

BBSAG Bulletin 57

1981 December 4

90th List of Minima of Eclipsing Binaries

The following table lists 13 photoelectric and 317 visual minima obtained mainly during 1981 October and November by the observers

MA	Maria Andrakakou, Athens, Greece
LC	Lars Capol, Wetzikon, Switzerland
NC	Nicholas Contopoulos, Berkeley, USA
ⒸRD	Roger Diethelm, Flüh, Switzerland, photoelectric
RG	Robert Germann, Wald, Switzerland
KL	Kurt Locher, Grüt, Switzerland
CM	Claudio Maranta, Uster, Switzerland
GM	George Mavrofridis, Athens, Greece
CPa	Carlo Pampaloni, Firenze, Italy
APA	Aristos Parris, Larisa, Greece
HP	Hermann Peter, Stelfingen, Switzerland
PR	Philippe Ralin-court, Nantes, France
NS	Nikolaos Stoikidis, Larisa, Greece
WZ	Wolfgang Zwing, Wetzikon, Switzerland

The O-C values refer to the linear elements of the GCVS 1969, disregarding improved elements in the 1971, 1974, and 1976 supplements to the GCVS. Reductions were made mainly using the tracing paper method.

- - - - -

(footnotes to page 2 :)

- * GCVS 1969 period erroneous, O-C according to the GCVS 1976: +.016 +.014
- ** O-C according to the GCVS amounts to one whole period (cf. page 6 of this issue), O-C according to the elements on p. 6: -.003
- *** not contained in the GCVS 1969, O-C according to the GCVS 1976: +.085 +.080
- **** O-C according to the GCVS 1969 exceeds one period, O-C according to the elements of BBSAG Bulletin 38, p. 6: +.006
- ***** GCVS period erroneous, O-C according to the elements of BBSAG Bulletin 53, page 5
- ***** not contained in the GCVS 1969, O-C according to the GCVS 1976: +.001 +.001
- § displaced secondary
- §§ ambiguous minimum orders due to lack of recent observations: As judged from the O-C, §§ should be primary, but as judged from the estimated brightness and comparing it to other recent BBSAG minima of certainly different order, secondary.
- (m) moderately
- (s) slightly
- (v) very slightly disturbed according to the criteria of Crawford and Olson, PASP 91, page 413, 1979, but no correction applied to the symmetric tracing paper solution

