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COMMUNICATIONS FROM THE OBSERVATORY AT LEIDEN.

Estimates of 11 variable stars on Franklin-Adams-plates with the centre η Carinae,

by *L. Plaut*.

Among the various areas on Franklin-Adams-plates taken at Johannesburg for the investigation of variable stars, the series of plates with the centre η Carinae is by far the most numerous, containing at present 939 plates and 17 copies on glass from older plates present at Johannesburg. Table 1 shows the distribution of the plates over the different oppositions. The plates cover an area of 10° × 10°; they are normally exposed for 30 minutes. The plates were taken by Prof. HERTZSPRUNG and Dr. VAN GENT.

The estimates are made in the ordinary way using ARGELANDER's method. Most of the 11 stars treated in this paper had already been estimated by HERTZSPRUNG on a smaller number of plates. All these older plates have been reestimated. The condensed results of the estimates are given in Table 2, the columns being selfexplanatory. The total number of new estimates used in the present paper is 9776.

As the right-ascension of VX Vel on the Leiden card catalogue differed by 3^s from that given in PRAGER's Katalog und Ephemeriden (K.V.B.B. 14) the position was redetermined.

The first 8 stars are of the δ Cep-type, the last 3 of the RR Lyr-type. The periods have been determined by least square solutions; for 4 stars the maximum and for 6 stars a certain point on the ascending branch has been used for the solutions; in the case of UY Car the period has been taken from an unpublished investigation by the late Mr. W. E. KRUYTBOSCH. Table 4 contains the epochs used and the (O–C)'s from the least square solutions.

The greatest difficulty in the reduction of these estimates is to get a good scale for the magnitudes of the comparison stars. For this purpose the following 4 different methods have been applied:

1. By the aid of counts of all stars brighter than each comparison star, using the tables of Groningen Publication 43. In 7 cases such star counts have been made in the neighbourhood of the comparison stars over an area of one or half a square degree. These magnitudes are assumed to be on the International Scale.

2. On plate 5240 with the centre 11^h—59° stars in the Selected Area 193 (H.A. 103) and the comparison stars of 7 variables could be measured with the Schilt-microphotometer. An inaccuracy is caused by the dependance of the star image on its distance from the platecentre. A least square solution of the Selected Area magnitudes with the provisional magnitudes of the Schilt-photometer measurements derived with the tables described in B.A.N. 190, gives a mean error of $\pm{}^m.23$ for one determination of magnitude.

3. For the comparison stars of 7 variables C.P.D. magnitudes reduced by the aid of H.A. 80, 231 were available.

4. For 8 variables the comparison stars could be measured with the Schilt-microphotometer on some of the 23 plates taken with a coarse grating in front of the objective. This method gives an absolute scale but no zero-point. The mean error of one determination of magnitude is $\pm{}^m.06$.

It was the intention to obtain a uniform scale and zero-point for the comparison stars of all 11 variables. For the reduction the following solutions have been used:

$$m_1 = +\overset{m}{2.55} + 0.830\ m_2 \quad \text{(24 stars)}$$
$$\pm 0.18 \pm 0.030 \quad \text{(m. e.)}$$
$$m_2 = -2.44 + 1.236\ m_3 \quad \text{(12 stars)}$$
$$\pm 0.27 \pm 0.130 \quad \text{(m. e.)}$$

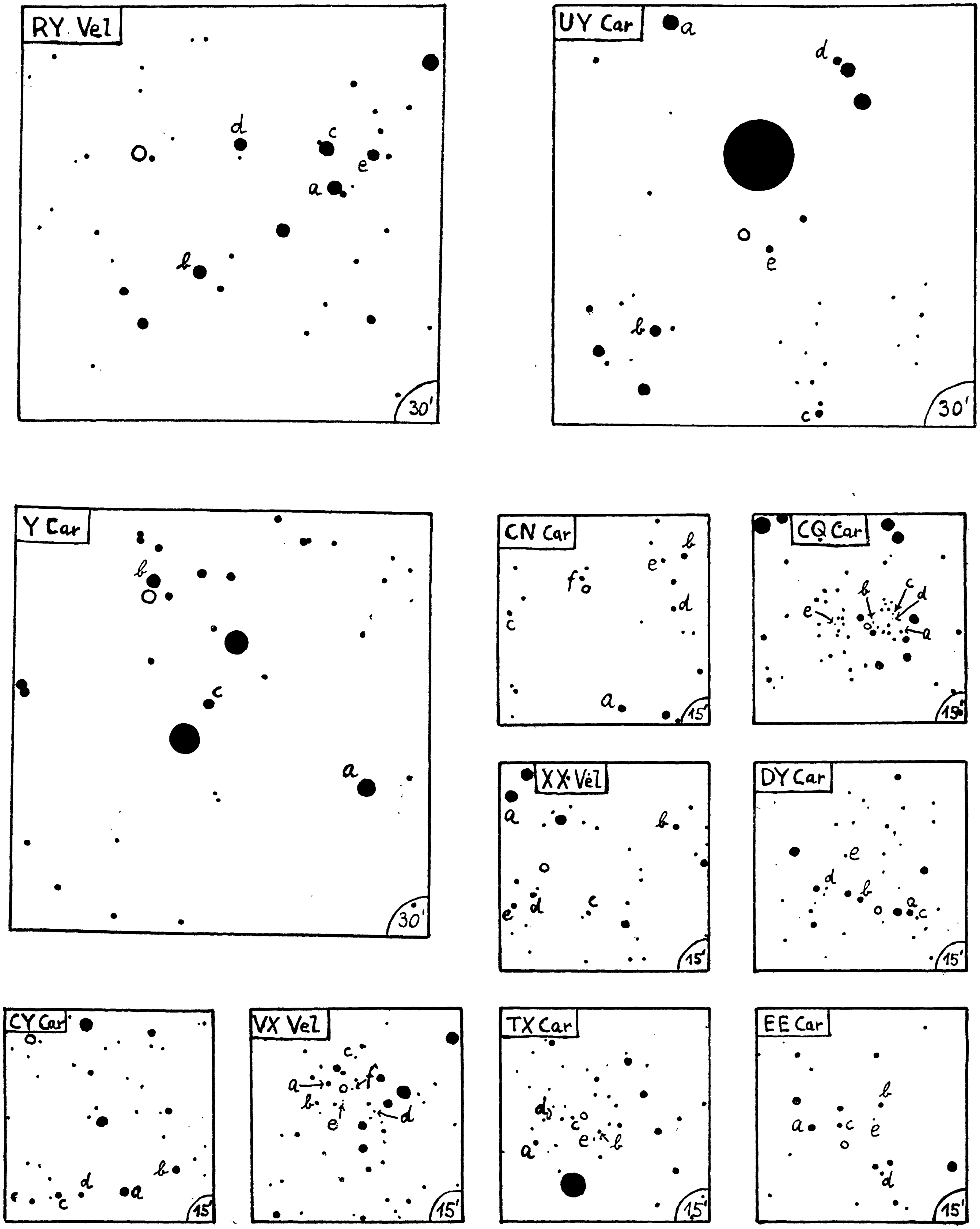
hence

$$m_1 = +0.52 + 1.026\ m_3$$
$$\pm 0.29 \pm 0.114 \quad \text{(m. e.)}$$

m_1 = m (starcounts)
m_2 = m (Selected Area)
m_3 = m (CPD, reduced)

The methods used in the case of each set of comparison stars are indicated in Table 3, where the

FIGURE 1.


