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MITTEILUNGEN
DER
STERNWARTE
DER UNGARISCHEN AKADEMIE
DER WISSENSCHAFTEN

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B. SZEIDL

A STUDY OF SOME VARIABLE STARS IN MESSIER 3

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INTRODUCTION

A comprehensive study of the RR Lyrae type variables in the globular cluster Messier 3 was carried out some years ago.(SZEIDL,1965; In the following we refer to this work as PaperI.)In order to complete this investigation, all the known variable stars in Messier 3 which were left out of attention at the earlier study and could either be measured or be estimated on the plates of the Konkoly Observatory were investigated.

Generally the results of the present study are in accordance with those of Paper I.

OBSERVATIONS

The detailed description of the observational material can be found in Paper I. All the available observations of the different authors were also used: B=(BAILEY,1913), L=(LARINK,1922), M=(MÜLLER, 1933), S=(SLAVENAS,1929), G=(GREENSTEIN,1935), Ma=(MARTIN,1942) and RS=(ROBERTS and SANDAGE, 1955).Additional observations for some of the variables are mentioned in the remarks on individual variables.

The comparison stars were selected from SANDAGE's (1953) primary photoelectric and secondary photographic sequence.

The systematic errors of the magnitudes may be fairly high because most of the stars estimated are near the centre or have close companion.The following stars were estimated: Nos. 2, 3, 30, 111, 128, 130, 137, 144, 152, 166, 167, 177 and 178. The stars Nos. 95 and 141 furthermore SVS1264=v.Z.89 and SVS1276=v.Z.1221 were measured with the microphotometers of the Konkoly Observatory. The magnitudes obtained for the variables are given in Table 4.

The elaboration of the observational material and the determination of the epochs were carried out in the same way as in Paper I. Most of the periods were taken from SAWYER's (1955)catalogue and were improved.For each variable (except No.95) 20 normal points were formed from the Budapest material. The normal points are given in Table 3 and plotted against phase in Figure 2.

The results obtained for the RR Lyrae type variables: the period, the maximum, minimum and medial brightness, the amplitude, $\varepsilon = \frac{1}{P}(t_{max} - t_{min})$, the different parameters characterizing the O - C diagram

Table 1

No.	Period	M	m	med	A	ε	$10^{10}\beta$	c_1	c_2	c	B_{eff}	r
3	0.5582053	14.75	16.00	15.37	1.25	0.12	0.0	0	0	0		1.5
30	0.5120902	15.18	15.92	15.55	0.74	0.15	-	1	1	2	i?	1.1
111	0.5102469	15.06	16.02	15.54	0.96	0.16	-	5	3	8	i	1.5
128	0.2922710	15.40	15.86	15.63	0.46	0.44	-	3	3	6	i	2.9
130	0.5688172	15.27	16.00	15.63	0.73	0.23:	-	4	3	7	i	1.4
137	0.5751464	15.30	16.04	15.67	0.74	0.16	+0.3	1	-	1		0.9
144	0.5967843	15.27	15.99	15.63	0.72	0.16	-	≥2	≥3	≥5	i?	1.9
152	0.3261217	15.42	15.76	15.59	0.34	0.34:	-	-	-	-		1.5
167	0.6439839	15.62	16.00	15.81	0.38	0.17:	-	≥2	≥2	≥4		1.4
177	0.3483438	15.52	15.90	15.71	0.38	0.32	-	≥1	≥3	≥4		1.2
178	0.2650805	15.51	15.81	15.66	0.30	0.28:	-	-	-	-	i?	1.5
vZ89	0.6369126	15.74	16.51	16.12	0.77	0.21	-	-	-	-		18
vZ1221	0.5093832	15.38	16.60	15.99	1.22	0.12	-	-	-	-	i	28

(β, c_1, c_2 and c; see their explanation in Paper I), the indication of light curve variation or possible light curve variation and the distance of the variable from the centre of the cluster are summarized in Table 1.

REMARKS ON INDIVIDUAL VARIABLES

No.2 The star is near the centre of the cluster and has close companions. It is very difficult to estimate. No period has been found.

No.3 The period given by MARTIN satisfies all the observations. The variable has larger amplitude than it is expected from its period. The period-maximum, period-ε and amplitude-ε diagrams also suggest that the star belongs to the long period branch of the RRab stars on the period-amplitude diagram.

Although the O - C values are approximated by a straight line, small oscillations are real. This scatter can only be explained by supposing Blashko-effect, but the few maxima observed do not show any light curve variations.The O - C residuals have been computed with the formula:

$$C = 2425000.491 + 0\overset{d}{.}5582053 \times E$$

Observer	Year	t (med.) hel.	E	O - C
B	1895	2413372.516	-20831	$0\overset{d}{.}000$
	1897	14077.522:	-19568	-0.008:
	1898	14456.554	-18889	+0.003
L	1921	22761.531	- 4011	+0.001
M	1925	24285.427	- 1281	-0.003
G	1926	24647.700	- 632	-0.005
Ma	1940	29770.358	+ 8545	+0.003
Bp	1940	29775.390	+ 8554	+0.011
	1941	30078.494	+ 9097	+0.009
	1950	33420.466	+15084	+0.006
	1952	34121.563	+16340	-0.003
	1953	34487.180:	+16995	-0.010:
	1955	35223.451	+18314	-0.012
	1956	35600.263:	+18989	+0.012:
	1957	35933.504	+19586	+0.004
	1962	37791.183:	+22914	-0.024:

No.30 The error of the observations is fairly large because of the close companions. For this reason, the light elements are distorted (for example the light amplitude observed is too small). To all probability the star has light curve variation. The O - C oscillations of LARINK's epochs are very likely the result of the Blashko-effect. The O - C diagram has been constructed by using the formula:

$$C = 2425000.468 + 0\overset{d}{.}5120902 \times E$$

Observer	Year	t (med.) hel	E	O - C
B	1895	2413395.481:	-22662	$+0\overset{d}{.}001$:
	1897	14079.621:	-21326	-0.011:
	1898	14456.507:	-20590	-0.024:
L	1921	22733.454	- 4427	+0.009
		22761.634	- 4372	+0.024
M	1924	23858.516	- 2230	+0.009
	1925	24298.399	- 1371	+0.007
G	1926	24647.658:	- 689	+0.020:
Ma	1940	29770.08 :	+ 9314	+0.004:
Bp	1941	30078.351:	+ 9916	-0.003:
	1950	33390.544	+16384	-0.010
	1951	33763.331:	+17112	-0.025:
	1952	34126.430	+17821	+0.003
	1953	34487.434	+18526	-0.017
	1955	35223.332:	+19963	+0.007:
	1956	35603.309:	+20705	+0.013:
	1962	37791.467	+24978	+0.010

No.95 The observational material for the variable known to us can be found in the following publications: BAILEY (1913), GREENSTEIN (1935), RYBKA (1930), LARINK (1922), GUTHNICK (1933) and RUSSEV (1971).

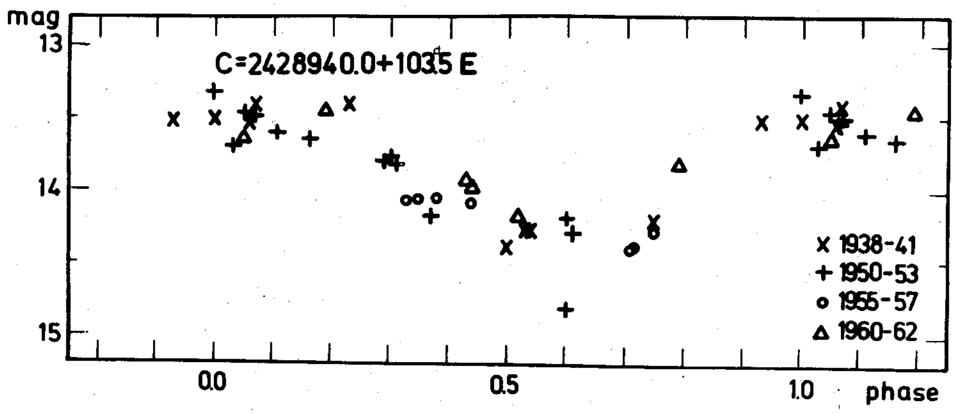

Figure 1 Light curve of No.95.

Table 2

J.D.	m	n	J.D.	m	n
2428963.5	13.40	1	2434126.4	13.60	1
991.5	14.39	5	131.4	13.64	1
29346.4	13.52	2	487.4	14.18	10
719.6	14.27	2	488.5	14.28	2
720.6	14.27	2	567.4	14.17	1
774.4	13.54	2	35223.5	14.40	10
775.4	13.42	4	224.5	14.38	10
30052.5	14.21	4	227.6	14.29	4
078.5	13.51	9	598.5	14.07	3
33390.5	13.31	6	600.4	14.06	7
420.5	13.79	8	603.4	14.06	11
421.5	13.76	7	920.5	14.09	7
422.5	13.82	6	36991.5	13.81	3
763.5	14.80	10	37018.6	13.62	10
34118.5	13.69	9	057.6	13.92	3
120.5	13.46	7	058.6	13.96	2
121.5	13.54	13	757.6	13.44	1
122.4	13.49	3	791.5	14.15	10

An attempt was made to transform all the observations into the same photographic system. For the colour index of the variable the mean value CI = $1^{m}.6$ was accepted. The greatest difficulty arose at BAILEY's observations. For estimating the brightness of the variable he used only the comparison stars a, c and d and, when No.95 was near maximum light he had to extrapolate. For this reason,his observations are systematically falsified.

The variable has a close, bright companion, therefore, the errors in the observations at Budapest may be considerable.

Our observations can be best satisfied with the period P = $= 103^{d}.5$. No period could, however, be found which satisfied all the observations.LARINK's 1921 observations showed great discrepancy. Disregarding this, a slight increase of the period seems real.

For each night mean magnitudes were formed from the Budapest observations (Table 2) and were plotted against phase (Figure 2).

<u>No.111</u> GREENSTEIN's period ($0^{d}.510$) is almost certainly well determined,although it is possible that the number of epochs in a year must be increased by one. (In this case $P = 0^{d}.50948$.) While the 1926 observations could be satisfied by the accepted period,LARINK's observations on J.D.2422730 led to discrepancy. The light curve variation can clearly be seen from each observer's material.Both the height and the phase of maxima show strong variations.

The O - C diagram is very complicated. During the last 30 years the period decreased by $0^{d}.0001$. The O - C's have been obtained with the formula:

$$C = 2425000.070 + 0^{d}.5102469 \times E$$

Observer	Year	t (med.) hel.	E	O - C
B	1896	2413691.538:	-22163	$+0^{d}.070$:
	1897	14067.561:	-21426	+0.041:
	1900	15160.813	-19283	-0.166
L	1921	22756.581	- 4396	-0.444
M	1924	23858.503:	- 2237	-0.145:
	1925	24298.391	- 1375	-0.090
S	1926	24621.916	- 741	-0.061
		24642.823	- 700	-0.074
G	1926	24647.929	- 690	-0.071
Bp	1939	29346.231:	+ 8517	+0.388:
Ma	1940	29770.220	+ 9348	+0.362
Bp	1940	29775.285:	+ 9358	+0.325:
	1941	30078.339:	+ 9952	+0.292:
	1950	33390.619:	+16444	+0.049:
	1952	34131.435:	+17896	-0.014:
	1955	35223.293:	+20036	-0.084:
	1956	35603.380:	+20781	-0.131:
	1960	37018.569	+23555	-0.367
	1962	37791.514	+25070	-0.446

<u>No.128</u> The large deviations in BAILEY's observations are very likely observational errors. The period is probably correct. From ROBERTS and SANDAGE's observations the light curve variation can be clearly seen, the oscillation of the phase of the medial brightness on the ascending branch amounts to $0^{d}.012$. The scatter in the Budapest

material is considerable.

