Nr	Design.	Star	Type	O	e.	O-C	n	Obs	Remarks

BBSAG

BULLETIN

121

2000 January 15th

154. LIST OF MINIMA OF ECLIPSING BINARIES

The following table lists 62 electronically recorded (CCD; underlined) and 117 visual timings of minima of eclipsing binaries obtained primarily between August and December 1999 by the following observers:

EBl	Ernst BlŠttler, Wald, Switzerland
RD	Roger Diethelm, R. Szafraniec Observatory, Metzerlen, Switzerland
KL	Kurt Locher, GrŸt, Switzerland
APs	Anton Paschke, RŸti, Switzerland
JVb	Jacqueline Vandenbroere, Bruxelles, Belgium
JVe	Jean-Paul Verrot, Valence, France

The O-C values given in the table below generally refer to the linear elements of the GCVS 1985, with the remarked exceptions. For the determinaton of the time of the minima, the tracing paper method was employed. For the reduction of some of the electronic observations, the Kwee-van Woerden algorithm was used. All times are UTC.

Nr	Design.	Star	Type	O	e.	O-C	n	Obs	Remarks
35801	0153+418	**XZ And**	p	51421.448	0.005	+0.095	6	KL	
35802	2347+455	**AP And**	s	51434.353	0.002	+0.010	11	JVe	elem. GEOS C. EB 22
35803			p	51438.315	0.002	+0.004	13	JVe	
35804			p	51457.363	0.002	+0.004	20	JVe	
35805			p	51492.282	0.004	+0.003	11	JVe	
35806			p	51519.273	0.004	+0.010	9	JVe	
35807	2304+506	**BD And**	p	51509.3195	0.0006	+0.0138	15	RD	CCD
35808	0139+445	**EP And**	p	51404.477	0.004	+0.054	7	KL	
35809	0104+372	**FK And**	p	51511.3232	0.0010	-0.0009	12	RD	CCD
35810	0209+444	**GZ And**	s	51440.337	0.002	+0.001	8	KL	
35811	2233-009	**CX Aqr**	p	51427.374	0.007	-0.001	6	KL	
35812	2319-162	**CZ Aqr**	p	51436.478	0.003	-0.015	6	KL	
35813	1945+091	**OO Aql**	p	51393.4244	0.0013	+0.0103	12	RD	CCD
35814	1944+062	**V676 Aql**	s	51390.371	0.002	+0.044	11	EBI	CCD
35815			p	51502.300	0.002	+0.044	11	EBI	CCD
35816	1920-011	**V919 Aql**	s	51435.397	0.003	+0.049	8	RD	CCD
35817	2006+147	**V1096 Aql**	p	51459.325	0.010	+0.227	10	RD	CCD
35818	1927+055	**V1243 Aql**	p	51431.425:	0.003	+0.027	6	RD	CCD
35819	0302+283	**TX Ari**	p	51140.373	0.010	-0.046	12	JVb	
35820			p	51525.243	0.004	-0.035	12	JVb	
35821	0546+316	**RZ Aur**	p	51533.561	0.009	-0.083	5	KL	
35822	0509+334	**CL Aur**	p	51473.554	0.003	+0.104	6	KL	
35823			p	51508.391:	0.003	+0.098	18	EBI	CCD
35824	1402+302	**TU Boo**	s	51519.693	0.003	0.000	7	KL	elem. A&A Suppl. 117, 105
35825	1454+465	**AC Boo**	p	51236.624	0.005	-0.014	48	APs	CCD
35826	0734+761	**Y Cam**	p	51434.427	0.005	+0.184	9	KL	
35827	1300+568	**BI CVn**	s	51278.470	0.010	-0.004	24	APs	CCD; elem IBVS No. 4554
35828			s	51315.369	0.004	+0.011	33	JVe	
35829	0711-180	**RX CMa**	p	51473.616	0.008	-0.085	6	KL	
35830	0720+068	**RY CMi**	p	51202.496	0.004	-1.076	77	APs	CCD
35831	0737+048	**TX CMi**	p	51250.308	0.003	+0.001	14	APs	CCD; elem. BBSAG B. 106, 7
35832	0737+040	**AK CMi**	p	51521.663	0.004	+0.002	6	KL	
35833	0232+710	**AB Cas**	p	51510.356	0.003	+0.060	6	KL	

