BBSAG Bulletin 24

1975 December 3

57th List of Minima of Eclipsing Binaries

The following table lists 290 minima obtained visually mainly during 1975 September, October, and November by the observers

MB	Martin Baumann, Grüningen, Switzerland
RB	Roland Boninsegna, Marcinelle, Belgium
JB	Jean Bourgeois, Montignies-le-Tilleul, Belgium
PC	Paolo Carnevali, Roma, Italy
JC	Jean-Pierre Clovin, Marcinelle, Belgium
RD	Roger Diethelm, Reinach, Switzerland
GD	Guy Dumarchi, Villeneuve-St.Georges, France
RG	Robert Germann, Wald, Switzerland
MK	Martin Kissling, Wallisellen, Switzerland
RL	Rolande Leydon, Embrun, France
KL	Kurt Locher, Grüt, Switzerland
AM	Alain Marot, Quimper, France
LM	Luc Maurin, Arles, France
NM	Nicolas Mauron, St.Rémy-de-Provence, France
HP	Hermann Peter, Otelfingen, Switzerland
JR	Joseph Remis, St.Avold, France
RR	Raymond Rolland, Rennes, France
GT	Gilles Troispoux, Fleury-lès-Aubrais, France
TW	Thomas Wüthrich, Wetzikon, Switzerland
GZ	György Zajàcz, Debrecen, Hungary

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

current no.	star	minimum order	JD hel 244...	O-C	n	observer
8793	RT And	I	2729.295	-0.024	14	RG
8794		I	2746.288	-0.013	9	RG
8795	TW And	I	2681.438	+0.032	11	KL
8796		I	2712.296	+0.031	6	KL
8797	UU And	I	2665.468	+0.102	6	KL
8798		I	2668.444	+0.105	7	KL
8799		I	2738.292	+0.098	10	HP
8800	XZ And	I	2710.341	-0.021	15	HP
8801		I	2710.344	-0.018	6	KL
8802		I	2725.280	-0.012	6	KL
8803		I	2725.282	-0.010	10	RG
8804		I	2729.346	-0.018	7	RG
8805		I	2729.355	-0.009	6	KL
8806		I	2740.205	-0.018	5	KL
8807		I	2744.275	-0.019	9	HP
8808	AB And	I	2669.445	+0.036	7	RG
8809		I	2680.386	+0.026	8	RG
8810		I	2688.354	+0.028	9	RG
8811		I	2701.286	+0.016	9	RG
8812		II	2707.440	+0.030	5	KL
8813		I	2708.269	+0.030	6	KL
8814		I	2710.253	+0.022	6	RG
8815		I	2712.253	+0.030	7	RG
8816		II	2729.327	+0.012	8	RG
8817		II	2738.287	+0.011	7	RG
8818		II	2738.308	+0.032	5	RD
8819		II	2739.300	+0.029	10	HP
8820		II	2740.293	+0.026	7	RD
8821		II	2740.294	+0.026	7	RG
8822	CN And	I	2740.286:	-0.059:	9	RD
8823	EP And	II	2657.509:	*	8	KL
8824		II	2664.268 ?	*	8	KL
8825		I	2664.469	*	6	KL
8826		I	2665.390	*	5	KL
8827		I	2671.648	*	6	KL
8828		I	2678.320	*	6	KL
8829		II	2679.336	*	8	KL
8830		I	2680.323	*	5	KL

* Accurate elements for the new interpretation (cf.BBSAG Bull 23, p.6) are intended to be deduced soon, and reduction is therefore postponed.