RY Vel
30'
UY Car
30'
Y Car
30'
CN Car
15'
CQ Car
15'
XX Vel
15'
DY Car
15'
CY Car
15'
VX Vel
15'
TX Car
15'
EE Car
15'

linear formulae finally adopted for the relation between magnitudes and steps are given in the last column. Table 5 gives the brightness in magnitudes and steps for each comparison star.

The phases were computed by the formula

phase = reciprocal period ×
(J. D. hel. M. Astr. T. Gr. — 2420000)

Normal points of the lightcurve are given in Table 6 in the usual way and represented graphically in Figures 2—12. A record of the individual estimates is kept at the Leiden Observatory.

Figure 1 gives the diagrams of the surrounding, North being at the top and the size scale being given in the lower right hand corner.

FIGURE 2.

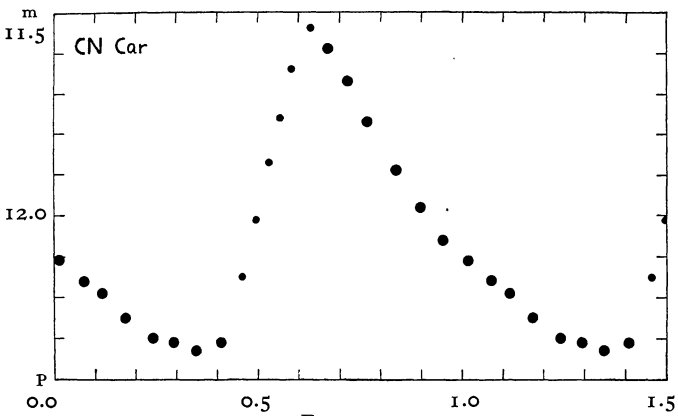


FIGURE 3.

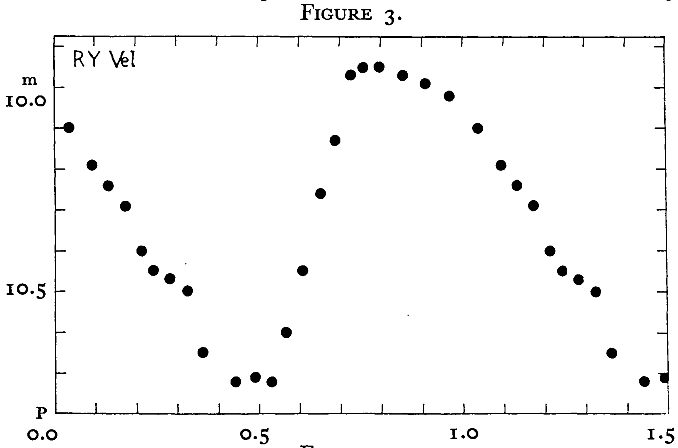


FIGURE 4.

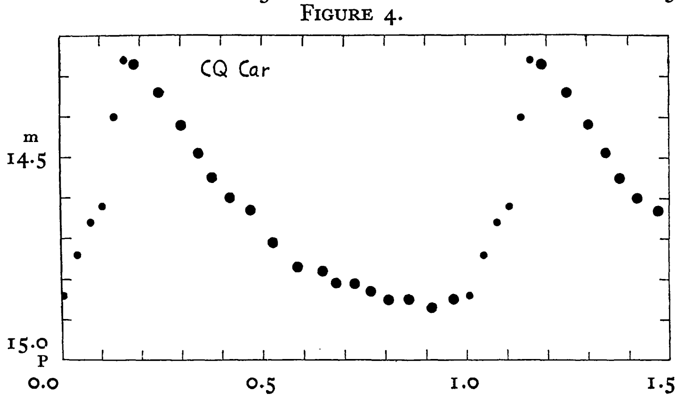


FIGURE 5.

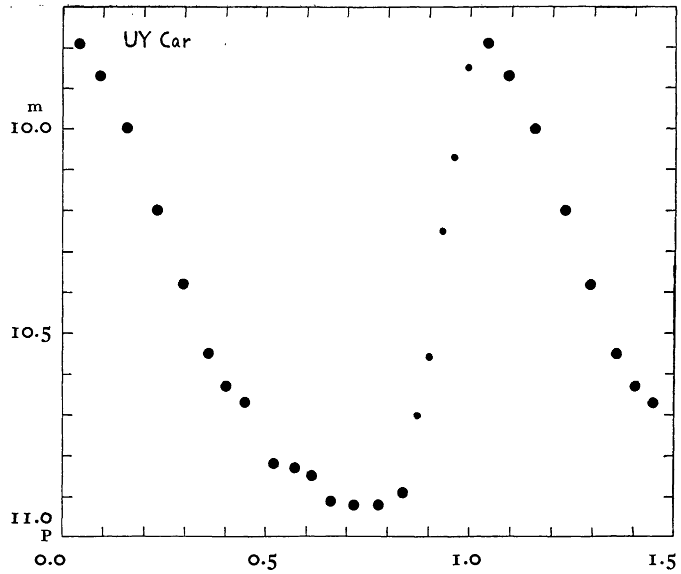


FIGURE 6.

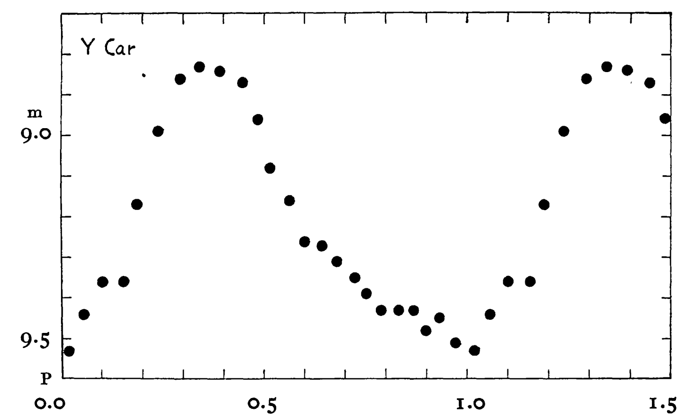


FIGURE 7.

