ECLIPSING BINARY SYSTEM AV HYDRAE

J. B. SRIVASTAVA and C. D. KANDPAL
Uttar Pradesh State Observatory, Naini Tal, India

(Received 17 September, 1980)

Abstract: The eclipsing binary AV Hya has been observed photoelectrically in *U*, *B* and *V* filters on 15 nights. The primary eclipse appeared to be total with a totality of 23 min duration. A modified period of $0^d.6\,834\,062$ has been obtained. Geometrical elements could only be determined for partial transit case.

1. Introduction

The eclipsing binary AV Hya was discovered by Hoffmeister (1934). He reported its photographic magnitude as 10–11 and light curve as that of Algol type. Götz and Wenzel (1961) have given its spectral type as A1. Szafraniec (1971) has presented the visual light curve and period. Except for a few times of minima, nothing else about this system is available in the literature.

2. Observations

A total of 15 nights of observations on the 104-cm Sampurnanand telescope have been secured during the years 1974 to 1978. An EMI 6094S photomultiplier thermoelectrically cooled to −20°C, standard *U*, *B* and *V* filters of Johnson and Morgan system and dc techniques have been used to record the observations which are listed in Tables Ia, Ib and Ic. The stars BD + 6°2190 and BD + 6°2191 have been observed alongwith the variable AV Hya. Finally, the star BD + 6°2191 has been selected as the comparison star as this was found to be better than BD + 6°2190 in respect of magnitude, colour, and proximity.

3. Light Curve and Period

By the method of bisection the following times of minima have been determined:

Primary Min: JD (Hel) 244 3225.190
3227.241
3581.246

Using our times of minima and also those given by others, a period of $0^d.6\,834\,062$ has been obtained. These times of minima and the respective (O–C)'s are listed in Table II. The ephemeris

$$\text{JD (Hel) } 243\,6673.376 + 0^d.683\,4062E$$
$$\pm 0.004 \pm 0.000\,0005$$

Astrophysics and Space Science **76** (1981) 173–186. 0004–640X/81/0761–0173$02.10

TABLE Ia

Standard U magnitudes of AV Hya

JD (Hel)	Phase	ΔU	JD (Hel)	Phase	ΔU
2442			462.3482	+0.7634	+0.249
091.2544	+0.7571	+0.297	.3702	0.7956	0.214
.2597	0.7648	0.287	.3782	0.8073	0.225
.2918	0.8118	0.265	.3871	0.8203	0.206
.2953	0.8169	0.275	.3941	0.8305	0.195
.3103	0.8389	0.267	.4027	0.8431	0.175
.3109	0.8398	0.254	.4097	0.8534	0.165
.3197	0.8526	0.252	.4172	0.8736	0.167
.3203	0.8535	0.233	.4268	0.8784	0.100
.3450	0.8897	0.197	487.1408	0.0414	−0.183
.3454	0.8902	0.226	.1478	0.0517	−0.118
.3545	0.9036	0.154	.1567	0.0647	−0.040
.3552	0.9046	0.162	.1634	0.0745	0.030
.3629	0.9159	0.152	.1704	0.0847	0.066
.3635	0.9167	0.143	.1790	0.0973	0.132
.3716	0.9286	0.125	.1867	0.1086	0.150
.3721	0.9293	0.130	.1931	0.1179	0.158
122.1738	0.0003	−0.359	.2281	0.1692	0.215
.1764	0.0041	−0.351	.2789	0.2435	0.216
.2161	0.0622	−0.030	.2867	0.2549	0.208
.2181	0.0651	−0.015	.2962	0.2688	0.213
.2236	0.0732	0.024	.3036	0.2796	0.213
.2260	0.0767	0.046	.3108	0.2902	0.220
.2301	0.0827	0.095	.3178	0.3004	0.197
.2323	0.0859	0.098	.3252	0.3112	0.195
.2380	0.0942	0.158	488.1489	0.5165	0.112
122.2400	0.0972	0.166	1567	0.5279	0.129
.2455	0.1052	0.203	.1670	0.5430	0.123
.2478	0.1086	0.185	.1779	0.5590	0.135
.2538	0.1174	0.195	.1880	0.5737	0.172
.2620	0.1294	0.204	.1997	0.5909	0.168
.2645	0.1330	0.205	.2090	0.6044	0.173
.2732	0.1457	0.235	.2124	0.6094	0.173
.2735	0.1462	0.234	.2232	0.6253	0.185
.2819	0.1585	0.210	.2339	0.6409	0.209
.2822	0.1589	0.233	.2442	0.6560	0.208
.2914	0.1724	0.228	.2504	0.6651	0.187
.2917	0.1728	0.230	.2566	0.6741	0.177
.2987	0.1831	0.216	.2643	0.6854	0.195
.2990	0.1835	0.230	.2707	0.6948	0.221
.3075	0.1959	0.207	.3101	0.7524	0.252
.3078	0.1964	0.202	.3188	0.7651	0.218
462.2792	0.6624	0.247	.3257	0.7752	0.252
.2873	0.6743	0.268	.3332	0.7862	0.225
.2952	0.6858	0.252	.3409	0.7975	0.270
.3027	0.6968	0.256	.3473	0.8068	0.217
.3138	0.7116	0.256	.3537	0.8162	0.164
.3253	0.7299	0.253	.3610	0.8269	0.192
.3321	0.7398	0.247	489.2047	0.0613	−0.029
.3410	0.7528	0.246	.2160	0.0778	0.065

Table Ia (continued)