current no.	star	minimum order	JD hel 244...	O-C	n	observer
8831		II	2681.348	*	9	KL
8832		I	2682.392:	*	8	KL
8833		II	2708.435	*	9	KL
8834		I	2710.254	*	8	KL
8835		I	2712.267	*	7	KL
8836		II	2713.265:	*	4	KL
8837		I	2714.285	*	7	KL
8838		II	2715.289	*	6	KL
8839		I	2716.315	*	7	KL
8840		II	2727.400	*	6	KL
8841		II	2738.326	*	5	KL
8842		I	2739.334	*	5	KL
8843		II	2739.540	*	8	KL
8844		II	2746.223	*	6	KL
8845	RY Aqr	I	2714.306	-0.099	6	KL
8846		I	2716.284	-0.088	6	KL
8847	XZ Aqr	I	2682.415	**	8	KL
8848		I	2746.257	**	5	KL
8849	CX Aqr	I	2688.382	+0.008	9	HP
8850		I	2708.397	+0.008	6	KL
8851		I	2712.292	+0.010	6	KL
8852		I	2712.292	+0.011	10	HP
8853		I	2717.293	+0.008	6	KL
8854		I	2742.320	+0.014	5	KL
8855		I	2746.205	+0.008	7	KL
8856	CZ Aqr	I	2712.324	+0.013	5	KL
8857	OO Aql	II	2669.301	-0.039	8	RG
8858		I	2688.296	-0.048	9	RG
8859		I	2692.372	-0.027	16	HP
8860		II	2708.323	-0.040	9	KL
8861		II	2710.351	-0.039	9	RG
8862		I	2725.308	-0.032	6	KL
8863		II	2738.224	-0.040	6	MK
8864		II	2738.226	-0.038	6	TW
8865		II	2738.231	-0.033	6	MB
8866		II	2738.232	-0.031	8	HP
8867	V 342 Aql	I	2665.395	-0.054	6	KL
8868	V 343 Aql	I	2689.286	0.000	9	HP
8869	V 346 Aql	I	2708.325	-0.012	14	HP
8870		I	2708.328	-0.009	12	KL
8871	Y Cam	I	2740.451	+0.089	8	KL
8872	SV Cam	I	2661.642	+0.010	7	KL
8873	AK CMi	I	2680.648	+0.019	12	KL
8874	TY Cap	I	2665.380	-0.096	6	KL
8875	RZ Cas	I	2564.439	+0.005	7	RR
8876		I	2663.642	+0.002	11	KL
8877		I	2680.370	-0.004	11	RG
8878		I	2680.388	+0.014	15	GD
8879		I	2686.351	+0.001	8	KL
8880		I	2686.353	+0.003	8	AM
8881		I	2686.354	+0.004	9	GT
8882		I	2692.332	+0.005	10	HP
8883		I	2692.334	+0.007	14	AM
8884		I	2710.251	-0.004	6	GZ
8885		I	2710.256	+0.001	6	KL
8886		I	2716.237	+0.006	6	KL
8887		I	2717.428	+0.001	10	RB
8888		I	2717.430	+0.004	7	JC
8889		I	2717.434	+0.008	10	JB
8890		I	2729.381	+0.003	7	RG
8891		I	2741.332	0.000	6	KL
8892	TV Cas	I	2679.292	-0.014	10	RG
8893		I	2688.340	-0.029	11	RG
8894		I	2708.294	-0.014	12	HP
8895	AB Cas	I	2710.363	+0.005	12	HP
8896	IR Cas	I	2740.239	-0.076	7	RD
8897	V 523 Cas	II	2678.640	***	6	KL
8898		I	2679.347	***	5	KL
8899		II	2708.313	***	6	KL
8900		I	2725.272	***	7	KL
8901	VW Cep	II	2669.371:	-0.118:	4	RL
8902		I	2669.536	-0.092	7	RL
8903		I	2701.276	-0.080	8	KL
8904		II	2715.315	-0.097	11	RL
8905	EG Cep	I	2679.347	+0.018	8	RG
8906	RW Cet	I	2738.440	-0.026	11	HP
8907		I	2740.392	-0.024	7	KL
8908		I	2741.372	-0.020	6	KL
8909	TW Cet	I	2673.599	-0.015	10	KL
8910		I	2729.358	-0.021	6	KL
8911		II	2738.396	-0.014	7	KL
8912		II	2740.285	-0.026	8	RG
8913		II	2740.296	-0.015	7	KL
8914		I	2741.412	-0.008	6	KL
8915		I	2742.334	-0.036	6	KL
8916	VY Cet	I	2668.500	****	8	KL
8917		I	2669.530	****	8	KL
8918		I	2673.610	****	11	KL
8919		I	2710.424	****	10	KL
8920		II	2715.366	****	6	KL
8921		II	2729.388	****	7	KL
8922		I	2738.371	****	7	KL
8923		I	2739.391	****	11	KL
8924		II	2740.242	****	8	KL
8925		I	2740.409	****	10	KL
8926		I	2741.433	****	7	KL
8927		II	2742.278	****	8	KL
8928		II	2744.342	****	4	KL

