Contrib. Astron. Obs. Skalnaté Pleso **40**, 19 – 71, (2010)

Photometric investigation of V466 And - a new WZ Sge-type dwarf nova

D. Chochol[1], N.A. Katysheva[2], S.Yu. Shugarov[1,2], I.M. Volkov[1,2], M.V. Andreev[3]

[1] *Astronomical Institute of the Slovak Academy of Sciences 059 60 Tatranská Lomnica, The Slovak Republic*

[2] *Sternberg State Astronomical Institute, Universitetskij Prosp. 13, 119992 Moscow, Russia*

[3] *Terskol Branch of the Institute of Astronomy of the Russian Academy of Sciences, 48 Pyatnitskaya St., 119017 Moscow, Russia; International Center for Astronomical, Medical and Ecological Research Centre Observatory and Main Astronomical Observatory, National Academy of Sciences of Ukraine, 27 Akademika Zabolotnoho Str., 03680 Kyiv, Ukraine*

Received: January 8, 2010; Accepted: April 21, 2010

Abstract. We present the $UBV(RI)_C$ photometry of a new dwarf nova V466 And, discovered during its superoutburst on Sept. 1.6, 2008 and classified as a WZ Sge-type object. In the first 11 days of the superoutburst, the early superhumps with the period of $0.^d056383$ were found. In days 13 – 23 of the superoutburst, the ordinary superhumps with the period of $0.^d05713$ were exposed. They were replaced by late superhumps with the period of $0.^d056$ in days 24 – 33 of the superoutburst. After one month, the dwarf nova returned to its pre-outburst state. A list of known WZ Sge-type dwarf novae, including suspected ones, is presented. We determined a mean value of superhump period excess for WZ Sge-type objects as ϵ=0.019±0.003. The multicolour photometry of the field stars enables us to conclude that there is no appreciable interstellar extinction in the direction of V466 And.

Key words: dwarf novae – photometry, superoutburst, superhumps

1. Introduction

Dwarf novae (DNe) are a subclass of cataclysmic variable stars - semidetached binaries, consisting of a red dwarf, transferring matter to a white dwarf. Variability of DNe is caused by the orbital motion of the components and quasi-periodic outbursts resulting from instabilities in the accretion disk, surrounding the white dwarf. The SU UMa-type DNe exhibit short (∼ days) normal outbursts and long (∼weeks) less frequent superoutbursts. During superoutbursts, which are ∼ (1 – 3) mag brighter than normal outbursts, a unique feature develops: superhumps – brightness variations with the period of a few percents longer than the orbital one (see, e.g., Patterson & Warner, 1998).

The WZ Sge-type DNe are the most extreme subgroup of SU UMa-type DNe with a long (several years) superoutbursts recurrence time. Some of them exhibit a complex post-superoutburst rise of brightness called rebrightening(s), rarely seen in other SU UMa-type dwarf novae. One of the most remarkable signatures of WZ Sge-type objects is a presence of "early superhumps" during the earliest stages of their superoutbursts. This feature is also referred to as orbital superhumps or outburst orbital humps. Early superhumps have a period extremely close to the binary period and commonly show a double - humped profile, in contrast to the ordinary superhumps of SU UMa-type dwarf novae. Early superhumps are the most discriminative feature of the WZ Sge-type objects, and have not been detected in other DNe (Andronov et al., 2001; Kato et al., 2009a).

V466 And was discovered as an optical transient by K. Itagaki (Yamaoka et al., 2008) on a CCD image taken on September 1.6 UT (JD 2454711.1) with the 0.21m reflector in the course of his sky survey. A confirming unfiltered CCD image was taken with the 0.6-m reflector on Sept. 1.603, that yields ~ 12.7 mag and the following precise position: R.A. $= 2^h00^m25^s.40$, Decl. $= +44^o10'18".7$ (equinox 2000.0) (Yamaoka et al., 2008). V466 And has a GSC-II counterpart with R.A. $= 02^h00^m25^s.44$ and Decl. $= +44^o10'19".1$ (J2000) with the $j = 21.16$ mag.

Korotkiy, Kryachko and Satovskiy (see Korotkiy, 2008) confirmed a possible nova in Andromeda as an object ~ 12.45 mag, found in one unfiltered image taken on Sep. 1.834 UT at the Kazan State University Astrotel Observatory (Karachay-Cherkessia, Russia) with the 8.0-cm f/7.5 ED-refractor (+ SBIG ST-2000XM). Their photometric observations during JD 2454711.343 – 11.434 (Sept. 1.843 - 1.934) clearly showed a humped light curve with the amplitude of $0.^m13$ and period of $0.^d$ 055(1), typical for cataclysmic variables of the WZ Sge-type.

The first multicolour photometry of the object was carried out by Shugarov and Volkov (2008) with the 0.6m reflector of the Astronomical Institute of the Slovak Academy of Sciences observatory in Stará Lesná, equipped with the photoelectric photometer, on Sept. 2.87 UT ($U = 12.29, B = 13.16, V = 13.15$) and Sept. 3.08, ($U = 12.28, B = 13.19, V = 13.09, R_J = 13.31$).

Challis et al. (2008) reported that the spectrum of the object, obtained with the 1.5m Tillinghast telescope of the Fred L. Whipple Observatory at Mt Hopkins on Sept. 3.479, is that of a dwarf nova in outburst.

Shafter et al. (2009) shortly presented the information about time-resolved CCD photometry of V466 And. During the nights Sept. 4 – 6, 2008, the object faded from $V = 13.4$ mag to $V = 14$ mag, and reached $V = 16.8$ mag on September 25, 2008. The data from the nights Sept. 4 – 6 revealed $V \sim 0.1$ mag dips in the light curve with recurrence time given by a best-fit period of 0.05636(9) days. They interpreted it as a manifestation of "early superhumps" of the WZ Sge-type system.

Kato et al. (2009a) used the VSNET data to derive the period of early superhumps of V466 And as 0.056365(7) days. They determined the mean period of ordinary superhumps 0.057203(10) days and constructed an (O-C) diagram of the positions of superhumps maxima suggesting their period variations (Fig. 47 of their work).

2. Photometry of the superoutburst

2.1. Light curve

Most of our $UBV(RI)_C$ CCD observations were taken with the SBIG ST10-XME camera mounted in the Newton focus of the 0.5m (f/5) reflector at the Stará Lesná observatory. Further CCD observations were taken with the Apogee-47p and Pictor-416 cameras mounted in the Cassegrain focus of the 0.6m (f/12.5) reflector and 0.5m Maksutov (f/4.0) telescope at the Crimean Laboratory of the Sternberg Astronomical Institute. We also used the 0.6m telescope Zeiss-600 of the Terskol Observatory (in Caucasus) equipped with a CCD camera (the PixelVision Vienna with a 1024x1024 array and pixel size 24 micron). The Maxim DL4 package and the special software written by V. Goranskij were used for the processing of the CCD frames.

We determined the $UBVR$ magnitudes of the star HD 12137 designated as "1" in Fig. 1, which is the brightest star in our frames, using the photoelectric photometer with photomultiplier Hamamatsu R 2949S in combination with the standard $UBVR$-filters, mounted in the Cassegrain focus of the 0.6m (f/12.5) reflector of the Stará Lesná Observatory. The standard procedure of the differential photometry was applied and HD 12131 was used as a comparison star. Its reliable magnitudes were published by Kornilov et al. (1991).

Table 1. The V magnitude and colour indices of the comparison stars.

Star	V	$U-B$	$B-V$	$V-R_C$	R_C-I_C	Sp
1	7.662	0.772	1.004	0.492	0.458	G9 III
±	0.005	0.004	0.006	0.005	-	
2	12.985	0.117	0.549	0.334	0.318	F9 III
±	0.010	0.009	0.013	0.013	0.011	
3	12.203	0.371	0.821	0.408	0.423	G9 V
±	0.007	0.008	0.010	0.009	0.011	
4	12.078	0.483	0.926	0.495	0.502	K2 V
±	0.003	0.008	0.008	0.005	0.012	

HD 12131 is situated only 18.6' north of the region under investigation. The magnitudes of the stars 2 – 4 (see Fig. 1) were found relatively to the star "1"

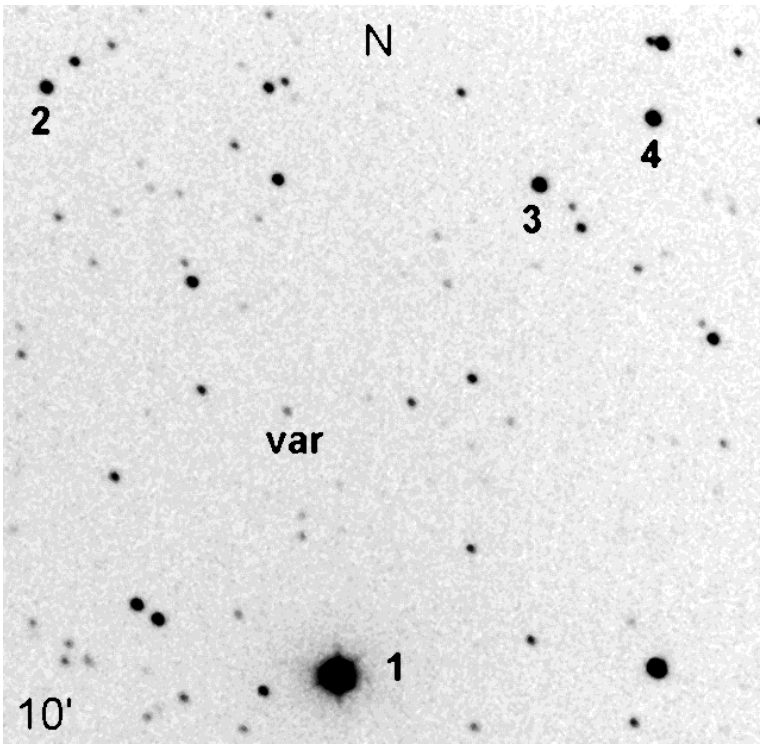

Figure 1. The comparison stars around V466 And, used for our CCD photometry.

in the CCD-frames made with a number of short expositions in order to disable the overflow for this bright star. Only the highest photometric quality nights were used for all these measurements. The data are presented in Table 1. We determined the spectral types of the comparison stars using their color indices and the standard $(U-B, B-V)$ diagram.

Due to the fact that the observations were obtained by different instruments, it was necessary to reduce them into one system ("z"), using the linear shifts. Their values are presented in Table 2.

Our $UBV(RI)_C$ observations of V466 And during its superoutburst and decline were obtained in 34 nights between Sept. 2 and Nov. 18, 2008. Brief information about the observations is presented in Table 3: JD, the average magnitude in each band during the night, the number of frames and the combination of the telescope and CCD-camera, denoted by marks "a, c, s, t, z" and explained in Table 2. The same marks are used in the tables of observations.

All our $UBV(RI)_C$ observations are displayed as follows: U in Table 7, B in Table 8, V in Table 9, R_C in Table 10 and I_C in Table 11. In the case of a good accuracy of individual measurements, they are presented with the JD in

Table 2. The magnitude correction for the standard sytem of observations.

mark	U	B	V	R_C	I_C	Location	Remarks
z	0	0	0	0	-	Stará Lesná	60-cm,phe UBVRc
s	-0.18	+0.21	-0.10	0	0	Stará Lesná	50-cm,CCD ST-10XME
t	-	+0.18	-0.12	-0.13	-	Terskol	60-cm,CCD PixelVision
a	-	-	-0.10	0	-	Crimea	50-cm, CCD Pic-416
c	0	+0.18	-0.10	0	-	Crimea	60-cm, CCD Ap-47p

four decimal numbers. In opposite case, the measurements are presented with the JD in two decimal numbers. In this case, the magnitude of a variable star is the mean value obtained as a result of combining a few CCD-images. The total number of summarized frames is given in Table 3.

The R_C, V light curves and $B-V$ and $V-R_C$ colour indices curves of V466 And are shown in Fig. 2. The R_C and V light curves exhibit the primary decline for $\approx$ 2.5 – 3 mag. A similar decline is observed in all WZ Sge-type DNe. Nevertheless, in a few objects the short-time decline for a few magnitudes, followed by an increase to the previous brightness, was detected ("dip", see Table 5).

The fast decline of the brightness ($>$ 1 mag/day) of V466 And occurred during the JD 2454733 – 736, 25 days after the beginning of the superoutburst. In Nova Tri 2008, the fast decline of brightness occurred 28 days after the beginning of the superoutburst (Chochol et al., 2009). The fast decline of AL Com (see Table 5) started 40 days after the beginning of the superoutburst (Patterson et al., 1996) detected in 1995. But the superoutburst amplitude of this object was higher than in nova Tri 2008 and V466 And. In SDSS J102146.44+234926.3, the fast decline started 20 days after the beginning of superoutburst, detected in 2007 (Pavlenko, 2007, Uemura et al., 2008). For SW UMa (an SU UMa type object), the fast decline occurred only 15 days after beginning of the superoutburst, as observed in 1995 (Burleigh et al., 2001) or 2000 (Pavlenko et al., 2000).

2.2. Colour - colour diagrams

The two-colour $(U-B, B-V)$ diagram of V466 And and 30 surrounding stars, detected in the same CCD images, is presented in Fig. 3. The direction of interstellar reddening is indicated by an arrow. It is obvious that the surrounding stars are not influenced by an interstellar extinction. Therefore, it is very probable that the light of the dwarf nova itself is not reddened, too. The corresponding data for these stars are presented in Table 4.

Table 3. The average magnitudes of V466 And. JD = JD* + 2 454 700.

JD*	U	n	B	n	V	n	R_C	n	I_C	n	mark
11.5	-	-	12.653	170	12.686	173	12.780	164	-	-	t
12.5	12.201	7	13.133	104	13.140	102	13.144	99	13.151	5	s,t,z
13.5	12.545	4	13.471	92	13.419	87	13.405	98	13.540	5	s
14.4	12.854	5	13.712	7	13.636	72	13.643	4	13.759	69	s
15.3	13.094	5	13.934	4	13.822	79	13.818	76	13.932	3	s
16.5	13.284	3	14.115	89	13.993	122	14.021	73	14.059	51	s,t
17.5	-	-	14.302	103	14.170	104	14.190	106	14.203	2	s,t
18.4	-	-	14.482	51	14.127	63	14.338	53	-	-	t
19.5	13.871	94	14.617	95	14.457	93	14.426	93	14.514	92	s
21.5	-	-	14.848	70	14.684	64	14.664	70	-	-	t
23.4	14.213	55	15.001	133	14.794	240	14.788	120	14.908	15	s,t
24.5	-	-	15.104	65	14.909	138	-	-	-	-	a,c
25.4	-	-	15.188	21	14.979	27	-	-	-	-	a,c
26.4	-	-	15.280	60	15.086	98	15.052	5	-	-	a
28.4	-	-	15.533	4	15.393	6	15.259	4	15.341	2	s
32.4	-	-	15.921	3	15.705	97	15.637	2	-	-	c
33.4	-	-	15.951	2	15.816	14	15.677	30	-	-	a,c
34.4	-	-	16.290	39	16.167	195	15.924	70	-	-	a,c
35.5	-	-	17.368	1	17.231	7	17.015	76	-	-	c
37.5	-	-	-	-	-	-	17.544	129	-	-	a,c
38.4	17.23	1	18.259	4	17.971	5	17.644	129	-	-	c
39.4	-	-	18.245	1	18.12	2	17.782	14	-	-	c
41.5	-	-	18.348	2	18.17	2	17.876	106	-	-	c
42.4	17.24	1	18.637	2	-	-	17.908	95	-	-	c
45.5	17.44	5	18.692	10	18.454	10	18.192	16	17.882	13	s,c
48.4	-	-	-	-	-	-	18.214	13	-	-	c
49.3	-	-	-	-	-	-	18.353	29	-	-	c
50.4	-	-	-	-	-	-	18.552	4	-	-	c
51.3	-	-	-	-	-	-	18.35	2	-	-	c
53.3	-	-	-	-	18.82	4	18.385	8	-	-	c
54.4	-	-	-	-	18.44	1	18.31	1	-	-	c
56.3	-	-	-	-	18.66	1	18.50	7	-	-	c
79.2	-	-	-	-	19.42	1	18.76	1	-	-	c
89.3	-	-	-	-	19.20	1	18.70	1	-	-	c

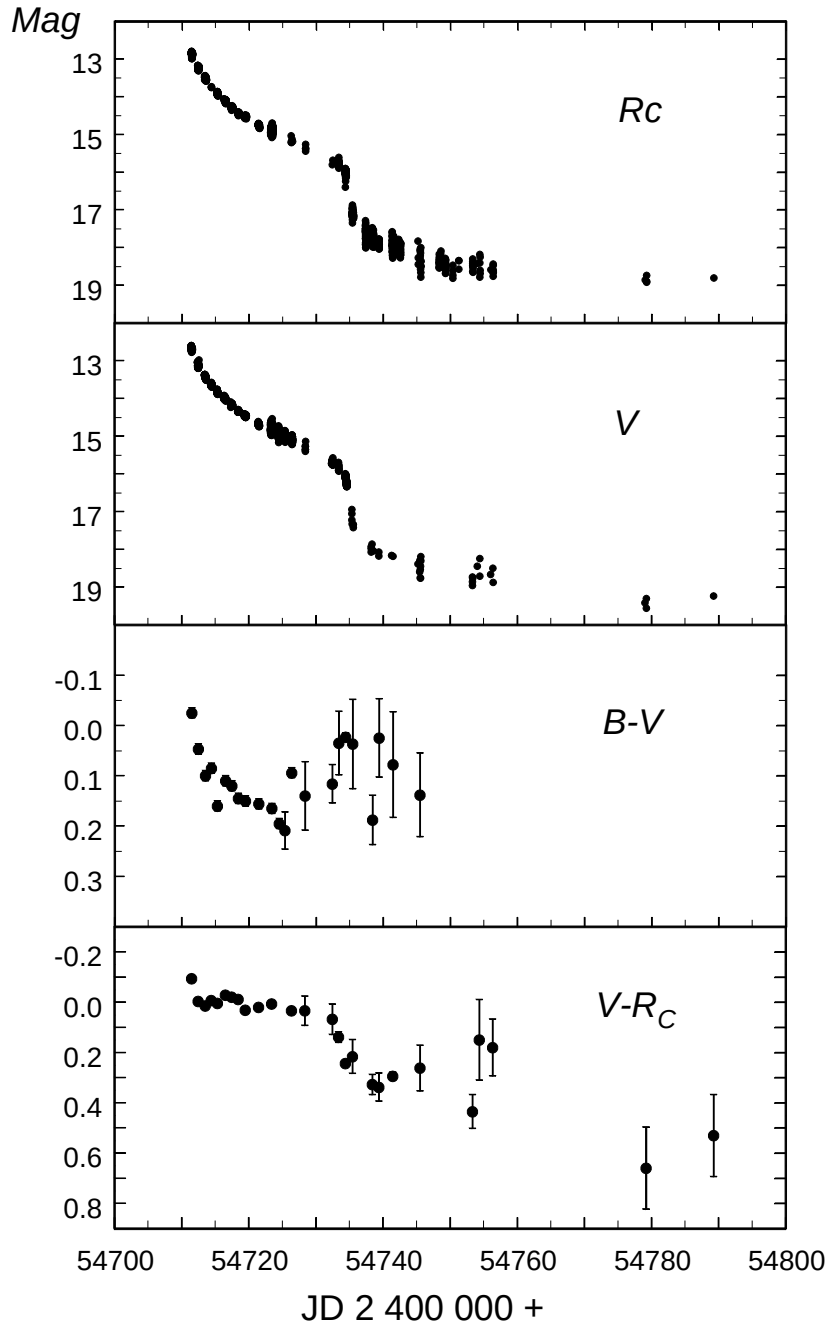

Figure 2. The R_C, V light curves, $B-V$ and $V-R_C$ colour indices curves of V466 And from September 1 to November 18, 2008. The average night magnitudes were used for $B-V$ and $V-R_C$ light curves.