JD (Hel)	Phase	$\Delta \lesssim$	JD (Hel)	Phase	ΔU
2442					
489.2220	+0.0866	+0.118	533.2048	+0.4448	+0.185
498.2275	0.0947	0.148	.2116	0.4548	0.178
.2351	0.1058	0.178	.2193	0.4660	0.157
.2431	0.1175	0.216	.2279	0.4786	0.149
.2491	0.1263	0.207	.2365	0.4912	0.115
.2563	0.1368	0.212	832.1545	0.8856	0.210
.2615	0.1444	0.233	.1674	0.9044	0.205
.2670	0.1525	0.227	.1771	0.9186	0.099
.2728	0.1610	0.233	.1846	0.9296	0.061
.2798	0.1712	0.238	.1937	0.9429	0.040
.2845	0.1781	0.242	.2015	0.9543	−0.102
.2891	0.1848	0.252	.2098	0.9665	−0.218
490.1464	0.4393	0.199	.2189	0.9798	−0.301
.1575	0.4555	0.146	2443		
.1680	0.4709	0.130	225.1550	0.9470	−0.089
.1750	0.4811	0.131	.1582	0.9517	−0.143
.1803	0.4889	0.121	.1753	0.9767	−0.323
.1857	0.4968	0.117	.1759	0.9776	−0.338
.1922	0.5063	0.117	.1851	0.9911	−0.365
.1985	0.5155	0.103	.1857	0.9920	−0.379
.2060	0.5265	0.139	.1883	0.9958	−0.397
.2131	0.5369	0.167	.1889	0.9966	−0.396
.2181	0.5442	0.117	.1988	0.0111	−0.358
.2240	0.5528	0.178	.1994	0.0120	−0.333
.2299	0.5615	0.174	.2022	0.0161	−0.323
.2349	0.5688	0.143	.2028	0.0170	−0.322
490.2402	0.5765	0.154	.2124	0.0310	−0.247
.2488	0.5891	0.165	.2132	0.0322	−0.228
.2550	0.5982	0.182	.2165	0.0370	−0.184
.2593	0.6045	0.165	.2238	0.0476	−0.093
.2636	0.6108	0.221	.2261	0.0511	−0.086
.2678	0.6169	0.165	.2321	0.0598	−0.034
.2728	0.6242	0.197	.2341	0.0628	−0.023
.2776	0.6312	0.185	.2349	0.0639	0.015
.2840	0.6406	0.220	.2427	0.0754	0.075
.2961	0.6583	0.221	.2432	0.0761	0.064
.3049	0.6712	0.202	.2575	0.0970	0.138
.3095	0.6779	0.219	.2943	0.1509	0.244
502.2248	0.1131	0.200	.2972	0.1551	0.259
.2356	0.1289	0.193	.2980	0.1563	0.267
.2446	0.1421	0.183	.3005	0.1599	0.262
.2527	0.1539	0.184	.3071	0.1696	0.244
.2604	0.1652	0.188	.3099	0.1737	0.243
.2696	0.1787	0.191	.3108	0.1750	0.231
.2800	0.1939	0.227	.3148	0.1809	0.244
.2886	0.2065	0.235	226.2104	0.4914	0.090
.2983	0.2207	0.211	.2107	0.4918	0.072
.3095	0.2370	0.229	.2222	0.5086	0.096
.3200	0.2524	0.259	.2228	0.5095	0.058
533.1596	0.3787	0.243	.2313	0.5219	0.080
.1657	0.3876	0.249	.2319	0.5228	0.095
.1986	0.4358	0.190	.2400	0.5347	0.122

Table Ia (continued)

JD (Hel)	Phase	ΔU	JD (Hel)	Phase	ΔU
2443					
226.2406	+0.5356	$+0^m.135$	227.3305	+0.1302	$+0^m.171$
.2479	0.5462	0.089	581.2036	0.9381	−0.009
.2484	0.5470	0.114	.2076	0.9440	−0.024
.2564	0.5587	0.154	.2090	0.9460	−0.044
.2570	0.5596	0.144	.2129	0.9517	−0.068
.2652	0.5715	0.152	.2197	0.9617	−0.160
.2756	0.5868	0.168	.2225	0.9658	−0.201
.2780	0.5903	0.131	.2229	0.9663	−0.191
.2875	0.6042	0.174	.2277	0.9734	−0.276
.2905	0.6086	0.195	.2306	0.9776	−0.272
.3007	0.6235	0.169	.2311	0.9783	−0.306
.3094	0.6362	0.188	.2376	0.9879	−0.341
.3128	0.6412	0.168	.2381	0.9886	−0.332
.3198	0.6514	0.184	.2405	0.9921	−0.339
.3228	0.6558	0.185	.2412	0.9931	−0.342
227.2205	0.9693	−0.223	.2454	0.9993	−0.340
.2231	0.9731	−0.265	.2478	0.0028	−0.315
.2337	0.9886	−0.322	.2482	0.0034	−0.352
.2343	0.9895	−0.323	.2523	0.0094	−0.332
.2421	0.0009	−0.381	.2553	0.0138	−0.311
.2427	0.0018	−0.377	.2558	0.0145	−0.307
.2496	0.0119	−0.339	.2611	0.0222	−0.318
.2502	0.0127	−0.352	.2643	0.0269	−0.293
.2601	0.0272	−0.229	.2648	0.0277	−0.280
.2607	0.0281	−0.236	.3199	0.1083	0.180
.2870	0.0666	−0.004	.3276	0.1195	0.216
.2874	0.0672	−0.002	.3280	0.1201	0.209
.2952	0.0786	0.052	590.2429	0.1649	0.178
.2958	0.0795	0.066	.2518	0.1779	0.173
.3037	0.0910	0.128	.2603	0.1904	0.208
.3042	0.0917	0.124	.2678	0.2013	0.185
.3127	0.1042	0.190	.2762	0.2136	0.223
.3131	0.1048	0.165	.2854	0.2271	0.203
.3212	0.1166	0.185	.3136	0.2684	0.174
.3218	0.1175	0.177	.3223	0.2811	0.195
.3301	0.1296	0.165	.3391	0.3057	0.177