* see preceding page

** no period given in the GCVS 1969, O-C according to the GCVS 1974: +0.071 +0.079

*** not contained in the GCVS, O-C according to the elements of Häussler IBVS 887: +0.007 +0.012 +0.001 +0.018

**** GCVS 1969 period erroneous, O-C according to the GCVS 1974 (cf. BBSAG Bull 20, p.2): -0.169 -0.162 -0.173 -0.172 -0.172 -0.175 -0.176 -0.178 -0.179 -0.183 -0.182 -0.189 -0.170

current no.	star	minimum order	JD hel 244...	O-C	n	observer
8929	AA Cet	I	2710.444	*	6	KL
8930		I	2739.387	*	10	KL
8931	RW Com	I	2745.722	-0.042	10	KL
8932	CC Com	I	2745.685	+0.104	12	KL
8933	TW CrB	II	2716.234	**	5	KL
8934	W Crv	I	2742.710	-0.004	11	KL
8935	SW Cyg	I	2741.305	+0.212	10	KL
8936	UW Cyg	I	2727.273	-0.013	10	KL
8937		I	2727.273	-0.012	11	HP
8938	WW Cyg	I	2710.265	+0.013	10	KL
8939	ZZ Cyg	I	2708.421	-0.031	5	KL
8940		I	2710.307	-0.031	6	KL
8941		I	2727.278	-0.033	9	HP
8942		I	2744.251	-0.032	9	HP
8943	AE Cyg	I	2657.537	-0.001	4	KL
8944	BR Cyg	I	2677.474	+0.010	6	KL
8945	KR Cyg	I	2708.293	+0.003	9	HP
8946	V456 Cyg	I	2708.324	+0.015	6	KL
8947		II	2712.328	+0.009	11	HP
8948	V477 Cyg	I	2708.312	-0.016	9	HP
8949	V687 Cyg	I	2738.271	+0.013	11	HP
8950	TY Del	I	2678.348	+0.014	6	KL
8951		I	2715.268	+0.009	12	HP
8952		I	2740.274	+0.002	12	HP
8953	YY Del	I	2715.251	+0.030	6	KL
8954	DM Del		2740.281	***	6	RD
8955	FZ Del	I	2672.300	+0.004	7	KL
8956		I	2679.352	+0.007	6	KL
8957		I	2708.322	-0.002	12	HP
8958		I	2712.243	+0.003	8	HP
8959	Z Dra	I	2742.278	-0.004	4	KL
8960	RR Dra	I	2688.333	+0.116	12	HP
8961	RZ Dra	I	2713.338	-0.009	9	RG
8962		I	2729.315	-0.007	7	RG
8963	UZ Dra	I	2633.452	-0.015	8	RD
8964	AI Dra	I	2669.435	-0.002	9	RG
8965	S Equ	I	2672.334	+0.007	7	KL
8966		I	2727.310	+0.005	13	HP
8967		I	2727.315	+0.010	6	KL
8968	TZ Eri	I	2716.577	-0.038	5	KL
8969	YY Eri	II	2673.500	-0.006	11	KL
8970	W For	I	2716.518	+0.155	4	KL
8971	AV Gem	I	2669.585	-0.022	11	KL
8972	RX Her	II	2713.328:	0.000:	9	RG