Nr	Design.	Star	Type	O	e.	O-C	n	Obs	Remarks
35834	0123+698	**AE Cas**	p	51448.600	0.005	+0.077	6	KL	

Nr	Design.	Star	Type	O	e.	O-C	n	Obs	Remarks
35835	0135+631	**BW Cas**	p	51431.419	0.006	-0.051	7	KL	elem. IBVS No. 4531
35836	0028+714	**CV Cas**	p	51483.349	0.008	+0.504	9	KL	
35837	0010+580	**GT Cas**	p	51140.413	0.008	+0.148	12	JVb	
35838			p	51185.284	0.005	+0.172	10	JVb	
35839			p	51424.454	0.011	+0.157	10	JVb	
35840	2339+514	**IT Cas**	s	51509.3080	0.0007	+0.1972	15	RD	CCD; displ. secondary
35841	0045+605	**OR Cas**	p	51394.398	0.006	-0.010	5	KL	
35842	2309+534	**V350 Cas**	p	51432.5535	0.0014	-0.0077	14	RD	CCD
35843			p	51464.412	0.006	-0.008	6	KL	
35844	0131+564	**V473 Cas**	p	51459.495	0.004	-0.012	7	KL	elem. IBVS No. 4669
35845	0037+499	**V523 Cas**	s	51413.351	0.004	+0.044	6	KL	
35846	2217+696	**WW Cep**	s	51362.469	0.008	+0.013	50	APs	CCD; elem. IBVS No. 4131
35847	2225+659	**BR Cep**	p	51393.456	0.008	-0.030	5	KL	
35848	2157+607	**DK Cep**	p	51440.434	0.003	+0.035	11	KL	
35849	2306+609	**DP Cep**	p	51512.247	0.005	-0.042	5	KL	
35850	2024+614	**HI Cep**	p	51430.346	0.005	+0.019	7	KL	elem. BBSAG Bull. 114. 12
35851	2109+575	**IO Cep**	p	51483.425	0.009	-0.003	5	KL	
35852	0220+809	**V358 Cep**	p	51404.364	0.005	+0.041	5	KL	elem. BBSAG Bull. 96. 10
35853	0246+015	**SS Cet**	p	51459.509	0.003	+0.006	10	KL	
35854	0146-211	**TW Cet**	p	51430.573	0.006	-0.017	6	KL	
35855	0147-198	**VY Cet**	s	51430.547	0.005	-0.001	6	KL	
35856	0156-231	**AA Cet**	p	51513.269	0.007	-0.019	6	KL	
35857	1205-128	**W Crv**	p	51529.648	0.005	+0.011	8	KL	
35858	2002+414	**WW Cyg**	p	51429.409	0.004	+0.035	8	KL	
35859	2051+386	**WZ Cyg**	p	51511.316	0.004	+0.051	5	KL	
35860	2022+467	**ZZ Cyg**	p	51466.265	0.006	-0.041	7	KL	
35861	1939+466	**BR Cyg**	p	51496.390	0.003	+0.005	6	KL	
35862	1928+342	**HK Cyg**	p	51393.4030	0.0008	-0.1203	12	RD	CCD
35863	1949+389	**NU Cyg**	p	51435.310:	0.002	-0.004	15	EBI	CCD
35864			s	51479.300	0.003	-0.010	20	EBI	CCD
35865			p	51479.441	0.003	-0.009	17	EBI	CCD
35866	2027+312	**V388 Cyg**	p	51503.2158	0.0008	-0.0380	17	EBI	CCD

Nr	Design.	Star	Type	O	e.	O-C	n	Obs	Remarks
35867	2025+586	**V728 Cyg**	p	51413.350	0.005	+0.045	6	KL	