TABLE Ib

Standard *B* magnitudes of AV Hya

JD (Hel)	Phase	ΔB	JD (Hel)	Phase	ΔB
2442			091.3115	+0.8406	$+0^m.160$
091.2528	+0.7574	$+0^m.185$	.3192	0.8519	0.138
.2560	0.7594	0.179	.3207	0.8541	0.145
.2587	0.7634	0.181	.3443	0.8886	0.095
.2923	0.8125	0.167	.3460	0.8911	0.097
.2945	0.8158	0.160	.3539	0.9027	0.092
.3097	0.8380	0.161	.3558	0.9055	0.081

Table Ib (continued)

JD (Hel)	Phase	ΔB	JD (Hel)	Phase	ΔB
2442					
091.3623	+0.9150	+0^{m}071	487.1704	+0.0847	+0^{m}013
.3641	0.9176	0.060	.1790	0.0973	0.072
.3710	0.9277	0.029	.1867	0.1086	0.101
.3725	0.9299	0.014	.1931	0.1179	0.089
122.1741	0.0007	−0.406	.2281	0.1692	0.145
.1755	0.0028	−0.426	.2789	0.2435	0.145
.2166	0.0629	−0.110	.2867	0.2549	0.137
.2177	0.0645	−0.113	.2962	0.2688	0.144
.2241	0.0739	−0.046	.3036	0.2796	0.145
.2255	0.0759	−0.028	.3108	0.2902	0.143
.2311	0.0841	0.022	.3178	0.3004	0.138
.2320	0.0855	0.035	.3252	0.3112	0.140
.2385	0.0950	0.054	488.1489	0.5165	0.012
.2396	0.0966	0.068	.1567	0.5279	0.022
.2459	0.1058	0.117	.1670	0.5430	0.033
.2471	0.1075	0.106	.1779	0.5590	0.050
.2542	0.1179	0.124	.1880	0.5737	0.070
.2556	0.1200	0.119	.1997	0.5909	0.069
.2626	0.1302	0.133	.2090	0.6044	0.062
.2639	0.1321	0.140	.2124	0.6094	0.075
.2726	0.1449	0.171	.2232	0.6253	0.117
.2741	0.1471	0.171	.2339	0.6409	0.116
.2814	0.1577	0.133	.2442	0.6560	0.115
.2828	0.1598	0.137	.2504	0.6651	0.112
.2908	0.1715	0.150	.2566	0.6741	0.117
.2922	0.1735	0.154	.2643	0.6854	0.126
.2981	0.1822	0.143	.2707	0.6948	0.130
.2994	0.1941	0.148	.3101	0.7524	0.156
.3069	0.1951	0.177	.3188	0.7651	0.149
.3084	0.1972	0.186	.3257	0.7752	0.138
462.2792	0.6624	0.167	.3332	0.7862	0.148
.2873	0.6743	0.165	.3409	0.7975	0.169
.2952	0.6858	0.173	.3473	0.8068	0.142
.3027	0.6968	0.175	.3537	0.8162	0.100
.3128	0.7116	0.179	.3610	0.8269	0.112
.3253	0.7299	0.177	489.2047	0.0613	0.099
.3321	0.7398	0.171	.2160	0.0778	−0.005
.3410	0.7528	0.175	.2220	0.0866	0.046
.3482	0.7634	0.181	.2275	0.0947	0.072
.3702	0.7956	0.149	.2351	0.1058	0.105
.3782	0.8073	0.155	.2431	0.1175	0.123
.3871	0.8203	0.138	.2491	0.1263	0.135
.3941	0.8305	0.124	.2563	0.1368	0.142
.4027	0.8431	0.106	.2615	0.1444	0.143
.4097	0.8534	0.097	.2670	0.1525	0.161
.4172	0.8736	0.080	.2728	0.1610	0.153
.4268	0.8784	0.035	.2798	0.1712	0.162
487.1324	0.0291	−0.270	.2845	0.1781	0.172
.1408	0.0414	−0.220	.2891	0.1848	0.171
.1478	0.0517	−0.163	490.1464	0.4393	0.096
.1567	0.0647	−0.083	.1575	0.4555	0.076
.1634	0.0745	−0.024	.1680	0.4709	0.058

Table Ib (continued)