8973	SZ Her	I	2664.406	+0.028	7	KL
8974		I	2668.495	+0.027	7	KL
8975		I	2669.312	+0.026	6	KL
8976		I	2678.313	+0.028	6	KL
8977	TT Her	I	2688.342	-0.031	9	HP
8978	TX Her	I	2692.305	+0.004	12	PC
8979		II	2693.325	-0.006	13	PC
8980	UX Her	I	2669.418	-0.029	7	RG
8981	V338 Her	I	2688.322	+0.098	10	HP
8982	u Her	I	2664.408	-0.016	10	JR
8983	SW Lac	II	2669.333	-0.090	7	RG
8984		II	2678.637	-0.087	10	KL
8985		II	2679.287	-0.079	6	RG
8986		II	2686.345	-0.076	10	KL
8987		I	2689.381	-0.083	6	KL
8988		I	2701.250	-0.086	9	RG
8989		I	2701.256	-0.080	7	KL
8990		I	2708.290	-0.102	7	KL
8991		II	2712.325	-0.075	7	HP
8992		II	2713.280	-0.083	8	RG
8993		I	2717.280	-0.092	6	RG
8994		I	2725.279	-0.110	6	RG
8995		I	2727.230	-0.084	7	HP
8996		II	2729.319	-0.080	7	RG
8997		II	2738.295	-0.085	7	RG
8998	AU Lac	I	2739.466	-0.048	6	KL
8999	CM Lac	I	2673.656	-0.007	7	KL
9000		I	2739.448	-0.008	10	KL
9001		I	2744.263	-0.007	9	HP
9002	EM Lac	I	2716.315	-0.087	6	KL
9003	UV Leo	II	2745.736	-0.013	11	KL
9004	RS Lep	I	2739.522	-0.014	7	KL
9005	SX Lyn	I	2664.573	-0.288	6	KL
9006		I	2729.280	-0.303	6	KL
9007		I	2741.422	-0.296	6	KL
9008	TZ Lyr	I	2692.372	+0.025	13	HP
9009		I	2710.337	+0.010	7	RG
9010		I	2710.352	+0.025	10	HP
9011	UZ Lyr	I	2708.370	+0.017	13	HP
9012		I	2727.277	+0.012	9	HP
9013	FL Lyr	I	2669.333	-0.010	8	RG
9014	RW Mon	I	2669.580	-0.004	13	KL
9015	U Oph	I	2680.321	-0.010	10	PC
9016		I	2680.336	+0.006	9	RG
9017		II	2701.287	-0.009	9	KL
9018		II	2701.304	+0.007	14	RG
9019	V501 Oph	I	2692.313	-0.006	11	HP
9020	V508 Oph	II	2664.345	+0.009	6	KL
9021		I	2678.312	+0.012	10	KL
9022		II	2712.273	+0.009	9	HP
9023		I	2746.234	+0.010	8	HP
9024	V566 Oph	I	2601.486	+0.018	8	NM
9025	EQ Ori	I	2716.519	-0.067	12	KL
9026		I	2744.456	-0.067	7	KL
9027	ET Ori	I	2724.644	-0.020	5	KL
9028	FL Ori	I	2715.468	+0.091	9	KL
9029	TY Peg	I	2715.292	-0.030	11	HP
9030	UX Peg	I	2739.403	+0.077	12	HP
9031	BY Peg	I	2669.312	+0.064	6	KL
9032		I	2681.287	+0.070	6	KL