Table 4. The V magnitudes and color-indices of the field stars.

R.A.(2000)	Dec(2000)	V	$U-B$	$B-V$	$V-R_C$	$(R-I)_C$
01 59 25.66	+44 09 34.3	13.87(2)	0.10(2)	0.64(3)	0.31(2)	0.33(2)
01 59 27.72	+44 08 59.9	13.52(1)	0.14(2)	0.69(2)	0.34(2)	0.37(2)
01 59 33.06	+44 09 25.2	14.11(3)	0.14(3)	0.71(4)	0.28(4)	0.35(4)
01 59 38.24	+44 13 52.6	12.71(1)	0.24(1)	0.74(1)	0.38(1)	0.39(2)
01 59 38.10	+44 13 27.9	13.31(1)	0.09(1)	0.61(1)	0.35(1)	0.33(2)
01 59 46.22	+44 13 19.5	15.19(4)	-1.07(3)	0.00(5)	-0.10(1)	0.03(4)
01 59 48.14	+44 11 18.6	13.22(2)	0.10(1)	0.61(2)	0.30(2)	0.34(2)
01 59 52.03	+44 15 56.9	12.39(1)	0.13(1)	0.58(1)	0.30(1)	0.32(1)
01 59 53.69	+44 06 10.8	11.03(1)	0.60(1)	0.95(1)	0.47(1)	0.47(1)
01 59 53.09	+44 15 59.8	13.76(4)	0.48(5)	0.89(6)	-	-
01 59 59.47	+44 13 05.7	14.17(3)	0.18(3)	0.76(4)	0.37(4)	0.42(3)
02 00 09.22	+44 10 46.1	14.18(2)	0.08(3)	0.71(3)	0.29(3)	0.37(3)
02 00 14.59	+44 10 25.0	14.87(4)	0.38(8)	0.73(7)	0.45(5)	0.46(5)
02 00 25.11	+44 15 28.8	14.65(3)	0.08(4)	0.55(4)	0.28(3)	0.33(4)
02 00 26.52	+44 15 23.0	13.83(2)	0.33(2)	0.77(3)	0.44(3)	0.38(2)
02 00 32.90	+44 10 40.3	14.71(5)	0.73(9)	0.91(7)	0.49(5)	0.47(3)
02 00 33.50	+44 12 22.1	13.68(1)	1.01(4)	1.15(2)	0.59(1)	0.53(1)
02 00 37.03	+44 07 05.5	13.11(1)	0.32(1)	0.81(2)	0.41(1)	0.40(1)
02 00 38.85	+44 07 19.6	13.44(1)	0.95(3)	1.14(2)	0.60(1)	0.59(1)
02 00 40.62	+44 09 20.4	14.28(2)	0.12(2)	0.53(3)	0.31(3)	0.17(6)
02 00 52.81	+44 05 16.6	11.84(1)	0.94(5)	1.08(4)	0.58(1)	0.51(1)
02 01 00.91	+44 06 29.5	13.80(1)	0.12(1)	0.55(2)	0.30(3)	0.29(3)
02 01 06.92	+44 05 05.2	11.07(1)	0.41(6)	0.61(6)	0.39(1)	0.35(1)
02 01 07.97	+44 07 16.7	11.16(1)	1.25(1)	1.24(1)	0.62(1)	0.55(1)
02 01 08.88	+44 16 42.1	13.86(2)	0.09(2)	0.61(2)	0.35(2)	0.32(2)
02 01 10.28	+44 09 13.9	12.50(1)	0.67(1)	1.00(1)	0.50(1)	0.49(1)

The celestial coordinates of the stars were derived using the MaxPoint package and USNO-A2.0 catalog with mean error of 0.4". The data in the table are arranged according to increasing right ascension.

Fig. 4 displays the evolution of V466 And in a two-colour $(U-B, B-V)$ diagram in a large scale. At the date of discovery, the object was located on the blackbody temperature sequence corresponding to the temperature of about 12000 K.

Thereafter, the object moved along the blackbody sequence towards the lower temperatures and reached 10000 K. The decrease of temperature is seen also in Fig. 2: during the brightness decline, the reddening of the colour-indices $B-V$ and $V-R_C$ was detected.

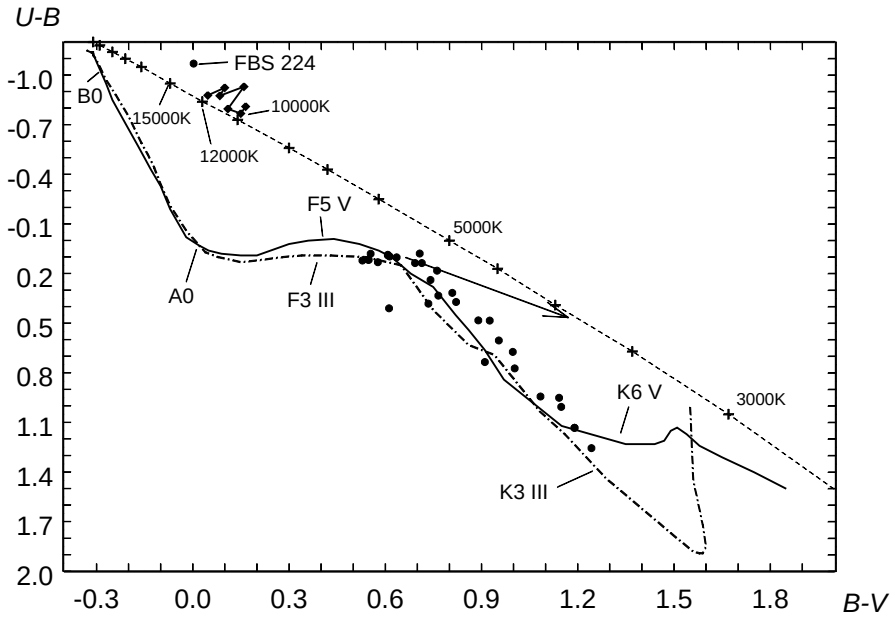

Figure 3. The two-colour $(U-B, B-V)$ diagram. The dwarf and giant sequences are plotted with the solid and dot-dashed lines, respectively. The colour indices of black bodies are shown by crosses and a dashed line. Filled diamonds correspond to V466 And, filled circles – to the position of the field stars.

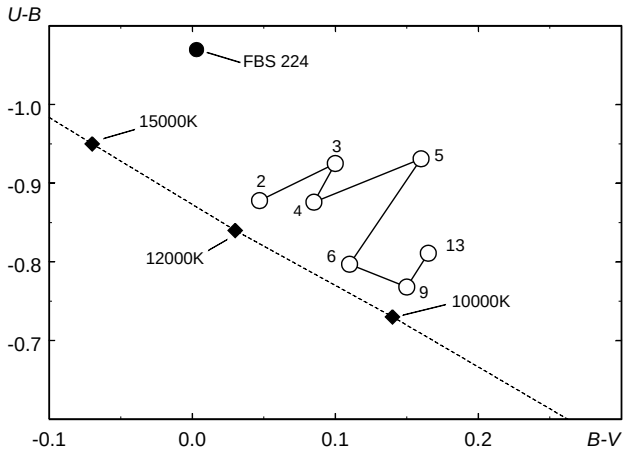

Figure 4. The detail of the two-colour $(U-B, B-V)$ diagram. The evolution of the object on the black body temperature scale is depicted. Numbers near the observational points give the days after outburst, which occurred on JD=2454711.

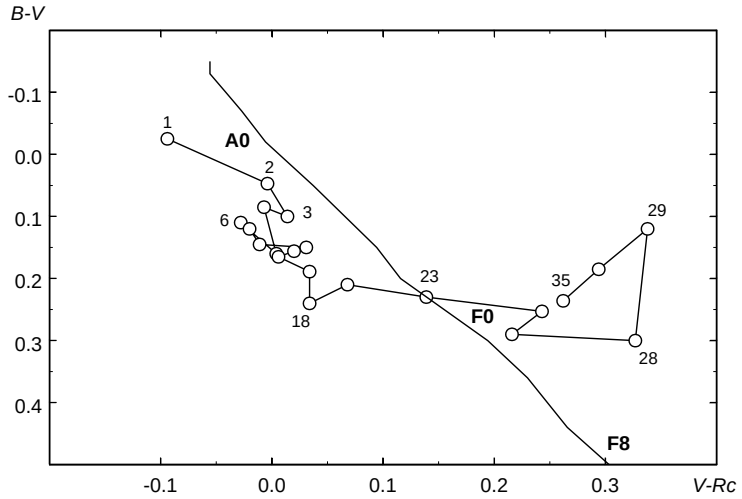

Figure 5. The track of V466 And in the two-colour $(B-V, V-R_C)$ diagram. The main sequence, with designation of spectral types, is represented by a solid line.

The position of a very blue stellar object FBS B 224, with the strong UV-excess (Mickaelian & Gigoyan, 2006), found in the field of V466 And, is marked in Figs. 3 and 4, too.

Temperature decrease of the object during the superoutburst is indicated also in the two-colour $(B-V, V-R_C)$ diagram, presented in Fig. 5. A strange behaviour of the track after the day 22 of the superoutburst was caused by an increase of the strength of the H_α emission.

2.3. Early, ordinary and late superhumps

A Fourier period analysis of our BVR_C observations, after removal of the declining trend of the superoutburst light curve, revealed the presence of early, ordinary and late superhumps and enabled us to determine their periods. The folded light curves of V466 And, phased with the periods: $0.^d056383$ for early superhumps,$0.^d05713$ for ordinary superhumps and $0.^d056$ for late superhumps, are presented in Figs. 6 – 11. Because the amplitude of this variability does not depend on the passband, we present their summarized phase light curves in BVR_C-bands.

In Fig. 6 (days 1–3 after outburst (AO)), the early superhumps are presented in the form of a double wave with the amplitude of 0.07 mag. There is a large scatter of the data.

Fig. 7 (days 4–7 AO) shows the continuation of the early superhump stage, but the double wave is expressed less clearly. Its amplitude decreased to ~ 0.05 mag.

Fig. 8 (days 8–9 AO) exhibits a weak double wave with the amplitude < 0.02 mag, hardly visible in scattered data.

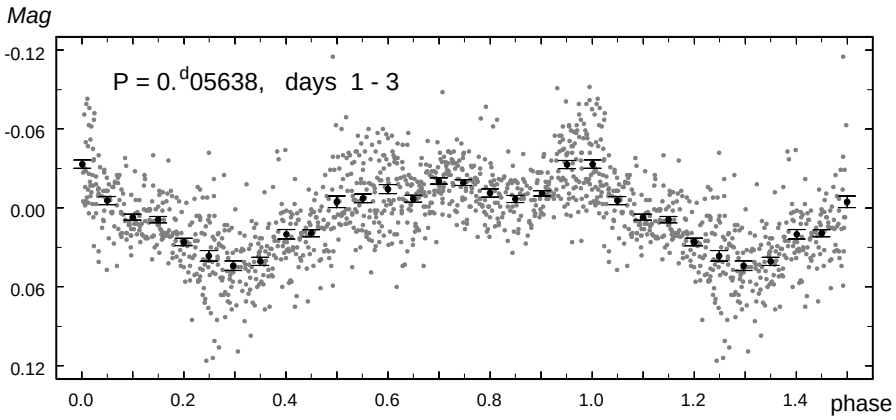

Figure 6. Early superhumps at the beginning of the superoutburst.

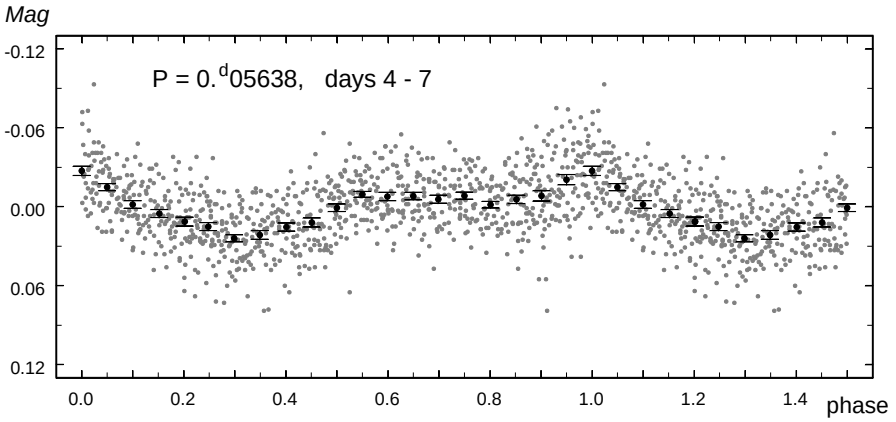

Figure 7. The continuation of the early superhumps.

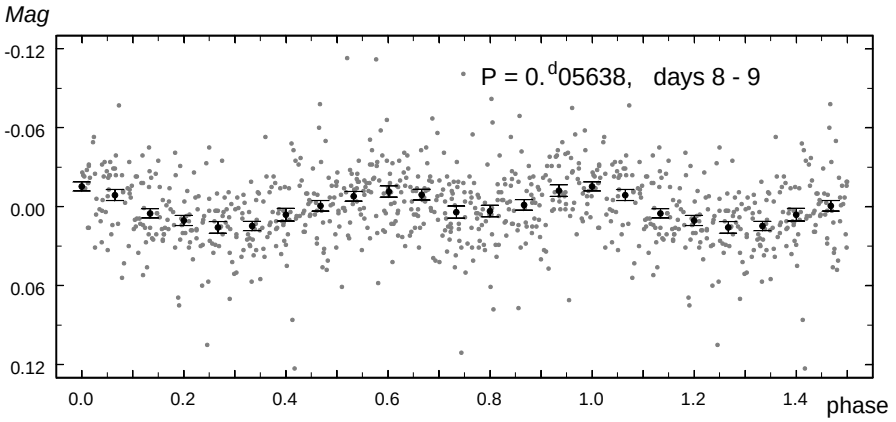

Figure 8. The last stage of the early superhumps.

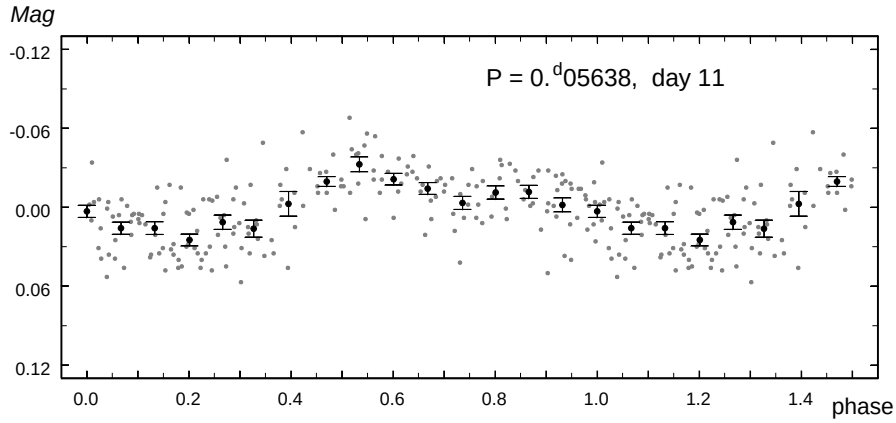

Figure 9. The summed light curve at the day 11 after outburst, when the early superhumps changes to the ordinary ones. A relic of the early superhumps (double wave) is still visible.

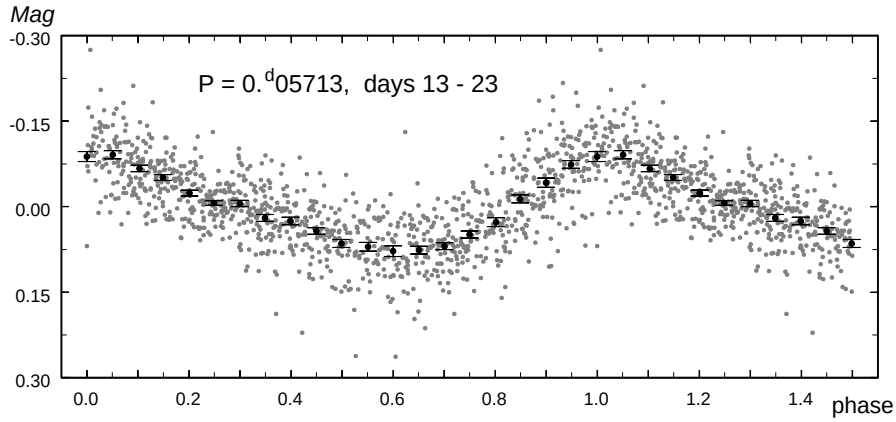

Figure 10. The ordinary superhumps are well detected.