cur- rent no.	star	minimum or- der	JD hel 244...	O-C	n	ob- ser- ver	cur- rent no.	star	minimum or- der	JD hel 244...	O-C	n	ob- ser- ver
17667	RT And	I	4900.381	-.008	6	GM	17713	SS Ari	I	4879.325	-.123	7	RG
17668	TT And	I	4902.553	-.074	9	KL	17714		I	4883.380	-.128	8	RG
17669	TW And	I	4895.347	+.024	6	KL	17715		I	4911.424	-.097	14	RD
17670	UU And	I	4902.352	+.120	6	KL	17716		I	4917.278	-.130	8	RG
17671		I	4911.270	+.119	7	KL	17717		II	4919.305	-.134	6	RG
17672	WX And	I	4885.518	-.402	9	KL	17718		II	4926.235	-.105	8	RG
17673	XZ And	I	4879.281	-.040	6	RG	17719		I	4929.269	-.116	8	RG
17674		I	4883.341	-.052	8	NS	17720	SX Aur	II	4929.450	+.039	18	RD
17675		I	4883.348	-.046	6	KL	17721	FW Aur	I	4902.439	-.012	7	KL
17676		I	4883.350	-.043	8	RG	17722	Y Cam	I	4902.338	+.162	8	KL
17677		I	4895.560	-.049	6	KL	17723	AT Cam	I	4929.286	-.059	8	RG
17678		I	4902.349	-.046	7	KL	17724	RR CMa	I	4925.598	+.100	8	KL
17679		I	4902.355	-.040	7	RG	17725	RU CMa	I	4925.662	-.020	8	KL
17680		I	4917.282	-.043	8	RG	17726		I	4929.621	-.014	6	KL
17681		I	4925.418	-.051	9	HP	17727		I	4931.621	+.010	10	KL
17682		I	4929.491	-.050	11	HP	17728	RX CMa	I	4885.612	-.021	6	KL
17683	BO And	I	4897.407	+.188	7	KL	17729	UU CMa	I	4912.543	-.346	6	KL
17684	EP And	II	4905.369	*	5	KL	17730		I	4925.550	-.338	6	KL
17685		II	4906.579	*	7	KL	17731	EG CMa	I	4931.636	*****	9	KL
17686	EX And	I	4902.586	**	7	KL	17732	AK CMi	I	4895.570	+.026	7	KL
17687	GZ And	I	4885.356	***	6	KL	17733	TY Cap	I	4907.322	-.112	5	NS
17688		I	4889.316	***	7	KL	17734	RZ Cas	I	4547.347	-.001	26	PR
17689	SW Ant	II	4910.702	-.063	7	KL	17735		I	4774.444	-.002	12	CPa
17690	RY Aqr	I	4889.362	-.144	8	HP	17736		I	4786.404	+.005	20	CPa
17691		I	4891.323	-.149	10	HP	17737		I	4823.461	+.009	22	CPa
17692		I	4893.303	-.136	9	NS	17738		I	4902.338	.000	8	RG
17693	AT Aqr	§§	4885.318	+.041	7	KL	17739	AB Cas	I	4882.328	+.004	7	NS
17694		§§	4910.257	+.044	6	KL	17740		I	4893.265	+.006	7	NS
17695	AY Aqr	§§	4910.403	-.006	6	KL	17741		I	4908.298	+.003	5	NS
17696	CR Aqr	I	4897.295	+.198	6	KL	17742		I	4912.398	+.002	9	HP
17697	CX Aqr	I	4902.324	+.016	7	RG	17743	IR Cas	I	4895.510	-.110	6	KL
17698		I	4926.232	+.017	5	KL	17744	IV Cas	I	4883.648	+.122	8	KL
17699	CZ Aqr	I	4925.280	+.005	6	KL	17745		I	4895.632	+.124	7	KL
17700	EE Aqr	I	4879.377	+.017	7	RG	17746		I	4906.614	+.122	8	KL
17701	KP Aql	I	4890.397	+.070	12	HP	17747		I	4924.583	+.118	8	KL
17702	LT Aql	I	4912.324	+.051	6	KL	17748	OR Cas	II	4912.356	+.046	10	HP
17703	OO Aql	I	4719.542	-.032	8	GM	17749	PV Cas	§II	4885.396	+.070	17	RD
17704		I	4824.433	-.047	10	GM	17750	V 345 Cas	I	4883.369	-.021	7	KL
17705		II	4913.360	-.062	7	RG	17751		I	4910.241	-.010	6	KL
17706		I	4925.276	-.056	7	RG	17752	V 523 Cas	I	4895.322	*****	5	KL
17707	V 343 Aql	I	4884.341	-.022	6	KL	17753		I	4906.305	*****	5	KL
17708		I	4897.264	-.012	6	KL	17754	U Cep (m)	I	4895.628	+.060	7	KL
17709	V 346 Aql	I	4913.305	-.017	11	HP	17755	(s)	I	4910.583	+.057	7	KL
17710	V 416 Aql	I	4910.305	-.025	6	KL	17756	(v)	I	4930.516	+.046	8	KL
17711	V 803 Aql	II	4910.296	****	6	KL	17757	WY Cep	I	4879.416	+.017	8	HP
17712	RS Ari	I	4910.349	-.040	6	NS	17758		I	4929.373	+.012	12	HP
							17759	XX Cep	I	4919.242	-.029	9	RG