JD (Hel)	Phase	ΔB	JD (Hel)	Phase	ΔB
2442			2443		
490.1750	+0.4811	$+0^m.036$	225.1558	+0.9482	$-0^m.199$
.1803	0.4889	0.048	.1575	0.9507	−0.206
.1857	0.4968	0.029	.1745	0.9756	−0.379
.1922	0.5063	0.034	.1765	0.9785	−0.389
.1985	0.5155	0.030	.1845	0.9902	−0.428
.2060	0.5265	0.040	.1863	0.9928	−0.430
.2131	0.5369	0.078	.1877	0.9949	−0.433
.2181	0.5442	0.037	.1895	0.9975	−0.429
.2240	0.5528	0.055	.1981	0.0101	−0.412
.2299	0.5615	0.112	.2000	0.0128	−0.396
.2349	0.5688	0.076	.2016	0.0152	−0.397
.2402	0.5765	0.093	.2035	0.0180	−0.389
.2488	0.5891	0.096	.2115	0.0297	−0.315
.2550	0.5982	0.095	.2140	0.0334	−0.284
.2593	0.6045	0.087	.2177	0.0388	−0.247
.2636	0.6108	0.152	.2244	0.0486	−0.168
.2678	0.6169	0.079	.2255	0.0502	−0.158
.2728	0.6242	0.152	.2325	0.0604	−0.090
.2776	0.6312	0.150	.2335	0.0619	−0.082
.2840	0.6406	0.140	.2353	0.0645	−0.048
.2961	0.6583	0.097	.2420	0.0743	0.006
.3049	0.6712	0.084	.2435	0.0765	0.021
.3095	0.6779	0.145	.2507	0.0871	0.066
502.2248	0.1131	0.092	.2531	0.0906	0.082
.2356	0.1289	0.100	.2567	0.0958	0.087
.2446	0.1421	0.110	.2950	0.1519	0.180
.2527	0.1539	0.119	.2966	0.1542	0.190
.2604	0.1652	0.128	.2985	0.1570	0.181
.2696	0.1787	0.129	.2998	0.1589	0.206
.2800	0.1939	0.148	.3077	0.1705	0.188
.2886	0.2065	0.154	.3093	0.1731	0.168
.2983	0.2207	0.149	.3113	0.1757	0.175
.3095	0.2370	0.154	.3144	0.1803	0.200
.3200	0.2524	0.170	226.2099	0.4906	0.015
533.1596	0.3787	0.144	.2113	0.4927	0.018
.1657	0.3876	0.163	.2215	0.5076	0.020
.1986	0.4358	0.113	.2235	0.5105	0.005
.2048	0.4448	0.105	.2307	0.5211	0.026
.2116	0.4548	0.085	.2328	0.5241	0.050
.2193	0.4660	0.050	.2394	0.5338	0.041
.2279	0.4786	0.050	.2413	0.5366	0.038
.2365	0.4912	0.008	.2476	0.5458	0.032
832.1545	0.8856	0.051	.2490	0.5478	0.021
.1674	0.9044	0.074	.2557	0.5576	0.083
.1771	0.9186	0.000	.2578	0.5607	0.076
.1846	0.9296	−0.061	.2642	0.5701	0.067
.1937	0.9429	−0.136	.2660	0.5727	0.092
.2015	0.9543	−0.207	.2747	0.5854	0.092
.2098	0.9665	−0.284	.2765	0.5881	0.094
.2189	0.9798	−0.380	.2788	0.5914	0.070

Table Ib (continued)

JD (Hel)	Phase	ΔB	JD (Hel)	Phase	ΔB
2443					
226.2798	+0.5929	$0^m.068$	581.2416	+0.9937	$-0^m.417$
.2883	0.6054	0.107	.2460	0.0001	−0.428
.2899	0.6077	0.110	.2473	0.0020	−0.433
.3001	0.6226	0.124	.2488	0.0042	−0.435
.3101	0.6372	0.134	.2531	0.0105	−0.414
.3120	0.6400	0.145	.2547	0.0129	−0.408
.3205	0.6525	0.164	.2564	0.0154	−0.395
.3221	0.6548	0.170	.2619	0.0234	−0.359
227.2212	0.9703	−0.334	.2637	0.0260	−0.334
.2226	0.9723	−0.344	.2654	0.0285	−0.323
.2330	0.9876	−0.391	.2744	0.0417	−0.199
.2349	0.9903	−0.408	.2770	0.0455	−0.184
.2415	0.0000	−0.450	.2783	0.0474	−0.164
.2431	0.0023	−0.430	.2795	0.0492	−0.154
.2490	0.0110	−0.421	.3077	0.0904	0.038
.2507	0.0135	−0.424	.3096	0.0932	0.050
.2594	0.0262	−0.350	.3171	0.1042	0.096
.2613	0.0290	−0.328	.3188	0.1067	0.083
.2880	0.0680	−0.072	.3204	0.1090	0.067
.2945	0.0776	−0.029	590.2419	0.1634	0.108
.2964	0.0803	−0.027	.2435	0.1661	0.134
.3032	0.0903	−0.008	.2512	0.1771	0.144
.3048	0.0926	0.020	.2522	0.1785	0.150
.3120	0.1032	0.049	.2596	0.1893	0.131
.3139	0.1059	0.048	.2608	0.1911	0.139
.3206	0.1157	0.058	.2672	0.2005	0.145
.3224	0.1184	0.051	.2683	0.2021	0.142
.3294	0.1286	0.049	.2756	0.2128	0.142
.3311	0.1311	0.065	.2767	0.2144	0.135
581.2050	0.9402	−0.116	.2849	0.2264	0.138
.2068	0.9428	−0.134	.2860	0.2280	0.141
.2101	0.9476	−0.166	.2923	0.2372	0.152
.2121	0.9505	−0.187	.2933	0.2387	0.152
.2204	+0.9627	−0.282	.3129	0.2673	0.127
.2219	0.9649	−0.289	.3216	0.2801	0.124
.0235	0.9672	−0.308	.3230	0.2821	0.136
.2283	0.9742	−0.330	.3296	0.2918	0.131
.2300	0.9768	−0.348	.3310	0.2938	0.129
.2317	0.9792	−0.375	.3381	0.3042	0.126
.2370	0.9870	−0.393	.3397	0.3066	0.123
.2386	0.9893	−0.418	.3468	0.3169	0.138
.2400	0.9914	−0.419	.3479	0.3186	0.113