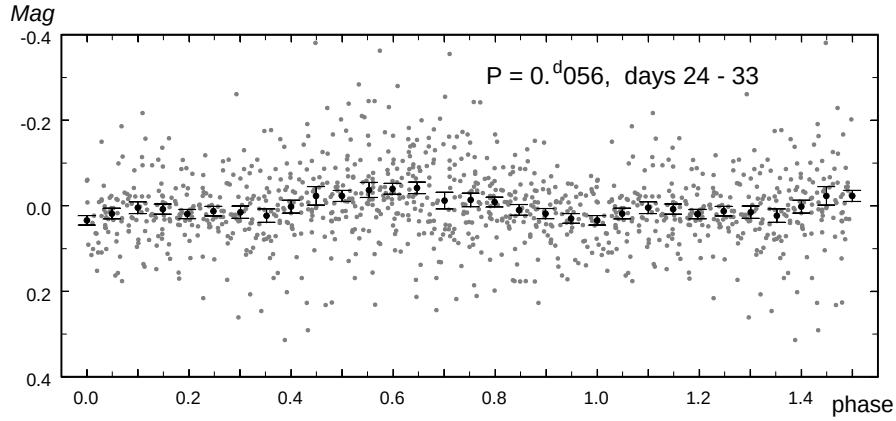

Figure 11. The late superhumps: their period and amplitude are very unstable.

Fig. 9 (day 11 AO) presents variations at the moment (JD 2454721) when the ordinary superhumps probably "turned on". The amplitude increased to ~ 0.07 mag, but the slight "phantom" of a double wave is still visible.

Fig. 10 (days 12–23 AO) shows the ordinary superhumps with the large amplitude ~ 0.2 mag and period of $0.^d05713$.

Fig. 11 (days 24–33 AO) presents late superhumps with an unstable period and amplitude. The average value of the period is $0.^d056$, while the mean amplitude is smaller than 0.02 mag. There is only one wave during the period. The scatter of the data is very large.

The multicolour light curves of ordinary superhumps taken on the day 13 AO (JD 2454723) are shown in Fig. 12.

The early superhumps are a unique feature of WZ Sge-type stars. They appear near the maximum magnitude of superoutburst and have periods almost identical to the orbital one. Osaki and Meyer (2002) suggested that a double peaked profile of early superhumps is manifestation of the tidal 2:1 resonance in accretion disks of binary systems with extremely low mass ratios. Early superhumps can be explained by a two-armed spiral pattern of tidal dissipation generated by the 2:1 resonance, first proposed by Lin and Papaloizou (1979).

The ordinary (common) superhumps, with a single peak profile, appear during the plateau of superoutburst of WZ Sge-type stars. Their periods are a few percent longer than the orbital period. The ordinary superhumps can be explained by the thermal tidal instability model of an accretion disk (Osaki, 1989; Whitehurst, 1988). The presence of the tidal 3:1 resonance in the disk (with the radius smaller than the 2:1 resonance radius) results in the formation of an eccentric outer ring undergoing apsidal precession with a period appreciably longer than the orbital one. The beating of the orbital and precessional periods cause periodic variations, identified as superhumps. This model is supported by numerical simulations (Bisikalo et al., 2005; Kaigorodov et al., 2006; Smith et al., 2007). However, Smak (2009) pointed out that the tidal model fails to reproduce the amplitudes of superhumps. In his new interpretation of superhumps, periodically variable irradiation of the secondary component results in a strongly modulated mass outflow. Superhumps are then due to enhanced dissipation of the kinetic energy of the stream.

The late superhumps appear several days after the rapid decline from the plateau of a superoutburst and may continue for several hundred cycles after the end of the superoutburst. The recent paper of Kato et al. (2009a), devoted to the period variations of superhumps in an SU UMa-type dwarf novae, presented data and analysis of observations about a hundred SU UMa and WZ Sge stars. It contains a description and review of some models and theories of outbursts of these systems. According to Kato et al. (2008), the late superhumps are proposed to originate in the precessing eccentric disk near the tidal truncation. The eccentric disk slowly expands during the decline of the superoutburst and finally reaches the tidal truncation, where the period is stabilized. It can be a natural extension of the explanation of late superhumps in WZ Sge-stars.

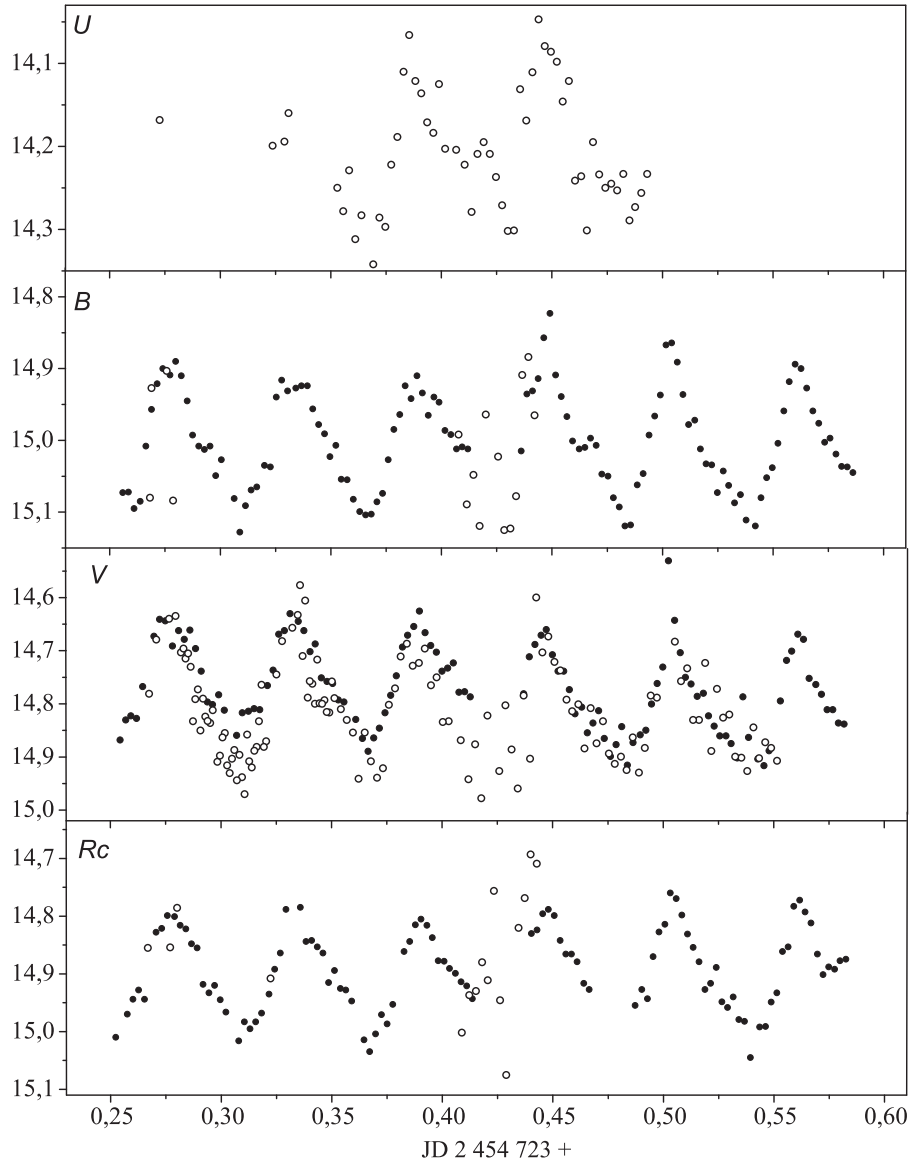

Figure 12. $UBVR_c$ light curves of V466 And on Sept. 13, 2008 (JD 2454723). The ordinary superhumps are clearly visible. Open circles – photometry from Stará Lesná, filled circles – photometry from Terskol.

In V466 And the early superhumps with the stable period of $0.^d056383$ and the form of a double wave were observed in days 3–11 AO. As seen in Fig. 13, the day 11 AO was the day of transition to the ordinary superhumps. The ordinary superhumps with the stable period of $0.^d05713$ and the form of a single wave were observed in the days 13–23 AO (Fig. 14). In days 24–33 AO the late superhumps with an unstable period about of 0.056 days and a small amplitude were detected (Fig. 11). The period of late superhumps in V466 And is smaller than that of ordinary superhumps. The late superhumps in WZ Sge-type stars have usually longer periods than the ordinary superhumps (see Kato et al., 2009a). The shorter period of the late superhumps in V466 And may be a sign of shrinking of the accretion disc.

3. WZ Sge-type dwarf novae and concluding remarks

Our photometric observations allow to classify V466 And as a dwarf nova of the WZ Sge-type. Another object of this type – nova Tri 2008 = CSS081026:023839 +355648 (or OT J023839.1 + 355648) has a very similar light curve and the colour-colour diagrams (Chochol et al., 2009). The early superhumps in V466 And are clearly expressed and a double-wave is seen better than in CSS081026. Both systems did not exhibit any rebrightenings. But in Nova Tri 2008 a sudden increase of activity with the amplitude of ∼1 mag was detected in quiescence (Chochol et al., 2009). V466 And in quiescence is not accessible to our telescopes facilities, but we could not miss any 2 – 3 mag rebrightening. WZ Sge itself had 13 rebrightenings and SDSS J080434.20+510349.2, another new WZ Sge-type star, showed 11 rebrightenings of a decreasing amplitude with the $2.^d5$ cycle (Pavlenko, 2007; Pavlenko et al., 2007; Kato et al., 2009b).

Due to the fact that we know only about 30 WZ Sge-type stars, detailed investigations of each object are very important. It helps to accumulate more data for a particular object as well as to increase the statistical data for all objects of this type. This investigation will help to understand the physical processes occurring in WZ Sge-type stars. A list of WZ Sge-type stars and suspected ones, with their main characteristics, is presented in Tables 5 and 6. The periods of ordinary superhumps P_{sh} were used in these tables (see Kato et al., (2009a)). For known values of orbital and superhump periods, we calculated the superhump period excess applying the well known relation $\epsilon = P_{sh}/P_{orb}–1$. Using the data from Tables 5 and 6, we found the mean value of a superhump period excess for WZ Sge-type objects as ϵ=0.019±0.003. In the case that either orbital or ordinary superhumps periods were not published, we appended them to Tables 5 and 6, using the relation metioned above. A more explicative table of candidates for WZ Sge-type dwarf novae and related systems was presented by Kato et al. (2001b).

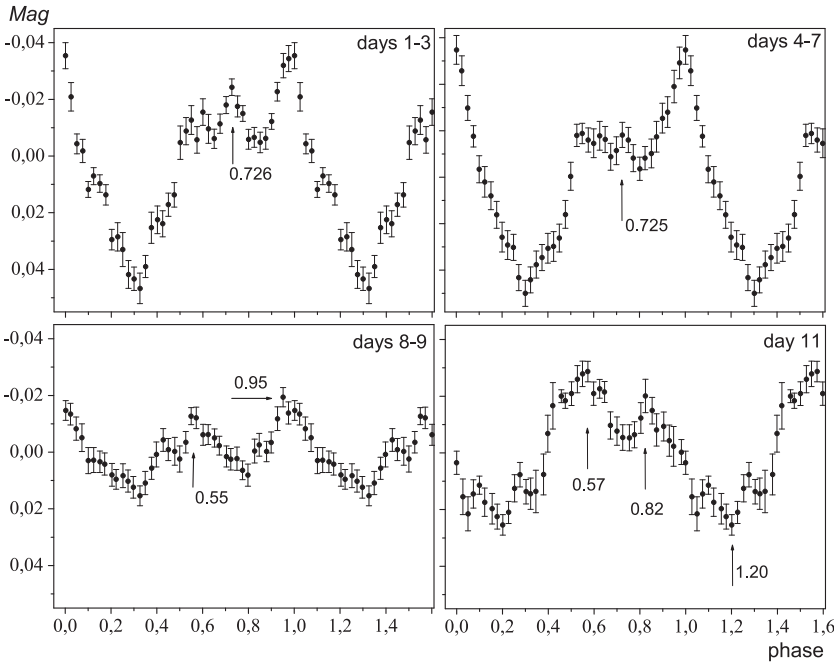

Figure 13. The phase evolution of early superhumps. The maxima of superhumps (days 1-9 AO) follow the ephemeris: $JD_{max} = 2454711.4688 + 0.056383 \cdot E$. The day 11 AO was the day of transition from the early to the ordinary superhumps.

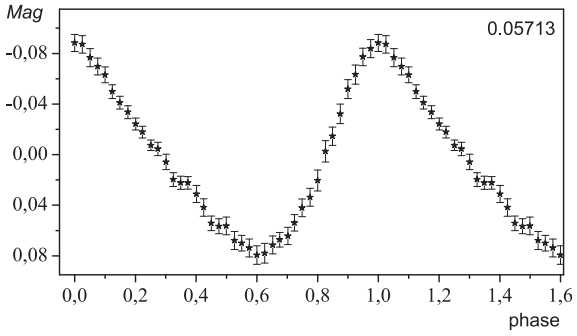

Figure 14. The phase light curve of ordinary superhumps. The maxima of superhumps (days 13-23 AO) follow the ephemeris: $JD_{max} = 2454723.5020 + 0.05713 \cdot E$ (see also Fig.12).

Table 5. The WZ Sge-type stars

Name	P_{sh},	P_{orb},	T_{sh},	N_r	Ref.
LL And	0.056900	0.055055	> 4000	0	1
	0.056583				
V455 And	0.057133	0.056309		0	1–4
V466 And	0.057203	0.056365		0	1, 5
UZ Boo	0.061743	0.060*	4600	2:(1994)	1
	0.061922			4 (2003)	
CG CMa	0.0636:	0.063275		0	1, 6
AL Com	0.057289	0.056668	2200	1, dip (1995)	1, 7, 8
	0.057229			1, dip (2001)	
EG Cnc	0.060337	0.05997	7000	6 (1996)	1, 9–11
V1251 Cyg	0.076284	0.07433	> 6000	1	1, 12
	0.075973				
V2176 Cyg	0.056239	0.0553	5000	1 or dip	1, 13, 14
V592 Her	0.056498	0.05592	4000		1, 15, 16
RZ Leo	0.078658	0.076038	2000	1	1, 17
	0.078428			1	
GW Lib	0.054095	0.05332	8800	0	18–20
V358 Lyr	0.055629	0.055*		1	21–23
V585 Lyr	0.060363	0.0593			1
WZ Sge	0.057232	0.056688	10700	>6 (1978)	1, 18, 24
	0.057204			12 (2001)	
UW Tri	0.054194	0.05334	4600	0	1, 25, 26
BC UMa	0.064555	0.06261	800	1	1
HV Vir	0.058266	0.057069	2900	0	1, 27
	0.058322				
002511+1217	0.057093	0.05654		1	1, 28
004226+4215	0.056892	0.05550		1?	1
022216+4122	0.055585	0.054868		1?	1,29
023238-3718	0.066166	0.0647		4	1
023322-1047	0.055987	0.0548		0	1, 30
023839+3556	0.053658	0.05267		0	1, 31
074727+0650	0.060736	0.059005		6	1
080434+5103	0.059713	0.059		11	32, 33, 34
080714+1138	0.061050	0.060		1	1
102146+2349	0.056312	0.0559		1 or dip	1, 35
160048-4846	0.064970	0.063381		1	36, 40

Explanation: P_{sh} – period of superhumps (sometimes for two superoutbursts, in days), P_{orb} – orbital period (in days), T_{sh} – recurrent time between superoutbursts, N_r – number of rebrightenings, ":" – uncertain value, "*" – period calculated using the relation: $\epsilon = P_{sh}/P_{orb} - 1$, for $\epsilon = 0.019$ (see text).

Table 6. Suspected WZ Sge-type stars or close to the WZ Sge-type.

Name	P_{sh},	P_{orb},	N_r	Ref.
PQ And	0.0566 :	0.0560		1, 42
WX Cet	0.059616	0.05826		1, 37
	0.05929			38
DV Dra	0.060*	0.05883		1, 39
V1108 Her	0.057480	0.05703	0	1
SS LMi	0.0058*	0.056637	0	1
SW UMa	0.05818	0.057*		1, 40
	0.05832			
083845+4910	0.07148	0.070*		1,
090239+0525	0.058*	0.05652		1, 43
102522-1542	0.063353	0.06136	1	1
111217-3538	0.059009	0.05843	0	1
153616-0839	0.064606	0.063*	4	1
195951+2242	0.059919	0.058	1	1

References to Table 5 and Table 6: 1. Kato et al. 2009a; 2. Araujo-Betancor et al., 2005; 3. Katysheva & Shugarov, 2009; 4. Matsui et al., 2009; 5. this paper; 6. Kato et al., 1999; 7. Nogami et al., 1997; 8. Ishioka et al., 2002; 9. Liu et al., 1997; 10. Patterson et al., 1998b; 11. Kato et al., 2004; 12. Kato, 1995; 13. Wenzel, 1991; 14. Novak et al., 2001; 15. Kato et al., 2002; 16. Mennickent et al., 2002; 17. Ishioka et al., 2001; 18. Kato et al., 2008; 19. Hiroi et al., 2009; 20. Nogami et al., 2009; 21. Galkina & Shugarov, 1985; 22. Richter, 1986; 23. Antipin et al., 2004; 24. Patterson et al., 2002; 25. Kurochkin, 1984; 26. Kato et al., 2001a; 27. Kato et al., 2001b; 28. Golovin et al., 2005; 29. Imada et al., 2006; 30. Vanmunster et al., 2006; 31. Chochol et al., 2009; 32. Pavlenko et al., 2007; 33. Zharikov et al., 2008; 34. Kato et al., 2009b; 35. Uemura et al., 2008; 36. Imada & Monard, 2006; 37. Rogoziecki & Schwarzenberg-Czerny, 2001; 38. Sterken et al., 2007; 39. Pavlov & Shugarov, 1985; 40. Soejima et al., 2009; 41. Pavlenko et al., 2000; 42. Patterson et al., 2005; 43. Drake et al., 2009.