* * * * * § § § (m) (s) (v) see preceding page

cur- rent no.	star	minimum or- der	JD hel 244...	O-C	n	ob- ser- ver	cur- rent no.	star	minimum or- der	JD hel 244...	O-C	n	ob- ser- ver
17760		I	4919.261	-.010	7	KL	17802	V 525 Cyg	I	4912.508	+.412	6	KL
17761	ZZ Cep	I	4919.338	-.012	13	HP	17803	V 548 Cyg	I	4911.420	-.080	9	HP
17762	BR Cep	I	4912.311	-.155	6	KL	17804	V 687 Cyg	I	4889.374	+.006	9	HP
17763	CW Cep	I	4925.419	+.023	12	(RD)	17805		I	4913.274	+.005	11	HP
17764	EG Cep	I	4918.288	+.025	11	HP	17806	V 836 Cyg	I	4929.265	-.013	8	RG
17765		I	4925.363	+.020	9	HP	17807	V 909 Cyg	I	4885.359	+.023	20	(RD)
17766	EK Cep	I	4918.262	+.012	10	HP	17808	W Del	I	4895.330	+.154	6	KL
17767	GI Cep	I	4913.271	-.005	9	HP	17809	TY Del	I	4884.308	+.018	6	KL
17768	TW Cet	I	4913.414	-.031	8	RG	17810		I	4915.286	+.027	8	HP
17769		II	4924.358	-.018	6	KL	17811	FZ Del	I	4879.367	-.023	9	RG
17770		II	4938.291	-.026	6	KL	17812		I	4912.272	-.013	8	HP
17771	TX Cet	I	4895.464	+.002	7	KL	17813		I	4919.308	-.026	8	RG
17772	VY Cet	II	4883.592	*	6	KL	17814	RZ Dra	I	4889.292	-.017	8	HP
17773		I	4924.321	*	8	KL	17815		I	4911.318	-.026	8	HP
17774	AA Cet	I	4883.552	**	6	KL	17816	UZ Dra	I	4929.428	+.004	18	(RD)
17775		I	4924.299	**	7	KL	17817	CM Dra	I	4911.308	***	6	KL
17776		I	4932.337	**	7	KL	17818	S Equ	I	4902.367	+.029	10	RG
17777	W Crv	I	4930.711	-.004	9	KL	17819	RZ Equ	I	4897.302	+.049	6	KL
17778	SW Cyg	I	4927.240	+.255	7	KL	17820	TT Eri	I	4912.361	-.118	6	KL
17779	UW Cyg	I	4932.323	+.007	8	KL	17821	WX Eri	I	4913.393	+.007	8	HP
17780		I	4932.328	+.012	11	HP	17822	ZZ Eri	I	4910.656	+.010	8	KL
17781	WW Cyg	I	4913.276	+.032	10	HP	17823	AM Eri	I	4885.603	****	6	KL
17782	ZZ Cyg	I	4868.343	-.039	6	NS	17824		I	4910.621	****	6	KL
17783		I	4907.331	-.026	7	NS	17825		II	4930.404	****	6	KL
17784		I	4912.349	-.036	8	HP	17826	BZ Eri	I	4902.460	+.052	6	GM
17785		I	4914.235	-.036	5	NS	17827	TZ Gem	I	4910.463	-.051	7	KL
17786		I	4929.327	-.031	8	HP	17828	AV Gem	I	4885.670	-.019	6	KL
17787	AE Cyg	I	4929.334	+.021	12	HP	17829	CX Gem	I	4906.651	-.030	10	KL
17788	CG Cyg	I	4886.396	-.021	8	HP	17830	EF Gem	I	4883.624	+.131	11	KL
17789		I	4905.329	-.023	7	KL	17831	SZ Her	I	4850.357	+.032	6	NS
17790		I	4912.269	-.025	9	HP	17832		I	4850.363	+.038	7	APa
17791		I	4917.313	-.031	9	RG	17833		I	4868.355	+.032	7	NS
17792		I	4917.324	-.020	8	HP	17834		I	4882.266	+.035	6	NS
17793		I	4929.298	-.038	9	RG	17835		I	4886.352	+.031	8	RG
17794		I	4929.313	-.023	9	HP	17836		I	4891.262	+.032	7	HP
17795	V 370 Cyg	I	4926.243	+.046	5	KL	17837		I	4909.258	+.030	6	NS
17796	V 387 Cyg	I	4911.302	+.067	8	HP	17838		I	4918.258	+.031	9	HP
17797		I	4918.350	+.068	9	HP	17839	AK Her	I	4724.441	-.042	12	GM
17798		I	4925.383	+.055	9	HP							
17799	V 456 Cyg	I	4886.394	+.015	8	HP							
17800		I	4911.357	+.025	10	HP							
17801	V 477 Cyg	I	4886.320	-.023	16	(RD)							