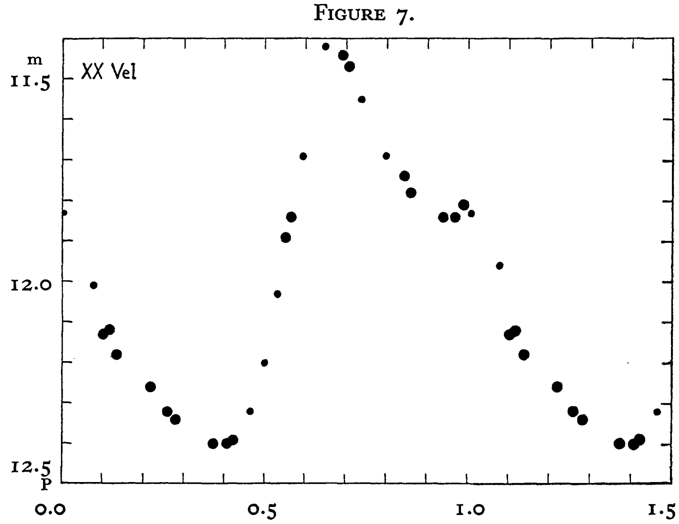


FIGURE 8.

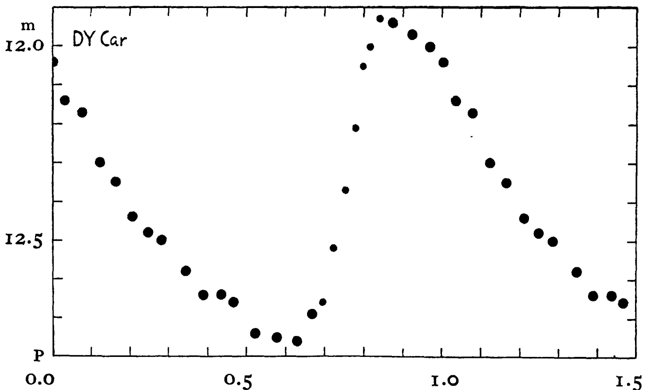


FIGURE 9.

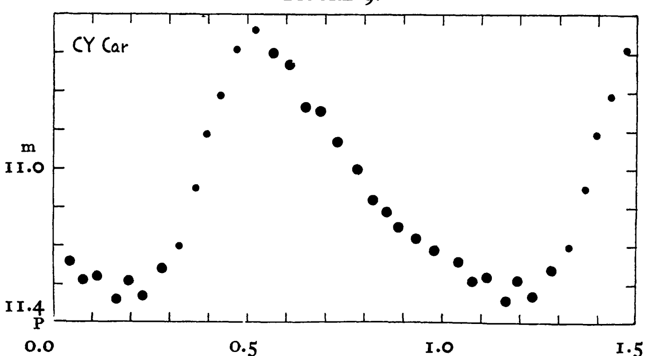


FIGURE 10.

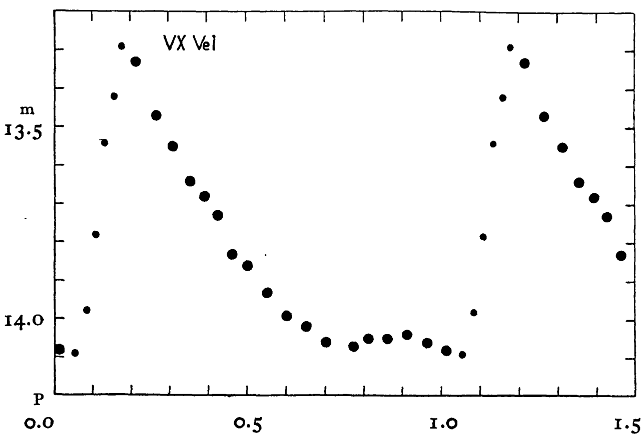


FIGURE 11.

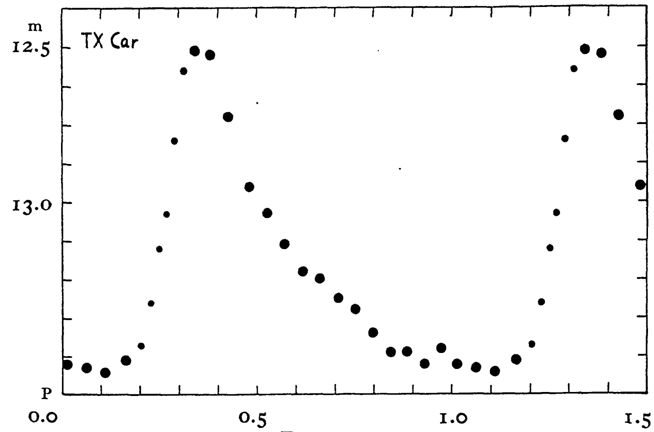


FIGURE 12.

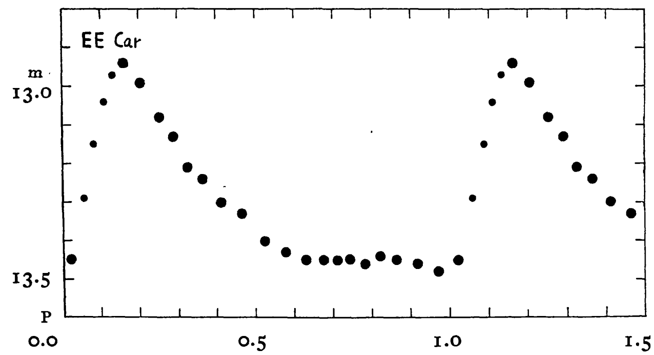


TABLE 1.

Copies on glass 1913—1927	17	plates
1923—1924	409	,,
1924—1925	198	,,
1925—1926	33	,,
1926—1927	24	,,
1927—1928	61	,,
1928—1929	100	,,
1929—1930	49	,,
1930—1931	22	,,
1931—1932	11	,,
1932—1933	—	,,
1933—1934	13	,,
1934—1935	2	,,
total	939	plates
including	23	,, with a coarse-grating in front of the objectiv.

TABLE 2.