Table 7. U magnitudes of V466 And. The symbols "s" and "c" are explained in Table 2. JD_{hel} = JD* + 2 454 700.

JD*	U	JD*	U	JD*	U	JD*	U
12.3731	12.21 s	12.3751	12.21 s	13.4142	12.55 s	14.4138	12.85 s
.3735	12.17 s	.5840	12.32 z	14.4106	12.86 s	15.3786	13.09 s
.3739	12.18 s	13.4115	12.57 s	.4113	12.89 s	.3794	13.15 s
.3743	12.19 s	.4127	12.52 s	.4122	12.82 s	.3807	13.08 s
.3747	12.18 s	.4135	12.54 s	.4129	12.85 s	.3814	13.08 s

Table 7. Continued.

JD*	U	JD*	U	JD*	U	JD*	U
15.3822	13.07 s	19.4484	13.90 s	19.5771	13.95 s	23.4017	14.20 s
16.3418	13.30 s	.4515	13.89 s	.5802	13.83 s	.4067	14.20 s
.3426	13.27 s	.4547	13.85 s	.5833	13.84 s	.4105	14.22 s
.3433	13.28 s	.4578	13.88 s	.5865	13.84 s	.4136	14.28 s
19.3323	13.81 s	.4610	13.77 s	.5896	13.87 s	.4163	14.21 s
.3354	13.76 s	.4641	13.79 s	.5928	13.87 s	.4191	14.20 s
.3386	13.88 s	.4672	13.80 s	.5959	13.90 s	.4218	14.21 s
.3417	13.83 s	.4704	13.92 s	.5990	13.88 s	.4246	14.24 s
.3448	13.81 s	.4735	13.89 s	.6021	13.87 s	.4274	14.27 s
.3480	13.90 s	.4767	13.90 s	.6053	13.87 s	.4301	14.30 s
.3511	13.88 s	.4798	13.86 s	.6085	13.90 s	.4329	14.30 s
.3542	13.89 s	.4829	13.85 s	.6116	13.84 s	.4356	14.13 s
.3574	13.91 s	.4861	13.90 s	.6147	13.91 s	.4384	14.17 s
.3605	13.87 s	.4892	13.93 s	.6179	13.87 s	.4411	14.11 s
.3637	13.82 s	.4923	13.90 s	.6210	13.82 s	.4440	14.05 s
.3699	13.83 s	.4955	13.82 s	.6241	13.74 s	.4468	14.08 s
.3731	13.94 s	.4986	13.83 s	.6273	13.82 s	.4495	14.09 s
.3762	13.84 s	.5017	13.88 s	.6304	13.92 s	.4522	14.10 s
.3793	13.92 s	.5049	13.85 s	23.2726	14.17 s	.4549	14.15 s
.3825	13.87 s	.5080	13.93 s	.3236	14.20 s	.4577	14.12 s
.3856	13.83 s	.5112	13.83 s	.3289	14.19 s	.4604	14.24 s
.3888	13.80 s	.5143	13.91 s	.3309	14.16 s	.4631	14.24 s
.3919	13.90 s	.5174	13.86 s	.3529	14.25 s	.4658	14.30 s
.3950	13.76 s	.5206	13.81 s	.3556	14.28 s	.4686	14.19 s
.3982	13.90 s	.5237	13.90 s	.3583	14.23 s	.4714	14.23 s
.4013	13.91 s	.5269	13.85 s	.3611	14.31 s	.4741	14.25 s
.4044	13.98 s	.5300	13.85 s	.3638	14.28 s	.4768	14.25 s
.4076	13.93 s	.5363	13.92 s	.3665	14.54 s	.4795	14.25 s
.4107	13.95 s	.5394	13.90 s	.3692	14.34 s	.4822	14.23 s
.4139	13.84 s	.5425	13.84 s	.3719	14.29 s	.4850	14.29 s
.4170	13.82 s	.5457	13.83 s	.3746	14.30 s	.4877	14.27 s
.4202	13.82 s	.5488	13.87 s	.3773	14.22 s	.4904	14.26 s
.4233	13.93 s	.5520	13.85 s	.3800	14.19 s	.4931	14.23 s
.4264	13.89 s	.5551	14.00 s	.3828	14.11 s	38.2679	17.23 c
.4296	13.95 s	.5582	13.92 s	.3855	14.07 s	42.2497	17.29 c
.4327	13.98 s	.5614	13.85 s	.3882	14.12 s	45.4745	17.23 c
.4358	13.88 s	.5645	13.85 s	.3909	14.14 s	.4767	17.59 c
.4390	13.91 s	.5677	13.84 s	.3936	14.17 s	.4788	17.41 c
.4421	13.96 s	.5708	13.87 s	.3963	14.18 s	.4810	17.32 c
.4453	13.84 s	.5739	13.86 s	.3990	14.13 s	.4831	17.66 c

Table 8. B magnitudes of V466 And. The symbols "c","s","t" and "z" are explained in Table 2. $JD_{hel} = JD^* + 2\,454\,700$.

JD^*	B	JD^*	B	JD^*	B	JD^*	B
11.4427	12.57 t	11.4700	12.61 t	11.4964	12.66 t	11.5316	12.69 t
.4437	12.60 t	.4707	12.59 t	.4971	12.64 t	.5322	12.68 t
.4447	12.60 t	.4714	12.62 t	.4978	12.65 t	.5328	12.67 t
.4454	12.59 t	.4720	12.63 t	.4985	12.66 t	.5334	12.67 t
.4463	12.56 t	.4727	12.63 t	.4992	12.65 t	.5340	12.69 t
.4470	12.58 t	.4734	12.64 t	.4999	12.66 t	.5346	12.67 t
.4477	12.59 t	.4741	12.64 t	.5006	12.67 t	.5352	12.66 t
.4484	12.61 t	.4748	12.64 t	.5013	12.65 t	.5377	12.67 t
.4491	12.61 t	.4755	12.65 t	.5020	12.66 t	.5383	12.68 t
.4498	12.60 t	.4762	12.65 t	.5027	12.68 t	.5389	12.69 t
.4505	12.59 t	.4769	12.67 t	.5034	12.67 t	.5395	12.70 t
.4512	12.62 t	.4776	12.66 t	.5041	12.68 t	.5401	12.71 t
.4518	12.59 t	.4783	12.66 t	.5048	12.69 t	.5407	12.70 t
.4525	12.58 t	.4790	12.66 t	.5054	12.68 t	.5413	12.69 t
.4533	12.58 t	.4797	12.67 t	.5061	12.67 t	.5419	12.73 t
.4539	12.57 t	.4803	12.69 t	.5068	12.65 t	.5425	12.72 t
.4547	12.58 t	.4810	12.72 t	.5075	12.65 t	.5431	12.71 t
.4553	12.60 t	.4817	12.69 t	.5082	12.64 t	.5437	12.71 t
.4560	12.62 t	.4824	12.71 t	.5089	12.64 t	.5443	12.69 t
.4567	12.62 t	.4831	12.72 t	.5096	12.63 t	.5449	12.70 t
.4574	12.62 t	.4838	12.72 t	.5103	12.67 t	.5455	12.71 t
.4581	12.61 t	.4845	12.71 t	.5110	12.67 t	.5461	12.71 t
.4588	12.62 t	.4852	12.71 t	.5117	12.66 t	.5467	12.69 t
.4595	12.61 t	.4859	12.72 t	.5124	12.65 t	.5473	12.68 t
.4602	12.63 t	.4866	12.70 t	.5131	12.66 t	.5485	12.68 t
.4610	12.62 t	.4873	12.69 t	.5138	12.66 t	.5491	12.69 t
.4617	12.65 t	.4880	12.69 t	.5145	12.65 t	.5499	12.70 t
.4624	12.63 t	.4887	12.67 t	.5152	12.64 t	.5505	12.69 t
.4631	12.62 t	.4894	12.66 t	.5256	12.66 t	.5511	12.69 t
.4638	12.62 t	.4901	12.68 t	.5262	12.65 t	.5517	12.68 t
.4644	12.60 t	.4908	12.65 t	.5268	12.66 t	.5523	12.67 t
.4651	12.61 t	.4915	12.67 t	.5274	12.66 t	.5529	12.67 t
.4658	12.59 t	.4922	12.68 t	.5280	12.64 t	.5535	12.64 t
.4665	12.57 t	.4929	12.67 t	.5286	12.65 t	.5541	12.66 t
.4672	12.57 t	.4936	12.67 t	.5292	12.64 t	.5547	12.64 t
.4679	12.58 t	.4943	12.67 t	.5298	12.66 t	.5553	12.65 t
.4686	12.59 t	.4950	12.66 t	.5304	12.68 t	.5561	12.64 t
.4693	12.58 t	.4957	12.68 t	.5310	12.68 t	.5567	12.63 t

Table 8. Continued.

JD*	B	JD*	B	JD*	B	JD*	B
11.5573	12.64 t	12.4393	13.16 t	12.4752	13.11 t	13.4089	13.50 s
.5579	12.63 t	.4402	13.18 t	.4761	13.09 t	.4161	13.44 s
.5585	12.63 t	.4410	13.19 t	.4769	13.12 t	.4182	13.43 s
.5592	12.65 t	.4418	13.16 t	.4777	13.11 t	.4197	13.42 s
.5598	12.65 t	.4427	13.18 t	.4786	13.12 t	.4212	13.45 s
.5604	12.67 t	.4435	13.19 t	.4807	13.14 t	.4227	13.46 s
.5610	12.67 t	.4453	13.16 t	.4815	13.11 t	.4258	13.43 s
.5616	12.68 t	.4461	13.17 t	.4823	13.12 t	.4274	13.41 s
.5623	12.67 t	.4469	13.16 t	.4831	13.13 t	.4289	13.41 s
.5630	12.67 t	.4477	13.16 t	.4840	13.13 t	.4305	13.37 s
.5636	12.68 t	.4486	13.15 t	.4848	13.13 t	.4320	13.44 s
.5642	12.66 t	.4494	13.16 t	.4856	13.18 t	.4335	13.41 s
.5648	12.65 t	.4502	13.16 t	.4865	13.19 t	.4563	13.41 s
.5654	12.65 t	.4510	13.16 t	.4873	13.17 t	.4624	13.44 s
.5660	12.65 t	.4519	13.14 t	.4882	13.16 t	.4700	13.42 s
.5666	12.66 t	.4527	13.13 t	.4890	13.15 t	.4716	13.43 s
.5672	12.66 t	.4538	13.17 t	.4898	13.16 t	.4731	13.44 s
.5678	12.67 t	.4547	13.16 t	.4906	13.14 t	.4746	13.45 s
12.3671	13.05 s	.4555	13.12 t	.4915	13.16 t	.4761	13.44 s
.3681	13.06 s	.4563	13.13 t	.4923	13.18 t	.4777	13.45 s
.3692	13.09 s	.4572	13.13 t	.4937	13.16 t	.4792	13.45 s
.3704	13.09 s	.4580	13.12 t	.4945	13.14 t	.4807	13.46 s
.3716	13.06 s	.4588	13.15 t	.4954	13.17 t	.4822	13.44 s
.4184	13.09 t	.4597	13.13 t	.4962	13.18 t	.4837	13.46 s
.4193	13.12 t	.4605	13.14 t	.4970	13.16 t	.4853	13.44 s
.4201	13.10 t	.4613	13.12 t	.4979	13.15 t	.4868	13.46 s
.4214	13.09 t	.4622	13.15 t	.4987	13.18 t	.4883	13.44 s
.4223	13.10 t	.4630	13.12 t	.4995	13.16 t	.4898	13.46 s
.4231	13.12 t	.4638	13.11 t	.5004	13.18 t	.4914	13.46 s
.4239	13.11 t	.4646	13.12 t	.5337	13.15 t	.4929	13.46 s
.4248	13.10 t	.4655	13.10 t	.5345	13.13 t	.4944	13.45 s
.4256	13.11 t	.4669	13.12 t	.5354	13.14 t	.4959	13.42 s
.4264	13.11 t	.4678	13.10 t	.5362	13.12 t	.4975	13.43 s
.4272	13.11 t	.4686	13.10 t	.5370	13.11 t	.4990	13.45 s
.4281	13.11 t	.4694	13.13 t	.5379	13.12 t	.5005	13.45 s
.4289	13.10 t	.4703	13.11 t	.5387	13.10 t	.5020	13.47 s
.4297	13.13 t	.4711	13.11 t	.5395	13.08 t	.5036	13.48 s
.4360	13.14 t	.4719	13.15 t	.5404	13.09 t	.5051	13.49 s
.4369	13.16 t	.4727	13.14 t	.5412	13.10 t	.5066	13.48 s
.4377	13.15 t	.4736	13.13 t	.5830	13.14 z	.5081	13.46 s
.4385	13.15 t	.4744	13.13 t	13.4016	13.41 s	.5096	13.49 s

Table 8. Continued.

JD*	B	JD*	B	JD*	B	JD*	B
13.5112	13.49 s	13.6239	13.52 s	16.4877	14.08 t	16.5381	14.12 t
.5127	13.47 s	.6254	13.54 s	.4889	14.11 t	.5393	14.08 t
.5142	13.52 s	.6269	13.55 s	.4901	14.13 t	.5405	14.08 t
.5157	13.50 s	.6300	13.56 s	.4914	14.14 t	.5417	14.09 t
.5172	13.52 s	.6330	13.46 s	.4926	14.15 t	.5429	14.09 t
.5188	13.51 s	.6345	13.51 s	.4937	14.13 t	.5440	14.11 t
.5203	13.50 s	.6375	13.52 s	.4949	14.12 t	.5452	14.11 t
.5218	13.49 s	.6391	13.39 s	.4961	14.13 t	.5464	14.11 t
.5234	13.49 s	.6406	13.43 s	.4973	14.14 t	.5476	14.13 t
.5249	13.51 s	14.3850	13.65 s	.4984	14.12 t	.5488	14.10 t
.5264	13.50 s	.3875	13.67 s	.4996	14.12 t	.5499	14.11 t
.5279	13.48 s	.3957	13.76 s	.5020	14.14 t	.5525	14.12 t
.5294	13.50 s	.3985	13.74 s	.5035	14.13 t	.5537	14.14 t
.5310	13.51 s	.4041	13.70 s	.5047	14.11 t	.5549	14.14 t
.5325	13.46 s	.4069	13.72 s	.5059	14.14 t	.5561	14.14 t
.5340	13.48 s	.4152	13.74 s	.5071	14.14 t	.5572	14.12 t
.5355	13.49 s	15.2724	13.92 s	.5082	14.16 t	.5584	14.12 t
.5371	13.48 s	.2746	13.95 s	.5094	14.15 t	.5596	14.13 t
.5386	13.46 s	.2767	13.94 s	.5106	14.11 t	.5608	14.13 t
.5401	13.47 s	.2788	13.93 s	.5118	14.14 t	.5620	14.13 t
.5416	13.48 s	16.2798	14.11 s	.5130	14.11 t	.5631	14.12 t
.5431	13.48 s	.2823	14.12 s	.5141	14.15 t	.5643	14.14 t
.5447	13.49 s	.2855	14.11 s	.5153	14.10 t	.5655	14.13 t
.5462	13.51 s	.3450	14.08 s	.5165	14.07 t	.5667	14.14 t
.5477	13.50 s	.3470	14.10 s	.5177	14.10 t	.5679	14.15 t
.5492	13.49 s	.3490	14.08 s	.5189	14.12 t	.5690	14.16 t
.5508	13.47 s	.3510	14.10 s	.5200	14.13 t	.5702	14.18 t
.5523	13.48 s	.3530	14.10 s	.5212	14.12 t	17.3272	14.30 s
.5538	13.50 s	.3550	14.09 s	.5224	14.11 t	.3759	14.29 t
.5629	13.46 s	.3570	14.11 s	.5236	14.12 t	.3776	14.30 t
.5690	13.52 s	.3589	14.11 s	.5248	14.12 t	.3810	14.30 t
.6086	13.48 s	.3609	14.10 s	.5260	14.10 t	.3827	14.30 t
.6102	13.45 s	.3629	14.08 s	.5275	14.11 t	.3984	14.30 t
.6117	13.46 s	.3649	14.08 s	.5286	14.10 t	.4001	14.30 t
.6132	13.48 s	.3669	14.10 s	.5298	14.14 t	.4018	14.31 t
.6147	13.50 s	.3689	14.11 s	.5310	14.14 t	.4035	14.32 t
.6162	13.51 s	.3709	14.06 s	.5322	14.10 t	.4052	14.31 t
.6178	13.51 s	.3729	14.02 s	.5334	14.11 t	.4069	14.32 t
.6193	13.51 s	.3749	14.06 s	.5345	14.10 t	.4086	14.32 t
.6208	13.52 s	.4854	14.11 t	.5357	14.10 t	.4104	14.34 t
.6223	13.54 s	.4865	14.10 t	.5369	14.10 t	.4120	14.36 t

Table 8. Continued.