* GCVS 1969 period erroneous, O-C according to the GCVS 1976: -.006 -.005

** not contained in the GCVS 1969, O-C according to the GCVS 1974: -.017 -.024

*** GCVS elements incomplete, O-C according to Martins' elements PASP 87, page 168, 1975: -.503

**** O-C according to the GCVS amounts to several entire periods, O-C according to the elements of BBSAG Bulletin 50, page 5: -.014 -.005

cur- rent no.	star	minimum or- der	JD hel 244...	0-C	n	ob- ser- ver	cur- rent no.	star	minimum or- der	JD hel 244...	0-C	n	ob- ser- ver
17840	AM Her	I	4812.441	*	33	NC	17876	V 913 Gph	I	4912.289	-.104	7	KL
17841	CT Her	I	4886.289	+.038	6	RG	17877	V 916 Gph	I	4912.271	+.071	6	KL
17842	DQ Her	I	4885.374	+.011	7	KL	17878	EQ Ori	I	4902.585	-.080	5	KL
17843		I	4910.351	+.011	6	KL	17879	FL Ori	I	4911.643	+.091	6	KL
17844	SY Hya	I	4912.626	-.137	6	KL	17880	U Peg	II	4886.332	-.026	16	(RD)
17845	RT Lac	II	4911.393	-.025	13	(RD)	17881	TY Peg	I	4895.304	-.031	6	KL
17846	TW Lac	I	4902.438	-.126	6	KL	17882		I	4926.230	-.027	5	KL
17847	VX Lac	I	4895.288	-.076	6	KL	17883		I	4929.314	-.035	6	KL
17848		I	4925.375	-.076	8	HP	17884		I	4929.321	-.028	14	HP
17849	CM Lac	I	4724.458	-.001	8	GM	17885	AT Peg	I	4878.312	-.125	6	RG
17850		I	4883.315	-.009	7	RG	17886		I	4886.348	-.112	8	RG
17851	DG Lac	I	4915.376	+.232	14	HP	17887		I	4902.368	-.137	7	RG
17852	Y Leo	I	4930.634	+.144	6	KL	17888		I	4910.432	-.096	9	KL
17853	RY Lyn	I	4678.306	**	8	NS	17889		I	4917.279	-.126	7	RG
17854		I	4883.512	**	7	KL	17890		I	4917.294	-.111	12	HP
17855	SX Lyn	I	4919.653	-.365	10	KL	17891		I	4925.293	-.135	7	RG
17856	TZ Lyr	I	4911.330	+.038	9	HP	17892		I	4925.331	-.098	9	HP
17857	UZ Lyr	I	4883.332	+.020	7	RG	17893	BG Peg	I	4917.358	+.282	10	HP
17858		I	4902.240	+.015	6	KL	17894	BN Peg	I	4883.300	-.282	7	KL
17859		I	4917.380	+.025	11	HP	17895		I	4890.427	-.288	9	HP
17860		I	4919.277	+.030	10	RG	17896		I	4913.262	-.278	7	HP
17861	EW Lyr	I	4915.326	+.082	8	HP	17897	BY Peg	I	4897.374	+.084	6	KL
17862		I	4917.269	+.076	9	HP	17898		II	4902.326	+.078	6	KL
17863	RW Mon	I	4924.502	.000	11	KL	17899		II	4927.285	+.075	4	KL
17864	TV Mon	I	4902.602	-.008	7	KL	17900	CW Peg	I	4883.427	-.258	7	KL
17865	AY Mon	I	4912.450	-.280	4	KL	17901		I	4902.406	-.260	7	KL
17866	BM Mon	I	4930.653	+.007	6	KL	17902	DI Peg	I	4853.392	-.021	10	HP
17867	BZ Mon	I	4911.669	-.778	7	KL	17903		I	4883.283	-.026	8	NS
17868	HM Mon	I	4910.580	+.096	6	KL	17904		I	4890.410	-.017	10	HP
17869	HX Mon	I	4930.487	+.007	6	KL	17905		I	4893.255	-.019	8	NS
17870	U Gph	I	4795.463	.000	26	CPa	17906		I	4900.387	-.005	9	GM
17871		I	4879.315	-.015	8	RG	17907		I	4910.330	-.028	5	NS
17872	RV Gph	I	4881.249	+.005	7	NS	17908		I	4925.284	-.022	10	HP
17873	V 501 Gph	I	4929.255	+.002	11	HP	17909	DK Peg	I	4879.362	+.030	10	RG
17874	V 508 Gph	II	4889.299	+.023	7	HP	17910	GH Peg	I	4885.379	+.004	20	(RD)
17875		II	4919.279	+.006	7	HP	17911		§II	4917.316	-.025	14	(RD)
							17912	RT Per	I	4919.412	-.072	8	HP
							17913	RV Per	I	4912.436	+.026	11	HP
							17914	ST Per	I	4907.468	-.024	5	MA
							17915		I	4915.401	-.038	14	HP