The O - C diagram is fairly complicated. The curve drawn in seems to be the most likely although the groups of points might be shifted by P or its multiple parallel to the O - C axis. The O - C diagram is especially uncertain around J.D.2430000. The residuals have been derived by using the formula:

$$C = 2425000.018 + 0\overset{d}{.}2922710 \times E$$

Observer	Year	t(med.) hel.	E	O - C
B	1895	2413372.518:	-39784	+0^{d}.209:
	1896	13692.547:	-38689	+0.202:
	1897	14071.611:	-37392	+0.190:
	1900	15161.777	-33662	+0.185
L	1921	22761.575	- 7659	+0.061
M	1925	24285.427	- 2445	+0.012
G	1926	24683.786	- 1082	+0.005
Bp	1938	28991.578:	+13657	+0.015:
	1939	29346.234:	+14870	+0.146:
	1941	30078.406:	+17375	+0.179:
	1950	33420.497	+28810	+0.151
	1951	33763.350:	+29983	+0.171:
	1952	34118.452	+31198	+0.163
RS	1953	34447.860	+32325	+0.182
Bp	1953	34487.296:	+32460	+0.161:
	1955	35223.528	+34979	+0.163
	1956	35603.492	+36279	+0.174
	1957	35933.473	+37408	+0.181
	1962	37791.497	+43765	+0.239

No.130 BAILEY's best observations (in 1900) are very poor, the observations of 1895 - 1899 are completely unusable. No ascending branch was observed in 1900, the epoch given for that year is very uncertain.

The variable has strong light curve variation. The oscillation in the height of maxima amounts to $0\overset{m}{.}5$. Unfortunately, the number of maxima well observed in the Budapest material is scarce, therefore the normal points were determined for the whole light curve.

The period accepted is probably correct, but $P = 0\overset{d}{.}569665$ (the number of epochs in a year is decreased by one) seems almost just as good. Contradiction seems to exist between MARTIN's epoch and the Budapest observations in the interval 1938 - 1941. The difference is about $0\overset{d}{.}03$. It would be important to measure the plates of the Perkins Observatory obtained in 1939.

The O - C diagram is very complicated. On the average the period is decreasing. The scatter on the O - C diagram can probably be attributed to the Blashko-effect what we are not able to take into account.The O - C diagram is especially uncertain between BAILEY's and LARINK's observations. For this reason, the Mount Wilson Observatory's plates obtained in 1912 and 1915 would be very important to be measured. The O - C values have been obtained with the formula:

$$C = 2425000.370 + 0\overset{d}{.}5688172 \times E$$

Observer	Year	t(med.) hel.	E	O - C
B	1900	2415161.677:	-17296	-0.431:
L	1921	22729.613:	- 3992	-0.039:
		22761.453	- 3936	-0.053
M	1925	24286.486:	- 1255	-0.018:
		24290.450	- 1248	-0.036
		24298.418	- 1234	-0.032
		24311.509	- 1211	-0.023
G	1926	24647.685	- 620	-0.018
		24684.671:	- 555	-0.005:
Bp	1938	28991.252:	+ 7016	+0.061:
	1939	29346.201:	+ 7640	+0.068:
Ma	1940	29770.565	+ 8386	+0.094
Bp	1941	30078.270:	+ 8927	+0.069:
	1950	33420.521	+14803	-0.050
	1951	33763.475	+15406	-0.093
	1952	34118.342	+16030	-0.168
	1953	34487.523	+16679	-0.149
	1955	35223.463	+17973	-0.259
	1956	35603.435	+18641	-0.256
	1957	35933.245:	+19221	-0.360:
	1960	37018.471	+21129	-0.438
	1962	37791.483	+22488	-0.448

No.137 Only one epoch could be obtained from BAILEY's material (in 1900),nevertheless, the descending branches observed in other years (1895 - 1899) clearly showed that no essential O - C residuals existed compared with the O - C value in 1900. The scatter of MÜLLER's observations is large, therefore the epochs deduced from his material are very uncertain.

No doubt,the O - C diagram is a positive parabola, the scatter on it can be explained by the uncertain observations.The star lies very close to the centre of the cluster. The O - C diagram has been constructed by using the formula:

$$C = 2425000.352 + 0\overset{d}{.}5751464 \times E$$

Observer	Year	t(med.) hel.	E	O - C
B	1900	2415160.760	-17108	$+0\overset{d}{.}013$
M	1925	24289.464:	- 1236	-0.007:
G	1926	24647.792	- 613	+0.005
Bp	1940	29720.578:	+ 8207	-0.001:
	1941	30052.440	+ 8784	+0.002
	1950	33420.500	+14640	+0.005
	1951	33763.295:	+15236	+0.012:
	1953	34487.406	+16495	+0.014
	1956	35600.318:	+18430	+0.018:
	1960	37018.631:	+20896	+0.020:

No.141 = RV CVn = 4.1921 CVn was discovered by LARINK (1921). Its type and period was determined by SCHILT (1927). The star is of W UMa type and does not belong to the cluster.

Since the star lies near the edge of the photographic plates the error of the observations is fairly considerable. The following elements were deduced from the Budapest material:

$$\text{Min.I} = 15^{m}.97; \quad \text{Min.II} = 15^{m}.96 \text{ and Max.} = 14^{m}.98$$

Almost every observer who investigated the RR Lyrae type variables of the cluster also measured No.141. In addition to these observations Sc = SCHILT(1927), Ba = BAADE (1931) and Gr = GRAFF (1931) investigated this variable. GRAFF (1931) published only some epochs of the minimum from which a mean epoch was formed. GRAFF's (1923) observations obtained in 1921 were insufficient for determining an acceptable epoch. It would be interesting to complete the O - C diagram with observations before 1921. The O - C diagram has been constructed with the formula:

$$C = 2425000.032 + 0^{d}.2695671 \times E$$

Observer	Year	t (med.) hel.	E	O - C
L	1921	2422756.427	- 8323	$-0^{d}.002$
Sc	1926	24642.587	- 1326	+0.001
G	1926	24683.830	- 1173	0.000
Ba	1928	25326.478	+ 1211	0.000
Gr	1930	26177.770	+ 4369	-0.001
Bp	1938	28991.519	+14807	+0.007
	1940	29775.422	+17715	+0.009
	1941	30078.415	+18839	+0.008
	1950	33422.400	+31244	+0.014
	1951	33763.404	+32509	+0.015
	1952	34118.421	+33826	+0.012
	1953	34487.456	+35195	+0.010
	1955	35224.451	+37929	+0.008
	1956	35600.497	+39324	+0.008
	1957	35933.410	+40559	+0.006
	1960	37018.416	+44584	+0.004
	1962	37791.531	+47452	+0.001

No.144 The errors of the observations are large because of the close companion and dense surroundings. The period seems to be good. The variable probably has light curve variation, however, the large scatter prevents us from being sure of it. The epochs given in the table below are very uncertain. The material obtained for 1957 is especially poor.

The O - C diagram is fairly complicated, the period suddenly changed around J.D.2434500.The material before 1925 would be important for constructing a more complete O - C diagram. The O - C values have been computed by the formula:

$$C = 2425000.033 + 0^{d}.5967843 \times E$$

Observer	Year	t(med.) hel.	E	O - C
M	1925	2424284.503	- 1199	+0^d.014
G	1926	24647.940	- 590	+0.010
Ma	1940	29770.58 :	+ 7994	-0.147:
Bp	1940	29775.348:	+ 8002	-0.153:
	1941	30078.514	+ 8510	-0.153
	1950	33420.496	+14110	-0.163
	1952	34120.480	+15283	-0.207
	1953	34487.493	+15898	-0.217
	1955	35224.551	+17133	-0.187
	1956	35600.506	+17763	-0.207
	1960	37057.456	+20204	-0.007
	1962	37791.523	+21434	+0.015

No.152 The error of the observations is very large bacause the variable cannot be separated from the object No.178 on most of the plates. GREENSTEIN's period ($0^{d}.32641$) may be right but the new period satisfies the observations better. The scatter on the O - C diagram is caused by observational errors.For the year 1938 the Budapest material provides the interval $-0^{d}.086 \leq O-C \leq -0^{d}.032$. Nothing can be said about possible light curve variation.

The residuals have been derived with the formula:

$$C = 2425000.280 + 0^{d}.3261217 \times E$$

Observer	Year	t(med.)hel	E	O - C
M	1925	2424298.469	- 2152	+0^d.003
G	1926	24647.728	- 1081	-0.014
Bp	1940	29720.551	+14474	-0.014
Ma	1940	29770.093:	+14626	-0.043:
Bp	1941	30078.297:	+15571	-0.024:
	1950	33421.397	+25822	+0.002
	1951	33763.515:	+26871	+0.019:
	1952	34121.556	+27969	-0.022
	1953	34487.467	+29091	-0.019
	1955	35223.514	+31348	-0.029
	1956	35600.519	+32504	-0.021
	1957	35920.468:	+33485	+0.003:
	1960	37018.490	+36852	-0.027
	1962	37791.436:	+39222	+0.011:

No.166 The period is probably about $0^{d}.486$. The variable has strong light curve variation therefore the exact period could not be deduced from the poor material.

No.167 According to the Budapest observations (especially J.D.2433420 and 422) GREENSTEIN's period is wrong. The new period satisfies all the observations except one point (J.D.2428963.487; m = = 16.18:) so it may also be wrong. Series of observations taken in the same year are needed for determining the exact value of the period.

The O - C diagram is fairly complicated. On possible light curve variation nothing can be said. The O - C values have been obtained with the formula:

$$C = 2425000.288 + 0\overset{d}{.}6439839 \times E$$

Observer	Year	t(med.) hel.	E	O - C
M	1925	2424312.499	- 1068	$-0\overset{d}{.}014$
G	1926	24684.730	- 490	-0.006
Bp	1940	29775.471	+ 7415	+0.042
	1950	33420.469	+13075	+0.092
	1952	34122.401	+14165	+0.081
	1953	34487.526	+14732	+0.067
	1956	35603.506	+16465	+0.023
	1960	37018.328:	+18662	+0.012:
	1962	37757.611:	+19810	+0.002:

No.177 The variable has a close, bright companion therefore the light amplitude measured is systematically small. The error of epochs is considerable because of the large observational errors. According to GREENSTEIN's observations (these are the best) the light curve variation is unlikely.

The O - C diagram is typical for that of an RRc type star, however, one of the cycles may not be real. The O - C residuals have been derived by using the formula:

$$C = 2425000.068 + 0\overset{d}{.}3483438 \times E$$

Observer	Year	t(med.) hel.	E	O - C
M	1925	2424289.441	- 2040	$-0\overset{d}{.}006$
G	1926	24647.897	- 1011	+0.005
Bp	1938	28991.380:	+11458	-0.011:
	1940	29720.447:	+13551	-0.028:
	1941	30078.548	+14579	-0.024
	1950	33422.328:	+24178	+0.004:
	1952	34121.482	+26185	+0.032
	1953	34567.360	+27465	+0.030
	1955	35227.483:	+29360	+0.042:
	1956	35600.503	+30431	-0.015
	1960	37018.610	+34502	-0.016
	1962	37791.580:	+36721	-0.021:

No.178 The star is a difficult object having No.152 as its close companion. The variable is of RRc type with small amplitude. Perhaps it has light curve variation although the light amplitudes measured can also be different because of the considerable observational errors. The error of the epochs is also fairly large, it can exceed $0\overset{d}{.}01$. The period is certainly about $P \approx 0\overset{d}{.}265$. We could, however, not find a period which satisfied all the observations. The period probably

