

BBSAG Bulletin 61

1982 August 10

94th List of Minima of Eclipsing Binaries

The following table lists 1 photoelectric and 209 visual minima obtained mainly during 1982 June and July by the observers

GB Guy Boistel, Sautron, France
(RD) Roger Diethelm, Flüh, Switzerland, photoelectric
DE Demetrius P. Elias, Penteli, Greece
RG Robert Germann, Wald, Switzerland
KL Kurt Locher, Grüt, Switzerland
GM George Mavrofridis, Athens, Greece
DM Dimosthenis Mourikis, Pireas, Greece
PR Philippe Ralincourt, Nantes, France
HP Hermann Peter, Otelfingen, Switzerland
TS Thomas Schildknecht, Evilard, Switzerland
GS George Stefanopoulos, Aghia Paraskevi, Greece
NS Nikolaos Stoikidis, Larisa, Greece

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: +.006
- ** not contained in the GCVS 1969, O - C according to the GCVS 1976: +.084
- *** no period given by the GCVS, O - C according to the elements in Veröffentlichungen Sonneberg 9, Heft 3, page 199, 1980: -.036
- **** O - C according to the GCVS exceeds one period, O - C according to the elements in BBSAG Bulletin 38, page 6: +.012 +.008 +.011
- ***** no period given by the GCVS, O - C according to the elements of BBSAG Bulletin 27, page 7: +.100 +.081
- § Ambiguous minimum order due to the lack of pre-recent observations: secondary as judged from the O - C, primary as judged from the estimated brightness and comparing it to other recent BBSAG minima of certainly different order
- §§ not contained in the GCVS 1969, O - C according to the GCVS 1976: -.004
- §§§ not contained in the GCVS 1969, O - C according to the GCVS 1974: -.055
- §§§§ not contained in the GCVS, O - C according to Шырапов 's elements *Астрономический Циркуляр* 949, 1977: +.091
- (n) see BBSAG Bulletin 60, page 1