Nr	Design.	Star	Type	O	e.	O-C	n	Obs	Remarks
35868	1933+296	**V907 Cyg**	p	51429.400	0.005	+0.016	8	RD	CCD
35869	1937+296	**V931 Cyg**	s	51462.2943	0.0014	+0.0023	20	EBI	CCD
35870	1937+575	**V940 Cyg**	s	51435.3218	0.0018		14	EBI	CCD; GCVS elem. need cor.
35871			p	51513.2960	0.0004		33	EBI	CCD
35872	1943+333	**V975 Cyg**	p	51429.3581	0.0013	-0.0994	14	RD	CCD
35873	1944+320	**V979 Cyg**	p	51435.3725	0.0016	+0.0634	15	EBI	CCD
35874	1932+396	**V1130 Cyg**	p	51503.3051	0.0008	-0.0306	23	EBI	CCD
35875	2010+414	**NSV25050 Cyg**	p	51432.431	0.003		8	RD	CCD; see note p. 6
35876	2035+181	**W Del**	p	51436.430	0.009	-0.010	7	KL	
35877	2033+082	**TT Del**	p	51425.371	0.005	-0.051	5	KL	
35878	2025+183	**XX Del**	p	51431.458:	0.002	-0.301	6	RD	CCD
35879	2014+155	**EW Del**	p	51430.376	0.007	-0.015	17	APs	CCD
35880	2051+044	**FZ Del**	p	51509.247	0.003	-0.037	6	KL	
35881	1142+725	**Z Dra**	p	51420.369	0.003	-0.123	6	KL	
35882	1214+651	**AR Dra**	p	51519.642	0.003	+0.011	6	KL	
35883	1238+665	**AX Dra**	p	51279.376	0.004	-0.048	22	APs	CCD
35884	1922+698	**DW Dra**	p	51429.406	0.005	0.007	8	KL	elem. BBSAG Bull. 118. 7
35885	1906+593	**LD282 Dra**	p	51421.419	0.005	-0.019	9	KL	elem. BBSAG Bull. 120. 7
35886			p	51427.391	0.003	-0.012	10	KL	
35887			p	51433.352	0.002	-0.015	11	KL	
35888			p	51434.546	0.002	-0.014	8	KL	
35889			p	51440.513	0.003	-0.012	8	KL	
35890			p	51458.401	0.002	-0.017	10	KL	
35891			p	51464.368	0.002	-0.014	14	KL	
35892			p	51483.446	0.003	-0.023	8	KL	
35893			p	51533.551	0.003	-0.020	9	KL	
35894	0558+231	**RW Gem**	p	51433.535	0.006	+0.001	10	KL	
35895	0631+155	**BD Gem**	p	51458.472	0.002	-0.024	6	KL	
35896	0559+274	**DP Gem**	p	51511.5481	0.0015	-0.0003	38	EBI	CCD; elem. see p. 7
35897			s	51519.645	0.003	-0.001	20	EBI	CCD
35898	1737+329	**SZ Her**	p	51420.488	0.003	-0.023	6	KL	
35899	1732+151	**DP Her**	p	51435.3543	0.0006	+0.0555	14	RD	CCD
35900	1806+458	**DQ Her**	p	51458.416	0.001	+0.003	7	KL	
35901	1843+252	**IT Her**	s	51385.3630	0.0020	+0.0305	15	EBI	CCD; elem. IBVS No. 4663
35902			s	51404.3676	0.0009	+0.0302	22	EBI	CCD

Nr	Design.	Star	Type	O	e.	O-C	n	Obs	Remarks
35903	1819+144	**MT Her**	p	51404.367	0.003	+0.006	5	KL	