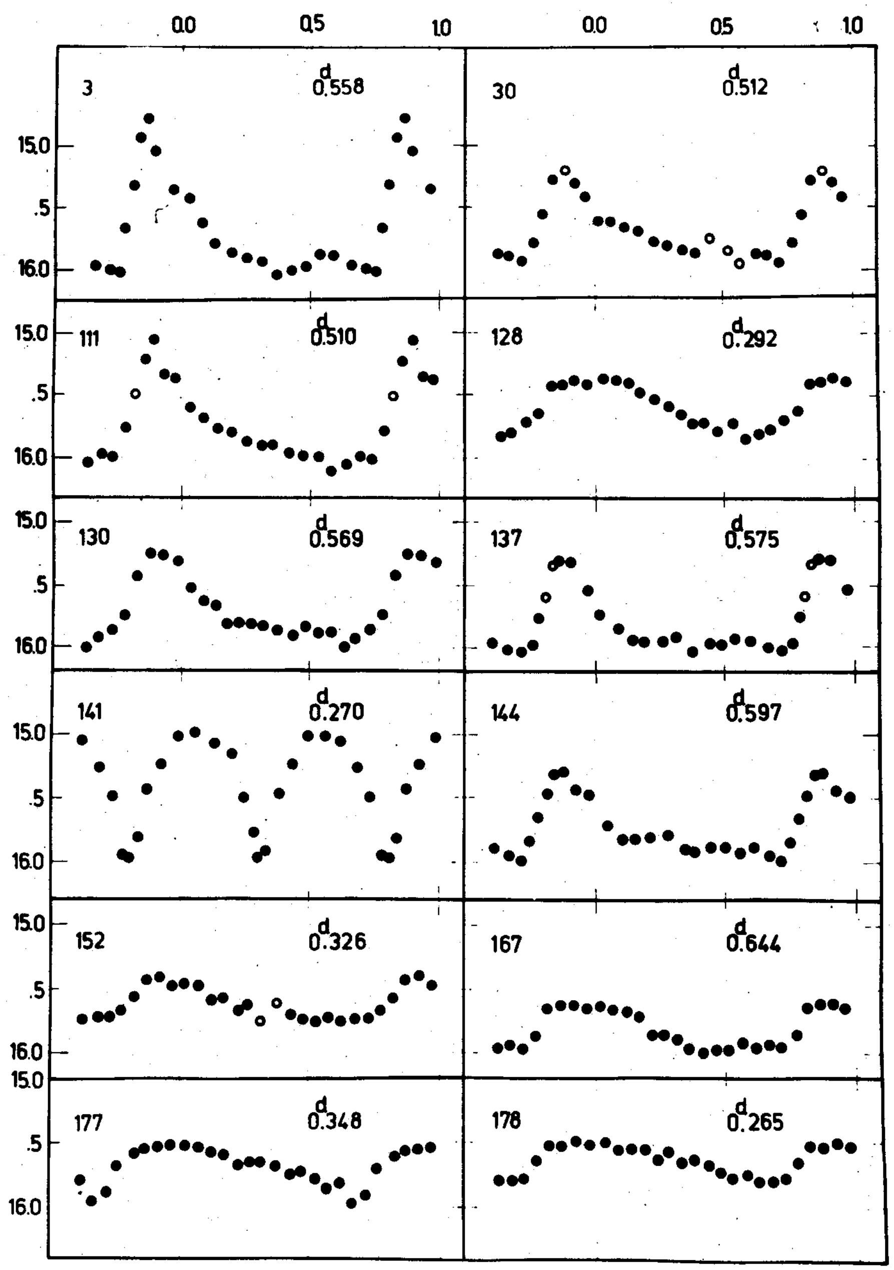

Fig. 2a Light curves of variables Nos. 3, 30, 111, 128, 130, 137, 141, 144, 152, 167, 177 and 178.

decreased by 10 sec between 1941 and 1950 and suddenly increased by about 10 sec around 1956. The O - C diagram has been constructed by using the formula:

$$C_1 = 2425000.050 + 0\overset{d}{.}2651549 \times E_1$$

for the interval 1925 - 1941 and

$$C = 2425000.050 + 0\overset{d}{.}2650805 \times E$$

for the years 1950 - 1962.

Observer	Year	t(med.) hel.	E	E_1	O - C	O - C_1
M	1925	2424286.500	- 2692	- 2691	+0$\overset{d}{.}$047	+0$\overset{d}{.}$247
G	1926	24647.942	- 1329	- 1328	+0.184	+0.283
Bp	1938	28991.429:	+15057	+15053	+0.062:	+0.267:
	1940	29774.426:	+18010	+18006	+0.276:	+0.262:
	1941	30078.543:	+19157	+19153	+0.346:	+0.246:
	1950	33422.494	+31772		+0.306	
	1951	33763.558:	+33059		+0.212:	
	1952	34120.578	+34406		+0.168	
	1953	34483.412	+35775		+0.107	
	1955	35224.467	+38571		-0.003	
	1956	35600.362	+39989		+0.008	
	1957	35933.562:	+41246		+0.002:	
	1960	37018.646:	+45339		+0.111:	
	1962	37791.551:	+48254		+0.307:	

<u>I-I-42</u> Its Zeipel-number is 1390.The light amplitude of this variable is smaller than the error of our photographic observations. Its brightness is around $15\overset{m}{.}8$.

<u>I-I-100</u> Its brightness is about $15\overset{m}{.}9$.The error of our photographic observations is larger than the amplitude of the light variation.

<u>SVS 1264</u> The light variation of this star was discovered by KUROCHKIN (1959) and the star's Zeipel-number (v.z.89) was given by KUKARKIN (1960). The variable is situated far from the centre of the cluster (and from the centre of the photographic plates),therefore the photometric errors are large. The star was measured with both the Rosenberg and Becker-iris photometer of the Konkoly Observatory and mean values were formed.

The period given by KUROCHKIN seems to be right. The O - C diagram could only be constructed for the last 30 years from Ku = KUROCHKIN's (1961) observations and the material obtained at Budapest. The small oscillations in the O - C diagram appear to be real. This kind of oscillations in the O - C diagrams is generally characteristic of RRab variables with long period.The O - C values have been computed by using the formula:

$$C = 2435000.355 + 0\overset{d}{.}6369126 \times E$$

Observer	Year	t(med.) hel.	E	O - C
Bp	1941	2430078.300:	- 7728	+0^d.006:
	1950	33421.432	- 2479	-0.017
	1951	33763.463	- 1942	-0.008
	1952	34121.407	- 1380	-0.009
Ku	1953	34454.512:	- 857	-0.009:
Bp	1955	35224.553	+ 352	+0.005
	1956	35600.328	+ 942	+0.001
Ku		35602.244	+ 945	+0.007
Bp	1957	35933.446	+ 1465	+0.014
Ku	1959	36668.432	+ 2619	+0.003
Bp	1960	36991.340:	+ 3126	-0.004:
	1962	37791.318:	+ 4382	+0.012:

SVS 1276 The light variation of the star was discovered by KUROCHKIN (1959) and its Zeipel-number (v.Z.1221) was given by KUKARKIN (1961). The variable is far from the centre of the cluster (and far from the centre of the plates). The star can only be measured on the 9 × 12 cm plates and is not present on the 6 × 9 cm plates at all.

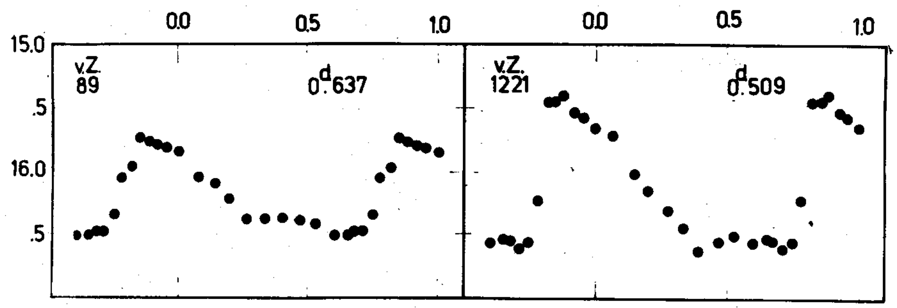

Fig. 2b Light curves of variables SVS 1264 = v.Z.89 and SVS 1276 = v.Z.1221

Although only a few well-observed maxima are available the Blashko-effect can be taken for certain. The period given by KUKARKIN and KUROCHKIN seems to be good. The O - C diagram has been constructed with the formula:

$$C = 2435000.317 + 0^d.5093832 \times E$$

Observer	Year	t(med.) hel.	E	O - C
Bp	1950	2433422.234:	- 3098	-0^d.014:
	1952	34121.147:	- 1726	+0.025:
	1953	34487.387	- 1007	+0.019
	1956	35603.421	+ 1184	-0.006
	1957	35933.500	+ 1832	-0.007
	1960	37018.495	+ 3962	+0.002
	1962	37791.234:	+ 5479	+0.006:

Table 3

PHASE		m - 10	n	PHASE		m - 10	n
No.3.				No.30.			
$0^{d}.005$	$0^{p}.009$	5.29	4	$0^{d}.004$	$0^{p}.008$	5.54	5
.020	.036	4.92	8	.022	.043	5.27	5
.038	.068	4.76	5	.046	.090	5.20	3
.054	.097	5.02	10	.065	.127	5.29	6
.092	.165	5.33	6	.084	.164	5.40	10
.125	.224	5.40	6	.110	.215	5.60	14
.155	.278	5.59	8	.135	.264	5.61	14
.182	.326	5.75	8	.163	.318	5.65	21
.218	.391	5.82	16	.190	.371	5.68	20
.250	.448	5.87	20	.220	.430	5.76	25
.285	.511	5.90	14	.248	.484	5.79	13
.314	.563	6.00	18	.278	.543	5.82	11
.350	.627	5.94	11	.304	.594	5.85	8
.380	.681	5.94	10	.332	.648	5.74	2
.412	.738	5.84	12	.370	.723	5.83	3
.441	.790	5.85	12	.392	.765	5.93	2
.480	.860	5.93	11	.426	.832	5.85	6
.513	.919	5.96	11	.447	.873	5.87	4
.535	.958	5.98	6	.471	.920	5.92	4
.548	.982	5.63	7	.497	.971	5.77	4
No.111.				No.128.			
$0^{d}.011$	$0^{p}.022$	5.49	2	$0^{d}.010$	$0^{p}.034$	5.45	11
.030	.059	5.21	4	.022	.075	5.44	5
.049	.096	5.05	5	.035	.120	5.41	6
.069	.135	5.33	6	.050	.171	5.44	7
.089	.174	5.36	5	.067	.229	5.40	13
.119	.233	5.59	7	.082	.281	5.41	11
.147	.288	5.67	17	.096	.328	5.43	11
.175	.343	5.76	14	.108	.370	5.50	13
.202	.396	5.79	18	.125	.428	5.56	13
.231	.453	5.86	19	.141	.482	5.62	8
.261	.512	5.89	18	.155	.530	5.68	10
.285	.559	5.88	17	.168	.575	5.76	7
.316	.619	5.94	13	.181	.619	5.75	8
.344	.674	5.96	8	.197	.674	5.82	7
.373	.731	5.97	14	.214	.732	5.76	9
.399	.782	6.08	11	.228	.780	5.88	10
.429	.841	6.02	10	.245	.838	5.84	7
.457	.896	5.96	13	.256	.876	5.81	5
.479	.939	5.98	7	.272	.931	5.73	9
.503	.986	5.76	4	.288	.985	5.66	7

Table 3 (continued)

PHASE		m - 10	n	PHASE		m - 10	n
No.130.				No.137.			
$0^{d}.015$	$0^{p}.026$	5.44	9	$0^{d}.005$	$0^{p}.009$	5.61	2
.042	.074	5.28	10	.020	.035	5.37	3
.072	.127	5.29	7	.035	.061	5.33	4
.103	.181	5.34	8	.061	.106	5.34	11
.132	.232	5.54	6	.099	.172	5.56	10
.160	.281	5.64	7	.124	.216	5.74	10
.188	.331	5.68	10	.167	.290	5.84	6
.212	.373	5.82	12	.198	.344	5.94	13
.239	.420	5.81	9	.224	.389	5.96	17
.267	.469	5.82	6	.264	.459	5.96	7
.293	.515	5.83	9	.291	.506	5.93	7
.324	.570	5.87	7	.330	.574	6.04	11
.357	.628	5.91	11	.368	.640	5.98	9
.385	.677	5.84	11	.394	.685	5.99	13
.412	.724	5.89	10	.425	.739	5.94	9
.443	.779	5.88	11	.460	.800	5.96	9
.470	.826	6.00	13	.496	.862	6.01	14
.497	.874	5.93	14	.525	.913	6.03	9
.528	.928	5.86	16	.552	.960	5.98	8
.556	.977	5.75	15	.567	.986	5.77	3
No.141.				No.144.			
$0^{d}.001$	$0^{p}.004$	5.96	16	$0^{d}.014$	$0^{p}.023$	5.47	8
.009	.033	5.80	4	.031	.052	5.31	8
.019	.070	5.42	9	.051	.085	5.29	4
.032	.119	5.23	16	.079	.132	5.43	12
.050	.185	5.01	14	.112	.188	5.47	8
.067	.249	4.98	15	.151	.253	5.70	7
.088	.326	5.06	14	.185	.310	5.81	5
.106	.393	5.15	13	.215	.360	5.81	7
.118	.438	5.48	11	.248	.416	5.79	7
.129	.479	5.76	8	.291	.488	5.77	5
.134	.497	5.95	5	.329	.551	5.88	4
.143	.530	5.90	4	.350	.586	5.90	8
.154	.571	5.45	6	.389	.652	5.87	12
.168	.623	5.22	15	.422	.707	5.87	13
.186	.690	5.01	13	.457	.766	5.92	19
.203	.753	5.00	17	.489	.819	5.87	18
.220	.816	5.04	15	.524	.878	5.94	20
.238	.883	5.25	11	.550	.922	5.98	7
.251	.931	5.48	5	.571	.957	5.83	6
.262	.972	5.94	8	.591	.990	5.64	14