JD*	B	JD*	B	JD*	B	JD*	B
17.4137	14.34 t	17.4844	14.31 t	17.5618	14.30 t	18.4574	14.48 t
.4154	14.33 t	.4861	14.33 t	.5635	14.30 t	.4597	14.48 t
.4172	14.32 t	.4878	14.31 t	.5653	14.31 t	.4619	14.48 t
.4189	14.30 t	.4895	14.29 t	.5672	14.30 t	.4664	14.48 t
.4206	14.30 t	.4912	14.32 t	.5689	14.29 t	.4686	14.48 t
.4223	14.30 t	.4929	14.30 t	.5706	14.31 t	.4714	14.49 t
.4240	14.30 t	.4946	14.31 t	.5723	14.32 t	.4737	14.49 t
.4257	14.29 t	.4963	14.31 t	18.3818	14.49 t	.4759	14.48 t
.4274	14.30 t	.4980	14.31 t	.3840	14.48 t	.4781	14.48 t
.4291	14.27 t	.4997	14.30 t	.3862	14.47 t	.4803	14.49 t
.4308	14.27 t	.5014	14.26 t	.3884	14.49 t	.4826	14.49 t
.4325	14.27 t	.5032	14.27 t	.3907	14.50 t	.4848	14.48 t
.4342	14.28 t	.5049	14.29 t	.3929	14.49 t	.4870	14.49 t
.4359	14.28 t	.5065	14.32 t	.3951	14.45 t	.4893	14.46 t
.4376	14.30 t	.5116	14.31 t	.3973	14.49 t	.4915	14.48 t
.4393	14.29 t	.5133	14.30 t	.3995	14.44 t	.4937	14.47 t
.4410	14.31 t	.5150	14.30 t	.4018	14.45 t	.4959	14.45 t
.4427	14.31 t	.5167	14.31 t	.4040	14.46 t	19.3330	14.55 s
.4444	14.30 t	.5184	14.32 t	.4062	14.48 t	.3362	14.59 s
.4461	14.31 t	.5201	14.32 t	.4084	14.45 t	.3393	14.56 s
.4478	14.30 t	.5218	14.32 t	.4107	14.49 t	.3424	14.59 s
.4495	14.29 t	.5235	14.32 t	.4129	14.50 t	.3456	14.64 s
.4512	14.29 t	.5252	14.30 t	.4151	14.49 t	.3487	14.63 s
.4529	14.32 t	.5270	14.28 t	.4173	14.50 t	.3518	14.63 s
.4546	14.29 t	.5294	14.29 t	.4195	14.49 t	.3550	14.60 s
.4563	14.31 t	.5311	14.31 t	.4218	14.51 t	.3581	14.60 s
.4580	14.31 t	.5328	14.30 t	.4240	14.51 t	.3613	14.61 s
.4597	14.31 t	.5345	14.29 t	.4263	14.50 t	.3644	14.61 s
.4614	14.33 t	.5362	14.28 t	.4285	14.48 t	.3675	14.59 s
.4631	14.31 t	.5379	14.31 t	.4307	14.51 t	.3707	14.63 s
.4648	14.33 t	.5396	14.30 t	.4330	14.47 t	.3738	14.60 s
.4666	14.30 t	.5413	14.30 t	.4352	14.48 t	.3769	14.63 s
.4683	14.32 t	.5430	14.30 t	.4374	14.48 t	.3801	14.65 s
.4700	14.32 t	.5447	14.30 t	.4397	14.46 t	.3832	14.60 s
.4717	14.33 t	.5499	14.28 t	.4419	14.47 t	.3864	14.58 s
.4734	14.29 t	.5516	14.28 t	.4441	14.49 t	.3895	14.66 s
.4751	14.29 t	.5533	14.27 t	.4463	14.48 t	.3926	14.60 s
.4768	14.29 t	.5550	14.30 t	.4486	14.49 t	.3958	14.63 s
.4785	14.30 t	.5567	14.27 t	.4508	14.49 t	.3989	14.63 s
.4802	14.27 t	.5584	14.30 t	.4530	14.50 t	.4020	14.59 s
.4819	14.30 t	.5601	14.29 t	.4552	14.49 t	.4083	14.65 s

Table 8. Continued.

JD*	B	JD*	B	JD*	B	JD*	B
19.4115	14.62 s	19.5402	14.64 s	21.4152	14.83 t	21.5341	14.84 t
.4146	14.61 s	.5433	14.62 s	.4178	14.83 t	.5367	14.83 t
.4178	14.62 s	.5464	14.66 s	.4204	14.82 t	.5394	14.84 t
.4209	14.62 s	.5496	14.63 s	.4230	14.85 t	.5419	14.84 t
.4240	14.64 s	.5527	14.63 s	.4261	14.85 t	.5445	14.84 t
.4272	14.62 s	.5558	14.59 s	.4287	14.82 t	.5471	14.85 t
.4303	14.63 s	.5590	14.64 s	.4313	14.82 t	.5497	14.86 t
.4334	14.65 s	.5621	14.61 s	.4339	14.85 t	.5543	14.85 t
.4366	14.62 s	.5653	14.60 s	.4390	14.81 t	.5569	14.86 t
.4397	14.63 s	.5684	14.65 s	.4416	14.82 t	.5603	14.87 t
.4429	14.62 s	.5715	14.62 s	.4442	14.83 t	.5629	14.87 t
.4460	14.66 s	.5747	14.63 s	.4468	14.83 t	.5655	14.90 t
.4492	14.61 s	.5778	14.59 s	.4494	14.84 t	.5685	14.89 t
.4523	14.64 s	.5810	14.60 s	.4522	14.85 t	.5710	14.89 t
.4554	14.61 s	.5841	14.60 s	.4547	14.85 t	.5736	14.89 t
.4586	14.61 s	.5872	14.58 s	.4573	14.84 t	.5768	14.90 t
.4617	14.60 s	.5904	14.61 s	.4599	14.85 t	.5794	14.89 t
.4648	14.60 s	.5935	14.62 s	.4625	14.84 t	.5820	14.89 t
.4680	14.63 s	.5966	14.62 s	.4651	14.83 t	23.2559	15.07 t
.4711	14.61 s	.5998	14.67 s	.4744	14.82 t	.2584	15.07 t
.4742	14.61 s	.6029	14.63 s	.4770	14.83 t	.2610	15.10 t
.4774	14.65 s	.6061	14.64 s	.4796	14.79 t	.2637	15.09 t
.4805	14.61 s	.6092	14.61 s	.4831	14.81 t	.2663	15.01 t
.4837	14.59 s	.6123	14.62 s	.4857	14.83 t	.2681	15.07 s
.4868	14.63 s	.6155	14.64 s	.4882	14.83 t	.2689	14.92 t
.4899	14.63 s	.6186	14.62 s	.4908	14.83 t	.2689	14.92 s
.4931	14.61 s	.6217	14.57 s	.4934	14.84 t	.2714	14.92 t
.4962	14.61 s	.6249	14.63 s	.4960	14.82 t	.2740	14.90 t
.4993	14.61 s	.6280	14.60 s	.4985	14.82 t	.2757	14.89 s
.5025	14.60 s	.6312	14.59 s	.5011	14.83 t	.2772	14.91 t
.5056	14.60 s	21.3868	14.81 t	.5037	14.84 t	.2786	15.07 s
.5088	14.63 s	.3893	14.82 t	.5063	14.88 t	.2798	14.89 t
.5119	14.63 s	.3919	14.82 t	.5099	14.87 t	.2824	14.91 t
.5151	14.65 s	.3945	14.84 t	.5134	14.88 t	.2850	14.95 t
.5182	14.61 s	.3971	14.85 t	.5160	14.88 t	.2875	14.99 t
.5213	14.62 s	.3998	14.86 t	.5186	14.88 t	.2902	15.01 t
.5244	14.61 s	.4024	14.88 t	.5212	14.87 t	.2928	15.01 t
.5276	14.59 s	.4049	14.88 t	.5237	14.86 t	.2954	15.01 t
.5307	14.61 s	.4075	14.87 t	.5263	14.85 t	.2979	15.05 t
.5339	14.62 s	.4101	14.86 t	.5289	14.85 t	.3005	15.03 t
.5370	14.62 s	.4127	14.84 t	.5315	14.84 t	.3062	15.08 t

Table 8. Continued.

JD*	B	JD*	B	JD*	B	JD*	B
23.3088	15.13 t	23.4119	15.01 t	23.5145	14.97 t	24.5284	15.01 c
.3114	15.09 t	.4145	15.04 s	.5171	15.01 t	.5292	15.02 c
.3140	15.07 t	.4173	15.11 s	.5196	15.03 t	.5300	15.02 c
.3165	15.07 t	.4200	14.95 s	.5222	15.03 t	.5309	15.00 c
.3200	15.04 t	.4255	15.01 s	.5248	15.07 t	.5317	15.03 c
.3226	15.04 t	.4283	15.12 s	.5274	15.04 t	.5325	15.03 c
.3252	14.94 t	.4311	15.11 s	.5299	15.06 t	.5333	15.06 c
.3277	14.92 t	.4338	15.07 s	.5325	15.09 t	.5342	15.05 c
.3303	14.93 t	.4360	15.02 t	.5351	15.08 t	.5350	15.07 c
.3341	14.93 t	.4366	14.90 s	.5377	15.11 t	.5358	15.05 c
.3367	14.92 t	.4386	14.94 t	.5419	15.12 t	.5366	15.04 c
.3393	14.92 t	.4393	14.87 s	.5445	15.08 t	.5375	15.07 c
.3418	14.96 t	.4412	14.93 t	.5470	15.05 t	.5383	15.07 c
.3444	14.98 t	.4421	14.96 s	.5496	15.04 t	.5391	15.07 c
.3470	14.99 t	.4437	14.91 t	.5522	15.00 t	.5399	15.07 c
.3495	15.02 t	.4463	14.86 t	.5548	14.96 t	.5408	15.06 c
.3521	15.01 t	.4490	14.82 t	.5573	14.92 t	.5416	15.08 c
.3547	15.05 t	.4515	14.91 t	.5599	14.89 t	.5424	15.06 c
.3573	15.06 t	.4541	14.94 t	.5625	14.90 t	.5432	15.09 c
.3600	15.08 t	.4567	14.97 t	.5651	14.93 t	.5441	15.12 c
.3630	15.10 t	.4593	15.00 t	.5680	14.96 t	.5449	15.12 c
.3656	15.10 t	.4622	15.01 t	.5706	14.98 t	.5457	15.10 c
.3682	15.10 t	.4648	15.01 t	.5732	15.00 t	.5465	15.13 c
.3707	15.09 t	.4674	15.00 t	.5757	15.00 t	.5474	15.14 c
.3733	15.07 t	.4700	15.01 t	.5783	15.02 t	.5482	15.15 c
.3759	15.03 t	.4725	15.05 t	.5809	15.04 t	.5490	15.15 c
.3785	14.99 t	.4752	15.05 t	.5835	15.04 t	.5498	15.16 c
.3811	14.96 t	.4777	15.08 t	.5860	15.05 t	.5507	15.18 c
.3836	14.92 t	.4803	15.09 t	24.5144	15.18 c	.5515	15.14 c
.3862	14.94 t	.4829	15.12 t	.5151	15.16 c	.5523	15.14 c
.3888	14.91 t	.4855	15.12 t	.5159	15.18 c	.5531	15.18 c
.3913	14.93 t	.4886	15.06 t	.5201	15.11 c	.5540	15.15 c
.3939	14.97 t	.4912	15.05 t	.5210	15.10 c	.5548	15.12 c
.3965	14.94 t	.4938	14.99 t	.5218	15.11 c	.5556	15.19 c
.3990	14.95 t	.4964	14.97 t	.5226	15.13 c	.5564	15.15 c
.4016	14.99 t	.4989	14.94 t	.5234	15.10 c	.5573	15.17 c
.4042	14.99 t	.5015	14.87 t	.5243	15.08 c	.5581	15.16 c
.4068	15.01 t	.5041	14.86 t	.5251	15.08 c	.5589	15.19 c
.4078	14.98 s	.5067	14.89 t	.5259	15.01 c	.5598	15.15 c
.4093	15.01 t	.5092	14.94 t	.5267	15.03 c	.5664	15.16 c
.4115	15.08 s	.5118	14.98 t	.5276	15.02 c	.5673	15.15 c

Table 8. Continued.

JD*	B	JD*	B	JD*	B	JD*	B
24.5681	15.16 c	26.4999	15.33 c	26.5409	15.26 c	34.4252	16.32 c
.5689	15.14 c	.5009	15.36 c	.5419	15.22 c	.4268	16.30 c
.5697	15.17 c	.5019	15.32 c	.5429	15.28 c	.4296	16.25 c
.5706	15.10 c	.5029	15.36 c	.5449	15.32 c	.4313	16.26 c
.5714	15.11 c	.5039	15.31 c	.5459	15.34 c	.4329	16.26 c
.5722	15.17 c	.5049	15.35 c	.5469	15.23 c	.4345	16.27 c
.5730	15.12 c	.5059	15.34 c	.5479	15.28 c	.4362	16.28 c
.5739	15.08 c	.5069	15.34 c	.5489	15.31 c	.4378	16.26 c
.5751	15.08 c	.5079	15.40 c	.5499	15.28 c	.4394	16.29 c
.5788	15.03 c	.5089	15.30 c	.5509	15.36 c	.4411	16.29 c
.5796	15.04 c	.5099	15.28 c	.5519	15.25 c	.4427	16.28 c
25.3932	15.18 c	.5109	15.33 c	.5529	15.32 c	.4444	16.35 c
.3962	15.20 c	.5119	15.30 c	28.4456	15.63 s	.4465	16.33 c
.3970	15.15 c	.5129	15.32 c	.4518	15.55 s	.4482	16.32 c
.3978	15.23 c	.5139	15.27 c	.4589	15.56 s	.4498	16.28 c
.3987	15.20 c	.5149	15.26 c	.4660	15.39 s	.4514	16.30 c
.3995	15.10 c	.5159	15.33 c	32.3400	15.89 s	.4531	16.32 c
.4003	15.14 c	.5169	15.30 c	.4084	16.00 c	.4547	16.34 c
.4011	15.17 c	.5179	15.29 c	.4833	15.88 c	.5024	16.34 c
.4020	15.17 c	.5189	15.27 c	33.3945	16.01 c	.5032	16.34 c
.4028	15.18 c	.5199	15.26 c	.3987	15.89 c	35.3851	17.37 c
.4036	15.12 c	.5209	15.23 c	34.3877	16.27 c	38.2385	18.24 c
.4044	15.25 c	.5219	15.23 c	.3958	16.29 c	.2490	18.30 c
.4053	15.11 c	.5240	15.23 c	.3974	16.30 c	.2596	18.31 c
.4061	15.14 c	.5250	15.11 c	.3990	16.28 c	39.3722	18.24 c
.4069	15.10 c	.5260	15.23 c	.4006	16.19 c	.3758	18.18 c
.4077	15.26 c	.5270	15.16 c	.4023	16.25 c	41.3392	18.14 c
.4085	15.37 c	.5280	15.15 c	.4039	16.26 c	.4971	18.57 c
.4094	15.16 c	.5290	15.22 c	.4056	16.27 c	42.2246	18.72 c
.4127	15.18 c	.5300	15.18 c	.4072	16.35 c	.2363	18.56 c
.4143	15.22 c	.5310	15.21 c	.4088	16.27 c	45.2061	19.15 c
.4151	15.32 c	.5320	15.27 c	.4105	16.31 c	.4954	18.64 s
26.3206	15.38 c	.5330	15.17 c	.4121	16.27 c	.5148	18.51 s
.3216	15.35 c	.5340	15.21 c	.4137	16.31 c	.5342	18.67 s
.3226	15.38 c	.5350	15.26 c	.4153	16.33 c	.5504	18.71 s
.4920	15.33 c	.5359	15.25 c	.4170	16.28 c	.5666	18.70 s
.4930	15.28 c	.5370	15.21 c	.4186	16.29 c	.5860	18.63 s
.4959	15.36 c	.5380	15.21 c	.4203	16.33 c	.6054	18.61 s
.4979	15.28 c	.5390	15.26 c	.4219	16.27 c	.6248	18.64 s
.4989	15.33 c	.5399	15.25 c	.4235	16.26 c	.6410	18.64 s

Table 9. V magnitudes of V466 And. The symbols "a","c","s","t" and "z" are explained in Table 2. JD_{hel} = JD* + 2 454 700.

JD*	V	JD*	V	JD*	V	JD*	V
11.4424	12.64 t	11.4704	12.64 t	11.4968	12.69 t	11.5330	12.70 t
.4433	12.63 t	.4711	12.68 t	.4975	12.66 t	.5336	12.71 t
.4444	12.63 t	.4718	12.66 t	.4982	12.67 t	.5342	12.70 t
.4451	12.63 t	.4725	12.65 t	.4989	12.68 t	.5348	12.67 t
.4461	12.61 t	.4732	12.67 t	.4996	12.68 t	.5379	12.71 t
.4468	12.61 t	.4738	12.69 t	.5003	12.70 t	.5385	12.72 t
.4474	12.63 t	.4745	12.68 t	.5010	12.68 t	.5391	12.70 t
.4481	12.63 t	.4752	12.67 t	.5017	12.70 t	.5397	12.73 t
.4488	12.65 t	.4759	12.69 t	.5031	12.71 t	.5403	12.72 t
.4495	12.67 t	.4766	12.71 t	.5038	12.70 t	.5409	12.74 t
.4502	12.65 t	.4773	12.67 t	.5045	12.73 t	.5415	12.72 t
.4509	12.63 t	.4780	12.69 t	.5052	12.69 t	.5421	12.75 t
.4516	12.63 t	.4787	12.66 t	.5059	12.68 t	.5427	12.72 t
.4523	12.66 t	.4794	12.69 t	.5066	12.73 t	.5433	12.75 t
.4530	12.61 t	.4801	12.72 t	.5073	12.65 t	.5439	12.74 t
.4537	12.62 t	.4808	12.73 t	.5080	12.71 t	.5445	12.72 t
.4544	12.61 t	.4815	12.72 t	.5087	12.68 t	.5451	12.73 t
.4558	12.62 t	.4822	12.74 t	.5094	12.69 t	.5457	12.74 t
.4565	12.65 t	.4828	12.75 t	.5101	12.69 t	.5463	12.76 t
.4572	12.68 t	.4835	12.77 t	.5107	12.67 t	.5469	12.73 t
.4579	12.60 t	.4842	12.74 t	.5114	12.69 t	.5475	12.71 t
.4586	12.65 t	.4849	12.72 t	.5121	12.67 t	.5481	12.74 t
.4593	12.65 t	.4856	12.72 t	.5128	12.68 t	.5487	12.71 t
.4600	12.64 t	.4863	12.73 t	.5135	12.67 t	.5493	12.73 t
.4607	12.68 t	.4870	12.75 t	.5142	12.67 t	.5501	12.73 t
.4614	12.65 t	.4877	12.75 t	.5149	12.70 t	.5507	12.71 t
.4621	12.68 t	.4884	12.71 t	.5258	12.69 t	.5513	12.72 t
.4628	12.63 t	.4891	12.75 t	.5264	12.69 t	.5519	12.70 t
.4635	12.67 t	.4898	12.71 t	.5270	12.69 t	.5525	12.71 t
.4642	12.65 t	.4905	12.71 t	.5276	12.69 t	.5531	12.68 t
.4649	12.63 t	.4912	12.70 t	.5282	12.68 t	.5537	12.68 t
.4656	12.61 t	.4919	12.68 t	.5288	12.71 t	.5544	12.71 t
.4663	12.60 t	.4926	12.71 t	.5294	12.67 t	.5550	12.69 t
.4669	12.61 t	.4933	12.71 t	.5300	12.66 t	.5556	12.69 t
.4676	12.60 t	.4940	12.69 t	.5306	12.73 t	.5563	12.69 t
.4683	12.61 t	.4947	12.67 t	.5312	12.69 t	.5569	12.65 t
.4690	12.64 t	.4954	12.69 t	.5318	12.71 t	.5575	12.73 t
.4697	12.59 t	.4961	12.67 t	.5324	12.70 t	.5581	12.67 t

Table 9. Continued.