	*	α (1875)	δ (1875)	number of plates	period	m.e.	reciprocal period	epoch 2420000+	m.e. of a single epoch	number of epochs	phase of epoch	max.	range	m.e. of a single estimate
		h m s	° ′		d	d	d^{-1}		d		P	m	m	st m
1	CN Car	10 11 9	—57 33·1	906	4·93285	± ·00017	·2027224	4585·84	± ·26	38	·652	11·54	0·79	±1·68 = ±·096
2	RY Vel	10 15 59	—54 41·6	889	28·1311	± ·0032	·0355478	5024·60	± ·78	46	·613	9·95	0·77	±1·79 = ±·103
3	CQ Car	10 26 47	—59 20·3	802	5·318934	± ·000082	·1880076	4298·405	± ·076	47	·133	14·26	0·61	±1.57 = ±·088
4	UY Car	10 27 38	—61 8·4	905	5·543698	—	·180385	—	—	—	—	9·79	1·13	±1·37 = ±·132
5	Y Car	10 28 29	—57 51·3	912	3·639061	± ·000075	·2747962	4626·53	± ·34	42	·353	8·83	0·70	±1·63 = ±·173
6	XX Vel	10 31 15	—55 23·7	896	6·98464	± ·00020	·1431713	4915·03	± ·26	46	·691	11·42	0·98	±1·16 = ±·076
7	DY Car	10 47 38	—59 51·7	907	4·674543	± ·000055	·2139247	4290·134	± ·088	78	·766	11·93	0·83	±1·38 = ±·106
8	CY Car	10 52 50	—60 4·6	917	4·265827	± ·000079	·2344211	4297·407	± ·138	84	·403	10·64	0·70	±1·26 = ±·093
9	VX Vel	10 53 47	—55 40·1	852	0·50940266	± ·00000055	1·9630836	4190·4104	± ·0093	92	·126	13·29	0·80	±1·79 = ±·099
10	TX Car	10 53 50	—58 24·8	911	0·6011360	± ·0000015	1·6635171	4566·442	± ·021	51	·354	12·51	0·83	±1·70 = ±·085
11	EE Car	10 54 54	—63 29·5	879	0·6787054	± ·0000011	1·4733933	4553·4888	± ·0121	75	·080	12·94	0·54	±1·06 = ±·058

TABLE 3.

						m
1	CN Car	star counts, 1 sq. degree	—	CPD	2 coarse grating plates	m = 11·52 + 0·0574 st
2	RY Vel	—	—	CPD	12 coarse grating plates	m = 10·08 + 0·0575 st
3	CQ Car	star counts, ½ sq. degree	—	—	—	m = 13·93 + 0·0559 st
4	UY Car	—	Selected Area	CPD	17 coarse grating plates	m = 9·56 + 0·0963 st
5	Y Car	—	—	CPD	22 coarse grating plates	m = 8·74 + 0·1061 st
6	XX Vel	star counts, 1 sq. degree	Selected Area	CPD	11 coarse grating plates	m = 11·18 + 0·0654 st
7	DY Car	star counts, 1 sq. degree	Selected Area	—	8 coarse grating plates	m = 11·66 + 0·0765 st
8	CY Car	star counts, 1 sq. degree	Selected Area	CPD	16 coarse grating plates	m = 10·54 + 0·0739 st
9	VX Vel	star counts, ½ sq. degree	Selected Area	—	—	m = 13·15 + 0·0551 st
10	TX Car	star counts, 1 sq. degree	Selected Area	—	—	m = 12·52 + 0·0498 st
11	EE Car	—	Selected Area	—	—	m = 12·81 + 0·0545 st

TABLE 4.

1. CN Car

Maxima.
Means of the plates of one night, v] 1st·0.

J.D. 242....	Epoch	O—C
		d
0605·26	0	+ ·24
3786·54	645	— ·18
91·53	646	— ·12
3816·43	651	— ·08
80·35	664	— ·08
85·35	665	— ·02
3900·29	668	+ ·12
10·29	670	+ ·26
39·29	676	— ·34
44·26	677	— ·31
49·20	678	— ·30
59·21	680	— ·15
64·23	681	— ·06
69·22	682	·00
74·23	683	+ ·07
79·21	684	+ ·12
89·20	686	+ ·24
4171·45	723	— ·02
76·47	724	+ ·07
96·53	728	+ ·39
4201·38	729	+ ·31
05·97	730	— ·43
40·42	737	— ·12
45·35	738	— ·12
94·36	748	— ·14
4586·46	807	+ ·62
5330·24	958	— ·46
80·25	968	+ ·23
5641·50	1021	+ ·04
51·55	1023	+ ·22
5740·20	1041	+ ·08
74·23	1048	— ·42
89·20	1051	— ·25
5922·57	1078	— ·07
6036·36	1101	+ ·27
6120·28	1118	+ ·33
7427·55	1383	+ ·40
7619·20	1422	— ·34

2. RY Vel

Reduced to 6st on the ascending branch using the gradient d/st·4125.

J.D. 242....	Epoch	O—C
		d
3786·21	0	— ·62
·77	0	— ·06
3787·57	0	+ ·74
3814·18	1	— ·78
·19	1	— ·77
·24	1	— ·72
15·26	1	+ ·30
41·66	2	— 1·43
42·39	2	— ·70
·50	2	— ·59
43·00	2	— ·09
70·31	3	— ·91
·39	3	— ·83
99·17	4	— ·18
·71	4	+ ·36
3900·53	4	+ 1·18
26·54	5	— ·94
27·81	5	+ ·33
·84	5	+ ·36
28·43	5	+ ·95
56·54	6	+ ·92
84·99	7	+ 1·24
4210·10	15	+ 1·30
36·54	16	— ·39
65·29	17	+ ·23
·58	17	+ ·52
·61	17	+ ·55
92·50	18	— ·69
93·09	18	— ·10
·67	18	+ ·48
5024·33	44	— ·27
5389·86	57	— ·44
5446·85	59	+ ·29
47·11	59	+ ·55
5617·31	65	+ 1·96
43·15	66	— ·33
5926·61	76	+ 1·82
6008·76	79	— ·42
·77	79	— ·43
37·09	80	— ·23
6120·69	83	— 1·02
21·00	83	— ·71
21·51	83	— ·20
6824·45	108	— ·54
81·21	110	— ·04
·26	110	+ ·01

3. CQ Car

Reduced to 9st on the ascending branch using the gradient d/st·0447.