Table 3 (continued)

PHASE		m - 10	n	PHASE		m - 10	n
No.152.				No.167.			
$0^{d}.008$	$0^{p}.025$	5.58	13	$0^{d}.016$	$0^{p}.025$	5.66	8
.023	.071	5.44	13	.050	.078	5.63	6
.041	.126	5.41	10	.083	.129	5.63	10
.057	.175	5.48	12	.112	.174	5.66	12
.072	.221	5.46	13	.147	.228	5.64	9
.091	.279	5.48	11	.177	.275	5.67	7
.107	.328	5.59	10	.214	.332	5.69	4
.120	.368	5.58	7	.244	.379	5.73	6
.139	.426	5.67	6	.276	.429	5.87	9
.151	.463	5.63	5	.304	.472	5.87	10
.168	.515	5.75	3	.338	.525	5.91	17
.189	.580	5.61	3	.370	.575	5.98	18
.206	.632	5.70	7	.400	.621	6.01	8
.222	.681	5.74	10	.435	.675	5.99	13
.237	.727	5.76	10	.467	.725	5.99	9
.254	.779	5.73	16	.500	.776	5.93	8
.269	.825	5.75	10	.536	.832	5.97	9
.288	.883	5.73	12	.566	.879	5.95	12
.304	.932	5.72	11	.597	.927	5.97	16
.319	.978	5.67	18	.633	.983	5.87	16
No.177.				No.178.			
$0^{d}.011$	$0^{p}.032$	5.60	9	$0^{d}.005$	$0^{p}.019$	5.53	9
.026	.075	5.56	8	.018	.068	5.54	9
.042	.121	5.55	9	.032	.121	5.50	9
.060	.172	5.53	8	.046	.174	5.53	9
.077	.221	5.54	9	.061	.230	5.51	12
.097	.278	5.55	14	.075	.283	5.57	8
.115	.330	5.58	10	.088	.332	5.56	8
.130	.373	5.60	12	.102	.385	5.56	11
.149	.428	5.68	13	.115	.434	5.64	7
.166	.477	5.65	12	.126	.475	5.57	10
.182	.522	5.65	7	.139	.525	5.66	11
.201	.577	5.68	15	.152	.574	5.64	13
.220	.632	5.75	11	.167	.630	5.68	10
.234	.672	5.73	11	.179	.675	5.73	12
.254	.729	5.78	14	.191	.721	5.78	11
.269	.772	5.85	5	.207	.781	5.75	8
.286	.821	5.81	9	.218	.823	5.80	11
.304	.873	5.97	4	.232	.876	5.80	9
.322	.924	5.90	4	.244	.921	5.78	12
.336	.965	5.70	6	.257	.970	5.65	9

Table 3 (continued)

PHASE		m - 10	n	PHASE		m - 10	n
v.Z.89.				v.Z.1221.			
$0^{d}.011$	$0^{p}.017$	5.97	8	$0^{d}.010$	$0^{p}.020$	5.47	4
.030	.047	5.74	7	.023	.045	5.47	3
.053	.083	5.77	6	.040	.079	5.42	7
.074	.116	5.80	4	.061	.120	5.55	4
.096	.151	5.82	10	.077	.151	5.59	3
.126	.198	5.85	15	.100	.196	5.67	2
.172	.270	6.05	12	.135	.265	5.73	4
.214	.336	6.10	11	.175	.344	6.03	4
.251	.394	6.23	13	.203	.399	6.16	11
.296	.465	6.38	17	.241	.473	6.31	19
.338	.531	6.37	17	.272	.534	6.44	17
.382	.600	6.37	12	.301	.591	6.62	13
.425	.667	6.40	14	.341	.669	6.55	10
.464	.729	6.41	12	.370	.726	6.50	11
.510	.801	6.51	8	.408	.801	6.56	12
.542	.851	6.50	4	.434	.852	6.53	2
.561	.881	6.47	8	.446	.876	6.54	4
.580	.911	6.47	4	.464	.911	6.60	8
.605	.950	6.34	7	.483	.948	6.55	4
.624	.980	6.05	7	.500	.982	6.23	8

OBSERVATIONS OF VARIABLES.(m-10)

Table 4

J.D. 24...	2	3	30	95	111	128	130	137
28963.487	6.04	6.10	6.10	3.40	6.27	5.77	5.77	6.37
28991.403	5.96	5.97	5.87	4.40	6.23	5.62	5.67	5.67
.416	6.05	6.03	5.92	4.41	6.20	5.53	5.53	5.87
.430	5.98	6.07	5.93	4.40	6.13	5.63	5.60	5.93
.522	5.98	6.12	6.03	4.36	6.20	5.87	5.93	6.13
.542	5.89	6.03	5.87	4.36	6.10	5.82	5.87	5.97
29346.376	5.69	5.70	5.97	3.58	5.63	5.68	5.67	5.87
.392	5.78	5.95	5.80	3.47	5.87	5.65	5.73	5.87
29719.549	5.82	5.95	5.77	4.26	6.07	5.60	5.87	5.90
.560	5.90	5.70	5.72	4.28	6.17	5.62	6.03	6.00
29720.546	5.84	5.68	5.63	4.34	6.00	5.65	5.62	6.07
.558	5.78	5.77	5.40	4.20	5.97	-	5.70	5.95
29774.405	5.89	5.70	5.97	3.51	5.72	5.37	6.20	6.23
.417	5.90	5.80	5.83	3.58	5.63	-	6.10	6.15
29775.403	5.76	4.97	5.80	3.46	5.63	5.43	6.00	5.93
.415	5.75	4.73	5.80	3.48	5.75	5.65	5.87	5.95
.426	5.80	4.73	5.87	3.31	5.83	-	6.03	5.97
.437	5.75	5.03	5.90	-	5.72	5.60	6.07	6.03
.447	5.82	5.15	5.75	3.43	5.73	-	6.07	6.00
30052.462	5.82	5.80	5.83	4.24	5.58	5.37	5.92	5.40
.474	5.78	5.80	5.73	4.22	5.53	5.23	5.93	5.43
.489	5.85	5.87	5.70	4.17	5.50	5.27	5.87	5.32
.501	5.75	5.93	5.75	4.22	5.67	5.40	5.80	5.40
30078.418	5.74	5.83	5.30	3.45	5.58	5.30	5.62	5.68
.434	5.70	5.97	5.43	3.42	5.63	5.30	5.63	5.63
.470	5.68	5.97	5.67	3.53	5.65	5.37	5.85	5.67
.483	5.63	5.53	5.65	3.53	5.65	5.27	5.75	-
.498	5.79	5.28	5.68	3.54	5.75	5.40	5.80	5.80
.509	5.80	4.97	5.65	3.56	5.90	5.37	5.90	5.80
.521	5.81	4.68	5.63	3.53	5.87	5.53	5.90	6.03
.536	5.70	4.72	5.63	3.53	5.70	5.52	5.87	5.93
.548	5.76	4.80	5.52	3.51	5.77	5.43	5.88	5.90
33390.497	5.88	5.70	5.83	3.36	6.00	5.53	5.62	5.90
.534	5.80	5.87	5.77	3.35	6.17	5.70	5.70	6.03
.545	5.79	5.83	5.55	3.26	6.13	5.77	5.63	6.10
.558	5.75	5.80	5.20	3.33	6.07	5.80	5.70	-
.570	5.82	5.97	5.27	3.30	6.00	5.70	5.77	5.93
.586	5.82	5.90	5.30	3.23	6.17	5.90	5.80	5.97
33420.424	5.85	6.13	5.65	3.74	6.07	6.00	6.17	6.05
.438	5.94	6.13	5.75	3.84	6.05	5.87	5.88	6.20
.450	5.92	5.73	5.87	3.76	6.10	5.80	5.97	6.07
.476	5.73	5.13	5.80	3.81	5.97	5.83	5.90	6.03
.487	5.76	4.98	5.80	3.71	6.07	5.67	5.75	5.90
.498	5.70	4.80	5.80	3.80	5.97	5.67	5.80	5.60
.510	5.66	5.10	5.68	3.84	5.97	5.40	5.88	5.50
.523	5.65	4.97	5.68	3.84	6.00	5.40	5.77	5.32
33421.385	5.74	5.93	5.70	-	5.72	5.53	5.80	5.85
.442	5.70	5.90	5.53	3.74	5.65	5.53	5.77	5.90
.454	5.77	6.00	5.63	3.75	5.85	5.50	5.85	5.97
.465	5.64	5.87	-	3.77	5.70	5.50	5.83	5.90
.475	5.68	5.80	-	3.88	5.73	5.50	5.77	5.90
.486	5.72	5.80	-	3.77	5.73	5.53	5.85	5.80
.497	5.69	5.90	5.60	-	5.78	5.53	5.80	6.00
.535	5.69	6.00	5.72	3.71	5.83	-	5.88	5.75
.548	5.73	-	6.00	3.69	5.80	5.90	6.00	-
33422.398	5.81	6.03	5.73	3.81	5.90	5.80	5.90	5.90
.431	5.70	5.93	5.57	3.71	5.92	5.95	5.77	5.90
.442	5.97	6.17	5.97	3.88	6.12	6.07	5.80	6.00

Table 4 (continued)