* no period given by the GCVS, 0-C according to the elements of Szkody & Brownlee, Ap. J. 212, page L 113, 1977: -.030

** no period given by the GCVS, 0-C according to the elements of Samolyk & Wedemayer, JAAVSO 6, page 49, 1977: +.007 +.012

§ slightly displaced secondary

cur- rent no.	star	minimum or- der	JD hel 244...	O-C	n	ob- ser- ver	cur- rent no.	star	minimum or- der	JD hel 244...	O-C	n	ob- ser- ver
17916	XZ Per	I	4881.358	-.009	8	NS	17958	V 505 Sgr	I	4912.276	-.019	10	HP
17917		I	4883.685	+.015	6	KL	17959		I	4925.280	-.027	7	RG
17918		I	4911.312	+.003	6	NS	17960	RT Scl	I	4883.514	-.155	6	KL
17919	AG Per	I	4925.392	-.050	11	RD	17961		I	4902.444	-.152	6	KL
17920		I	4929.463	-.036	13	RD	17962		I	4924.439	-.155	8	KL
17921	BY Per	I	4885.593	+.171	6	KL	17963		I	4938.257	-.149	8	KL
17922	KW Per	I	4869.374	+.043	6	NS	17964	AC Tau	I	4929.596	+.061	6	KL
17923		I	4870.290	+.037	8	NS	17965		I	4931.633	+.061	8	KL
17924		I	4883.339	+.039	8	RG	17966	AM Tau	I	4883.463	-.170	6	KL
17925		I	4883.342	+.042	6	KL	17967	BN Tau	I	4883.491	+.058	11	KL
17926		I	4883.344	+.044	7	NS	17968	ES Tau	I	4812.536	-.115	6	KL
17927		I	4884.283	+.052	9	NS	17969	HU Tau	I	4929.380	+.029	16	HP
17928		I	4895.449	+.043	7	KL	17970	IL Tau	I	4924.304	*	6	KL
17929		I	4897.312	+.043	6	NS	17971	X Tri	I	4902.420	-.036	7	GM
17930		I	4906.636	+.055	7	KL	17972		I	4903.386	-.041	10	GM
17931		I	4910.342	+.037	6	NS	17973		I	4906.300	-.041	11	GM
17932		I	4911.272	+.034	6	NS	17974		I	4906.301	-.041	7	KL
17933		I	4925.258	+.052	8	RG	17975	RS Tri	I	4925.240	.000	9	HP
17934	Y Psc	I	4927.284	+.170	5	KL	17976	RW Tri	I	4883.556	-.003	6	KL
17935	SX Psc	I	4925.253	-.031	10	HP	17977	W Uma	I	4718.455	-.156	10	GM
17936	UV Psc	I	4913.358	+.024	7	RG	17978		I	4719.458	-.154	11	GM
17937		I	4913.363	+.028	8	HP	17979	UX Uma	I	4934.649	-.001	6	KL
17938		I	4931.438	+.022	7	HP	17980	BM Uma	II	4885.645	+.058	6	KL
17939	RW PsA	II	4883.356	-.061	6	KL	17981	<u>cc</u>	II	4910.624	+.084	5	KL
17940		I	4902.274	-.067	6	KL	17982	Z Vul	I	4889.339	+.028	13	HP
17941		I	4911.282	-.070	6	KL	17983		I	4911.416	+.010	9	HP
17942		I	4924.260	-.068	6	KL	17984	VV Vul	I	4885.474	+.196	9	KL
17943	XZ Pup	I	4924.654	-.021	9	KL	17985	AW Vul	I	4915.299	-.025	13	HP
17944	AY Pup	I	4883.657	+.060	6	KL	17986		I	4919.334	-.022	10	HP
17945		I	4906.629	+.052	8	KL	17987	AX Vul	I	4924.257	-.006	6	KL
17946		II	4925.634	+.064	8	KL	17988	BO Vul	I	4872.330	-.080	8	NS
17947	DF Pup	I	4934.656	+.127	4	KL	17989		I	4907.341	-.095	6	NS
17948	GK Pup	I	4912.668	+.014	7	KL	17990		I	4909.291	-.091	5	NS
17949	RZ Pyx	I	4924.638	+.200	6	KL	17991		I	4911.240	-.087	10	HP
17950	U Sge	I	4824.444	+.007	19	GM	17992	BU Vul	I	4891.355	+.010	10	HP
17951		I	4912.331	-.002	10	HP	17993		I	4932.314	+.001	7	HP
17952		I	4929.238	+.002	6	CM	17994	GF Vul	I	4919.271	-.025	7	KL
17953		I	4929.240	+.004	11	RG	17995	NO Vul	II	4924.247	**	8	KL
17954		I	4929.245	+.008	6	WZ	17996	NP Vul	I	4924.294	***	7	KL
17955		I	4929.247	+.010	9	HP							
17956		I	4929.249	+.013	7	LC							
17957	UZ Sge	I	4915.301	+.054	9	HP							