TABLE Ic

Standard V magnitudes of AV Hya

JD (Hel)	Phase	ΔV	JD (Hel)	Phase	ΔV
2442			462.3410	+0.7528	$-0^m.081$
091.2518	+0.7533	$-0^m.060$	.3482	0.7634	−0.067
.2568	0.7606	−0.049	.3702	0.7956	−0.111
.2579	0.7622	−0.051	.3782	0.8073	−0.097
.2931	0.8137	−0.066	.3871	0.8203	−0.112
.2938	0.8147	−0.065	.3941	0.8305	−0.126
.3091	0.8371	−0.106	.4027	0.8431	−0.136
.3121	0.8415	−0.079	.4097	0.8534	−0.130
.3188	0.8513	−0.109	.4172	0.8736	−0.123
.3213	0.8550	−0.113	.4268	0.8784	−0.170
.3436	0.8876	−0.126	487.1324	0.0291	−0.498
.3465	0.8919	−0.129	.1408	0.0414	−0.448
.3535	0.9021	−0.137	.1478	0.0517	−0.390
.3563	0.9062	−0.147	.1567	0.0647	−0.309
.3621	0.9147	−0.175	.1634	0.0745	−0.268
.3647	0.9185	−0.187	.1704	0.0847	−0.197
.3705	0.9270	−0.229	.1790	0.0973	−0.172
.3727	0.9302	−0.247	.1867	0.1086	−0.147
122.1746	0.0015	−0.605	.1931	0.1179	−0.143
.1750	0.0020	−0.623	.2281	0.1692	−0.081
.2170	0.0635	−0.351	.2789	0.2435	−0.082
.2247	0.0748	−0.254	.2867	0.2549	−0.075
.2252	0.0755	−0.263	.2962	0.2688	−0.094
.2313	0.0844	−0.196	.3036	0.2796	−0.090
.3216	0.0849	−0.230	.3108	0.2902	−0.085
.2389	0.0956	−0.177	.3178	0.3004	−0.082
.2393	0.0961	−0.152	.3252	0.3112	−0.084
.2464	0.1065	−0.129	488.1489	0.5165	−0.240
.2467	0.1070	−0.130	.1567	0.5279	−0.259
.2547	0.1187	−0.108	.1670	0.5430	−0.227
.2551	0.1193	−0.109	.1779	0.5590	−0.204
.2631	0.1310	−0.105	.1880	0.5737	−0.175
.2634	0.1314	−0.095	.1997	0.5909	−0.174
.2722	0.1443	−0.117	.2090	0.6044	−0.166
.2745	0.1476	−0.088	.2124	0.6094	−0.156
.2811	0.1573	−0.106	.2232	0.6253	−0.127
.2832	0.1604	−0.108	.2339	0.6409	−0.141
.2902	0.1706	−0.093	.2442	0.6560	−0.137
.2927	0.1743	−0.078	.2504	0.6651	−0.116
.2978	0.1817	−0.081	.2566	0.6741	−0.125
.3000	0.1850	−0.063	.2643	0.6854	−0.108
.3063	0.1942	−0.063	.2707	0.6948	−0.092
.3087	0.1977	−0.040	.3101	0.7524	−0.087
462.2792	0.6624	−0.077	.3188	0.7651	−0.114
.2873	0.6743	−0.078	.3257	0.7752	−0.089
.2952	0.6858	−0.097	.3332	0.7862	−0.096
.3027	0.6968	−0.087	.3409	0.7975	−0.089
.3128	0.7116	−0.076	.3473	0.8068	−0.102
.3253	0.7299	−0.084	.3537	0.8162	−0.136
.3321	0.7398	−0.083	.3610	0.8269	−0.134

Table Ic (continued)

JD (Hel)	Phase	ΔV	JD (Hel)	Phase	ΔV
2442					
489.2047	+0.0613	$-0^m.323$	533.1596	+0.3787	$-0^m.065$
.2160	0.0778	−0.224	.1657	0.3876	−0.083
.2220	0.0866	−0.202	.1986	0.4358	−0.132
.2275	0.0947	−0.165	.2048	0.4448	−0.150
.2351	0.1058	−0.137	.2116	0.4548	−0.187
.2431	0.1175	−0.119	.2193	0.4660	−0.205
.2491	0.1263	−0.104	.2279	0.4786	−0.207
.2563	0.1368	−0.100	.2365	0.4912	−0.249
.2615	0.1444	−0.091	832.1545	0.8856	−0.175
.2670	0.1525	−0.091	.1674	0.9044	−0.176
.2728	0.1610	−0.082	.1771	0.9186	−0.207
.2798	0.1712	−0.090	.1846	0.9296	−0.256
.2845	0.1781	−0.062	.1937	0.9429	−0.346
.2891	0.1848	−0.084	.2015	0.9543	−0.409
490.1464	0.4393	−0.204	.2098	0.9665	−0.503
.1575	0.4555	−0.196	.2189	0.9798	−0.596
.1680	0.4709	−0.214	2443		
.1750	0.4811	−0.196	225.1564	0.9491	−0.439
.1803	0.4889	−0.236	.1569	0.9498	−0.436
.1857	0.4968	−0.229	.1736	0.9747	−0.625
.1922	0.5063	−0.212	.1768	0.9789	−0.620
.1985	0.5155	−0.222	.1839	0.9893	−0.638
.2060	0.5265	−0.221	.1867	0.9934	−0.664
.2131	0.5369	−0.189	.1873	0.9943	−0.670
.2181	0.5442	−0.226	.1901	0.9984	−0.665
.2240	0.5528	−0.182	.1974	0.0091	−0.629
.2299	0.5615	−0.170	.2004	0.0135	−0.628
.2349	0.5688	−0.158	.2010	0.0143	−0.634
.2402	0.5765	−0.180	.2041	0.0189	−0.619
.2488	0.5891	−0.123	.2107	0.0285	−0.538
.2550	0.5982	−0.210	.2147	0.0344	−0.508
.2593	0.6045	−0.185	.2199	0.0420	−0.462
.2636	0.6108	−0.194	.2249	0.0493	−0.386
.2678	0.6169	−0.177	.2252	0.0498	−0.391
.2728	0.6242	−0.128	.2328	0.0609	−0.333
.2776	0.6312	−0.113	.2331	0.0613	−0.323
.2840	0.6406	−0.112	.2358	0.0653	−0.322
.2961	0.6583	−0.090	.2414	0.0735	−0.252
.3049	0.6712	−0.076	.2438	0.0770	−0.232
.3095	0.6779	−0.088	.2514	0.0881	−0.197
502.2248	0.1131	−0.127	.2521	0.0892	−0.179
.2356	0.1289	−0.121	.2561	0.0950	−0.174
.2446	0.1421	−0.101	.2956	0.1528	−0.077
.2527	0.1539	−0.094	.2961	0.1535	−0.078
.2604	0.1652	−0.092	.2988	0.1574	−0.072
.2969	0.1787	−0.080	.2994	0.1583	−0.071
.2800	0.1939	−0.074	.3082	0.1712	−0.065
.2886	0.2065	−0.074	.3088	0.1721	−0.053
.2983	0.2207	−0.071	.3121	0.1769	−0.068
.3095	0.2370	−0.077	.3137	0.1792	−0.059
.3200	0.2524	−0.074	226.2094	0.4899	−0.287