Nr	Design.	Star	Type	O	e.	O-C	n	Obs	Remarks
35904	1612+238	**V687 Her**	s	51427.2992	0.0007	-0.0564	13	EBI	CCD
35905	1809+239	**V836 Her**	p	51425.340	0.006		17	JVe	period see JBAA 101. 171
35906			p	51459.292	0.005		15	JVe	
35907	1604+503	**V842 Her**	s	51030.441	0.005	+0.029	15	JVb	elem. IBVS No. 3946
35908			p	51327.534	0.004	+0.029	13	JVb	
35909			p	51425.388	0.003	+0.039	10	JVb	
35910			p	51430.412	0.004	+0.035	7	JVb	
35911	1631+503	**GSC3505.677 Her**	p	51425.353	0.003	0.000	20	EBI	CCD; elem. IBVS No. 4611
35912	2226+535	**DG Lac**	p	51413.455	0.006	-0.177	5	KL	
35913	2229+551	**NW Lac**	p	51459.3453	0.0014	-0.0919	14	RD	CCD; see note p. 6
35914	2231+558	**OO Lac**	p	51404.399	0.008	+0.099	7	KL	
35915	2249+384	**V364 Lac**	p	51513.2919	0.0008	+0.0532	15	RD	CCD
35916	0933+264	**Y Leo**	p	51462.592	0.002	+0.013	7	KL	
35917	1141+236	**CE Leo**	p	51284.410	0.002	-0.005	12	JVb	
35918	1919+378	**UZ Lyr**	p	51459.283	0.005	-0.007	6	KL	
35919	1920+347	**ET Lyr**	p	51432.332	0.002	-0.072	16	RD	CCD
35920	1912+380	**V400 Lyr**	p	51415.3941	0.0008	+0.0128	9	RD	CCD; elem. BBSAG B. 120, 6
35921	1843+401	**NSV11321 Lyr**	p	51385.4269	0.0011	+0.0026	16	EBI	CCD; elem. IBVS No. 4696
35922	0749-011	**V681 Mon**	p	51458.639	0.006	+0.501	9	KL	elem. BBSAG Bull. 75. 4
35923	1803+005	**V423 Oph**	p	51384.445	0.010	+0.039	39	APs	CCD
35924	1816+142	**V501 Oph**	p	51386.441	0.008	-0.008	59	APs	CCD
35925	1638+006	**V502 Oph**	p	51393.394	0.007	+0.131	34	APs	CCD
35926	1756+135	**V508 Oph**	s	51420.352	0.005	+0.013	6	KL	
35927	1719+106	**V752 Oph**	p	51322.413	0.010	-0.072	32	APs	CCD
35928	1613-052	**V1016 Oph**	p	51377.387	0.008	-0.049	12	APs	CCD; elem BBSAG Bull. 99, 9
35929	0533+088	**OS Ori**	p	51490.534	0.009	-0.022	5	KL	
35930	0618+031	**V647 Ori**	s	50862.355	0.010	-0.181	16	JVb	
35931			p	51184.450	0.004	-0.194	12	JVb	
35932	2327+132	**TY Peg**	p	51413.524	0.005	-0.180	9	KL	
35933	2226+177	**UX Peg**	p	51463.322	0.006	+0.010	6	KL	
35934	2220+160	**BB Peg**	s	51513.3149	0.0009	+0.0032	16	RD	CCD
35935	2128+117	**BO Peg**	p	51479.2916	0.0009	-0.0189	13	RD	CCDV

Nr	Design.	Star	Type	O	e.	O-C	n	Obs	Remarks
35936	2146+278	**CW Peg**	p	51436.358	0.004	+0.042	6	KL	

Nr	Design.	Star	Type	O	e.	O-C	n	Obs	Remarks
35937	2205+059	**DO Peg**	p	51393.377	0.008	+0.001	5	KL	
35938	2120+218	**DP Peg**	p	51513.283	0.003		8	RD	CCD; no elements in GCVS
35939	2312+165	**EY Peg**	p	51430.508	0.009	+0.012	6	KL	elem. BBSAG Bull. 105, 8
35940	0236+419	**Z Per**	p	51429.417	0.006	-0.135	6	KL	
35941	0320+463	**RT Per**	p	51422.463	0.007	+0.045	5	KL	
35942	0407+341	**RV Per**	p	51448.622	0.008	-0.018	7	KL	
35943	0220+577	**DK Per**	p	51479.355	0.004	-0.017	5	KL	elem. IBVS No. 3875
35944	0156+529	**KW Per**	p	51478.524	0.003	+0.006	6	KL	
35945	0236+454	**PS Per**	p	51515.501	0.008	+0.059	6	KL	
35946	2331+076	**Y Psc**	p	51483.459	0.004	-0.018	5	KL	
35947	0126+193	**SU Psc**	s	51519.293:	0.006	-0.002	15	JVe	
35948	0054+120	**SX Psc**	p	51513.298	0.005	-0.004	5	KL	
35949	1554+224	**AU Ser**	s	51532.739	0.009	-0.073	4	KL	
35950	1521+027	**CX Ser**	p	51250.50	0.01	+0.42	32	APs	CCD
35951	0434+015	**AC Tau**	p	51513.348	0.005	+0.066	6	KL	
35952	0344+249	**AH Tau**	p	51411.495	0.003	-0.102	5	KL	
35953	0553+252	**EN Tau**	p	50750.542	0.003	-0.019	13	JVb	
35954			p	51139.601	0.004	-0.015	10	JVb	
35955	0526+287	**ES Tau**	p	51458.511	0.004	+0.009	7	KL	
35956	0358+202	**GR Tau**	p	51202.272	0.003	-0.020	20	APs	CCD
35957	0128+301	**V Tri**	p	51433.5624	0.0006	+0.0012	12	RD	CCD
35958			p	51435.324	0.005	+0.007	7	KL	
35959	0210+367	**RV Tri**	p	51509.431	0.004	-0.018	6	KL	
35960	0222+278	**RW Tri**	p	51433.558	0.001	-0.004	6	KL	
35961	1334+521	**UX UMa**	p	51523.728	0.001	0.000	7	KL	
35962	1241-084	**HW Vir**	p	51516.694	0.001	-0.002	5	KL	elem. IBVS No. 4109
35963			p	51518.678	0.002	-0.002	6	KL	
35964			p	51519.611	0.001	-0.002	6	KL	
35965			p	51519.729	0.001	-0.002	6	KL	
35966			p	51521.712	0.001	-0.002	6	KL	
35967			p	51523.696	0.001	-0.003	6	KL	
35968			p	51529.649	0.001	-0.002	6	KL	
35969			p	51534.667	0.001	-0.003	5	KL	
35970	2033+225	**AY Vul**	p	51430.482	0.006	-0.014	7	KL	