J.D. 24...	2	3	30	95	111	128	130	137
33422.452	5.97	6.08	5.77	-	6.03	6.00	5.90	5.97
.462	-	-	-	-	-	-	-	-
.472	5.78	6.13	5.77	3.85	6.07	6.07	5.80	6.00
.483	5.97	6.07	5.62	-	6.13	6.13	5.80	6.03
.493	5.72	6.03	5.80	3.86	5.97	6.07	5.63	6.10
.508	5.71	5.97	5.67	3.83	6.00	5.73	5.80	5.78
.520	5.65	6.07	5.72	-	5.90	5.70	5.75	6.10
33763.406	5.80	5.90	5.43	4.75	6.17	5.10	6.03	5.70
.420	5.80	5.65	5.43	4.73	5.90	5.40	6.07	5.60
.442	5.75	5.80	5.57	4.81	6.03	5.47	5.92	5.65
.455	5.84	6.03	5.80	4.78	6.07	5.52	5.90	5.93
.464	5.82	5.93	5.75	4.82	6.13	5.58	5.80	6.03
.483	5.80	5.97	5.73	4.89	6.17	5.55	5.35	5.97
.494	5.80	5.97	5.72	4.82	5.97	5.60	5.17	5.93
.504	5.85	6.10	5.90	4.79	6.07	5.75	5.38	6.07
.514	5.90	5.97	5.92	4.85	6.03	5.65	5.50	6.00
.525	5.92	6.13	5.80	4.78	6.13	5.68	5.57	-
34118.355	5.68	5.62	5.63	3.69	5.85	5.60	5.43	6.05
.372	5.76	5.50	5.73	3.69	5.70	5.70	5.22	5.95
.388	5.66	5.53	5.65	-	5.72	5.67	4.97	-
.428	5.82	5.90	5.87	3.79	5.90	5.80	5.23	6.03
.443	5.78	5.93	5.87	3.65	5.83	5.87	5.47	6.03
.470	5.74	5.60	5.80	3.72	5.85	5.50	5.45	-
.485	5.78	6.03	6.00	3.68	6.03	5.63	5.58	6.00
.499	5.80	5.80	5.80	3.60	5.90	-	5.68	6.10
.513	5.88	5.83	6.10	3.73	5.93	-	5.70	6.17
.526	5.66	5.80	5.90	-	6.00	5.53	5.72	-
.540	5.82	5.97	5.93	3.71	5.97	5.47	5.87	6.00
34120.471	5.76	4.80	-	3.47	5.83	-	5.73	-
.484	5.83	4.80	5.50	3.48	5.80	5.47	5.97	-
.497	5.70	5.03	5.57	3.38	5.83	5.62	5.80	-
.510	5.79	5.30	5.80	-	5.90	5.53	6.07	5.43
.523	5.73	5.35	5.60	3.42	6.07	5.45	5.90	5.60
.536	5.70	5.20	5.73	3.46	5.97	5.30	6.00	5.70
.551	5.82	5.63	5.93	3.43	6.00	5.40	5.97	5.80
.564	5.81	5.30	5.65	-	5.90	5.33	5.93	5.67
.579	5.82	5.30	5.80	3.55	5.93	5.20	5.87	5.65
34121.401	5.75	5.80	5.60	3.52	5.70	5.40	5.80	-
.412	5.66	5.80	5.60	3.49	5.67	5.45	5.72	6.00
.422	5.72	5.73	5.73	3.50	5.67	5.47	5.72	6.00
.431	5.68	5.70	5.50	3.51	5.73	5.37	5.77	6.10
.441	5.66	5.80	5.63	3.58	5.68	5.47	5.82	6.05
.484	5.71	5.93	5.75	3.54	5.88	5.73	5.87	6.07
.495	5.81	6.03	5.70	3.47	5.93	5.58	5.83	6.03
.505	5.70	5.90	5.77	3.57	5.77	5.68	5.90	5.97
.517	5.82	6.03	5.90	3.49	5.87	5.70	5.93	6.00
.528	5.77	5.93	5.70	-	5.85	5.63	5.93	6.00
.539	5.80	5.93	5.80	3.60	5.95	5.75	5.95	6.10
.552	5.77	5.60	5.77	3.61	5.83	-	5.93	-
.562	5.84	5.45	-	3.60	5.70	-	5.93	-
.594	5.80	-	5.75	3.55	5.83	5.97	5.78	-
.605	5.85	4.80	5.97	-	6.03	5.90	6.10	-
34122.404	5.66	5.60	-	3.50	5.63	5.80	5.30	-
.416	5.70	5.80	5.50	3.53	5.68	5.60	5.40	6.00
.431	5.72	5.73	-	3.44	5.77	5.77	5.50	-
34126.433	5.68	5.82	5.50	3.60	5.57	5.57	5.58	5.87
34131.415	5.64	5.73	5.97	3.64	5.85	5.63	5.60	-
34487.347	5.73	5.65	5.85	4.15	6.00	5.47	5.75	6.00

Table 4 (continued)

J.D. 24...	2	3	30	95	111	128	130	137
34487.367	5.76	-	6.00	4.17	6.13	5.37	6.00	6.03
.385	5.84	5.63	6.00	4.15	6.20	5.52	6.00	6.10
.397	5.75	5.80	5.93	-	6.13	5.40	5.88	5.75
.410	5.66	5.73	6.00	-	6.00	5.58	6.03	5.72
.428	5.77	5.87	5.43	-	6.17	5.57	5.97	5.38
.438	5.72	6.00	5.50	4.23	6.03	5.65	6.02	5.33
.449	5.70	5.80	5.33	4.20	6.13	5.77	5.92	5.35
.460	5.69	5.83	5.07	4.13	6.13	5.70	6.03	5.18
.474	5.70	5.90	5.12	4.15	6.17	-	6.07	5.33
.483	5.60	5.93	5.18	4.24	6.00	5.80	5.83	5.30
.494	5.61	6.00	5.08	4.18	5.93	5.65	5.87	5.17
.508	5.66	6.10	5.17	-	6.00	5.65	5.78	5.45
.518	5.71	5.90	5.18	4.19	6.07	5.72	5.78	5.40
34488.530	5.75	5.90	5.30	4.30	5.90	5.43	5.83	5.95
.540	5.79	6.00	5.37	4.25	5.90	5.43	5.93	6.00
34567.388	5.60	5.93	5.12	4.17	5.77	5.40	5.72	5.23
35223.415	5.59	5.90	5.45	4.33	5.60	5.75	5.90	6.00
.428	5.61	5.87	5.45	4.33	5.63	-	5.90	5.95
.441	5.66	5.53	5.53	4.36	5.73	5.63	5.68	5.95
.467	5.69	5.10	5.43	4.47	5.63	5.90	5.57	5.93
.490	5.65	4.77	-	4.38	5.77	5.70	5.55	6.00
.503	5.66	5.03	-	4.42	5.82	5.85	5.37	5.95
.517	5.67	4.97	-	4.41	5.72	5.67	5.33	5.90
.530	5.67	5.13	-	4.40	5.77	5.60	5.20	6.00
.546	5.58	5.15	-	4.46	5.75	5.50	5.42	-
.573	5.65	5.23	-	4.40	5.87	5.37	5.37	-
35224.454	5.58	5.80	5.58	4.36	5.80	5.52	5.68	5.87
.472	5.64	5.93	5.43	4.41	5.72	5.40	5.78	6.00
.485	5.65	6.00	5.65	4.45	5.73	5.60	5.90	6.00
.499	5.69	6.00	5.52	4.39	5.73	5.17	5.82	5.93
.512	5.58	6.00	5.57	4.39	5.77	5.37	5.87	6.03
.524	5.53	5.90	5.58	4.46	5.78	-	5.73	5.83
.542	5.62	6.00	5.58	4.34	5.73	-	5.80	5.75
.556	5.61	5.60	5.72	4.31	6.00	-	5.78	6.05
.569	5.69	5.27	-	4.37	5.68	-	5.62	-
.583	5.65	5.10	5.78	4.34	5.83	-	-	-
35227.534	5.53	5.87	-	4.33	5.70	5.90	5.32	6.00
.547	5.56	5.80	-	4.25	5.95	5.72	5.07	-
.560	5.58	5.77	-	4.33	5.80	5.80	5.43	5.97
.573	5.55	5.83	-	4.25	5.93	5.77	5.37	-
.586	5.69	5.67	-	-	5.90	5.90	5.70	6.00
35598.507	5.68	6.00	5.67	4.10	6.00	5.87	5.60	6.00
.524	5.69	6.00	5.80	4.02	5.82	5.62	5.73	6.00
.537	5.63	6.00	5.72	4.10	5.97	5.47	5.83	6.00
35600.363	5.69	5.52	5.37	4.08	5.03	5.43	5.83	5.03
.378	5.58	5.43	5.53	-	5.12	5.42	5.92	5.17
.391	5.68	5.43	5.52	4.09	5.33	5.47	5.80	5.33
.405	5.60	5.55	5.70	4.09	5.28	5.65	5.73	5.40
.421	5.60	5.55	5.58	4.04	5.57	5.63	5.75	5.62
.434	5.74	5.60	5.72	-	5.50	5.60	5.90	5.58
.446	5.63	5.62	5.83	4.08	5.53	-	5.90	5.50
.501	5.61	5.60	5.93	4.03	5.68	5.70	5.83	-
.525	5.60	5.90	5.62	3.98	5.88	5.83	5.77	-
35603.369	5.70	5.97	5.33	4.13	5.68	5.70	5.90	5.75
.381	5.80	6.00	5.37	4.02	5.55	-	5.93	-
.397	5.69	5.87	5.37	4.01	5.12	-	5.83	5.80
.408	5.70	5.85	5.50	4.05	5.00	5.60	5.68	6.00
.419	5.71	6.00	5.50	4.05	5.03	5.85	5.80	5.77

Table 4 (continued)

J.D. 24...	2	3	30	95	111	128	130	137
35603.431	5.76	6.00	5.68	4.13	5.23	-	5.85	5.93
.446	5.70	5.90	5.53	4.06	5.30	5.80	5.52	5.85
.457	5.70	5.80	5.53	4.11	5.20	-	5.60	5.90
.468	5.74	5.93	5.50	4.03	5.35	5.72	5.50	5.90
.491	5.64	5.90	5.57	4.03	5.45	5.62	5.43	5.87
.507	5.72	5.93	5.72	4.09	5.52	5.47	5.43	6.00
35920.444	5.82	6.03	-	4.05	5.82	5.43	-	6.00
.467	5.82	-	-	4.13	5.75	-	6.00	-
.487	5.58	5.68	5.50	4.15	5.90	5.43	5.90	5.87
.504	-	6.00	-	4.00	5.60	-	5.97	-
.547	-	6.00	-	4.07	5.93	-	5.93	6.00
.562	-	5.97	-	4.12	5.90	-	5.97	-
.585	-	5.93	-	4.14	-	-	5.78	-
35933.415	5.76	5.70	5.62	-	5.43	5.85	5.68	5.60
.443	5.70	6.00	-	-	5.53	6.00	5.80	-
.479	5.84	6.10	5.80	-	5.70	5.57	5.73	5.65
.503	-	-	-	-	-	-	-	-
.515	-	5.00	-	-	-	-	6.00	-
.530	-	4.77	-	-	5.20	-	5.85	-
.543	-	-	-	-	-	-	-	-
.573	-	5.30	-	-	5.25	-	5.80	-
.588	-	-	-	-	-	-	-	-
.602	-	-	-	-	-	-	-	-
36991.457	5.53	5.45	5.90	3.81	-	-	5.68	5.80
.470	-	-	-	3.81	5.80	-	5.90	-
.485	5.60	-	-	3.82	-	-	5.70	-
37018.470	-	5.80	5.80	3.62	5.77	5.40	5.65	5.90
.483	5.58	5.78	-	3.69	5.83	5.37	5.43	5.93
.496	5.67	5.87	5.60	3.64	5.80	5.27	5.10	5.95
.510	5.63	-	-	-	5.65	5.30	5.03	-
.523	5.60	5.77	-	3.53	5.80	5.33	4.97	-
.537	5.66	5.77	-	3.66	5.83	5.35	5.20	-
.550	5.60	5.70	-	3.65	-	-	5.13	-
.563	-	-	-	-	-	-	-	-
.577	5.69	5.83	-	3.54	5.43	-	5.27	-
.609	5.68	5.80	-	3.60	4.93	-	5.50	5.97
.623	-	-	-	3.62	-	-	-	-
.637	-	5.70	-	3.65	5.30	-	5.60	-
37057.539	5.65	5.97	5.65	3.84	5.73	-	5.77	5.80
.552	5.69	5.97	5.77	3.99	5.77	-	6.00	5.93
.578	5.70	5.97	5.68	3.92	5.63	5.30	5.97	5.90
37058.529	5.70	5.90	5.97	3.96	5.93	5.57	5.97	5.97
.580	5.85	5.93	5.93	3.97	5.93	5.68	5.90	5.93
37757.598	-	-	-	3.44	5.65	-	-	-
37791.365	5.82	5.85	5.83	4.23	5.90	5.72	5.97	6.03
.380	5.90	5.75	5.87	4.11	5.87	5.80	5.97	6.00
.394	5.97	5.87	5.87	4.13	6.07	5.72	6.07	6.00
.424	5.93	5.90	5.93	-	5.93	-	6.00	6.00
.439	5.80	5.83	5.67	-	5.97	5.90	5.87	6.13
.454	5.78	5.90	5.63	4.10	5.87	-	5.83	6.03
.469	5.95	6.00	5.73	-	6.00	5.93	5.75	6.03
.483	5.83	5.97	5.50	4.15	5.70	5.63	5.53	6.03
.497	5.85	6.00	-	4.12	5.80	5.65	5.68	6.03
.519	5.79	5.97	-	4.23	5.50	5.47	5.30	5.97
.533	5.79	6.00	5.40	4.18	5.23	5.40	5.43	6.00
.549	5.73	6.00	5.50	4.19	5.23	5.47	5.55	6.03
.563	5.65	5.97	5.57	4.10	5.47	5.47	5.40	5.97