Table Ic (continued)

JD (Hel)	Phase	ΔV	JD (Hel)	Phase	ΔV
2443					
226.2118	+0.4934	−0.298	227.3315	+0.1317	−0.156
.2207	0.5064	−0.279	581.2055	0.9409	−0.354
.2243	0.5117	−0.274	.2062	0.9419	−0.347
.2301	0.5202	−0.276	.2107	0.9485	−0.388
.2335	0.5252	−0.253	.2114	0.9495	−0.393
.2390	0.5332	−0.254	.2210	0.9636	−0.496
.2420	0.5376	−0.240	.2215	0.9643	−0.492
.2472	0.5452	−0.236	.2241	0.9681	−0.515
.2496	0.5487	−0.258	.2289	0.9751	−0.541
.2551	0.5568	−0.186	.2294	0.9759	−0.541
.2584	0.5616	−0.206	.2321	0.9798	−0.546
.2636	0.5692	−0.181	.2364	0.9861	−0.595
.2669	0.5740	−0.199	.2392	0.9902	−0.611
.2741	0.5846	−0.173	.2396	0.9908	−0.599
.2772	0.5891	−0.209	.2421	0.9944	−0.590
.2794	0.5923	−0.208	.2465	0.0009	−0.613
.2798	0.5929	−0.207	.2469	0.0015	−0.611
.2888	0.6061	−0.198	.2493	0.0050	−0.607
.2893	0.6068	−0.178	.2537	0.0114	−0.583
.2996	0.6218	−0.148	.2542	0.0121	−0.597
.3107	0.6381	−0.144	590.2414	0.1627	−0.120
.3112	0.6389	−0.136	.2443	0.1670	−0.131
.3210	0.6532	−0.152	.2509	0.1766	−0.061
.3215	0.6539	−0.158	.2526	0.1791	−0.062
227.2217	0.9710	−0.518	.2590	0.1885	−0.071
.2222	0.9718	−0.536	.2613	0.1918	−0.073
.2324	0.9867	−0.601	.2666	0.1996	−0.066
.2357	0.9915	−0.593	.2689	0.2030	−0.061
.2411	0.9994	−0.633	.2750	0.2119	−0.096
.2434	0.0028	−0.615	.2770	0.2148	−0.099
.2486	0.0104	−0.603	.2843	0.2255	−0.113
.2511	0.0140	−0.583	.2866	0.2289	−0.103
.2586	0.0250	−0.539	.2919	0.2366	−0.087
.2618	0.0297	−0.510	.2938	0.2394	−0.044
.2886	0.0689	−0.304	.3122	0.2663	−0.092
.2939	0.0767	−0.251	.3143	0.2694	−0.041
.2969	0.0811	−0.235	.3210	0.2792	−0.088
.3027	0.0896	−0.200	.3236	0.2830	−0.096
.3054	0.0935	−0.186	.3290	0.2909	−0.094
.3114	0.1023	−0.169	.3316	0.2947	−0.083
.3142	0.1064	−0.200	.3375	0.3033	−0.098
.3200	0.1149	−0.147	.3402	0.3073	−0.102
.3229	0.1191	−0.177	.3462	0.3161	−0.077
.3288	0.1277	−0.183	.3482	0.3190	−0.085

TABLE II

Times of minima of AV Hya

Time of min	O–C	Ref.
243 1143.273	$0^d.020$	*Astron. Circ.* **85**, 6, 1949.
1162.38	−0.008	*Astron. Circ.* **32**, 6, 1944.
6673.388	0.012	*AA* **10**, 69, 1960.
7348.538	−0.043	*MVS* **570**, 1961.
244 1392.316	0.020	*IBVS* **779**, 1973.
3220.421	0.014	*BBSAG Bull.* **33**, 3, 1977.
3225.190	−0.001	Present work.
3227.241	−0.0004	Present work.
3581.246	0.0001	Present work.

can be used for further planning of observations of the star AV Hya.