JD*	V	JD*	V	JD*	V	JD*	V
11.5587	12.70 t	12.4371	13.15 t	12.4738	13.15 t	13.4076	13.36 s
.5593	12.71 t	.4379	13.15 t	.4747	13.15 t	.4094	13.38 s
.5600	12.69 t	.4388	13.16 t	.4755	13.13 t	.4165	13.36 s
.5606	12.68 t	.4396	13.17 t	.4763	13.13 t	.4187	13.37 s
.5612	12.73 t	.4404	13.18 t	.4772	13.12 t	.4203	13.40 s
.5618	12.75 t	.4413	13.18 t	.4780	13.12 t	.4218	13.38 s
.5625	12.70 t	.4421	13.18 t	.4788	13.12 t	.4233	13.37 s
.5632	12.71 t	.4429	13.19 t	.4809	13.15 t	.4264	13.38 s
.5638	12.71 t	.4438	13.18 t	.4817	13.13 t	.4280	13.37 s
.5644	12.71 t	.4455	13.19 t	.4826	13.14 t	.4737	13.40 s
.5650	12.68 t	.4464	13.18 t	.4834	13.13 t	.4752	13.38 s
.5656	12.69 t	.4472	13.19 t	.4842	13.14 t	.4767	13.37 s
.5662	12.68 t	.4480	13.19 t	.4851	13.18 t	.4782	13.36 s
.5668	12.72 t	.4497	13.17 t	.4859	13.15 t	.4798	13.38 s
.5674	12.68 t	.4505	13.19 t	.4867	13.17 t	.4813	13.39 s
.5680	12.68 t	.4513	13.18 t	.4876	13.19 t	.4828	13.39 s
.5687	12.70 t	.4522	13.18 t	.4884	13.15 t	.4843	13.38 s
.5693	12.65 t	.4530	13.17 t	.4892	13.17 t	.4859	13.39 s
.5699	12.73 t	.4541	13.17 t	.4901	13.14 t	.4874	13.38 s
.5705	12.69 t	.4549	13.18 t	.4909	13.17 t	.4889	13.39 s
.5711	12.66 t	.4558	13.13 t	.4917	13.17 t	.4904	13.40 s
12.3674	13.05 s	.4566	13.15 t	.4926	13.18 t	.4919	13.41 s
.3684	13.04 s	.4574	13.15 t	.4940	13.16 t	.4935	13.39 s
.3695	13.03 s	.4583	13.16 t	.4948	13.18 t	.4950	13.36 s
.3707	13.02 s	.4591	13.16 t	.4956	13.18 t	.4965	13.38 s
.3719	13.05 s	.4599	13.15 t	.4965	13.18 t	.4980	13.36 s
.4187	13.14 t	.4608	13.14 t	.4973	13.20 t	.4995	13.40 s
.4195	13.13 t	.4616	13.14 t	.4981	13.15 t	.5011	13.39 s
.4204	13.13 t	.4624	13.13 t	.4989	13.18 t	.5026	13.40 s
.4217	13.13 t	.4632	13.13 t	.4998	13.19 t	.5041	13.41 s
.4225	13.12 t	.4641	13.12 t	.5340	13.15 t	.5056	13.39 s
.4234	13.11 t	.4649	13.13 t	.5348	13.13 t	.5072	13.41 s
.4242	13.11 t	.4657	13.14 t	.5356	13.13 t	.5087	13.44 s
.4250	13.13 t	.4672	13.14 t	.5365	13.12 t	.5102	13.41 s
.4258	13.13 t	.4680	13.14 t	.5373	13.13 t	.5117	13.43 s
.4267	13.13 t	.4689	13.12 t	.5381	13.11 t	.5133	13.42 s
.4275	13.12 t	.4697	13.13 t	.5390	13.13 t	.5148	13.46 s
.4283	13.12 t	.4705	13.13 t	.5398	13.08 t	.5163	13.45 s
.4292	13.12 t	.4713	13.14 t	.5406	13.09 t	.5178	13.44 s
.4300	13.11 t	.4722	13.16 t	.5415	13.10 t	.5193	13.45 s
.4363	13.15 t	.4730	13.16 t	.5830	12.97 z	.5209	13.43 s

Table 9. Continued.

JD*	V	JD*	V	JD*	V	JD*	V
13.5224	13.42 s	13.6351	13.50 s	14.4543	13.65 s	15.2820	13.79 s
.5239	13.43 s	.6366	13.47 s	.4554	13.61 s	.2831	13.81 s
.5254	13.44 s	.6381	13.45 s	.4566	13.60 s	.2843	13.82 s
.5270	13.44 s	.6397	13.44 s	.4578	13.57 s	.2854	13.85 s
.5285	13.47 s	.6412	13.42 s	.4589	13.60 s	.2866	13.78 s
.5300	13.44 s	14.3392	13.63 s	.4601	13.61 s	.2877	13.80 s
.5315	13.43 s	.3936	13.59 s	.4612	13.62 s	.2889	13.82 s
.5346	13.42 s	.3992	13.60 s	.4624	13.65 s	.2900	13.81 s
.5361	13.41 s	.4021	13.59 s	.4636	13.66 s	.2912	13.83 s
.5376	13.43 s	.4077	13.63 s	.4647	13.65 s	.2924	13.80 s
.5392	13.41 s	.4159	13.66 s	.4659	13.68 s	.2935	13.80 s
.5407	13.41 s	.4171	13.67 s	.4670	13.67 s	.2947	13.83 s
.5422	13.42 s	.4182	13.65 s	.4682	13.68 s	.2958	13.76 s
.5437	13.43 s	.4194	13.64 s	.4694	13.67 s	.2970	13.78 s
.5452	13.43 s	.4206	13.64 s	.4705	13.68 s	.2981	13.75 s
.5468	13.44 s	.4217	13.65 s	.4717	13.69 s	.2993	13.79 s
.5483	13.44 s	.4229	13.64 s	.4729	13.69 s	.3004	13.83 s
.5498	13.41 s	.4240	13.67 s	.4740	13.67 s	.3016	13.81 s
.5513	13.42 s	.4275	13.65 s	.4752	13.68 s	.3027	13.76 s
.5529	13.42 s	.4287	13.66 s	.4763	13.68 s	.3039	13.79 s
.5544	13.42 s	.4298	13.61 s	.4775	13.69 s	.3050	13.77 s
.5635	13.44 s	.4310	13.61 s	.4787	13.67 s	.3062	13.82 s
.5681	13.41 s	.4322	13.63 s	.4807	13.64 s	.3073	13.81 s
.5696	13.40 s	.4333	13.63 s	.4820	13.64 s	.3085	13.81 s
.6092	13.46 s	.4345	13.61 s	.4832	13.64 s	.3096	13.78 s
.6107	13.41 s	.4357	13.63 s	.4843	13.63 s	.3108	13.79 s
.6122	13.41 s	.4368	13.63 s	.4855	13.64 s	.3119	13.81 s
.6138	13.44 s	.4380	13.64 s	.4866	13.63 s	.3131	13.81 s
.6153	13.41 s	.4391	13.62 s	.4878	13.61 s	.3142	13.86 s
.6168	13.45 s	.4403	13.62 s	.4889	13.62 s	.3154	13.87 s
.6183	13.41 s	.4415	13.63 s	.4901	13.61 s	.3165	13.83 s
.6199	13.45 s	.4426	13.64 s	.4913	13.61 s	.3177	13.86 s
.6214	13.47 s	.4438	13.63 s	.4924	13.60 s	.3269	13.85 s
.6229	13.46 s	.4450	13.63 s	.4936	13.61 s	.3280	13.85 s
.6244	13.49 s	.4461	13.63 s	.4947	13.62 s	.3292	13.82 s
.6259	13.48 s	.4473	13.63 s	.4959	13.62 s	.3303	13.82 s
.6275	13.51 s	.4484	13.64 s	15.2730	13.79 s	.3315	13.82 s
.6290	13.48 s	.4496	13.63 s	.2751	13.77 s	.3338	13.82 s
.6305	13.51 s	.4508	13.61 s	.2773	13.78 s	.3349	13.81 s
.6320	13.48 s	.4519	13.63 s	.2797	13.76 s	.3384	13.81 s
.6336	13.46 s	.4531	13.65 s	.2809	13.83 s	.3395	13.82 s

Table 9. Continued.

JD*	V	JD*	V	JD*	V	JD*	V
15.3407	13.81 s	16.2898	13.99 s	16.3636	13.97 s	16.5278	14.02 t
.3418	13.81 s	.2915	13.94 s	.3656	13.97 s	.5290	14.01 t
.3441	13.79 s	.2932	13.97 s	.3676	13.99 s	.5302	14.02 t
.3453	13.80 s	.2948	13.98 s	.3695	13.98 s	.5314	14.02 t
.3476	13.83 s	.2965	13.96 s	.3715	13.92 s	.5325	14.02 t
.3488	13.83 s	.2982	13.98 s	.3735	13.93 s	.5337	13.98 t
.3499	13.85 s	.2998	13.96 s	.3755	13.99 s	.5349	13.99 t
.3511	13.86 s	.3015	13.97 s	.4857	13.99 t	.5361	13.99 t
.3522	13.84 s	.3032	13.98 s	.4869	13.99 t	.5373	14.00 t
.3534	13.87 s	.3049	13.98 s	.4881	14.00 t	.5385	14.00 t
.3545	13.83 s	.3065	13.97 s	.4893	13.98 t	.5409	13.95 t
.3557	13.82 s	.3082	13.95 s	.4904	14.00 t	.5420	13.97 t
.3568	13.83 s	.3099	13.98 s	.4918	14.00 t	.5444	13.99 t
.3580	13.85 s	.3115	13.95 s	.4929	14.01 t	.5456	13.99 t
.3591	13.83 s	.3132	13.96 s	.4941	14.00 t	.5468	14.00 t
.3603	13.82 s	.3149	13.94 s	.4953	14.01 t	.5491	14.00 t
.3615	13.83 s	.3166	13.94 s	.4965	14.02 t	.5508	13.99 t
.3626	13.83 s	.3182	13.96 s	.4977	14.01 t	.5529	14.02 t
.3637	13.82 s	.3199	13.94 s	.4988	14.02 t	.5541	14.06 t
.3649	13.85 s	.3216	13.99 s	.5000	14.04 t	.5553	14.02 t
.3660	13.85 s	.3233	13.98 s	.5012	14.01 t	.5564	14.05 t
.3672	13.86 s	.3249	13.99 s	.5024	14.02 t	.5576	14.05 t
.3684	13.85 s	.3266	13.98 s	.5039	14.03 t	.5588	14.03 t
.3695	13.84 s	.3283	13.99 s	.5051	14.04 t	.5600	14.04 t
.3707	13.86 s	.3299	14.00 s	.5063	14.02 t	.5612	14.06 t
.3718	13.86 s	.3316	13.97 s	.5074	14.03 t	.5623	14.04 t
.3730	13.87 s	.3333	14.00 s	.5086	14.02 t	.5635	14.03 t
.3741	13.89 s	.3349	14.03 s	.5110	14.01 t	.5647	14.03 t
.3753	13.88 s	.3366	14.01 s	.5122	14.02 t	.5659	14.05 t
.3764	13.86 s	.3383	13.98 s	.5133	14.02 t	.5671	14.05 t
.3776	13.88 s	.3406	13.97 s	.5145	14.00 t	.5682	14.03 t
.3829	13.85 s	.3441	13.97 s	.5157	13.99 t	.5694	14.05 t
.3833	13.83 s	.3457	13.98 s	.5169	14.00 t	17.3265	14.09 s
16.2741	13.94 s	.3477	13.97 s	.5181	14.01 t	.3269	14.16 s
.2759	13.94 s	.3497	13.98 s	.5192	14.02 t	.3273	14.18 s
.2771	13.96 s	.3516	13.99 s	.5204	14.01 t	.3277	14.23 s
.2788	13.97 s	.3536	13.98 s	.5216	14.03 t	.3798	14.18 t
.2806	13.96 s	.3556	13.98 s	.5228	14.00 t	.3815	14.18 t
.2832	13.99 s	.3576	14.00 s	.5240	13.99 t	.3990	14.17 t
.2863	13.96 s	.3596	13.98 s	.5252	14.01 t	.4007	14.17 t
.2881	13.92 s	.3616	13.95 s	.5263	14.01 t	.4024	14.16 t

Table 9. Continued.

JD*	V	JD*	V	JD*	V	JD*	V
17.4041	14.18 t	17.4739	14.17 t	17.5521	14.15 t	18.4448	14.31 t
.4058	14.17 t	.4756	14.18 t	.5538	14.13 t	.4470	14.34 t
.4075	14.17 t	.4773	14.16 t	.5555	14.16 t	.4493	14.33 t
.4092	14.20 t	.4790	14.13 t	.5572	14.17 t	.4515	14.34 t
.4109	14.20 t	.4807	14.15 t	.5590	14.16 t	.4537	14.33 t
.4126	14.20 t	.4824	14.15 t	.5607	14.19 t	.4559	14.33 t
.4143	14.19 t	.4849	14.16 t	.5624	14.16 t	.4582	14.33 t
.4160	14.19 t	.4866	14.15 t	.5641	14.15 t	.4604	14.31 t
.4177	14.19 t	.4883	14.14 t	.5658	14.18 t	.4626	14.30 t
.4194	14.18 t	.4901	14.18 t	.5678	14.18 t	.4649	14.32 t
.4211	14.17 t	.4918	14.19 t	.5695	14.20 t	.4671	14.31 t
.4228	14.18 t	.4935	14.18 t	.5712	14.18 t	.4693	14.32 t
.4245	14.17 t	.4952	14.18 t	.5729	14.20 t	.4722	14.33 t
.4262	14.16 t	.4969	14.17 t	18.3825	14.33 t	.4744	14.33 t
.4279	14.17 t	.4986	14.17 t	.3847	14.33 t	.4766	14.34 t
.4296	14.18 t	.5003	14.18 t	.3869	14.34 t	.4789	14.35 t
.4313	14.13 t	.5020	14.13 t	.3892	14.34 t	.4811	14.34 t
.4330	14.15 t	.5037	14.13 t	.3914	14.32 t	.4833	14.34 t
.4347	14.16 t	.5054	14.18 t	.3936	14.36 t	.4855	14.34 t
.4364	14.14 t	.5071	14.17 t	.3958	14.31 t	.4877	14.32 t
.4381	14.16 t	.5122	14.15 t	.3981	14.34 t	.4900	14.34 t
.4398	14.15 t	.5139	14.16 t	.4003	14.30 t	.4922	14.35 t
.4416	14.16 t	.5156	14.16 t	.4025	14.29 t	.4944	14.31 t
.4433	14.17 t	.5173	14.18 t	.4047	14.31 t	.4966	14.35 t
.4449	14.16 t	.5190	14.17 t	.4069	14.30 t	.4989	14.33 t
.4466	14.16 t	.5207	14.17 t	.4092	14.29 t	.5011	14.34 t
.4484	14.17 t	.5224	14.17 t	.4114	14.31 t	.5033	14.33 t
.4501	14.16 t	.5241	14.17 t	.4136	14.32 t	.5056	14.33 t
.4518	14.19 t	.5258	14.19 t	.4158	14.34 t	.5100	14.32 t
.4535	14.16 t	.5275	14.17 t	.4181	14.35 t	.5122	14.33 t
.4552	14.19 t	.5299	14.17 t	.4203	14.36 t	.5145	14.30 t
.4569	14.19 t	.5316	14.16 t	.4225	14.36 t	.5174	14.31 t
.4586	14.20 t	.5333	14.18 t	.4247	14.35 t	.5196	14.32 t
.4603	14.18 t	.5351	14.15 t	.4270	14.33 t	.5219	14.33 t
.4620	14.20 t	.5368	14.16 t	.4292	14.33 t	.5241	14.35 t
.4637	14.21 t	.5385	14.20 t	.4315	14.33 t	19.3336	14.44 s
.4654	14.20 t	.5402	14.18 t	.4337	14.31 t	.3367	14.41 s
.4671	14.18 t	.5419	14.15 t	.4359	14.32 t	.3399	14.43 s
.4688	14.20 t	.5436	14.19 t	.4381	14.32 t	.3430	14.45 s
.4705	14.20 t	.5453	14.17 t	.4404	14.32 t	.3462	14.45 s
.4722	14.20 t	.5504	14.13 t	.4426	14.31 t	.3493	14.48 s

Table 9. Continued.