Table 4 (continued)

J.D. 24...	141	144	152	166	167	177	178	V.Z. 89	V.Z. 1221
28963.487	5.78	6.07	5.97	5.98	6.18	-	5.78	6.47	6.59
28991.403	5.60	5.68	5.62	6.12	6.07	5.73	5.80	6.48	6.67
.416	5.11	5.93	5.67	6.07	6.08	5.70	5.80	6.31	6.33
.430	4.92	5.90	5.67	6.00	6.13	5.97	5.65	6.32	6.51
.522	5.66	6.10	5.83	5.63	6.17	-	5.65	6.50	6.62
.542	5.10	5.87	5.87	5.50	6.03	5.77	5.60	6.43	6.66
29346.376	5.05	5.32	5.73	5.97	5.95	5.50	5.70	6.33	6.66
.392	5.47	5.27	5.80	5.93	5.95	5.47	5.80	6.55	6.70
29719.549	4.98	5.80	5.80	5.57	5.77	5.77	5.78	6.20	6.52
.560	4.91	5.70	5.77	5.50	5.77	5.83	5.90	-	6.36
29720.546	5.33	5.57	5.58	5.63	6.00	5.77	5.70	-	6.42
.558	5.64	5.35	5.60	5.48	6.00	5.75	5.68	-	6.34
29774.405	4.80	5.67	5.68	5.68	5.83	6.10	5.83	6.35	6.35
.417	4.93	5.63	5.53	5.77	5.75	6.10	5.70	6.13	-
29775.403	5.26	5.20	5.50	5.93	5.87	5.93	5.82	6.13	6.06
.415	5.68	5.50	5.57	5.97	6.03	5.97	5.83	6.39	6.07
.426	5.72	5.40	-	6.03	6.10	5.87	5.90	6.10	6.35
.437	5.59	5.43	5.63	6.10	6.00	5.93	5.87	6.42	6.43
.447	5.12	5.47	5.55	6.03	6.00	5.97	5.85	6.12	6.25
30052.462	4.99	5.62	5.65	6.13	5.77	5.65	5.52	6.37	6.12
.474	4.97	-	5.80	6.13	5.67	5.55	5.65	6.34	6.13
.489	4.83	-	5.75	6.20	5.67	5.57	5.65	6.45	6.48
.501	5.13	5.55	5.77	6.10	5.70	5.55	5.73	6.46	6.37
30078.418	5.94	5.70	5.60	5.45	5.93	5.80	5.70	5.75	6.04
.434	5.46	-	5.60	5.42	6.00	5.77	5.77	5.98	6.17
.470	4.96	-	5.75	5.67	5.87	5.83	5.75	5.95	6.37
.483	5.08	-	5.67	5.70	5.90	5.80	5.68	5.91	6.52
.498	5.10	-	5.78	5.85	5.83	5.83	5.78	6.02	6.26
.509	4.95	5.65	5.73	5.78	6.00	5.70	5.68	6.06	6.44
.521	5.09	5.60	5.83	5.90	6.10	5.97	5.70	6.07	6.42
.536	5.50	5.37	5.73	6.17	6.03	5.80	5.63	6.24	6.48
.548	5.75	5.23	5.70	5.90	6.03	5.70	5.65	6.14	6.39
33390.497	5.16	5.97	5.65	5.83	5.93	5.90	5.62	6.21	6.70
.534	4.93	5.97	5.68	6.07	5.83	5.97	5.68	6.45	6.72
.545	5.05	5.97	5.65	6.10	5.93	5.90	5.65	6.42	6.50
.558	5.23	6.00	5.68	6.13	5.93	5.80	5.58	6.50	6.50
.570	5.30	5.88	5.87	6.00	5.83	5.90	5.87	6.45	6.61
.586	5.86	6.00	5.72	6.03	6.00	-	5.68	6.58	6.55
33420.424	5.06	6.10	5.72	5.73	6.07	5.77	5.68	6.41	6.53
.438	5.00	6.03	5.50	5.68	5.93	5.73	5.60	6.38	6.35
.450	4.83	5.90	5.57	5.58	5.93	5.78	5.60	6.35	6.51
.476	5.00	5.70	5.47	5.62	5.73	5.82	5.60	6.47	6.44
.487	5.28	5.68	5.47	5.68	5.62	5.77	5.60	6.51	6.61
.498	5.56	5.65	5.47	5.55	5.60	5.62	5.70	-	6.75
.510	6.12	5.53	5.53	5.53	5.57	5.77	5.73	6.52	6.70
.523	-	5.43	5.60	5.83	5.50	5.73	5.73	6.78	-
33421.385	5.10	5.80	5.53	5.77	5.93	5.70	5.80	-	6.03
.442	5.54	5.93	5.37	5.87	5.78	5.52	5.37	6.04	6.18
.454	5.97	5.90	5.47	5.85	5.97	5.73	5.47	6.01	6.17
.465	5.80	5.73	5.37	5.90	5.87	5.62	5.37	5.88	-
.475	5.58	5.97	5.33	5.73	5.83	-	5.33	5.90	6.29
.486	-	5.83	5.40	5.77	5.93	5.65	5.40	5.62	6.57
.497	5.12	5.90	5.43	5.80	6.00	5.50	5.43	5.61	-
.535	4.98	5.90	5.60	5.68	5.83	5.80	5.60	5.74	6.47
.548	4.96	5.87	5.63	5.65	6.02	5.90	5.63	5.71	-
33422.398	6.04	5.77	5.63	5.87	5.87	5.63	5.92	6.59	6.13
.431	5.22	-	5.53	5.92	-	5.57	5.87	-	6.25
.442	4.91	5.87	5.73	6.03	5.60	-	6.00	6.60	6.18

Table 4 (continued)

J.D. 24...	141	144	152	166	167	177	178	v.Z. 89	v.Z. 1221
33422.452	4.86	5.97	5.72	5.90	5.68	5.70	6.13	-	-
.462	4.89	-	-	-	-	-	-	-	-
.472	5.00	5.93	5.70	6.10	5.67	5.58	6.07	6.63	6.65
.483	5.12	6.03	5.72	6.07	5.70	5.80	5.75	6.55	6.57
.493	4.99	6.03	5.53	6.13	5.40	5.57	5.50	6.45	6.69
.508	5.16	5.97	5.73	5.97	5.47	5.60	5.62	6.56	6.70
.520	5.50	5.77	5.73	6.03	5.60	5.68	5.55	6.64	6.75
33763.406	5.96	5.80	5.73	5.93	5.93	5.67	5.67	6.46	6.66
.420	5.61	5.73	5.63	5.93	6.00	5.60	5.58	6.45	6.44
.442	5.19	5.80	5.60	5.87	6.00	5.60	5.53	6.52	6.44
.455	5.05	6.00	5.77	6.03	6.17	5.75	5.73	6.19	6.47
.464	5.05	5.83	5.73	6.10	6.07	5.77	5.70	6.07	6.50
.483	5.03	5.97	5.58	5.97	6.07	5.62	5.68	6.08	6.56
.494	5.16	5.97	5.58	5.90	6.03	5.72	5.68	6.06	6.51
.504	5.13	6.03	5.80	6.10	6.13	5.90	5.80	5.88	6.56
.514	5.29	5.90	5.70	6.07	6.23	5.80	5.83	5.83	6.66
.525	5.61	5.87	5.60	6.03	6.27	5.83	5.78	5.82	6.55
34118.355	5.17	5.90	5.40	5.68	5.83	5.62	5.80	5.81	-
.372	5.05	5.75	5.37	5.80	5.90	5.62	5.83	5.66	6.48
.388	5.24	5.78	5.37	5.90	5.78	5.52	5.62	5.99	-
.428	5.72	5.93	5.73	5.97	6.00	-	5.80	6.20	-
.443	5.43	6.03	5.80	5.93	6.03	5.65	5.73	6.00	6.32
.470	5.03	5.88	5.50	5.80	5.97	5.40	5.50	5.90	-
.485	4.77	5.93	5.83	5.72	6.03	5.80	5.63	6.08	-
.499	5.03	5.90	5.73	5.68	5.93	5.83	5.67	6.16	-
.513	4.98	5.83	5.90	5.73	5.87	5.87	5.65	6.37	6.54
.526	5.10	5.63	5.63	5.60	5.87	5.70	5.60	-	-
.540	5.48	6.07	5.93	5.97	5.92	5.90	5.63	6.30	-
34120.471	5.20	5.67	-	5.77	5.67	5.62	-	6.26	6.32
.484	5.12	5.47	5.80	6.00	5.77	5.47	-	-	-
.497	5.03	5.43	5.60	5.97	5.68	5.60	5.60	-	-
.510	5.00	-	5.68	6.10	-	5.50	5.68	6.39	-
.523	5.06	5.40	5.70	5.97	5.68	5.62	5.70	6.33	6.55
.536	5.12	5.35	5.68	5.97	5.78	5.65	5.68	6.50	6.87
.551	5.23	5.27	5.73	6.10	5.80	5.73	5.80	6.35	-
.564	5.61	5.40	5.57	5.93	5.68	5.57	5.80	6.50	-
.579	5.68	5.47	5.53	5.90	5.70	5.55	5.60	6.45	-
34121.401	5.72	5.77	5.67	5.68	5.75	5.75	5.62	6.33	6.17
.412	5.34	5.72	5.55	5.72	6.03	5.75	5.60	6.02	6.63
.422	5.20	5.77	5.70	5.73	5.80	5.80	5.65	6.00	6.36
.431	5.03	5.83	5.60	5.68	5.90	5.82	5.60	5.95	6.49
.441	4.87	5.83	5.77	5.80	6.00	5.80	5.50	5.94	6.80
.484	5.04	5.87	5.70	5.92	5.97	5.70	5.63	5.76	6.61
.495	5.19	5.97	5.83	5.90	5.97	5.72	5.62	5.83	6.67
.505	5.54	5.97	5.77	5.83	6.00	5.62	5.62	5.75	6.55
.517	5.83	5.90	5.77	5.93	5.97	5.68	5.77	5.68	-
.528	5.76	5.73	5.67	5.78	5.90	5.60	5.60	5.87	6.61
.539	5.57	5.90	5.60	5.93	6.00	5.53	5.60	5.89	6.52
.552	5.27	5.85	5.45	5.87	5.90	5.40	-	5.84	6.76
.562	5.09	5.80	5.50	5.90	5.80	5.30	-	5.83	6.53
.594	5.00	5.93	5.53	5.87	5.93	5.68	5.62	6.11	6.50
.605	5.22	-	5.45	5.93	5.87	5.70	5.85	6.13	6.60
34122.404	5.12	5.52	-	5.68	5.67	5.65	-	6.04	6.23
.416	5.20	5.55	5.68	5.80	5.57	5.85	5.72	6.26	6.27
.431	5.19	5.62	5.60	5.73	5.68	5.70	5.70	6.30	6.24
34126.433	5.13	5.80	5.63	5.75	5.70	5.65	5.80	6.40	6.45
34131.415	4.98	5.73	-	5.72	5.78	5.62	-	6.40	-
34487.347	5.41	6.05	5.77	5.62	6.08	5.47	5.77	6.31	6.61

Table 4 (continued)