Figure 1 gives the light curve in U, B and V filters. The depths of the minima are

	U	B	V
Primary Min.	$0^m.630$	$0^m.610$	$0^m.570$
Secondary Min.	0.135	0.150	0.150

The light curve appears to be that of β Lyrae type. The coverage between the phases 0.30 to 0.45 is not adequate. Therefore, it is difficult to say anything with certainty about the shift of secondary minimum from phase 0.5. The primary minimum, when plotted on a large scale, gave the appearance of totality of about 23 min. Although a large scatter in the observations can be noticed in the integrated light curve, the nightly observations do not show such large scatter for which the standard deviation is less than $0^m.015$ for each of the U, B and V filters. There could be two possible reasons for this scatter:

(i) faulty instrumental correction,
(ii) variable light curve.

The first possibility can be ruled out as the differential magnitudes of comparison stars do not deviate from the mean by more than $0^m.02$. Therefore, it may be that the light curve itself is changing.

4. Orbital Elements

The rectification of the light curve has been done by graphical method of Russell and Merrill (1952). The rectification constants are listed in Table III.

As the primary eclipse appeared to be total, a solution was first tried by using the R-M method. But the computed depth of the secondary minimum came out to be larger than the observed one. Then the nomographic method of Russell and

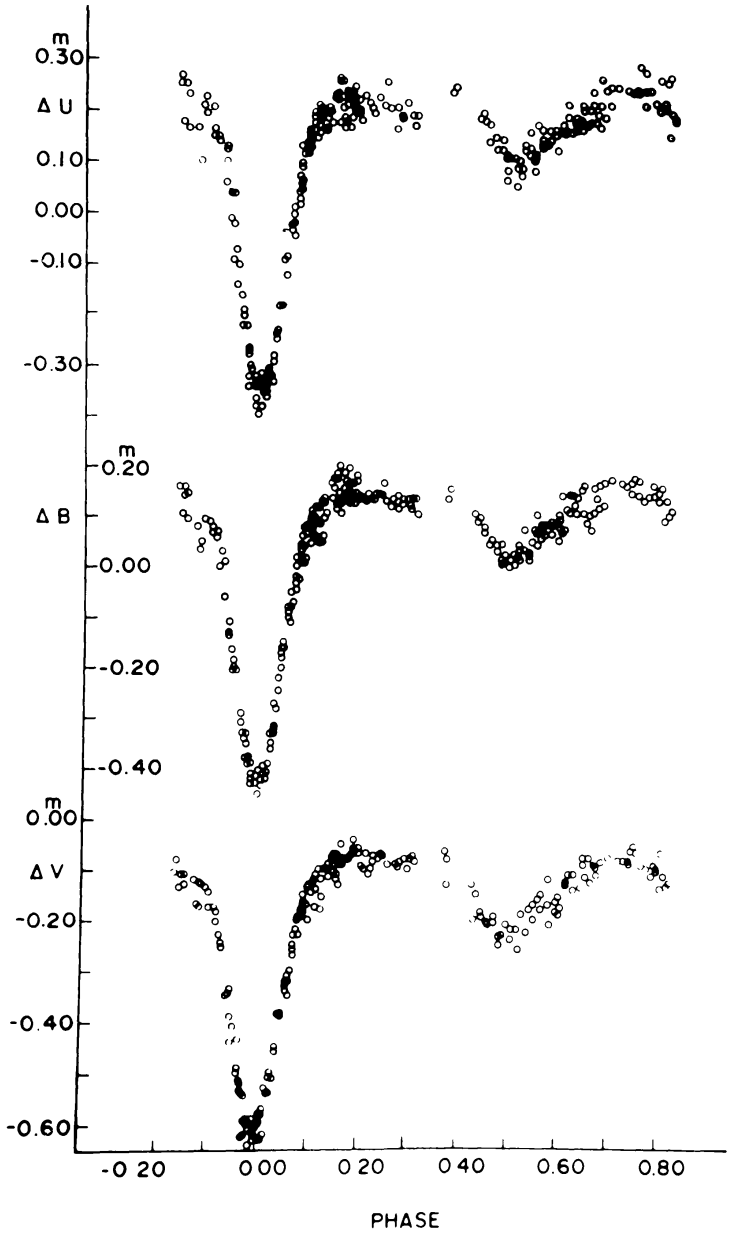

Fig. 1. Light curves of AV Hya.

TABLE III

Fourier Coefficients for the U, B and V light curves of AV Hya

Filter	A_0	A_1	A_2	B_1	B_2
U	0.9760	0.0100	−0.0230	0.0000	0.0000
B	0.9740	0.0100	−0.0240	−0.0038	+0.0030
V	0.9600	0.0120	−0.0380	−0.0020	+0.0016

TABLE IV

Photometric elements of AV Hya

Elements	U	B	V
x (assumed)	0.8	0.6	0.6
k	0.83	0.83	0.83
α_0^{oc}	0.657	0.649	0.568
α_0^{tr}	0.587	0.598	0.518
$(1-l_0)^{oc}$	0.061	0.061	0.043
$(1-l_0)^{tr}$	0.410	0.402	0.356
L_s	0.092	0.094	0.075
L_g	0.908	0.906	0.925
p_0	−0.343	−0.348	−0.225
θ_e	48°.9	46°.2	44°.8
i	72°.2	73°.1	70°.7
r_s	0.354	0.339	0.337
r_g	0.426	0.409	0.406
J_s/J_g	0.147	0.151	0.118