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
18675	TT And	I	5151.426	-.066	7 KL	18720	IR Cas	I	5108.567	-.110	8 DM
18676		I	5162.498	-.054	9 HP	18721	V 523 Cas	I	5164.528	§§	13 DE
18677	WZ And	I	5141.534	-.037	6 KL	18722	U Cep (n)	I	5122.486	+.051	8 KL
18678	XZ And	I	5138.510	-.055	6 KL	18723	(n)	I	5167.376	+.067	12 GM
18679	BO And	I	5152.447	+.149	7 KL	18724	SU Cep	I	5158.455	+.016	7 KL
18680	EP And	I	5169.443	*	6 KL	18725	TV Cep	I	5145.529	-.004	6 KL
18681	GZ And	II	5175.571	**	10 KL	18726		I	5172.531	-.002	8 KL
18682	RY Aqr	I	5176.490	-.144	7 HP	18727	WY Cep	I	5160.434	-.002	7 RG
18683		I	5182.404	-.130	5 HP	18728	CM Cep	I	5172.450	-.118	7 KL
18684	AT Aqr	§	5151.558	+.045	6 KL	18729	EG Cep	I	5158.471	+.030	8 KL
18685		§	5165.553	+.052	15 DE	18730	EK Cep	I	5126.369	+.013	GS
18686		§	5176.492	+.044	6 KL	18731		I	5126.369	+.014	10 GM
18687	AU Aqr	II	5177.466	+.001	5 KL	18732	TW Cet	II	5182.580	-.031	5 KL
18688	CX Aqr	I	5162.522	+.014	8 HP	18733	AA Cet	I	5180.554	§§§	6 KL
18689	XZ Aql	I	5176.434	+.067	9 HP	18734	RW Com	I	5138.405	-.055	7 RG
18690	FK Aql	I	5163.468	-.053	10 HP	18735		II	5159.411	-.054	6 RG
18691	KO Aql	I	5132.495	+.245	15 GM	18736		I	5162.369	-.062	7 RG
18692	OO Aql	II	5138.379	-.060	7 RG	18737	U CrB	I	5066.379	-.016	8 DE
18693		I	5159.415	-.056	7 RG	18738		I	5104.362	-.007	GS
18694		I	5160.431	-.054	6 RG	18739		I	5142.345	+.002	8 GM
18695	V 343 Aql	I	5131.522	-.018	15 DE	18740	SW Cyg	I	5128.446	+.249	7 KL
18696	V 346 Aql	I	5112.456	-.012	GS	18741	WW Cyg	I	5145.518	+.030	9 KL
18697		I	5163.346	-.016	10 GM	18742		I	5145.522	+.035	12 HP
18698		I	5165.551	-.022	9 RG	18743		I	5165.428	+.034	8 HP
18699	V 407 Aql	I	5176.422	+.058	6 KL	18744	ZZ Cyg	I	5169.451	-.039	12 HP
18700		I	5176.433	+.069	9 DE	18745	AE Cyg	I	5145.466	+.025	7 HP
18701	V 416 Aql	I	5152.483	-.034	6 TS	18746	BR Cyg	I	5129.400	+.020	6 KL
18702		I	5152.484	-.033	6 KL	18747		I	5133.392	+.015	GS
18703	V 479 Aql	I	5145.515	+.012	6 KL	18748		I	5133.393	+.016	9 GM
18704	V 589 Aql	I	5136.545	***	6 KL	18749		I	5141.390	+.017	6 KL
18705	V 760 Aql	I	5169.515	+.014	7 KL	18750		I	5145.385	+.014	8 HP
18706	V 803 Aql	II	5139.482	****	13 DE	18751		I	5149.382	+.014	7 GM
18707		I	5175.435	****	8 KL	18752	CG Cyg	I	5158.414	-.026	9 HP
18708		I	5175.438	****	11 DE	18753	V 370 Cyg	I	5131.502	+.052	6 KL
18709	V 1045 Aql	I	5151.424	-.002	6 KL	18754		I	5138.472	+.051	6 KL
18710	TU Boo	II	5141.387	+.002	6 KL	18755	V 387 Cyg	I	5162.423	+.074	8 HP
18711	AC Boo	I	5160.416	+.011	7 RG	18756	V 456 Cyg	I	5172.485	+.034	11 HP
18712	AD Boo	I	5162.420	+.036	8 HP	18757	V 687 Cyg	I	5145.460	+.008	6 HP
18713	SV Cam	I	5097.377	-.009	GS	18758	SVS 294 Cyg	I	5167.382	§§§§	16 DE
18714	VW CVn	II	5162.381	-.070	7 RG	18759	TY Del	I	5165.424	+.029	7 HP
18715	YZ CVn	I	5141.402	*****	7 NS	18760	FZ Del	I	5182.483	-.010	6 HP
18716		I	5148.436	*****	12 DE	18761	Z Dra	I	5112.389	+.017	27 DE
18717	RZ Cas	I	4878.430	-.003	12 GB	18762		I	5131.397	+.020	7 KL
18718		I	5154.534	-.002	20 PR	18763	RZ Dra	I	5145.444	-.023	8 HP
		I	5154.530	-.004	36 PR	18764		I	5172.438	-.022	8 HP
		I	5154.530	-.004	36 PR	18765	TW Dra	I	5180.434	-.056	10 HP