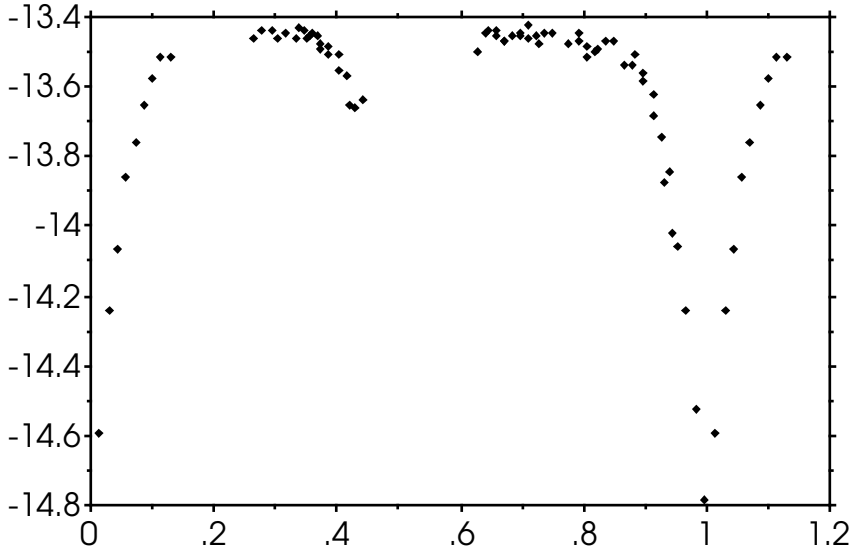
Nr	Design.	Star	Type	O	e.	O-C	n	Obs	Remarks
35971	2117+218	**BG Vul**	p	51483.225	0.006	+0.080	11	EBI	CCD

Nr	Design.	Star	Type	O	e.	O-C	n	Obs	Remarks
35972	2120+268	**BI Vul**	p	51431.3147	0.0006	-0.0411	36	EBI	CCD; see note p. 7
35973			s	51483.3160	0.0006	-0.0402	27	EBI	CCD
35974			p	51483.4419	0.0004	-0.0402	28	EBI	CCD
35975	1954+237	**BO Vul**	p	51412.399	0.003	+0.010	6	KL	
35976	2023+208	**BP Vul**	p	51432.343	0.009	-0.002	5	KL	
35977	1945+195	**CS Vul**	s	51429.3648	0.0009	+0.0244	14	RD	CCD
35978	2000+226	**HS Vul**	s	51432.3163	0.0006	-0.0397	36	EBI	CCD
35979	1953+275	**KN Vul**	p	51421.3180	0.0012	-0.0876	19	EBI	CCD

Notes on observations in table above

NSV35050 Cyg

This star is an EA type eclipsing binary. Our CCD photometry (ST6, no filter) gathered in 11 nights from JD2451361 to JD2451435 yields a period of 1.4107 days. The brightness outside eclipse is 13.45 mag (GSC), while the star reaches 14.78 mag in primary and 13.66: mag in secondary minimum. The following Figure shows our data folded with the provisional elements Min (JD, hel) = 2451432.431 + 1.4107 á E .



NW Lac

The variable is the NW component of a close double.

R. Diethelm

Nr	Design.	Star	Type	O	e.	O-C	n	Obs	Remarks

DP Geminorum

From our CCD photometry (ST-7 camera, no filter), the following corrected elements can be deduced: Min (JD, hel) = 2451198.2568 + 0.558452 á E. These elements have been used to give the light curve shown in the following Figure 1.