* no period given by the GCVS 1969, O-C according to the GCVS 1974: -.018

** not contained in the GCVS 1969, O-C according to the GCVS 1976: +.032

*** not contained in the GCVS 1969, O-C according to the GCVS 1976: +.035

V 4 5 6 O p h i u c h i
 R e v i s e d E l e m e n t s

Two minima recently observed photoelectrically (BBSAG Bulletin 56, page 5) have shown the GCVS (1969) elements to be in need of a revision. The literature available to the author contains three more minimum timings with photoelectric equipment. All five minima can be fitted very well with a period slightly longer than the one given in the GCVS 1969 (1.^d015986). The new elements, obtained by a simple linear regression of the five minima, are

$$\text{Min}_I \text{ JD hel} = 2441897.532 + 1.0159996 E$$

Table 18 lists all minima as well as the O-C values with regard to these elements, and references.

R. Diethelm

Table 18	Minimum JD hel	E	O - C	Reference
	2441897.534	0	+0.002	IBVS 937
	1951.383	53	+0.003	"
	2239.410	336.5	-0.006	IBVS 1053
	4814.468	2871	+0.001	BBSAG Bulletin 56, p. 5
	4842.406	2898.5	-0.001	"

E X A n d r o m e d a e

Evidence of an Overrounding against the GCVS
 E p h e m e r i s

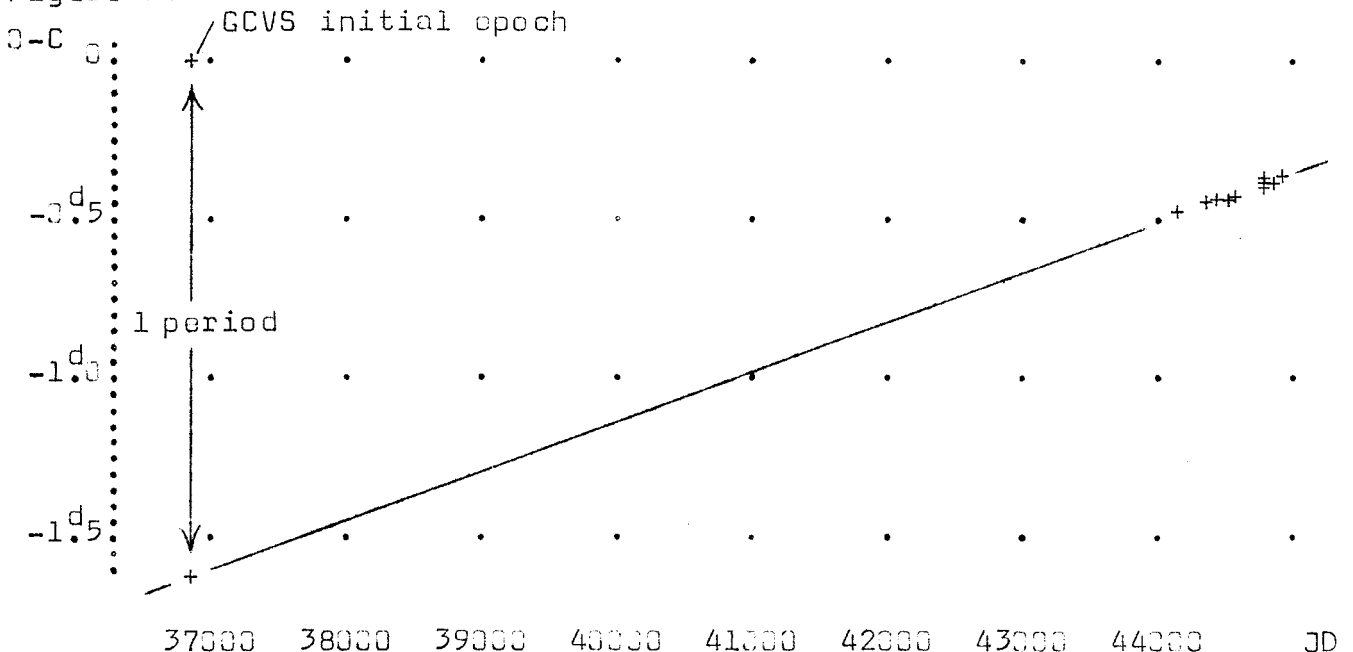
This EA binary has probably not been surveyed between Romano's discovering photographic series in the fifties and the BBSAG minima of the two past years. Since the present linear slope of the O-C values is clearly regressive, it had to be checked if its extrapolation meets the GCVS initial epoch, which originates from Romano's investigation (Pubblicazioni Padova 120, 1960), corrected by one or more entire periods.