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
18766	UZ Dra	I	5172.399	+0.009	7	HP	18802	TZ Lyr	I	5132.370	+0.030		GS
18767	AI Dra	I	5154.589	+0.011	14	PR	18803		I	5132.382	+0.042	9	GM
18768	CM Dra	I	5136.445	*	29	DE	18804		I	5133.420	+0.023		GS
18769		I	5138.348	*	21	DE	18805		I	5133.436	+0.038	8	GM
18770		I	5141.515	*	6	KL	18806		I	5141.362	+0.031	10	GM
18771		I	5148.493	*	18	DE	18807		I	5141.366	+0.036		GS
							18808		I	5168.329	+0.028	7	GM
18772	S Equ	I	5163.512	+0.032	10	HP	18809	EW Lyr	I	5176.460	+0.085	11	HP
18773	RZ Equ	I	5136.568	+0.021	6	KL	18810	FL Lyr	I	5139.375	+0.004	10	GM
18774	RX Her	I	5138.416	+0.005	6	RG	18811	GZ Lyr	I	5136.459	***	6	KL
18775	SZ Her	I	5111.330	+0.033	6	NS	18812	U Oph	II	5180.416	+0.002	7	RG
18776		I	5133.413	+0.028	7	NS	18813	RV Oph	I	5139.369	+0.027	5	NS
18777		I	5133.418	+0.033	13	DE	18814	V 501 Oph	I	5163.493	-0.004	6	HP
18778		I	5133.420	+0.034	8	GM	18815		I	5165.421	-0.011	7	HP
18779		I	5138.326	+0.032	11	GM	18816	V 508 Oph	I	5138.400	+0.011	7	RG
18780		I	5138.331	+0.037		GS	18817		I	5138.400	+0.012	9	HP
18781		I	5160.415	+0.032	8	RG	18818		I	5158.401	+0.015	10	HP
18782		I	5169.417	+0.036	7	HP	18819	V 511 Oph	I	5176.359	+0.102	6	KL
18783	TT Her	I	5165.554	-0.029	7	RG	18820	V 586 Oph	I	5152.415	+0.009	6	KL
18784	TU Her	I	5131.482	-0.075	5	KL	18821	V 636 Oph	I	5152.514	+0.604	7	KL
18785	UX Her	I	5141.358	-0.064		GS	18822	V 735 Oph	I	5122.489	-0.228	6	KL
18786		I	5141.359	-0.063	10	GM	18823		I	5135.342	-0.196	5	NS
18787		I	5158.397	-0.062	10	HP	18824	V 752 Oph	I	5138.452	****	7	KL
18788	AM Her	I	5165.455	**	12	DE	18825	V 913 Oph	I	5138.528	-0.114	5	KL
18789	CC Her	I	5111.379	+0.094		GS	18826		I	5163.446	-0.121	8	HP
18790		I	5163.406	+0.102	7	HP	18827	V 1010 Oph	I	5133.352	-0.097	8	GM
18791	DQ Her	I	5101.456	+0.012	16	DE	18828		I	5135.323	-0.110	8	GM
18792		I	5140.273	+0.008	29	DE	18829		I	5158.477	-0.106	10	KL
18793	ES Her	I	5172.486	-0.127	7	KL	18830	UX Peg	I	5170.533	-0.032	6	KL
18794	EX Hya	I	5101.338	+0.003	23	DE	18831	BN Peg	I	5176.470	-0.276	9	HP
18795		I	5101.405	+0.001	16	DE	18832	BY Peg	I	5169.530	+0.060	7	KL
18796	VX Lac	I	5172.504	-0.082	7	HP	18833	CU Peg	I	5136.480	+0.219	7	KL
18797	AU Lac	I	5141.414	-0.076	7	KL	18834		I	5171.396	+0.213	6	KL
18798	CM Lac	I	5167.362	+0.007	13	GM	18835	CW Peg	I	5151.522	-0.262	9	KL
18799		I	5175.362	-0.016	12	GM	18836	KW Per	I	5138.510	+0.046	6	KL
18800	DG Lac	I	5162.505	+0.240	11	HP	18837	QU Per	I	5172.527	*****	6	KL
18801	BL Leo	I	5131.412	-0.020	5	KL							

* GCVS elements incomplete, 0 - C according to Martins' elements PASP 87, page 168, 1975: -.543 -.543 -.548 -.533

** no period given by the GCVS, 0 - C according to the elements of Szkody & Brownlee, Ap. J. 212, page L 113, 1977: -.018