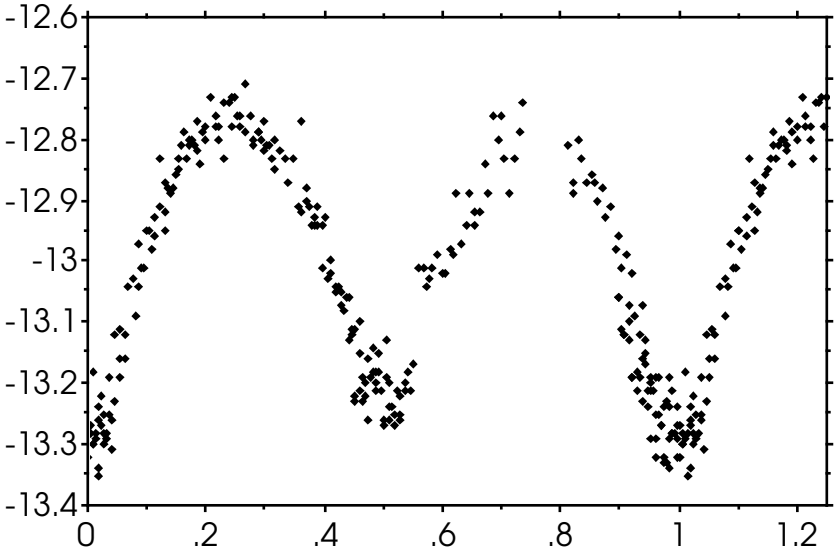


Figure 1 E. BlŠttler

CCD light curve of BI Vulpeculae

As far as we know, no light curve of this short period EW type eclipsing binary has been published up to now. Below, we show our CCD data from the 1999 season using the elements Min(JD, hel) = 2451483.4419 + 0.251818 á E.

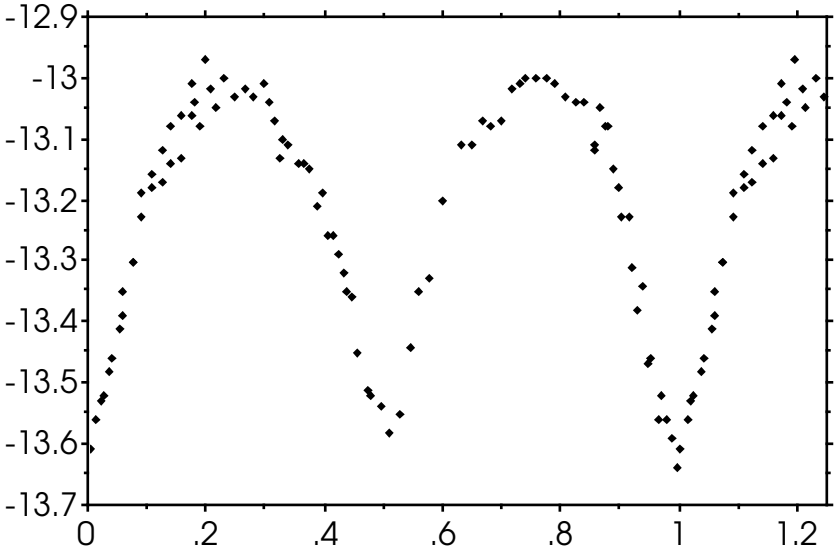


Figure 2 E. BlŠttler

Nr	Design.	Star	Type	O	e.	O-C	n	Obs	Remarks

Erratum

No.	Bulletin	Star	Correction
35644	120	**XZ Aql**	**XZ Aqr**

AU Serpentis

302 timings of minima for this star are known (according to the BAV data base), 262 of them obtained by members of the BBSAG (258 visual). The O-C diagram given in Figure 3 below reproduces this set of data where 6 of the 258 visual timings had to be omitted due to excessiv scatter.

Interestingly, 9 of the minima published in Orion (BBSAG No. 489 - 492, 610 - 612, 834, 985; observers K. Locher and R. Diethelm) would fit nicely into the O-C diagram if they were observations of maxima. Possibly, the observers confounded the variable with one of the comparison stars.

Our O-C diagram strengthens the case of a sudden period change of AU Serpentis near JD 2447100 (see Shengbang et al.: A&A 341, 799 (1999)).

Thanks go to F. Agerer of the BAV for giving access to the BAV data base.

Figure 3 A. Paschke