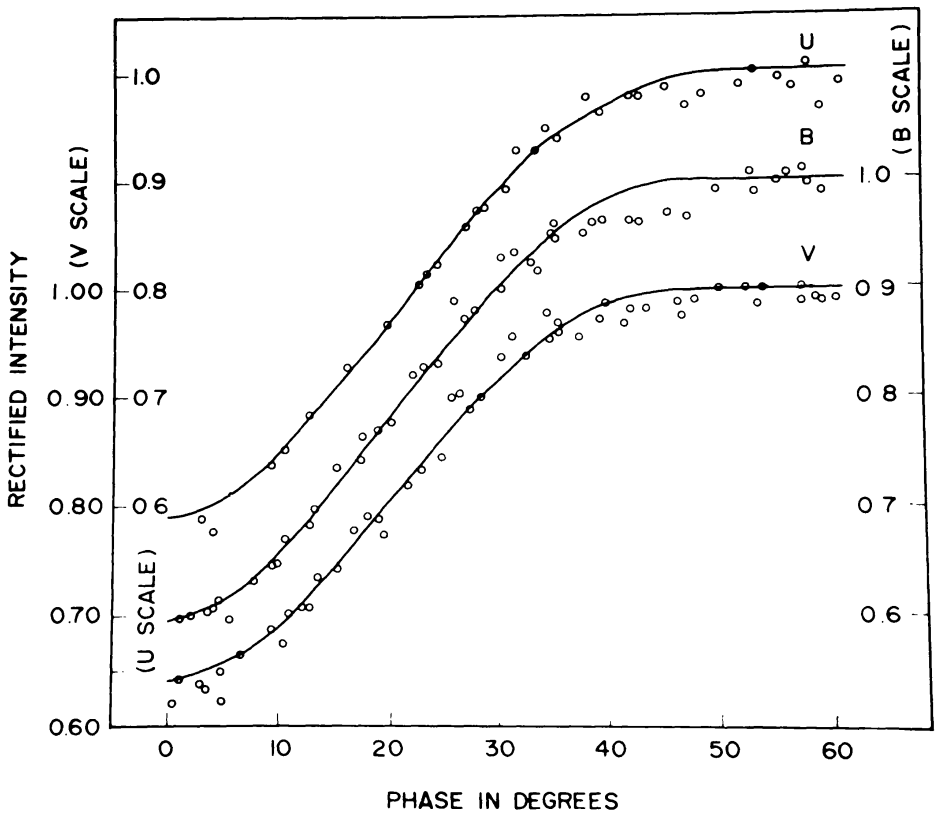

Fig. 2. Primary eclipse of AV Hya. Open circles are normal points and the line indicates the computed curve.

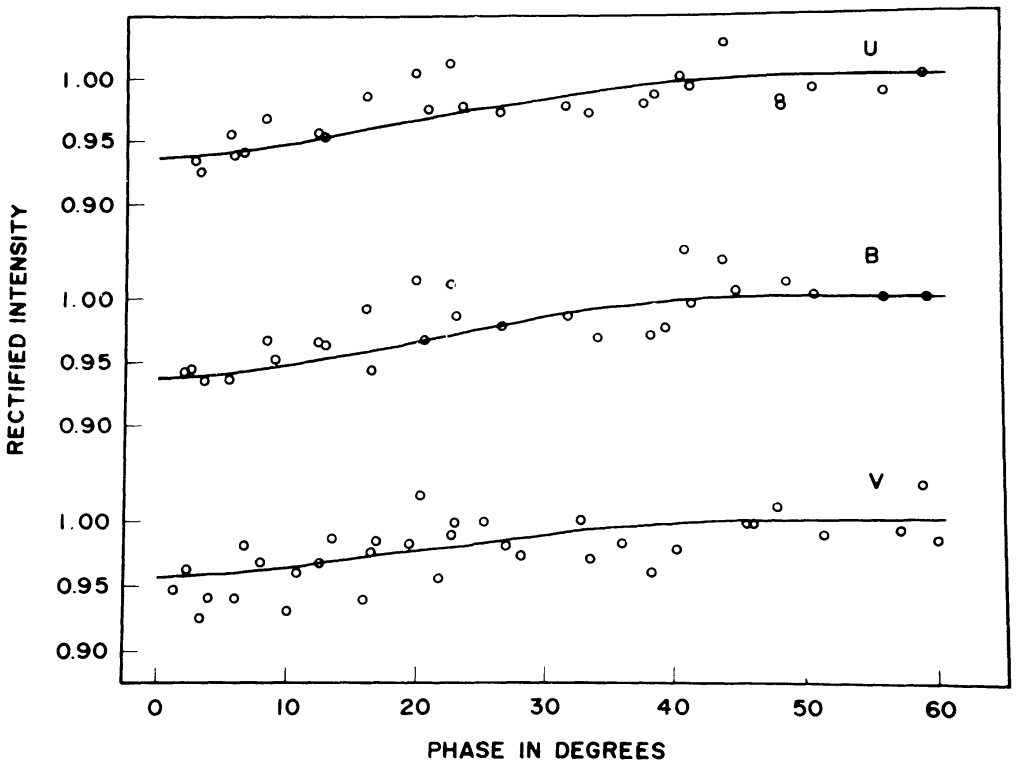

Fig. 3. Secondary eclipse of AV Hya. Open circles are normal points and the line indicates the computed curve.

Merrill was tried and a solution was obtained for a partial transit case only. In order to get a better fit at the shoulders of the primary minimum, different values of k ranging from 0.75 to 0.85 were tried but it was found that the curve was not very sensitive to the variations of k. We have taken $k = 0.83$ for all the three filters. The geometrical elements have been tabulated in Table IV and the computed curves for primary and secondary minimum are given in Figures 2 and 3, respectively.

References

Götz, W. and Wenzel, W.: 1961, *Mitt. Veränderl. Sterne*, No. 570.
Hoffmeister, C.: 1934, *Astron. Nachr.* **253**, 199.
Russell, H. N. and Merrill, J. E.: 1952, Princeton Contr., No. 26.
Szafraniec, R.: 1971, *Acta Astron.* **21**, 75.