* not contained in the GCVS 1969, O-C according to the GCVS 1974: -0.014 -0.024

** not contained in the GCVS, O-C according to the elements of Цесевич and Каретников, Переменные Звёзды Приложение 1, № 6, p.459 : -0.006

*** GCVS period probably erroneous

current no.	star	minimum order	JD hel 244...	O-C	n	observer
9033		I	2682.303	+0.062	5	KL
9034		II	2713.246	+0.060	5	KL
9035		II	2740.268	+0.069	6	KL
9036	DI Peg	I	2739.300	-0.011	10	HP
9037	RV Per	I	2664.614	+0.005	7	KL
9038	DK Per	I	2742.272	+0.091	5	KL
9039	HK Per	I	2740.464	-0.074	5	KL
9040	IQ Per	I	2740.304	*	7	RD
9041	KW Per	I	2717.244	+0.043	6	KL
9042		I	2729.346:	+0.039:	4	KL
9043	β Per	I	2636.572	-0.071	13	LM
9044		I	2659.505	-0.078	26	RL
9045		I	2708.267	-0.061	11	HP
9046		I	2728.330	-0.070	16	PC
9047	Y Psc	I	2671.565	+0.145	8	KL
9048		I	2739.339	+0.135	15	HP
9049	UV Psc	I	2680.663	+0.021	6	KL
9050		I	2681.523	+0.020	10	KL
9051		I	2738.353	+0.021	11	HP
9052	SX Psc	I	2738.311	-0.037	8	RD
9053		I	2738.326	-0.023	11	HP
9054	RW PsA	II	2716.306	-0.067	6	KL
9055		II	2738.309	-0.042	5	KL
9056		I	2740.297	-0.047	8	KL
9057	AY Pup	II	2742.626	+0.065	11	KL
9058	RZ Sct	I	2715.5	+0.6	4	KL
9059	SV Tau	I	2727.349	-0.008	6	KL
9060	AH Tau	II	2743.578	-0.009	5	KL
9061	AM Tau	I	2739.399	-0.112	6	KL
9062		I	2741.422	-0.132	6	KL
9063	AP Tau	I	2744.429	**	10	KL
9064	V Tri	I	2740.327:	+0.012	8	RD
9065	X Tri	I	2681.407	-0.032	6	KL
9066		I	2688.295	-0.024	9	RG
9067	RW Tri	I	2669.536	0.000	6	KL
9068		I	2671.620	-0.003	6	KL
9069		I	2715.450	+0.001	5	KL
9070		I	2740.263	+0.003	5	KL
9071		I	2746.286	-0.003	4	KL
9072	W UMa	II	2714.462	-0.105	14	RL
9073	Z Vul	I	2714.251	+0.005	8	HP
9074	AW Vul	I	2740.294	-0.028	9	RD
9075	BO Vul	I	2679.329	-0.064	8	KL
9076		I	2681.271	-0.068	10	KL
9077		I	2716.301	-0.064	7	KL
9078		I	2718.246	-0.064	10	KL
9079	BU Vul	I	2710.395	-0.002	13	HP
9080		I	2738.288	+0.011	10	HP
9081	CD Vul	I	2727.303	-0.016	7	KL
9082		I	2740.295	-0.015	9	RD

* no period given by the GCVS 1969, O-C according to the GCVS 1974: -0.005

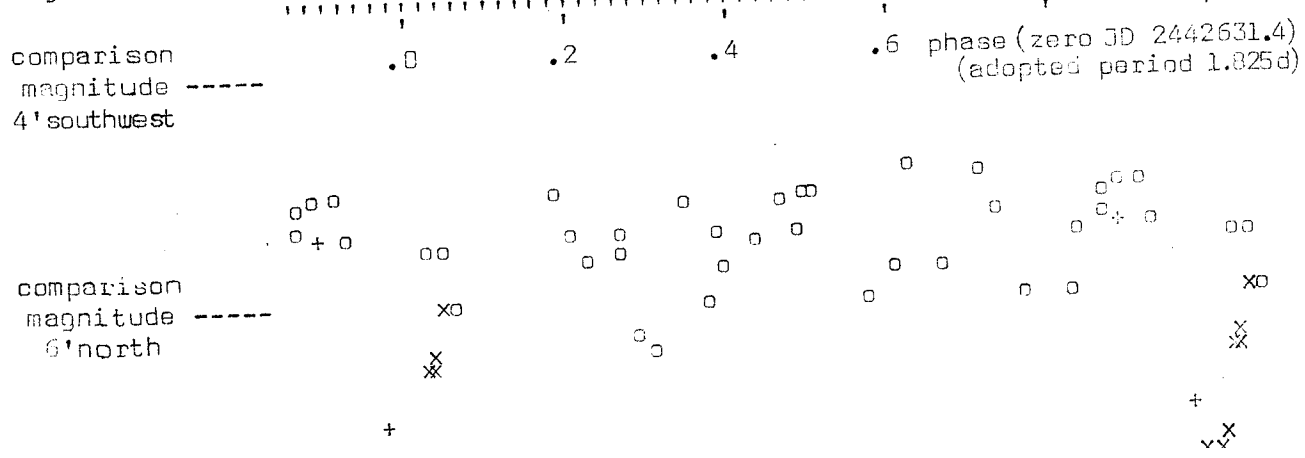
** no O-C because the GCVS states no epoch