J.D. 242....	Epoch	O—C
		d
3814·299	0	— ·083
3814·303	0	— 0·79
·324	0	— 58
·351	0	— 31
·360	0	— 22
·466	0	+ 84
78·123	12	— 86
·168	12	— 41
·188	12	— 21
·193	12	— 16
·218	12	+ 9
83·517	13	— 11
·591	13	+ 63
99·389	16	— 96
3910·134	18	+ 11
·197	18	+ 78
15·322	19	— 120
·482	19	+ 40
·483	19	+ 41
·509	19	+ 67
26·098	21	+ 19
31·294	22	— 104
·386	22	— 12
·406	22	+ 8
·407	22	+ 9
47·364	25	+ 9
63·394	28	+ 82
·419	28	+ 107
·550	28	+ 238
4245·148	81	— 67
61·205	84	+ 33
·294	84	+ 122
93·128	90	+ 42
98·293	91	— 112
4915·346	207	— 55
·363	207	— 38
5330·279	285	+ 1
83·418	295	— 49
·440	295	— 27
5447·240	307	— 55
·263	307	— 32
5745·139	363	— 16
·251	363	+ 96
60·981	366	— 131
61·122	366	+ 10
77·133	369	+ 64
·200	369	+ 131

5. Y Car

Maxima.
The first two maxima are from ROBERTS (A.J. 313 and 491), the other means of the plates of one night, v] 0st.

J.D. 24.....	Epoch	O—C
		d
12869·2	0	+ ·47
5041·40	597	+ 12
21722·27	2433	— 29
3789·53	3001	— 2
3815·43	3008	+ 41
18·56	3009	— 10
77·16	3025	+ 28
80·27	3026	— 25
87·41	3028	— 39
3902·37	3032	+ 2
13·29	3035	+ 2
31·29	3040	— 18
46·25	3044	+ 23
49·20	3045	— 46
64·23	3049	+ 1
67·23	3050	— 63
75·23	3052	+ 9
78·71	3053	— 7
89·20	3056	— 50
4171·45	3106	— 20
4200·43	3114	— 33
04·42	3115	+ 2
40·42	3125	— 37
66·24	3132	— 2
77·28	3135	+ 10
84·24	3138	— 21
4550·38	3210	+ 27
53·45	3211	— 30
86·47	3220	— 3
4626·24	3231	— 29
5067·26	3352	+ 41
5561·56	3488	— 21
5641·48	3510	— 34
5740·20	3537	+ 12
66·20	3544	+ 65
73·28	3546	+ 45
76·30	3547	— 17
91·22	3551	+ 19
6122·22	3642	+ 3
55·21	3651	+ 28
6828·30	3836	+ 15
7604·31	4049	+ 102

6. XX Vel

Maxima.
Means of the plates of one night, v] 5st·7.

J.D. 242....	Epoch	O—C
		d
0605·26	0	— ·25
1010·27	58	— 35
3790·53	456	+ 3
3818·56	460	+ 12

TABLE 4 (*continued*).

J.D. 242....	Epoch	O—C
		d
3874·29	468	− ·04
81·40	469	+ 9
3902·38	472	+ 12
16·35	474	+ 12
30·26	476	+ 6
37·28	477	+ 10
44·25	478	+ 8
58·23	480	+ 9
65·22	481	+ 10
72·22	482	+ 12
79·22	483	+ 13
4202·42	515	− 18
58·26	523	− 21
86·49	527	+ 8
93·50	528	+ 10
4537·41	563	− 46
58·86	566	+ 5
66·46	567	+ 66
86·47	570	− 28
4642·36	578	− 28
49·78	579	+ 16
4915·41	617	+ 38
5068·25	639	− 45
5320·32	675	+ 18
27·31	676	+ 19
83·41	684	+ 40
5446·24	693	+ 37
5564·56	710	− 4
71·50	711	− 9
5641·47	721	+ 4
5732·23	734	− 1
46·31	736	+ 11
53·30	737	+ 11
60·25	738	+ 7
74·26	740	+ 12
6123·31	790	− 7
6269·60	811	− 45
6423·37	833	− 35
6828·30	891	− 52
84·23	899	− 47
7604·33	1002	+ 21
18·20	1004	+ 11

7. DY Car

Reduced to 8st on the ascending branch using the gradient d/st·0580.

J.D. 242....	Epoch	O—C
		d
1401·295	0	+ ·029
3813·194	516	− 136
·223	516	− 107
·247	516	− 83
·272	516	− 58
·272	516	− 58
·323	516	− 7
·338	516	+ 8
·390	516	+ 60
41·351	522	− 27
·456	522	+ 78
·477	522	+ 99
74·101	529	+ 2
78·703	530	− 71
·713	530	− 61
83·313	531	− 135
·521	531	+ 73
97·531	534	+ 59
		d
3911·345	537	− ·151
·514	537	+ 18
·546	537	+ 50
·597	537	+ 101
16·306	538	+ 136
30·044	541	− 150
·166	541	− 28
·301	541	− 107
·331	541	− 137
39·558	543	+ 15
·587	543	+ 44
·613	543	+ 70
44·153	544	− 64
·191	544	− 26
·213	544	− 4
·267	544	+ 50
·281	544	+ 64
58·190	547	− 51
·239	547	− 2
·242	547	+ 1
72·355	550	+ 90
·382	550	+ 117
86·389	553	+ 101
4168·493	592	− 103
·617	592	+ 21
·719	592	+ 123
·756	592	+ 160
73·138	593	− 132
96·655	598	+ 12
4201·188	599	− 129
·205	599	− 112
·281	599	− 36
·305	599	− 12
·345	599	+ 28
57·283	611	− 129
·362	611	− 50
62·006	612	− 80
·093	612	+ 7
85·302	617	− 157
·365	617	− 94
·389	617	− 70
·465	617	+ 6
90·134	618	0
·255	618	+ 121
5038·090	778	+ 29
·114	778	+ 53
5206·649	814	+ 305
5360·533	847	− 71
·632	847	+ 28
79·310	851	+ 8
·363	851	+ 61
5561·563	890	− 46
·564	890	− 45
5753·417	931	+ 151
6010·364	986	− 1
·386	986	+ 21
6155·204	1017	− 72
·316	1017	+ 40
6828·336	1161	− 75
7604·339	1327	− 46

8. CY Car

Reduced to 5st on the ascending branch using the gradient d/st·0983.