*** no period given by the GCVS 1969, 0 - C according to the GCVS 1976: -.006

**** no period given by the GCVS, 0 - C according to the elements of BBSAG Bulletin 27, page 4, footnote 1: +.069

***** no period given by the GCVS, 0 - C according to the elements of BBSAG Bulletin 42, page 3: -.215

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
18838	β Per	I	5165.539	-.142	10	RG	18864	TY UMa	II	5159.392	****	7	RG
18839	U Sge	I	5162.504	+.005	11	HP	18865		I	5162.403	****	8	RG
18840	UZ Sge	I	5163.460	+.050	7	HP	18866	UX UMa	I	5137.415	-.003	12	DE
18841	WZ Sge	I	5142.492	+.007	17	DE	18867		I	5145.483	+.001	6	KL
18842	CK Sge	I	5151.591	+.046	6	KL	18868		I	5172.426	+.001	6	KL
18843	WX Sgr	I	5105.473	+.443	7	KL	18869	XZ UMa	I	5101.342	-.074	11	DE
18844	XY Sgr	I	5136.431	-.006	6	KL	18870	UW Vir	I	5111.388	+.385		GS
18845	V 1961 Sgr	I	5138.497	+.028	6	KL	18871		I	5140.349	+.374	7	GM
18846		I	5151.525	+.010	6	KL	18872	GR Vir		5116.381:*****		5	RD
18847	RS Sct	I	5162.512	+.008	10	HP	18873	VV Vul	I	5151.568	+.208	9	KL
18848		I	5172.484	+.016	7	HP	18874	AY Vul	I	5136.425	+.038	7	KL
18849		I	5176.470	+.017	8	HP	18875	BO Vul	I	5115.557	-.088	10	HP
18850		I	5182.449	+.017	11	HP	18876	BP Vul	I	5114.551	-.004	14	DM
18851	AK Ser	I	5138.445	+.001	7	KL	18877	BU Vul	I	5172.440	+.012	10	HP
18852	AO Ser	I	5145.533	+.001	9	HP	18878		I	5180.401	+.008	9	RG
18853		I	5182.468	+.004	5	HP	18879	CD Vul	I	5163.490	-.015	8	HP
18854	AU Ser	II	5145.503	**	7	HP	18880	GP Vul	I	5114.420	-.020	10	DM
18855		II	5159.416	**	7	RG	18881	NO Vul	I	5134.439	*	15	DE
18856		I	5182.417	**	8	HP	18882		II	5141.493	*	5	KL
18857	LX Ser	I	5101.505	***	23	DE	18883		I	5165.416	*	12	DE
18858		I	5114.496	***	23	DE	18884		I	5169.495	*	6	KL
18859		I	5139.529	***	27	DE							
18860		I	5142.538	***	28	DE							
18861		I	5148.399	***	25	DE							
18862	X Tri	I	5169.582	-.046	11	KL							
18863	TX UMa	I	5108.419	-.014	11	DM							

* not contained in the GCVS 1969, O - C according to the GCVS 1976: -.001 +.008 +.018 +.018

- ** GCVS 1969 elements too inaccurate for reasonable reduction, O-C according to the GCVS 1974: -.001 -.002 +.002
- *** not contained in the GCVS, O - C according to the elements of Africano, Horne & Margon IAUC 3466: +.016 +.015 +.016 +.016 +.014
- **** GCVS period erroneous, O - C according to the elements of Broglia & Conconi IBVS 1949: -.006 -.010
- ***** period unknown

Z H e r c u l i s :
A p h o t o e l e c t r i c a l l y o b s e r v e d S e c o n d a r y C o n t a c t

The bright eclipsing binary Z Herculis is very poorly observed, mainly due to its unfavourable period of 3d.993. For this reason and contrary to the BBSAG custom, the data of an incompletely observed minimum of this star are reported herewith:

During the night of JD 2445116 I observed Z Herculis with my OPTEC photometer attached to a C 14 telescope. Due to the onset of morning twilight I was able to secure only the descending branch and a good part of the totality phase of a primary minimum between UT 21:50 and 02:20. 19 photoelectric measurements yield a time of secondary contact $JD_{hel} 2445116.570 \pm .003$.

Tsvetkova's Star in Cygnus :
 Detection of the Period

After preliminary lightcurve parameters had already been given in BBSAG Bulletin 60 page 6, my meanwhile extended visual survey has now led to the unambiguous elements