JD*	V	JD*	V	JD*	V	JD*	V
19.3524	14.43 s	19.4843	14.48 s	19.6161	14.45 s	21.4969	14.68 t
.3556	14.42 s	.4874	14.47 s	.6192	14.45 s	.4995	14.69 t
.3587	14.40 s	.4905	14.47 s	.6223	14.44 s	.5020	14.70 t
.3619	14.44 s	.4937	14.46 s	.6255	14.43 s	.5046	14.70 t
.3650	14.41 s	.4968	14.47 s	.6286	14.46 s	.5072	14.74 t
.3713	14.46 s	.4999	14.47 s	21.3877	14.65 t	.5108	14.70 t
.3744	14.47 s	.5031	14.45 s	.3902	14.66 t	.5143	14.72 t
.3775	14.45 s	.5062	14.49 s	.3928	14.64 t	.5169	14.72 t
.3807	14.47 s	.5094	14.46 s	.3954	14.70 t	.5195	14.71 t
.3838	14.43 s	.5125	14.49 s	.3980	14.68 t	.5221	14.72 t
.3870	14.47 s	.5156	14.49 s	.4007	14.68 t	.5272	14.69 t
.3901	14.43 s	.5188	14.47 s	.4033	14.68 t	.5350	14.65 t
.3932	14.45 s	.5219	14.44 s	.4058	14.67 t	.5376	14.67 t
.3964	14.44 s	.5251	14.44 s	.4084	14.67 t	.5428	14.66 t
.3995	14.43 s	.5282	14.45 s	.4110	14.69 t	.5454	14.67 t
.4027	14.46 s	.5345	14.50 s	.4136	14.66 t	.5480	14.70 t
.4058	14.43 s	.5376	14.48 s	.4161	14.62 t	.5506	14.67 t
.4089	14.44 s	.5407	14.48 s	.4187	14.65 t	.5552	14.71 t
.4121	14.43 s	.5439	14.50 s	.4213	14.61 t	.5578	14.73 t
.4152	14.45 s	.5470	14.48 s	.4239	14.65 t	.5612	14.72 t
.4183	14.45 s	.5502	14.49 s	.4270	14.66 t	.5638	14.73 t
.4215	14.45 s	.5533	14.47 s	.4296	14.70 t	.5664	14.70 t
.4246	14.47 s	.5564	14.46 s	.4348	14.65 t	.5694	14.73 t
.4278	14.47 s	.5596	14.49 s	.4373	14.67 t	.5719	14.74 t
.4309	14.47 s	.5627	14.45 s	.4399	14.66 t	.5745	14.73 t
.4340	14.48 s	.5659	14.47 s	.4451	14.66 t	.5777	14.71 t
.4372	14.47 s	.5690	14.48 s	.4477	14.68 t	.5803	14.72 t
.4403	14.48 s	.5721	14.48 s	.4502	14.72 t	.5829	14.69 t
.4435	14.47 s	.5753	14.48 s	.4531	14.68 t	23.2542	14.87 t
.4466	14.45 s	.5784	14.45 s	.4556	14.72 t	.2568	14.83 t
.4497	14.46 s	.5815	14.46 s	.4582	14.71 t	.2593	14.82 t
.4529	14.43 s	.5847	14.42 s	.4608	14.70 t	.2619	14.83 t
.4560	14.46 s	.5878	14.48 s	.4634	14.69 t	.2646	14.77 t
.4592	14.43 s	.5910	14.46 s	.4660	14.68 t	.2674	14.78 s
.4623	14.46 s	.5941	14.45 s	.4779	14.64 t	.2698	14.67 t
.4654	14.45 s	.5972	14.49 s	.4805	14.63 t	.2707	14.68 s
.4686	14.47 s	.6004	14.44 s	.4840	14.66 t	.2723	14.64 t
.4717	14.46 s	.6035	14.44 s	.4866	14.68 t	.2749	14.64 t
.4748	14.44 s	.6067	14.45 s	.4891	14.69 t	.2764	14.64 s
.4780	14.43 s	.6098	14.47 s	.4917	14.67 t	.2781	14.69 t
.4811	14.47 s	.6129	14.46 s	.4943	14.65 t	.2794	14.63 s

Table 9. Continued.

JD*	V	JD*	V	JD*	V	JD*	V
23.2807	14.66 t	23.3149	14.81 t	23.3556	14.80 t	23.4128	14.79 t
.2818	14.70 s	.3150	14.89 s	.3569	14.83 s	.4149	14.88 s
.2829	14.70 s	.3161	14.88 s	.3596	14.85 s	.4177	14.98 s
.2833	14.68 t	.3172	14.83 s	.3609	14.83 t	.4204	14.82 s
.2840	14.72 s	.3174	14.81 t	.3623	14.94 s	.4259	14.93 s
.2851	14.71 s	.3183	14.76 s	.3639	14.87 t	.4287	14.80 s
.2859	14.66 t	.3194	14.88 s	.3650	14.85 s	.4314	14.89 s
.2862	14.73 s	.3205	14.87 s	.3665	14.89 t	.4342	14.96 s
.2873	14.83 s	.3209	14.77 t	.3678	14.91 s	.4369	14.78 t
.2884	14.70 t	.3235	14.74 t	.3691	14.86 t	.4369	14.78 s
.2884	14.79 s	.3251	14.75 s	.3705	14.94 s	.4395	14.71 t
.2895	14.77 s	.3261	14.67 t	.3716	14.85 t	.4397	14.90 s
.2907	14.85 s	.3275	14.68 s	.3732	14.92 s	.4421	14.69 t
.2911	14.74 t	.3286	14.66 t	.3742	14.82 t	.4425	14.60 s
.2918	14.79 s	.3312	14.63 t	.3759	14.80 s	.4447	14.67 t
.2929	14.82 s	.3322	14.66 s	.3768	14.78 t	.4453	14.70 s
.2937	14.80 t	.3347	14.63 s	.3786	14.77 s	.4472	14.66 t
.2939	14.83 s	.3350	14.64 t	.3794	14.75 t	.4480	14.67 s
.2951	14.84 s	.3358	14.58 s	.3813	14.71 s	.4499	14.71 t
.2962	14.80 t	.3369	14.71 s	.3820	14.69 t	.4508	14.72 s
.2962	14.81 s	.3376	14.66 t	.3840	14.69 s	.4525	14.74 t
.2984	14.91 s	.3380	14.61 s	.3845	14.67 t	.4535	14.74 s
.2988	14.78 t	.3391	14.79 s	.3867	14.73 s	.4550	14.74 t
.2995	14.90 s	.3402	14.70 t	.3871	14.65 t	.4562	14.79 s
.3006	14.86 s	.3402	14.76 s	.3895	14.72 s	.4576	14.77 t
.3014	14.81 t	.3413	14.76 s	.3897	14.63 t	.4589	14.81 s
.3017	14.86 s	.3424	14.80 s	.3922	14.67 t	.4602	14.82 t
.3028	14.92 s	.3427	14.69 t	.3922	14.70 s	.4617	14.80 s
.3039	14.93 s	.3435	14.72 s	.3948	14.69 t	.4631	14.81 t
.3050	14.90 s	.3445	14.80 s	.3949	14.77 s	.4644	14.88 s
.3061	14.89 s	.3453	14.75 t	.3974	14.70 t	.4657	14.85 t
.3071	14.86 t	.3457	14.80 s	.3976	14.75 s	.4671	14.81 s
.3072	14.94 s	.3468	14.79 s	.3999	14.74 t	.4683	14.84 t
.3083	14.90 s	.3479	14.76 t	.4003	14.83 s	.4698	14.87 s
.3094	14.94 s	.3479	14.81 s	.4025	14.73 t	.4709	14.81 t
.3097	14.82 t	.3490	14.82 s	.4030	14.83 s	.4727	14.83 s
.3106	14.97 s	.3501	14.76 s	.4051	14.72 t	.4734	14.87 t
.3117	14.86 s	.3504	14.76 t	.4077	14.78 t	.4754	14.89 s
.3123	14.81 t	.3512	14.79 s	.4084	14.87 s	.4761	14.90 t
.3128	14.91 s	.3530	14.79 t	.4102	14.78 t	.4781	14.91 s
.3139	14.92 s	.3542	14.81 s	.4119	14.94 s	.4786	14.88 t

Table 9. Continued.

JD*	V	JD*	V	JD*	V	JD*	V
23.4808	14.90 s	23.5386	14.86 t	24.3911	14.91 a	24.4407	14.84 a
.4812	14.84 t	.5407	14.84 s	.3927	14.94 a	.4414	15.03 a
.4835	14.92 s	.5428	14.90 t	.3935	14.95 a	.4422	14.84 a
.4838	14.92 t	.5434	14.90 s	.3943	14.99 a	.4430	15.01 a
.4862	14.86 s	.5454	14.92 t	.3951	14.96 a	.4438	14.96 a
.4864	14.87 t	.5461	14.87 s	.3958	15.00 a	.4446	15.05 a
.4890	14.93 s	.5479	14.89 t	.3966	14.91 a	.4454	15.05 a
.4895	14.86 t	.5488	14.88 s	.3974	14.97 a	.4462	15.16 a
.4917	14.88 s	.5515	14.91 s	.3982	14.97 a	.4470	14.98 a
.4921	14.85 t	.5531	14.80 t	.3990	14.95 a	.4478	15.03 a
.4944	14.78 s	.5557	14.72 t	.4003	14.98 a	.4486	15.00 a
.4947	14.80 t	.5582	14.70 t	.4011	15.02 a	.4501	15.07 a
.4971	14.79 s	.5608	14.67 t	.4019	14.96 a	.4509	15.09 a
.4973	14.76 t	.5634	14.68 t	.4058	15.04 a	.4593	14.87 a
.4998	14.73 t	.5660	14.75 t	.4066	14.81 a	.4600	14.88 a
.5024	14.53 t	.5689	14.76 t	.4082	14.93 a	.4608	14.95 a
.5050	14.64 t	.5715	14.78 t	.4090	14.76 a	.4616	14.94 a
.5053	14.68 s	.5741	14.81 t	.4097	14.90 a	.4624	15.00 a
.5076	14.70 t	.5766	14.81 t	.4105	14.92 a	.4632	14.89 a
.5080	14.76 s	.5792	14.84 t	.4113	14.89 a	.4640	14.93 a
.5101	14.75 t	.5818	14.84 t	.4121	14.79 a	.4648	14.94 a
.5108	14.73 s	24.3695	14.95 a	.4129	14.87 a	.4655	14.80 a
.5127	14.76 t	.3753	14.91 a	.4137	14.78 a	.4663	14.97 a
.5135	14.83 s	.3762	14.97 a	.4145	14.81 a	.4671	14.90 a
.5154	14.79 t	.3769	14.94 a	.4155	14.91 a	.4679	14.84 a
.5162	14.83 s	.3777	14.87 a	.4170	14.76 a	.4687	14.86 a
.5180	14.78 t	.3785	14.90 a	.4178	14.83 a	.4695	14.84 a
.5190	14.72 s	.3793	14.85 a	.4186	14.84 a	.4703	14.82 a
.5205	14.82 t	.3801	14.92 a	.4194	14.73 a	.4711	14.79 a
.5217	14.89 s	.3809	14.82 a	.4202	14.87 a	.4719	14.92 a
.5231	14.84 t	.3817	14.90 a	.4210	14.85 a	.4726	14.75 a
.5244	14.77 s	.3825	14.87 a	.4218	14.78 a	.4734	14.73 a
.5257	14.86 t	.3833	14.87 a	.4226	14.84 a	.4742	14.86 a
.5271	14.83 s	.3840	15.00 a	.4233	14.82 a	.4750	14.79 a
.5283	14.86 t	.3848	14.91 a	.4241	14.82 a	.4758	14.80 a
.5298	14.82 s	.3856	14.95 a	.4249	14.78 a	.4766	14.80 a
.5308	14.88 t	.3864	14.94 a	.4257	14.92 a	.4774	14.87 a
.5325	14.90 s	.3872	14.94 a	.4281	14.91 a	.4781	14.86 a
.5334	14.90 t	.3880	14.84 a	.4289	14.94 a	.4789	14.83 a
.5353	14.90 s	.3888	14.87 a	.4336	14.93 a	.4797	14.88 a
.5360	14.79 t	.3895	14.92 a	.4367	14.96 a	.4805	14.78 a
.5380	14.93 s	.3903	15.01 a	.4399	14.81 a	.4813	14.89 a

Table 9. Continued.

JD*	V	JD*	V	JD*	V	JD*	V
24.4821	14.78 a	25.3756	15.03 a	26.4351	15.04 a	26.4871	15.07 a
.4829	14.84 a	.3768	14.93 a	.4363	15.01 a	.4883	15.07 a
.4837	14.87 a	.3779	14.92 a	.4374	15.03 a	.4894	15.10 a
.4845	14.86 a	.3790	14.97 a	.4385	15.16 a	.4905	15.05 a
.4852	14.94 a	.3802	14.94 a	.4397	15.09 a	.4909	15.17 a
.4860	14.82 a	.3813	14.91 a	.4408	15.16 a	.4917	15.10 a
.4868	14.95 a	.3824	14.90 a	.4419	15.21 a	.4928	15.15 a
.4876	14.91 a	.3836	14.87 a	.4468	15.18 a	.4940	15.10 a
.4884	14.96 a	.3847	14.93 a	.4483	15.11 a	.4951	15.12 a
.4892	14.88 a	.3858	14.95 a	.4494	15.18 a	.4962	15.16 a
.4902	14.81 a	.3870	14.91 a	.4508	15.11 a	.4974	15.12 a
.4914	14.91 a	.3871	14.85 c	.4520	15.11 a	.4985	15.14 a
.4922	14.88 a	.3881	14.90 a	.4531	15.17 a	.4996	15.19 a
.4931	14.87 a	.3893	14.85 c	.4542	15.15 a	.5008	15.17 a
.4939	14.93 a	.3905	14.98 c	.4554	15.15 a	.5019	15.15 a
.4948	14.94 a	.4004	15.04 a	.4565	15.21 a	.5030	15.13 a
.4956	14.95 a	.4215	15.16 a	.4576	15.16 a	.5042	15.15 a
.4964	14.94 a	.4228	15.01 a	.4588	15.05 a	.5053	15.15 a
.4973	15.13 a	26.3157	15.09 a	.4599	15.12 a	.5064	15.11 a
.4981	15.02 a	.4090	15.01 a	.4610	15.11 a	.5076	15.12 a
.4990	14.95 a	.4102	14.99 a	.4622	15.14 a	.5087	15.20 a
.4998	14.87 a	.4113	15.05 a	.4633	15.03 a	.5098	15.17 a
.5007	15.05 a	.4124	15.06 a	.4644	15.04 a	.5110	15.12 a
.5015	14.95 a	.4136	15.06 a	.4656	15.07 a	.5121	15.16 a
.5024	14.99 a	.4147	15.04 a	.4667	15.11 a	.5132	15.13 a
.5032	14.99 a	.4158	15.03 a	.4678	15.03 a	.5144	15.08 a
.5041	15.03 a	.4170	14.98 a	.4690	14.96 a	.5155	15.09 a
.5049	14.97 a	.4181	14.98 a	.4701	15.01 a	.5166	15.12 a
.5058	14.99 a	.4192	15.01 a	.4713	14.98 a	.5178	15.11 a
.5066	15.03 a	.4204	15.03 a	.4724	14.97 a	.5189	15.10 a
.5120	14.97 a	.4215	15.05 a	.4735	14.97 a	.5200	15.09 a
.5128	14.99 a	.4226	15.08 a	.4747	15.01 a	.5212	15.07 a
.5136	15.00 a	.4238	15.06 a	.4758	15.02 a	28.4466	15.40 s
25.3591	14.98 a	.4249	15.10 a	.4769	15.02 a	.4496	15.35 s
.3628	15.11 c	.4260	15.04 a	.4781	15.06 a	.4534	15.35 s
.3659	15.08 c	.4272	15.03 a	.4792	15.06 a	.4573	15.26 s
.3680	15.11 c	.4283	15.15 a	.4803	15.08 a	.4605	15.26 s
.3697	15.12 a	.4294	15.08 a	.4815	15.11 a	.4644	15.13 s
.3711	15.06 a	.4306	15.06 a	.4826	15.06 a	32.3400	15.72 s
.3722	14.99 a	.4317	15.05 a	.4837	15.02 a	.4062	15.74 c
.3734	14.95 a	.4328	15.06 a	.4849	15.02 a	.4126	15.71 c
.3745	14.99 a	.4340	15.05 a	.4860	15.08 a	.4139	15.70 c

Table 9. Continued.