The Period of V 752 Ophiuchi

My visual survey of this eclipsing binary of unknown period yielded distinct fadings in only 2 of 33 nights 1975 February to November, namely JD 2442629 (+ symbols in fig.27) and the after-next one JD..31 (x symbols). Along with the normal brightness observed the night between, it immediately turned out that the period must be in the interval 1.6...1.9 day. Any value of this interval is contradicted by results of the remaining 30 nights except one close to 1.825 day. Of course all this interpretation depends crucially on one single observation, the deeper + symbol; but this observation was made very carefully under excellent seeing conditions. That is why I am rather convinced in spite.

K.Locher

fig. 27

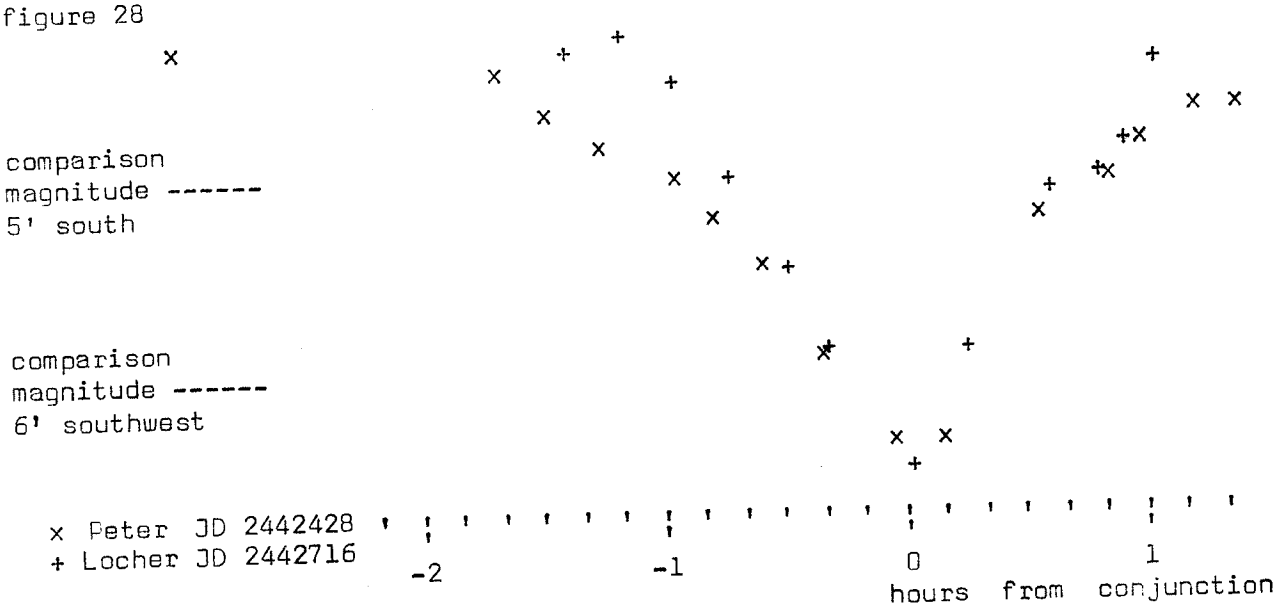


The d Value of EQ Orionis

is unknown according to the GCVS 1969/1971/1974. By superposition of our two minimum surveys in figure 28 we show that it is less than half an our, i.e. less than 0.012 period, and possibly zero.

H.Peter & K.Locher

figure 28



A further Ephemeridal A.P.L. Computer Programme

Whereas the programme presented in BBSAG Bull 18, p.3 was mainly conceived for short period variables, a complementary one has now stood the test for the longer period eclipsing binaries, for which I did not find it too fussy 1) to eliminate unobservable minima (by the same process as in BBSAG Bull 2, p.3), 2) to grade up with respect to time, and 3) to process all these stars in one sample.