J.D. 242....	Epoch	O—C
		d
0991·236	0	− ·155
3789·850	656	+ 76
·872	656	+ 98
·985	656	+ 211
3815·197	662	− 172
·324	662	− 45
·493	662	+ 124
45·093	669	− 105
·125	669	− 137
79·066	677	− 291
·171	677	− 186
·224	677	− 133
·317	677	− 40
·375	677	+ 18
·439	677	+ 82
·463	677	+ 106
·488	677	+ 131
·591	677	+ 234
83·522	678	− 100
·650	678	+ 28
3913·125	685	− 358
·518	685	+ 35
·591	685	+ 108
·707	685	+ 224
26·254	688	− 26
30·584	689	+ 37
39·198	691	+ 121
·263	691	+ 186
43·242	692	− 102
·413	692	+ 69
·438	692	+ 94
·460	692	+ 116
·514	692	+ 170
56·356	695	+ 215
·491	695	+ 350
60·516	696	+ 109
·588	696	+ 181
73·185	699	− 19
77·508	700	+ 38
90·402	703	+ 135
4169·234	745	− 199
·246	745	− 187
·307	745	− 126
·354	745	− 79
·377	745	− 56
·441	745	+ 8
·457	745	+ 24
·470	745	+ 37
·480	745	+ 47
·497	745	+ 64
4263·046	767	− 234
·082	767	− 198
·123	767	− 157
·164	767	− 116
·179	767	− 101
80·401	771	+ 57
92·895	774	− 247
93·205	774	+ 63
97·262	775	− 145
·295	775	− 112
·383	775	− 24
·484	775	+ 77
4553·358	835	− 99
·420	835	+ 63
·494	835	+ 137
5077·978	958	+ 24
78·182	958	+ 128
·223	958	+ 169
5385·075	1030	− 118
		d
5385·240	1030	+ 0·47
5564·390	1072	+ 32
·441	1072	+ 83
5615·677	1084	+ 129
40·999	1090	− 144
5709·309	1106	− 87
·361	1106	− 35
·527	1106	+ 131
73·127	1121	− 257
·268	1121	− 116
·407	1121	+ 23
6123·084	1203	− 97
·283	1203	+ 102
6413·141	1271	− 116
·433	1271	+ 176

9. VX Vel

Reduced to 9st on the ascending branch using the gradient d/st·00369.

J.D. 242....	Epoch	O—C
		d
0605·2406	0	+ ·0061
1287·3286	1339	+ 40
3788·4849	6249	− 68
·4855	6249	− 62
·4903	6249	− 14
89·4910	6251	− 195
·5026	6251	− 79
·5128	6251	+ 23
90·5336	6253	+ 43
91·5455	6255	− 26
3813·4501	6298	− 24
·4590	6298	+ 65
·4597	6298	+ 72
·4617	6298	+ 92
14·4689	6300	− 24
·4696	6300	− 17
15·4973	6302	+ 72
16·5097	6304	+ 8
17·5436	6306	+ 159
18·5515	6308	+ 50
·5521	6308	+ 56
57·2640	6384	+ 29
58·2921	6386	+ 122
84·2438	6437	− 156
85·2701	6439	− 81
86·2899	6441	− 71
3910·2294	6488	− 96
·2448	6488	+ 58
11·2594	6490	+ 16
13·3035	6494	+ 81
·3045	6494	+ 91
15·3438	6498	+ 108
·3507	6498	+ 177
16·3402	6500	− 116
·3644	6500	+ 126
36·2144	6539	− 41
37·2474	6541	+ 101
38·2557	6543	− 4
·2709	6543	+ 148
39·2680	6545	− 69
·2896	6545	+ 147
40·2857	6547	− 80
·3023	6547	+ 86
41·3234	6549	+ 109
42·3201	6551	− 112

TABLE 4 (*continued*).

J.D. 242....	Epoch	O—C
		d
3962·1901	6590	− ·0079
63·1962	6592	− 206
·2122	6592	− 46
64·2227	6594	− 130
·2466	6594	+ 109
65·2591	6596	+ 46
66·2791	6598	+ 58
88·1723	6641	− 53
89·1895	6643	− 69
4141·4962	6942	− 116
·5112	6942	+ 34
68·4838	6995	− 223
·5033	6995	− 28
·5043	6995	− 18
69·5109	6997	− 140
·5133	6997	− 116
·5217	6997	− 32
90·4016	7038	− 88
·4268	7038	+ 164
4238·2855	7132	− 88
·2874	7132	− 69
61·2171	7177	− 3
62·2180	7179	− 182
·2273	7179	− 89
63·2457	7181	− 93
·2491	7181	− 59
90·2602	7234	+ 68
91·2727	7236	+ 5
·2816	7236	+ 94
92·2979	7238	+ 69
94·3316	7242	+ 30
4543·4207	7731	− 58
·4304	7731	+ 39
·4356	7731	+ 91
5320·2715	9256	+ 60
77·3212	9368	+ 26
·3281	9368	+ 95
79·3546	9372	− 17
·3732	9372	+ 169
83·4410	9380	+ 95
5731·3487	10063	− 48
77·2052	10153	+ 55
6010·5083	10611	+ 21
30·3786	10650	+ 57
6155·1610	10895	− 155
7618·1917	13767	+ 107
19·1906	13769	− 92

10. TX Car

Means of the plates of one night, v ≧ 0st.

J.D. 242....	Epoch	O—C
		d
0327·248	0	+ ·017
3525·259	5320	− 16
3791·567	5763	− 10
3814·426	5801	+ 2
17·418	5806	− 8
76·340	5904	+ 2
85·360	5919	+ 5
3903·386	5949	− 4
11·264	5962	+ 60
26·214	5987	− 18
29·238	5992	0
32·235	5997	− 9
35·277	6002	+ 27
38·254	6007	− 1
41·282	6012	+ 21
44·253	6017	− 13
62·268	6047	− 33
4168·476	6390	− 14
71·457	6395	− 39
77·524	6405	+ 17
98·928	6440	− 19
4200·348	6443	− 2
04·568	6450	+ 10
06·357	6453	− 5
54·434	6533	− 18
63·430	6548	− 40
77·279	6571	− 17
86 331	6586	+ 19
92·342	6596	+ 18
4560·469	7042	+ 38
66·460	7052	+ 18
5406·215	8449	− 14
5562·547	8709	+ 22
71·504	8724	− 37
5615·410	8797	− 14
86·357	8915	− 1
5745·286	9013	+ 16
60·278	9038	− 21
72·339	9058	+ 17
75·333	9063	+ 6
89·200	9086	+ 47
6007·368	9449	+ 3
		d
6120·386	9637	+ ·007
25·197	9645	+ 9
26·375	9647	− 15
29·373	9652	− 23
55·216	9695	− 29
6364·454	10043	+ 14
6423·362	10141	+ 11
6883·233	10906	+ 13
7605·184	12107	0

11. EE Car

Reduced to 7st on the ascending branch using the gradient d/st·00665.