Figure 57, that plots all O-C values, shows that this is the case with one period. Therefore the GCVS period must be corrected by multiplication with the actual $E/(E-1)$ to obtain the revised elements

$$2436818.40 + 1.63251 E$$

K. Locher

Figure 57



R e v i s e d S v e t c h n i k o v C l a s s i f i c a t i o n
o f 6 B i n a r i e s B a s e d o n R e c e n t
B B S A G R e s u l t s

Recently Свечников, Истомин, and Грехова (Переменные Звёзды 21, page 413, 1980) applied their classification to all GCVS eclipsing binaries including those in the 1976 supplement to the GCVS. New light curve parameters found by BBSAG and published in previous issues of this Bulletin yield new criteria which cause the revisions compiled in Table 19.

K. Locher

Table 19

star	classification		reference for	
	original	revised	revision	criterion
YZ CVn	E	HP	BBSAG Bulletin 27, page 7	
EG CMa	PP?	HP	53	5
RS Crt	PP:	E?	26	5
V 752 Oph	PP?	HP	24	4
V 868 Oph	KW?	KP?	34	5
BY Peg	KW	~KW	52	5

R U C a n i s M a i o r i s

The M i n i m u m D u r a t i o n a n d M a g n i t u d e

are unknown according to the GCVS 1969-71-74-76, which gives $12^{mV.7}$ as an upper limit. My three minimum surveys reported on page 2 of this issue have yielded

$$d/p = .005 \pm .005$$

$$m_v \min_I = 14.6 \pm .3$$

K. Locher