DEFINITION OF THE PROGRAMME ∇ *HANDYBBSAG*

```
[1]  DATE←STARTDATE
[2]  TIMES←EPOCHS
[3]  ACTUALS←TIMES+(DATE>TIMES+PERIODS-1)×PERIODS
[4]  OCCURRENCE←0<ACTUALS-DATE
[5]  DARKNESS←(¯.3-.35×10((02÷365.242)×ACTUALS-41031.7764))>10(02
                                          ×ACTUALS-41000.7264)
[6]  HEIGHT←LIMITS>(.99726957|ACTUALS-CULMS)L.99726957|CULMS-ACTU
                                                          ALS
[7]  ENTRY←OCCURRENCE×DARKNESS×HEIGHT
[8]  SET←ENTRY/ACTUALS
[9]  TENTHS←L10×1|SET
[10] HUNDREDTHS←L100×.1|SET
[11] SETINDEX←⍋SET
[12] SETNAMES←ENTRY/[0]NAMES
[13] NAMESCALE←SETNAMES[SETINDEX;]
[14] TENTHSCALE←TENTHS[SETINDEX]
[15] HUNDREDTHSCALE←HUNDREDTHS[SETINDEX]
[16] DIGITS←,⍉(2,⍴SET)⍴TENTHSCALE,HUNDREDTHSCALE
[17] BLOCK←((⍴SET),2)⍴'0123456789'[DIGITS]
[18] DATE
[19] ' '
[20] BLOCK,[1]NAMESCALE
[21] ' '
[22] DATE←DATE+1
[23] TIMES←ACTUALS
```

DESCRIPTION OF THE INPUT VARIABLES & INPUT EXAMPLE FOR 1975 NOVEMBER

NAMES←50 9⍴' *BO HER SX HYA T LMI V449 OPH Z PER*.....

the n·9 alphanumerical APL matrix of the names of the n stars. Be careful of the spaces so that each name occupies the rightmost ones of 9 positions.

PERIODS←4.272827 2.895697 3.0199336 1.243077 3.0563.....

the n-dimensional APL vector of their periods

EPOCHS←42726.38 42728.63 42727.78 42729.63 42728.255.....

the n-dimensional APL vector of their Julian dates of minimum, each latest one before 'STARTDATE' and already corrected for the actual O-C

CULMS←41395.745 41395.539 41395.376 41395.697 41395.079.....

the n-dimensional APL vector of their Julian dates of culmination at any arbitrary day

LIMITS←.24 .05 .26 .2 .27 .....

the n-dimensional APL vector of their maximum hour angles either side from meridian, judged for useful observation at reasonable zenith distances, expressed in fractions of a day

STARTDATE←42730

the integer Julian date which the ephemeris is ordered to start with

THE CORRESPONDING OUTPUT EXAMPLE

42730

48 *EQ ORI*
49 *RS LEP*
58 *RW MON*

42731

31 *Z PER*
31 *SX LYN*
69 *UU LEO*

42732

26 *V913 OPH*
48 *RW MON*
52 *FL ORI*

42733

33 *SX LYN*
48 *OS ORI*
62 *Y LEO*
64 *AN MON*

42734

36 *Z PER*
39 *RW MON*

42735

35 *SX LYN*
62 *FL ORI*
65 *RS LEP*

42736

42737

38 *SX LYN*
42 *Z PER*
47 *EQ ORI*
49 *TV MON*
68 *BO MON*

42738

41 *WY PER*
53 *AN MON*
68 *Y LEO*

42739

40 *SX LYN*
51 *RS LEP*

42740

48 *Z PER*
63 *OS ORI*

42741

41 *V640 ORI*
42 *SX LYN*
57 *SY HYA*
67 *TV MON*

42742

56 *RW LEO*

42743

38 *FL ORI*
43 *V640 ORI*
44 *SX LYN*
53 *Z PER*

42744

45 *EQ ORI*

42745

22 *GL HER*
40 *OS ORI*
43 *Y LEO*
45 *V640 ORI*
47 *SX LYN*
56 *VW HYA*
65 *DE HYA*

42746

48 *FL ORI*
58 *BO MON*
59 *Z PER*

42747

47 *V640 ORI*
49 *SX LYN*
60 *RW LEO*

42748

28 *EW LYR*
39 *WY PER*
49 *UU LEO*
53 *RS LEP*

42749

K. Locher