J.D. 242....	Epoch	O—C
		d
3786·5218	0	− ·0299
·5434	0	− 83
3814·3798	41	+ 12
·3805	41	+ 19
58·4611	106	− 334
·4993	106	+ 48
71·3864	125	− 35
77·4812	134	− 170
·5015	134	+ 33
80·2096	138	− 34
82·2357	141	− 135
84·2861	144	+ 8
86·3134	147	− 80
·3364	147	+ 150
3901·2576	169	+ 47
·2742	169	+ 213
·2860	169	+ 331
·2911	169	+ 382
07·3619	178	+ 6
·3643	178	+ 30
37·2181	222	− 62
39·2555	225	− 49
·2578	225	− 26
41·2791	228	− 174
·2876	228	− 89
43·3373	231	+ 47
56·2152	250	− 128
·2349	250	+ 69
		d
3958·2473	253	− ·0169
73·1841	275	− 116
75·2402	278	+ 84
·2406	278	+ 88
4141·4981	523	− 165
·5344	523	+ 198
71·3834	567	+ 57
73·4075	570	− 63
77·4835	576	− 25
·4844	576	− 16
·5013	576	+ 153
90·3916	595	+ 102
98·5206	607	− 53
·5298	607	+ 39
·5347	607	+ 88
4205·3088	617	− 41
45·3520	676	− 46
58·2460	695	− 60
62·3305	701	+ 63
64·3762	704	+ 159
77·2721	723	+ 164
94·2110	748	− 123
96·2489	751	− 106
·2541	751	− 54
4553·4858	1130	− 30
·4915	1130	+ 27
4642·3972	1261	− 20
51·2309	1274	+ 85
5067·2598	1887	− 90
·2671	1887	− 17
·2679	1887	− 9
·2772	1887	+ 84
5329·2541	2273	+ 50
5686·2529	2799	+ 47
5709·3165	2833	− 77
·3483	2833	+ 241
45·2956	2886	+ 1
·2973	2886	+ 18
60·2326	2908	+ 55
·2335	2908	+ 64
77·1918	2933	− 29
6123·3269	3443	− 76
·3314	3443	− 31
55·2274	3490	− 62
·2360	3490	+ 24
6423·3252	3885	+ 29
7619·1872	5647	− 140

TABLE 5.

CN Car

*	st	m
		m
a	0·0	11·52
b	3·5	11·73
c	7·4	11·95
d	10·3	12·12
e	14·4	12·35
f	18·0	12·56

CQ Car

*	st	m
		m
a	0·0	13·93
b	5·2	14·22
c	10·2	14·50
d	12·5	14·63
e	16·9	14·88

Y Car

*	st	m
		m
a	0·0	8·74
b	6·4	9·42
c	11·8	9·99

DY Car

*	st	m
		m
a	0·0	11·66
b	5·4	12·07
c	10·1	12·43
d	14·6	12·77
e	18·5	13·07

RY Vel

*	st	m
		m
a	0·0	10·08
b	4·6	10·34
c	9·0	10·60
d	11·0	10·71
e	14·6	10·93

UY Car

*	st	m
		m
a	0·0	9·56
b	5·0	10·05
c	9·5	10·48
d	12·1	10·73
e	17·2	11·22

XX Vel

*	st	m
		m
a	0·0	11·18
b	5·6	11·55
c	11·4	11·93
d	15·8	12·21
e	19·4	12·45

CY Car

*	st	m
		m
a	0·0	10·54
b	4·6	10·88
c	9·6	11·25
d	13·6	11·54

TABLE 5 (*continued*).

VX Vel

*	st	m
		m
a	0·0	13·15
b	4·7	13·41
c	9·7	13·68
d	15·1	13·98
e	17·5	14·11
f	21·4	14·33

TX Car

*	st	m
		m
a	0·0	12·52
b	4·3	12·73
c	8·5	12·94
d	14·4	13·23
e	18·9	13·46

EE Car

*	st	m
		m
a	0·0	12·81
b	2·8	12·96
c	4·3	13·04
d	7·8	13·23
e	13·2	13·53

TABLE 6.

CN Car

Phase	m	n
P	m	
·0145	12·11	52
·0725	12·16	52
·1174	12·19	52
·1740	12·25	52
·2426	12·30	52
·2921	12·31	52
·3470	12·33	52
·4096	12·31	51
·4624	12·15	30
·4962	12·01	30
·5282	11·87	30
·5543	11·76	30
·5812	11·64	30
·6300	11·54	30
·6714	11·59	51
·7197	11·67	52
·7660	11·77	52
·8385	11·89	52
·8966	11·98	52
·9507	12·06	52

CQ Car

Phase	m	n
P	m	
·0069	14·84	20
·0426	14·74	20
·0757	14·66	20
·1056	14·62	20
·1361	14·40	20
·1598	14·26	20
·1861	14·27	40
·2463	14·34	40
·3006	14·42	40
·3450	14·49	40
·3787	14·55	40
·4209	14·60	40
·4722	14·63	40
·5268	14·71	40
·5862	14·77	40
·6436	14·78	40
·6808	14·81	40
·7251	14·81	40
·7640	14·83	40
·8083	14·85	40
·8564	14·85	40
·9139	14·87	41
·9664	14·85	41

Y Car

Phase	m	n
P	m	
·0191	9·53	38
·0554	9·44	38
·1006	9·36	38
·1547	9·36	38
·1889	9·17	38
·2380	8·99	38
·2942	8·86	38
·3409	8·83	38
·3900	8·84	38
·4487	8·87	38
·4843	8·96	38
·5150	9·08	38
·5636	9·16	38
·5998	9·26	38
·6411	9·27	38
·6799	9·31	38
·7231	9·35	38
·7524	9·39	38
·7872	9·43	38
·8328	9·43	38
·8689	9·43	38
·8992	9·48	38
·9310	9·45	38
·9712	9·51	38

RY Vel

Phase	m	n
P	m	
·0361	10·10	41
·0929	10·19	41
·1329	10·24	41
·1743	10·29	41
·2143	10·40	41
·2424	10·45	41
·2837	10·47	41
·3258	10·50	41
·3630	10·65	41
·4424	10·72	40
·4911	10·71	40
·5303	10·72	40
·5662	10·60	40
·6073	10·45	40
·6510	10·26	40
·6864	10·13	40
·7264	9·97	40
·7583	9·95	40
·7959	9·95	40
·8536	9·97	40
·9084	9·98	40
·9673	10·02	40

UY Car

Phase	m	n
P	m	
·0424	9·79	50
·0928	9·87	50
·1564	10·00	50
·2310	10·20	50
·2947	10·38	50
·3571	10·55	50
·4007	10·63	50
·4463	10·67	50
·5179	10·82	50
·5720	10·83	50
·6147	10·85	50
·6607	10·91	50
·7184	10·92	50
·7777	10·92	50
·8337	10·89	50
·8714	10·70	31
·8979	10·56	31
·9332	10·25	31
·9618	10·07	31
·9949	9·85	31