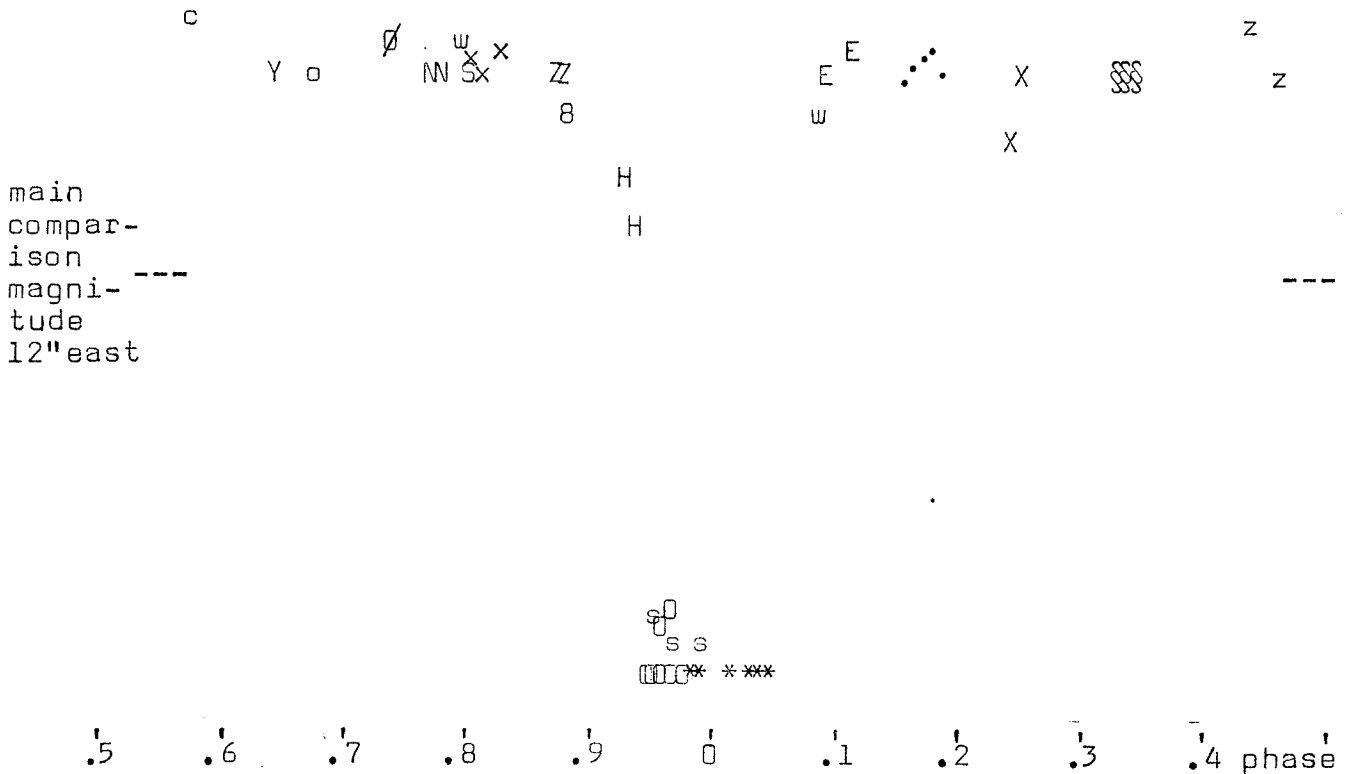
$$\text{Min}_{\text{hel}} = \text{JD } 2445171.80 + 6.385 \text{ E}$$

and improved the eclipse durations as

$$D/p = .16 \pm .02 \qquad d/p = .08 \pm .02$$

Figure 62 plots all observations known to me against phase. K. Locher

Fig.62



Legend to fig.62 :

- * Tsvetkova IBVS 2130, all observations below ultraviolet plate limit adopted as within totality, JD 44495 - 44897
 - w Wild, photovisual exposures kindly taken on request in crucial phases, JD 45138 & 45172
 - Locher, JD 45115
- | | | | | | |
|---|---|-------|---|------------|-------|
| § | " | 45116 | x | Locher, JD | 45151 |
| S | " | 45119 | s | " | 45152 |
| O | " | 45120 | Y | " | 45169 |
| o | " | 45131 | H | " | 45171 |
| z | " | 45136 | E | " | 45172 |
| N | " | 45138 | c | " | 45175 |
| X | " | 45141 | ∅ | " | 45176 |
| Z | " | 45145 | 8 | " | 45177 |

N o r m a l M i n i m a
o f L o n g P e r i o d E c l i p s i n g B i n a r i e s

Observations of several long-period eclipsing binaries carried out for the past two years have yielded times of minimum. These stars were observed during several different eclipses and later the data were combined by phase into one eclipse light curve.

The stars are listed in Table 20 along with the heliocentric times of minimum, the span of time covered by the observations, the O - C to the GCVS 1969, and the number of data points.

Observations of RU Cnc, RZ Cnc, TU Cnc, ZZ Cnc, RY Gem, AE Gem and several other stars are still in progress. A. D. Mallama

Table 20

Star	Normal Minimum JD 244....	Time Covered JD 244....	O - C	n
AM Aur	4853.14	4622 - 5071	+.05	16
KR Cas	4821.83	4615 - 5037	-.08	11
RX Gem	4804.45	4634 - 4999	+.12	16
RY Per	4813.04	4634 - 4998	+.01	15