J.D. 24...	141	144	152	166	167	177	178	v.Z. 89	v.Z. 1221
34487.367	–	6.00	5.80	5.50	6.00	5.53	5.87	6.12	6.30
.385	5.19	6.00	5.93	5.72	6.13	5.75	5.93	6.12	6.28
.397	5.14	6.03	5.80	5.77	5.97	5.55	5.77	6.37	5.81
.410	5.35	5.97	5.67	5.87	5.97	5.57	5.60	6.31	5.78
.428	5.39	6.07	5.68	5.87	6.07	5.67	5.52	6.20	5.76
.438	5.60	6.00	5.83	5.93	6.03	5.73	5.55	6.10	–
.449	6.19	6.10	5.77	5.90	5.93	5.93	5.62	6.33	–
.460	5.93	5.93	5.72	5.93	5.93	5.67	5.63	6.30	–
.474	5.76	5.77	5.43	6.00	6.03	5.70	5.43	6.56	–
.483	5.44	5.55	5.27	5.97	5.92	–	5.37	6.35	–
.494	5.30	5.62	5.40	5.93	5.90	–	5.43	6.35	–
.508	5.18	5.60	5.13	6.03	6.00	–	5.43	6.32	–
.518	5.10	5.37	5.27	6.00	5.93	–	5.53	–	–
34488.530	6.12	5.85	5.37	6.03	5.97	5.63	5.43	6.23	–
.540	6.00	–	5.42	6.03	6.07	–	5.48	5.92	–
34567.388	6.02	5.87	5.50	5.58	5.65	5.52	5.62	5.82	–
35223.415	5.20	5.30	5.73	5.97	5.97	5.43	6.65	5.92	–
.428	5.09	5.43	5.70	6.00	5.93	5.37	5.62	5.93	–
.441	–	5.50	5.70	5.97	5.97	5.65	5.62	5.97	–
.467	5.14	5.27	5.70	5.87	6.00	5.73	5.40	6.14	–
.490	5.49	5.58	5.65	5.90	5.97	5.67	5.50	6.00	5.75
.503	5.93	5.72	5.60	5.82	5.93	5.65	5.57	6.13	–
.517	5.98	5.68	5.60	5.80	5.93	5.67	5.43	6.16	–
.530	5.36	5.50	5.33	5.68	5.83	–	5.57	6.22	–
.546	5.24	5.88	5.30	5.47	5.92	5.62	5.60	6.22	–
.573	5.05	5.65	5.37	5.25	5.90	5.65	5.50	6.49	–
35224.454	6.00	5.78	5.62	5.90	5.63	5.52	5.63	6.58	–
.472	5.22	5.88	5.58	5.70	5.65	5.33	5.58	6.72	–
.485	5.24	5.90	5.73	5.63	5.77	5.57	5.58	6.53	–
.499	5.02	5.88	5.53	5.67	5.80	5.55	5.47	6.38	–
.512	5.11	5.87	5.43	5.63	5.62	5.52	5.50	6.64	–
.524	5.00	–	5.37	5.60	5.60	5.40	5.43	6.33	–
.542	5.16	5.77	5.45	5.58	5.70	5.55	5.50	6.30	–
.556	5.19	5.50	5.47	5.47	5.87	5.78	5.50	6.08	–
.569	5.65	–	5.17	5.52	5.72	–	5.40	–	–
.583	5.96	5.33	5.43	5.40	5.97	–	5.47	6.02	–
35227.534	5.46	5.67	5.60	5.63	5.53	5.30	5.60	6.41	5.31
.547	5.76	5.57	5.40	5.77	5.63	5.45	5.63	6.50	5.45
.560	6.06	5.30	5.68	5.57	5.80	5.20	5.53	6.61	5.77
.573	5.16	5.23	5.37	5.60	5.73	5.37	5.80	6.24	–
.586	–	5.30	–	5.58	5.63	5.40	5.80	6.60	5.77
35598.507	5.20	5.97	5.77	5.80	5.68	5.27	5.53	5.87	6.06
.524	5.12	5.87	5.70	5.83	5.70	5.50	5.43	5.90	6.10
.537	5.02	5.80	5.65	5.90	5.60	5.33	5.27	5.94	6.20
35600.363	5.88	5.90	–	5.43	5.57	5.60	5.50	5.92	6.07
.378	5.43	5.80	5.53	5.43	5.50	5.47	5.43	5.92	5.29
.391	5.34	5.87	5.67	5.47	5.60	5.68	5.53	5.75	5.53
.405	5.08	5.93	5.62	5.53	–	5.68	5.40	5.86	5.66
.421	5.17	5.92	5.65	5.60	5.63	5.75	5.58	–	–
.434	5.08	6.00	5.57	5.68	5.63	5.83	5.50	5.93	5.67
.446	5.22	5.95	5.77	5.70	5.67	5.75	5.47	5.89	–
.501	6.02	5.68	5.70	5.57	5.87	5.73	5.60	6.20	–
.525	5.40	5.33	5.18	5.60	5.60	5.53	5.53	6.07	–
35603.369	5.18	5.83	5.73	5.67	5.87	5.40	5.47	6.55	–
.381	5.20	5.90	5.65	5.77	6.00	5.40	5.47	6.55	6.50
.397	5.01	5.68	5.55	5.63	5.90	5.15	5.43	6.80	6.70
.408	5.12	5.93	5.62	5.68	5.80	5.37	5.47	6.52	6.26
.419	5.18	5.83	5.60	5.88	5.92	5.40	5.58	6.58	6.11

Table 4 (continued)

J.D. 24...	141	144	152	166	167	177	178	v.Z. 89	v.Z. 1221
35603.431	5.32	5.93	5.75	5.97	5.93	-	5.55	6.53	5.43
.466	5.67	-	5.63	6.00	6.00	5.45	5.68	6.80	-
.457	6.13	5.80	5.62	5.97	5.90	5.43	5.62	6.55	5.28
.468	6.09	5.90	5.50	5.97	5.97	5.53	5.87	6.61	5.31
.491	5.25	5.58	5.57	5.80	5.97	5.50	5.68	6.51	-
.507	5.24	5.52	-	5.97	5.77	5.50	-	6.16	5.64
35920.444	5.68	-	5.90	5.87	5.82	5.65	5.83	6.63	6.22
.467	6.11	5.80	5.60	5.93	5.83	-	5.50	6.39	6.13
.487	-	5.50	5.50	5.73	-	5.50	5.73	6.34	-
.504	5.18	5.55	5.47	5.70	5.73	-	5.47	-	6.22
.547	5.10	-	5.65	5.78	6.03	-	5.80	6.43	6.72
.562	5.20	5.80	5.50	5.80	5.90	-	5.63	6.35	6.58
.585	5.51	-	5.27	5.97	5.87	-	5.57	-	6.33
35933.415	6.28	5.90	5.72	5.87	5.90	5.60	5.68	6.51	6.58
.443	5.34	5.87	5.73	5.83	5.77	5.75	5.60	6.18	6.71
.479	4.90	5.83	5.73	5.80	5.87	5.93	5.83	5.92	6.59
.503	5.09	-	-	-	-	-	-	5.45	5.07
.515	5.36	-	-	-	-	-	-	5.37	4.80
.530	-	-	-	5.87	5.87	-	-	5.36	4.72
.543	5.99	-	-	-	-	-	-	5.51	4.59
.573	5.48	-	5.37	5.68	5.87	-	5.13	5.78	5.23
.588	5.10	-	-	-	-	-	-	5.81	5.42
.602	5.03	-	-	-	-	-	-	-	5.30
36991.457	6.00	-	5.20	6.00	5.57	5.50	5.70	5.75	6.69
.470	5.84	-	-	5.97	5.63	5.55	-	5.82	-
.485	5.31	5.95	5.20	5.70	5.55	5.40	-	5.91	6.43
37018.470	5.04	5.93	5.63	5.63	5.50	5.43	5.50	6.21	-
.483	4.90	5.87	5.70	5.73	5.70	5.65	5.42	6.51	6.36
.496	4.95	5.75	5.47	5.72	5.60	5.68	5.60	6.34	5.95
.510	5.00	-	5.30	5.47	5.65	5.60	5.45	-	5.35
.523	5.10	5.93	5.30	5.53	5.77	5.67	5.57	6.23	5.10
.537	-	5.80	5.43	5.62	5.73	-	5.47	-	5.19
.550	5.88	5.85	5.07	5.27	5.47	-	5.53	6.36	5.31
.563	-	-	-	-	-	-	-	6.31	5.38
.577	5.26	5.67	5.50	5.50	5.60	-	-	6.45	5.46
.609	4.95	5.77	5.50	5.72	5.80	5.70	5.57	6.50	5.56
.623	-	-	-	-	-	-	-	-	5.79
.637	4.79	5.90	5.57	5.93	5.90	5.60	5.63	6.27	5.59
37057.539	5.06	5.43	5.60	5.77	5.90	5.70	5.80	-	-
.552	4.84	5.50	5.70	5.90	5.97	5.80	5.57	6.17	6.59
.578	5.00	5.70	5.83	5.63	6.00	-	5.77	6.21	6.41
37058.529	4.79	6.03	5.97	5.93	5.93	5.83	5.60	6.26	6.70
.580	6.14	-	5.83	5.80	5.87	5.80	5.77	6.27	6.51
37757.598	5.00	5.30	-	5.62	5.90	-	-	5.61	6.36
37791.365	4.80	6.03	5.97	5.87	5.90	5.77	5.70	5.73	5.71
.380	5.28	5.90	5.83	5.90	5.87	5.87	5.73	5.70	5.84
.394	5.63	5.97	5.97	5.97	6.00	5.60	5.90	5.71	5.89
.424	5.08	5.80	5.87	5.97	6.00	5.63	5.80	5.69	5.99
.439	4.83	6.13	5.65	5.80	5.93	5.90	5.73	5.71	6.08
.454	4.68	5.80	5.65	6.03	6.10	5.80	5.70	5.83	6.25
.469	4.64	6.10	5.83	5.93	6.07	5.90	5.90	5.89	6.25
.483	-	6.00	5.57	5.80	5.97	5.80	5.73	5.98	6.17
.497	5.05	5.90	5.68	5.83	5.90	5.87	5.80	5.88	6.33
.519	5.81	5.65	5.70	5.80	5.93	5.90	5.87	6.09	6.48
.533	5.90	5.50	5.77	5.97	6.00	5.83	5.97	6.18	6.59
.549	5.30	5.25	5.72	5.80	5.93	5.90	5.77	6.14	6.70
.563	5.06	5.23	5.63	5.97	5.93	5.80	5.67	6.46	6.59