XX Vel

Phase	m	n
P	m	
·0060	11·83	20
·0789	12·01	20
·1018	12·13	40
·1179	12·12	40
·1355	12·18	40
·2187	12·26	40
·2594	12·32	40
·2803	12·34	40
·3740	12·40	40
·4055	12·40	40
·4204	12·39	40
·4631	12·32	20
·4987	12·20	20
·5308	12·03	20
·5502	11·89	40
·5637	11·84	40
·5927	11·69	20
·6487	11·42	20
·6921	11·44	40
·7084	11·47	40
·7358	11·55	20
·7982	11·69	20
·8423	11·74	40
·8590	11·78	39
·9396	11·84	39
·9669	11·84	39
·9873	11·81	39

DY Car

Phase	m	n
P	m	
·0012	12·04	41
·0334	12·14	41
·0760	12·17	41
·1241	12·30	41
·1638	12·35	41
·2081	12·44	41
·2464	12·48	41
·2835	12·50	40
·3447	12·58	40
·3874	12·64	40
·4353	12·64	40
·4657	12·66	40
·5228	12·74	40
·5769	12·75	40
·6292	12·76	40
·6672	12·69	40
·6942	12·66	20
·7225	12·52	20
·7522	12·37	20
·7763	12·21	20
·7970	12·05	20
·8133	12·00	20
·8403	11·93	20
·8744	11·94	40
·9236	11·97	40
·9664	12·00	40

CY Car

Phase	m	n
P	m	
·0430	11·24	41
·0758	11·29	41
·1141	11·28	41
·1632	11·34	41
·1945	11·29	41
·2312	11·33	41
·2802	11·26	40
·3250	11·20	30
·3675	11·05	30
·3965	10·91	30
·4319	10·81	30
·4709	10·69	30
·5197	10·64	30

TABLE 6 (*continued*).

Phase	m	n
p	m	
·5668	10·70	41
·6080	10·73	41
·6498	10·84	41
·6866	10·85	41
·7309	10·93	41
·7802	11·00	41
·8223	11·08	41
·8552	11·11	41
·8844	11·15	41
·9335	11·18	41
·9793	11·21	41

VX Vel

Phase	m	n
p	m	
·0128	14·08	40
·0527	14·09	22
·0845	13·98	22
·1101	13·78	22
·1337	13·54	22
·1571	13·42	22
·1776	13·29	22
·2154	13·33	40
·2662	13·47	40
·3129	13·55	40
·3562	13·64	40
·3944	13·68	40
·4270	13·73	40
·4627	13·83	40
·5032	13·86	40
·5528	13·93	40
·6042	13·99	40
·6541	14·02	40
·7034	14·06	40
·7757	14·07	40
·8127	14·05	40
·8623	14·05	40
·9128	14·04	40
·9641	14·06	40

TX Car

Phase	m	n
p	m	
·0120	13·32	41
·0607	13·33	41
·1093	13·34	41
·1638	13·31	41
·2033	13·27	22
·2261	13·16	22
·2493	13·02	22
·2673	12·93	22
·2885	12·74	22
·3118	12·56	22
·3407	12·51	41
·3810	12·52	41
·4262	12·68	41
·4801	12·86	41
·5254	12·93	41
·5705	13·01	41
·6178	13·08	41
·6636	13·10	41
·7082	13·15	41
·7513	13·18	41
·7970	13·24	41
·8450	13·29	41
·8861	13·29	41
·9303	13·32	41
·9724	13·28	41

EE Car

Phase	m	n
p	m	
·0204	13·45	40
·0575	13·29	20
·0847	13·15	20
·1095	13·04	20
·1311	12·97	20
·1605	12·94	40
·2045	12·99	40
·2516	13·08	40
·2901	13·13	40
·3254	13·21	40
·3651	13·24	40
·4129	13·30	40
·4657	13·33	40
·5242	13·40	40
·5784	13·43	40
·6308	13·45	40
·6753	13·45	40
·7110	13·45	40
·7435	13·45	40
·7823	13·46	40
·8201	13·44	40
·8620	13·45	40
·9166	13·46	40
·9710	13·48	39

Photographic exposures of RR Leonis in the beginning of the year 1935 measured and discussed by *C. J. Kooreman.*

In continuation of the publication by P. TH. OOSTERHOFF in *B.A.N.* 206 „On the variability of the period of RR Leonis" 16 plates were taken with the 34 cm refractor, 7 by A. J. WESSELINK, 6 by J. UITTERDIJK and 3 by L. PLAUT. Of these 16 plates 9 contain an ascending branch of the lightcurve. Guilleminot Superguil plates of size 9×12 cm were used. The time of one exposure was $2\frac{1}{4}$ min. with an interval of $\frac{1}{4}$ min. between two consecutive exposures. The total number of exposures is 286. The plates have been measured in the Schilt-photometer. The same comparison stars *a*, *b*, *c* and *d* as in *B.A.N.* 206 have been used.

The reduction of the measurements to differences of magnitude was made in the following manner. By the aid of a normal table the galvanometer readings were converted into provisional magnitudes. Then the variable was interpolated between $\frac{1}{2}(m_a + m_b)$ and $\frac{1}{2}(m_c + m_d)$. As in Table 1 of *B.A.N.* 206 the mean of the comparison stars was taken as zero point.

The individual results here given in the first three columns of Table 1 form a direct continuation of the same Table of *B.A.N.* 206, the phases having again been calculated from the formula

$$\text{phase} = 2^{d-1}{\cdot}210541 \times (\text{J. D. hel. M. astr. T. Grw.} - 2420000)$$

In order to derive accurate epochs, those observations were used which lie on that part of the ascending branch that may be considered as rectilinear. For each ascending branch a least square solution was made, assuming Δm to be a linear function of the time. The corresponding residuals are given in the last column of Table 1. The mean error in magnitude for a single observation as derived from the least square solutions was practical the same for OOSTERHOFF's plates and the new ones, viz. $\pm\,^{m}{\cdot}032$.

In Table 2 the slope of the ascending branch is given separately for each of the 13 plates of OOSTERHOFF and of the 9 new plates, all slopes reduced to $^{m}/2{\cdot}5$ min.

The two plates 3110 and 3134, which show irregular fog, have nevertheless been given full weight.

The mean slope of OOSTERHOFF's plates is $-\,^{m}{\cdot}0884/2{\cdot}5$ min. and of the new plates $-\,^{m}{\cdot}0894/2{\cdot}5$ min.

The mean error of the slope as derived from the deviations from the mean is $\pm\,^{m}{\cdot}0054/2{\cdot}5$ min., while the least square solutions give a mean value of $\pm\,^{m}{\cdot}0033/2{\cdot}5$ min. The difference between these two values is in the direction to be expected, but too small to be considered as real in view of the scantiness of the material.