4.298	4.239
9062.9185		4.887	4.324	4.213
9063.8461		4.938	4.374	4.395
9140.6975		4.887		4.272
9185.5979		4.760	4.229	4.122

9185.6595		4.832	4.317	4.167
9391.9300		4.822	4.365	4.294
9392.9290		4.840	4.316	4.253
9424.9229	5.081	4.856	4.235	4.078
9425.9343	5.300	4.926	4.338	4.285

9461.8664		4.848	4.335	4.223
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T VUL

8320.6402	4.882	4.542	4.195	
8340.6327	4.954	4.568	4.176	
8377.5734	4.960	4.745	4.242	
8378.5764	4.622	4.471	4.138	
8379.5718		4.505	3.978	

8395.5550	5.013	4.878	4.307	
8671.7583		4.538	4.216	4.086
8673.7882		4.726	4.230	4.324
8694.6251		4.472	4.082	4.081
9040.6751		4.545	4.142	4.068

9061.6798		4.513	4.176	4.170
9062.6483		4.520	4.079	4.022
9063.6590		4.649	4.128	3.912
9064.6379		4.733	4.254	4.139
9072.6539		4.624	4.162	4.092

9385.7252			4.165	4.002
9391.7216		4.695	4.142	4.216
9393.7082		4.678	4.281	4.277
9424.6641		4.733	4.357	4.268
9425.6738	4.707	4.574	4.190	4.150