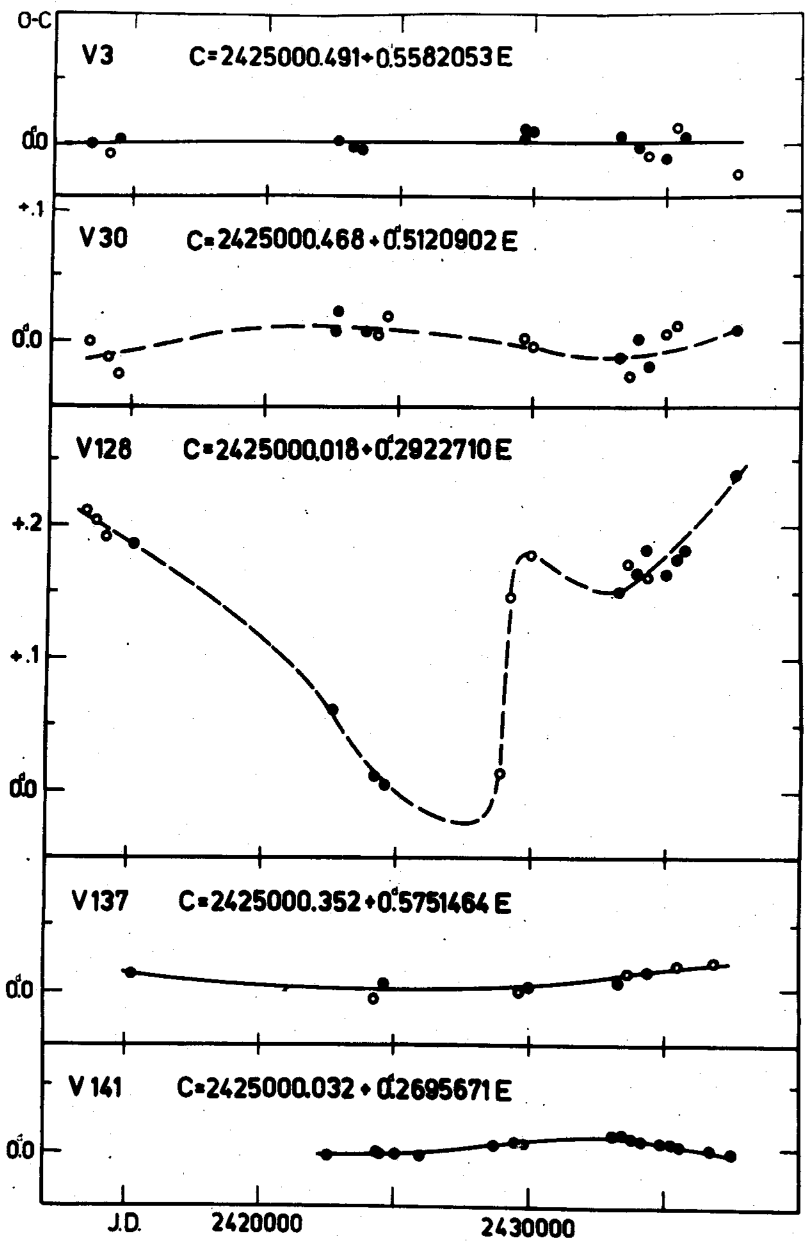

Fig. 3a O - C diagrams of variables Nos. 3, 30, 128, 137 and 141

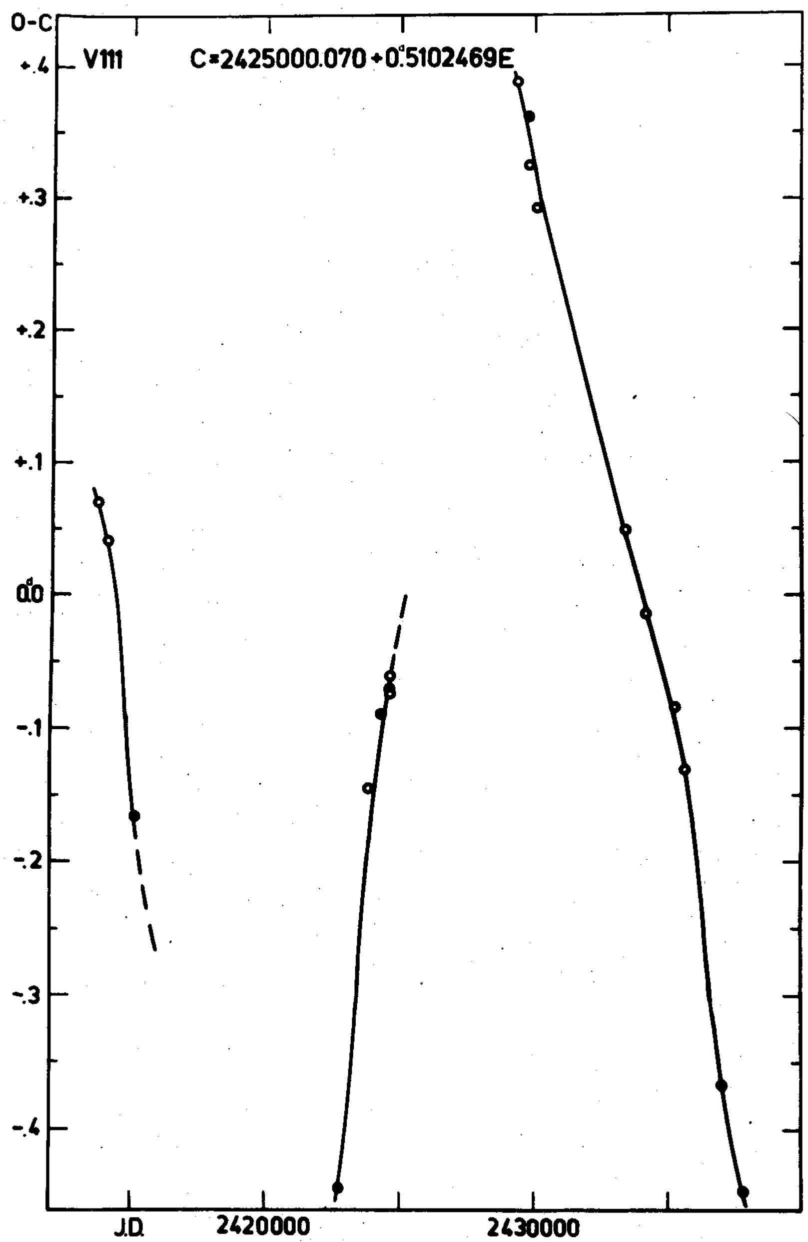

Fig. 3b O - C diagram of variable No. 111

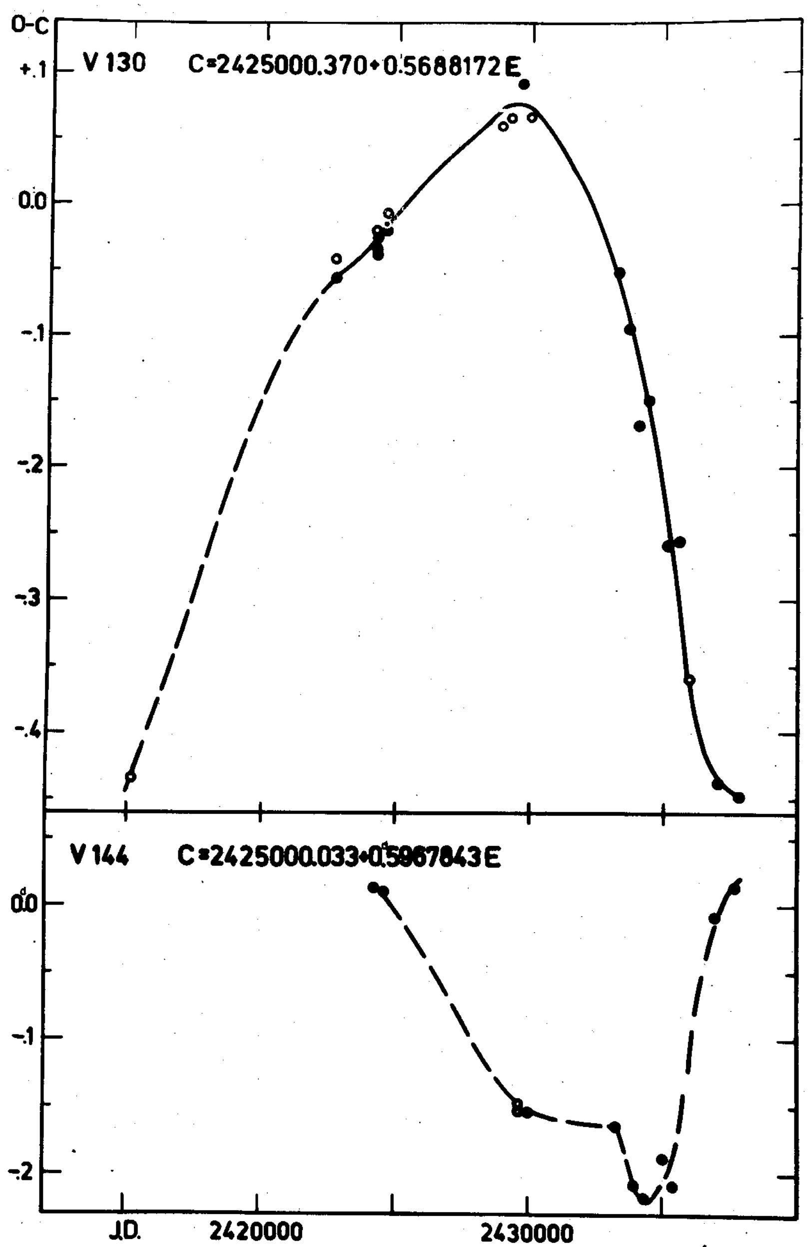

Fig. 3c O - C diagrams of variables No. 130 and No. 144

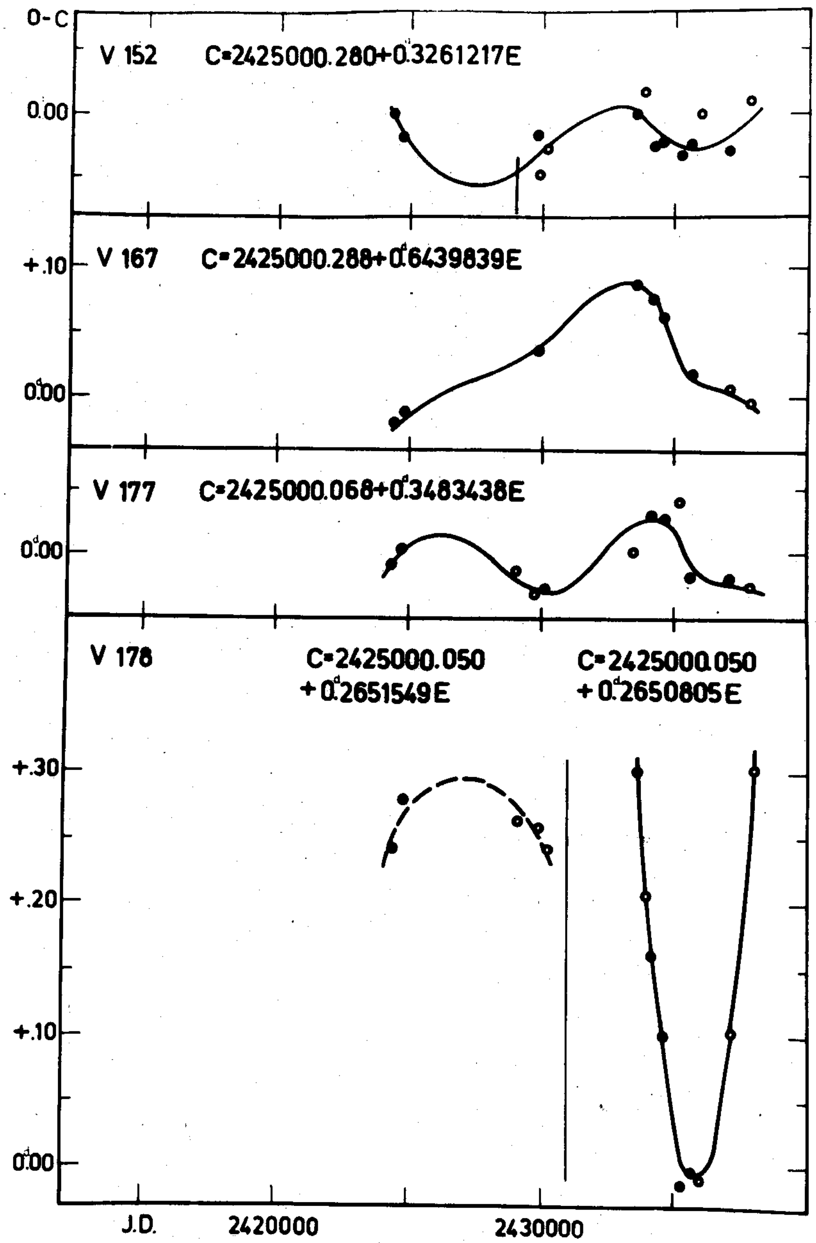

Fig. 3d O - C diagrams of variables Nos. 152, 167, 177, and 178

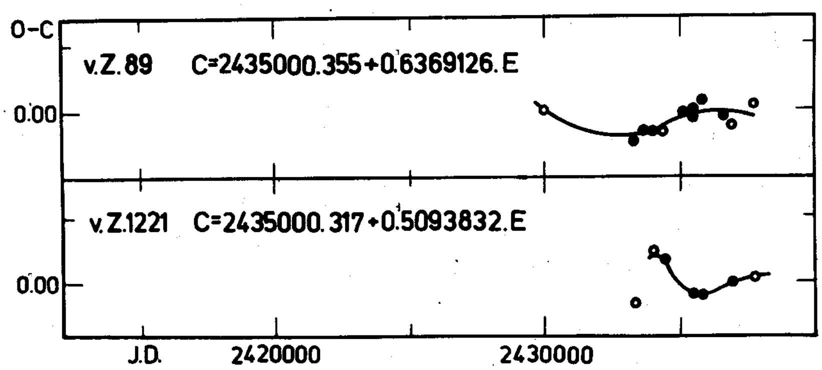

Fig. 3e O – C diagrams of variables SVS 1264 = v.Z.89 and SVS 1276 = v.Z.1221

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