JD*	V	JD*	V	JD*	V	JD*	V
32.4158	15.69 c	32.5004	15.75 c	32.5359	15.74 c	34.4227	16.10 c
.4170	15.68 c	.5013	15.72 c	.5368	15.68 c	.4243	16.09 c
.4178	15.68 c	.5021	15.73 c	.5376	15.67 c	.4260	16.04 c
.4187	15.67 c	.5029	15.71 c	.5392	15.73 c	.4288	16.07 c
.4195	15.67 c	.5037	15.73 c	.5392	15.74 c	.4305	16.06 c
.4203	15.69 c	.5046	15.72 c	.5401	15.69 c	.4321	16.08 c
.4211	15.71 c	.5054	15.74 c	.5417	15.70 c	.4337	16.02 c
.4220	15.70 c	.5062	15.74 c	.5425	15.69 c	.4353	16.03 c
.4228	15.69 c	.5070	15.74 c	.5450	15.69 c	.4370	16.01 c
.4236	15.72 c	.5079	15.74 c	33.3931	15.75 c	.4386	16.05 c
.4244	15.70 c	.5087	15.74 c	.3996	15.69 c	.4403	16.05 c
.4253	15.72 c	.5095	15.73 c	.4011	15.78 c	.4419	16.09 c
.4261	15.70 c	.5103	15.71 c	.4019	15.78 c	.4435	16.06 c
.4269	15.69 c	.5112	15.73 c	.4027	15.74 c	.4457	16.08 c
.4277	15.69 c	.5120	15.75 c	.4035	15.81 c	.4474	16.09 c
.4286	15.67 c	.5128	15.71 c	.4044	15.90 c	.4490	16.10 c
.4294	15.69 c	.5136	15.72 c	.4060	15.78 c	.4506	16.04 c
.4302	15.66 c	.5136	15.72 c	.4068	15.81 c	.4523	16.07 c
.4310	15.68 c	.5145	15.73 c	.4085	15.89 c	.4539	16.09 c
.4318	15.64 c	.5153	15.75 c	.4093	15.85 c	.4557	16.08 c
.4327	15.66 c	.5161	15.75 c	.4101	15.88 c	.4564	16.09 c
.4343	15.61 c	.5169	15.74 c	.4109	15.92 c	.4570	16.06 c
.4822	15.69 c	.5177	15.74 c	.4118	15.85 c	.4577	16.06 c
.4843	15.71 c	.5186	15.73 c	34.3844	16.03 c	.4583	16.06 c
.4851	15.69 c	.5194	15.73 c	.3859	16.05 c	.4590	16.10 c
.4859	15.68 c	.5202	15.73 c	.3949	15.99 c	.4596	16.09 c
.4868	15.68 c	.5202	15.76 c	.3966	16.01 c	.4603	16.13 c
.4876	15.70 c	.5218	15.75 c	.3982	16.07 c	.4616	16.13 c
.4884	15.68 c	.5226	15.70 c	.3998	16.04 c	.4622	16.12 c
.4892	15.69 c	.5235	15.73 c	.4015	16.04 c	.4635	16.14 c
.4901	15.71 c	.5243	15.74 c	.4031	16.08 c	.4642	16.14 c
.4909	15.71 c	.5251	15.75 c	.4047	16.10 c	.4655	16.11 c
.4917	15.73 c	.5259	15.74 c	.4064	16.08 c	.4661	16.12 c
.4925	15.71 c	.5268	15.66 c	.4080	16.12 c	.4668	16.09 c
.4934	15.71 c	.5276	15.66 c	.4096	16.07 c	.4674	16.14 c
.4946	15.70 c	.5284	15.65 c	.4113	16.06 c	.4681	16.09 c
.4955	15.73 c	.5284	15.67 c	.4129	16.07 c	.4687	16.07 c
.4963	15.71 c	.5318	15.57 c	.4145	16.08 c	.4694	16.11 c
.4971	15.70 c	.5326	15.65 c	.4162	16.10 c	.4700	16.10 c
.4980	15.71 c	.5334	15.63 c	.4178	16.08 c	.4707	16.13 c
.4988	15.71 c	.5343	15.70 c	.4194	16.07 c	.4713	16.11 c
.4996	15.73 c	.5351	15.73 c	.4211	16.09 c	.4720	16.13 c

Table 9. Continued.

JD*	V	JD*	V	JD*	V	JD*	V
34.4726	16.12 c	34.5000	16.15 c	34.5882	16.29 c	34.6213	16.20 c
.4733	16.07 c	.5007	16.13 c	.5889	16.27 c	.6221	16.23 c
.4739	16.13 c	.5063	16.14 c	.5895	16.26 c	.6229	16.18 c
.4746	16.07 c	.5603	16.23 c	.5902	16.32 c	.6237	16.25 c
.4752	16.12 c	.5612	16.25 c	.5908	16.27 c	.6246	16.23 c
.4759	16.11 c	.5621	16.21 c	.5915	16.28 c	.6254	16.33 c
.4766	16.09 c	.5632	16.22 c	.5921	16.30 c	.6270	16.26 c
.4772	16.12 c	.5639	16.21 c	.5928	16.29 c	.6287	16.26 c
.4779	16.12 c	.5645	16.25 c	.5934	16.32 c	35.3806	17.05 c
.4785	16.13 c	.5652	16.27 c	.5941	16.32 c	.3835	16.94 c
.4792	16.07 c	.5658	16.26 c	.5947	16.32 c	.3903	17.22 c
.4798	16.14 c	.5665	16.23 c	.5954	16.32 c	.4154	17.32 c
.4805	16.12 c	.5671	16.20 c	.5965	16.22 c	.5258	17.34 c
.4811	16.11 c	.5678	16.20 c	.5973	16.22 c	.5756	17.33 c
.4818	16.10 c	.5684	16.21 c	.5982	16.27 c	.5780	17.42 c
.4824	16.13 c	.5691	16.25 c	.5990	16.25 c	38.2362	17.98 c
.4831	16.11 c	.5697	16.22 c	.5998	16.26 c	.2467	18.07 c
.4837	16.14 c	.5704	16.21 c	.6006	16.29 c	.2573	17.93 c
.4844	16.13 c	.5710	16.24 c	.6015	16.28 c	.3847	17.85 c
.4850	16.13 c	.5717	16.22 c	.6023	16.29 c	.5839	18.03 c
.4857	16.12 c	.5723	16.24 c	.6031	16.29 c	39.3663	18.07 c
.4863	16.10 c	.5730	16.22 c	.6039	16.25 c	.3694	18.17 c
.4870	16.11 c	.5736	16.20 c	.6048	16.27 c	41.3094	18.16 c
.4876	16.10 c	.5743	16.20 c	.6056	16.25 c	.5025	18.18 c
.4883	16.07 c	.5749	16.22 c	.6064	16.29 c	45.2036	18.38 c
.4889	16.09 c	.5756	16.25 c	.6072	16.25 c	.4908	18.59 s
.4896	16.12 c	.5762	16.22 c	.6081	16.25 c	45.5038	18.29 s
.4902	16.11 c	.5769	16.25 c	.6089	16.24 c	.5232	18.31 s
.4909	16.08 c	.5775	16.24 c	.6097	16.26 c	.5491	18.75 s
.4915	16.09 c	.5782	16.22 c	.6106	16.28 c	.5685	18.54 s
.4922	16.12 c	.5788	16.22 c	.6114	16.27 c	45.5879	18.44 s
.4928	16.04 c	.5795	16.21 c	.6122	16.29 c	.6073	18.76 s
.4935	16.11 c	.5801	16.21 c	.6130	16.26 c	.6267	18.30 s
.4941	16.08 c	.5808	16.25 c	.6139	16.33 c	.6461	18.18 s
.4948	16.08 c	.5814	16.24 c	.6147	16.34 c	53.3449	18.95 c
.4955	16.10 c	.5821	16.27 c	.6155	16.25 c	.3487	18.72 c
.4961	16.10 c	.5833	16.27 c	.6163	16.29 c	.3504	18.86 c
.4968	16.11 c	.5839	16.28 c	.6172	16.22 c	.3577	18.76 c
.4974	16.09 c	.5850	16.26 c	.6180	16.25 c	54.43	18.44 c
.4981	16.12 c	.5856	16.28 c	.6188	16.26 c	56.40	18.66 c
.4987	16.12 c	.5863	16.29 c	.6196	16.28 c	79.20	19.42 c
.4994	16.12 c	.5869	16.31 c	.6205	16.31 c	89.26	19.20 c

Table 10. R_C magnitudes of V466 And. The symbols "a","c","s" and "t" are explained in Table 2. $JD_{hel} = JD^* + 2\,454\,700$.

JD^*	R_C	JD^*	R_C	JD^*	R_C	JD^*	R_C
11.4403	12.87 t	11.4695	12.82 t	11.4959	12.89 t	11.5320	12.91 t
.4421	12.81 t	.4702	12.80 t	.4966	12.94 t	.5325	12.92 t
.4431	12.85 t	.4709	12.87 t	.4973	12.89 t	.5331	12.85 t
.4442	12.84 t	.4716	12.85 t	.4980	12.89 t	.5338	12.88 t
.4449	12.88 t	.4723	12.85 t	.4987	12.88 t	.5343	12.90 t
.4459	12.82 t	.4730	12.86 t	.4994	12.90 t	.5349	12.90 t
.4466	12.85 t	.4736	12.88 t	.5001	12.87 t	.5380	12.88 t
.4472	12.82 t	.4743	12.89 t	.5008	12.93 t	.5386	12.89 t
.4479	12.83 t	.4750	12.87 t	.5015	12.88 t	.5392	12.90 t
.4486	12.83 t	.4757	12.85 t	.5022	12.90 t	.5398	12.89 t
.4493	12.85 t	.4764	12.87 t	.5029	12.90 t	.5404	12.93 t
.4500	12.84 t	.4771	12.90 t	.5036	12.94 t	.5410	12.91 t
.4507	12.81 t	.4778	12.86 t	.5043	12.93 t	.5416	12.95 t
.4514	12.85 t	.4785	12.89 t	.5050	12.86 t	.5422	12.90 t
.4521	12.82 t	.4792	12.88 t	.5057	12.90 t	.5428	12.93 t
.4535	12.84 t	.4799	12.87 t	.5063	12.87 t	.5434	12.88 t
.4542	12.82 t	.4806	12.92 t	.5071	12.90 t	.5440	12.91 t
.4549	12.85 t	.4813	12.92 t	.5078	12.87 t	.5447	12.93 t
.4556	12.83 t	.4819	12.92 t	.5085	12.87 t	.5453	12.94 t
.4563	12.82 t	.4826	12.99 t	.5091	12.85 t	.5459	12.91 t
.4570	12.82 t	.4833	12.99 t	.5098	12.85 t	.5465	12.92 t
.4577	12.84 t	.4840	12.98 t	.5105	12.86 t	.5471	12.90 t
.4584	12.86 t	.4847	12.96 t	.5112	12.90 t	.5477	12.86 t
.4591	12.84 t	.4854	12.95 t	.5119	12.87 t	.5483	12.91 t
.4598	12.84 t	.4861	12.98 t	.5126	12.91 t	.5489	12.91 t
.4605	12.86 t	.4868	12.96 t	.5133	12.89 t	.5495	12.92 t
.4612	12.84 t	.4875	12.97 t	.5140	12.87 t	.5503	12.89 t
.4619	12.87 t	.4882	12.93 t	.5147	12.87 t	.5509	12.90 t
.4626	12.87 t	.4889	12.93 t	.5259	12.88 t	.5515	12.92 t
.4633	12.87 t	.4896	12.95 t	.5265	12.90 t	.5521	12.88 t
.4640	12.85 t	.4903	12.91 t	.5271	12.92 t	.5527	12.87 t
.4647	12.81 t	.4910	12.94 t	.5277	12.86 t	.5533	12.84 t
.4654	12.84 t	.4917	12.93 t	.5283	12.88 t	.5539	12.84 t
.4660	12.82 t	.4924	12.95 t	.5289	12.87 t	.5545	12.87 t
.4667	12.82 t	.4931	12.90 t	.5295	12.91 t	.5551	12.87 t
.4674	12.79 t	.4938	12.95 t	.5301	12.86 t	.5557	12.85 t
.4681	12.81 t	.4945	12.88 t	.5307	12.93 t	.5565	12.86 t

Table 10. Continued.

JD*	R_C	JD*	R_C	JD*	R_C	JD*	R_C
11.5571	12.87 t	12.4424	13.28 t	12.4791	13.23 t	13.4253	13.48 s
.5577	12.86 t	.4432	13.30 t	.4812	13.24 t	.4269	13.47 s
.5583	12.88 t	.4440	13.28 t	.4820	13.23 t	.4284	13.50 s
.5589	12.85 t	.4458	13.29 t	.4828	13.23 t	.4299	13.46 s
.5595	12.85 t	.4466	13.29 t	.4837	13.23 t	.4330	13.45 s
.5601	12.86 t	.4474	13.30 t	.4845	13.25 t	.4345	13.48 s
.5607	12.86 t	.4483	13.29 t	.4853	13.25 t	.4558	13.49 s
.5613	12.85 t	.4499	13.28 t	.4862	13.25 t	.4634	13.48 s
.5619	12.90 t	.4507	13.27 t	.4870	13.25 t	.4711	13.46 s
.5627	12.89 t	.4516	13.28 t	.4878	13.27 t	.4726	13.45 s
.5633	12.88 t	.4524	13.27 t	.4887	13.27 t	.4741	13.50 s
.5639	12.88 t	.4533	13.25 t	.4895	13.27 t	.4756	13.47 s
.5645	12.86 t	.4544	13.27 t	.4903	13.26 t	.4771	13.48 s
.5651	12.82 t	.4552	13.25 t	.4912	13.26 t	.4787	13.49 s
.5657	12.86 t	.4560	13.25 t	.4920	13.26 t	.4802	13.52 s
.5663	12.87 t	.4569	13.24 t	.4928	13.27 t	.4817	13.48 s
12.3677	13.17 s	.4577	13.26 t	.4942	13.29 t	.4832	13.46 s
.3687	13.16 s	.4585	13.25 t	.4950	13.29 t	.4848	13.48 s
.3697	13.18 s	.4594	13.27 t	.4959	13.26 t	.4863	13.47 s
.3710	13.18 s	.4602	13.27 t	.4967	13.26 t	.4878	13.48 s
.3722	13.17 s	.4610	13.24 t	.4975	13.29 t	.4893	13.48 s
.4190	13.21 t	.4618	13.24 t	.4984	13.28 t	.4909	13.49 s
.4198	13.22 t	.4627	13.24 t	.4992	13.28 t	.4924	13.50 s
.4206	13.20 t	.4635	13.24 t	.5001	13.31 t	.4939	13.49 s
.4220	13.19 t	.4643	13.23 t	.5342	13.24 t	.4954	13.44 s
.4228	13.22 t	.4652	13.23 t	.5351	13.25 t	.4969	13.46 s
.4236	13.20 t	.4660	13.22 t	.5359	13.25 t	.4985	13.48 s
.4244	13.21 t	.4675	13.22 t	.5367	13.21 t	.5000	13.47 s
.4253	13.21 t	.4683	13.24 t	.5376	13.21 t	.5015	13.49 s
.4261	13.22 t	.4691	13.24 t	.5384	13.20 t	.5030	13.49 s
.4269	13.21 t	.4699	13.26 t	.5392	13.20 t	.5045	13.48 s
.4278	13.20 t	.4708	13.23 t	.5401	13.19 t	.5061	13.51 s
.4286	13.21 t	.4716	13.24 t	.5409	13.20 t	.5076	13.53 s
.4294	13.20 t	.4724	13.27 t	13.4043	13.55 s	.5091	13.50 s
.4366	13.26 t	.4733	13.25 t	.4080	13.49 s	.5106	13.52 s
.4374	13.27 t	.4741	13.26 t	.4098	13.49 s	.5122	13.52 s
.4382	13.27 t	.4749	13.24 t	.4170	13.45 s	.5137	13.52 s
.4390	13.26 t	.4758	13.23 t	.4192	13.45 s	.5152	13.52 s
.4399	13.27 t	.4766	13.23 t	.4207	13.45 s	.5167	13.55 s
.4407	13.28 t	.4774	13.25 t	.4222	13.46 s	.5183	13.54 s
.4415	13.29 t	.4783	13.25 t	.4238	13.49 s	.5198	13.53 s

Table 10. Continued.

JD*	R_C	JD*	R_C	JD*	R_C	JD*	R_C
13.5213	13.54 s	13.6309	13.56 s	15.3102	13.90 s	15.3713	13.96 s
.5228	13.51 s	.6325	13.57 s	.3114	13.89 s	.3724	13.95 s
.5243	13.52 s	.6340	13.53 s	.3125	13.91 s	.3736	13.96 s
.5259	13.54 s	.6355	13.56 s	.3137	13.96 s	.3747	13.95 s
.5274	13.51 s	.6370	13.57 s	.3148	13.94 s	.3759	13.98 s
.5289	13.54 s	.6386	13.54 s	.3160	13.92 s	.3770	13.97 s
.5304	13.52 s	.6401	13.53 s	.3171	13.91 s	16.2734	14.05 s
.5320	13.50 s	.6416	13.53 s	.3263	13.94 s	.2840	14.08 s
.5335	13.47 s	14.3971	13.74 s	.3275	13.95 s	.2845	14.06 s
.5350	13.49 s	.4055	13.76 s	.3286	13.94 s	.4861	14.10 t
.5365	13.50 s	.4083	13.73 s	.3298	13.90 s	.4873	14.08 t
.5381	13.50 s	.4146	13.75 s	.3309	13.92 s	.4885	14.10 t
.5396	13.49 s	15.2735	13.94 s	.3321	13.92 s	.4896	14.14 t
.5411	13.49 s	.2756	13.88 s	.3332	13.93 s	.4908	14.11 t
.5426	13.50 s	.2777	13.92 s	.3344	13.93 s	.4921	14.13 t
.5442	13.49 s	.2803	13.91 s	.3355	13.91 s	.4933	14.11 t
.5457	13.54 s	.2814	13.88 s	.3401	13.88 s	.4945	14.14 t
.5472	13.50 s	.2826	13.91 s	.3413	13.90 s	.4957	14.13 t
.5487	13.51 s	.2837	13.95 s	.3447	13.92 s	.4968	14.15 t
.5502	13.49 s	.2849	13.94 s	.3459	13.95 s	.4980	14.11 t
.5518	13.49 s	.2860	13.92 s	.3470	13.93 s	.4992	14.12 t
.5533	13.49 s	.2872	13.91 s	.3482	13.93 s	.5004	14.14 t
.5548	13.49 s	.2883	13.89 s	.3493	13.94 s	.5016	14.15 t
.5594	13.54 s	.2895	13.88 s	.3505	13.93 s	.5027	14.15 t
.5609	13.52 s	.2906	13.93 s	.3516	13.95 s	.5043	14.17 t
.5685	13.57 s	.2918	13.89 s	.3528	13.93 s	.5055	14.16 t
.5700	13.55 s	.2929	13.90 s	.3540	13.93 s	.5066	14.15 t
.5746	13.57 s	.2941	13.89 s	.3551	13.91 s	.5078	14.12 t
.6096	13.51 s	.2953	13.91 s	.3563	13.88 s	.5090	14.16 t
.6111	13.47 s	.2964	13.87 s	.3574	13.93 s	.5102	14.13 t
.6127	13.49 s	.2976	13.86 s	.3586	13.91 s	.5114	14.14 t
.6142	13.52 s	.2987	13.87 s	.3597	13.91 s	.5125	14.14 t
.6157	13.53 s	.2998	13.86 s	.3609	13.91 s	.5137	14.15 t
.6172	13.54 s	.3010	13.90 s	.3620	13.92 s	.5149	14.13 t
.6188	13.52 s	.3022	13.90 s	.3632	13.93 s	.5161	14.09 t
.6203	13.53 s	.3033	13.91 s	.3643	13.94 s	.5173	14.10 t
.6218	13.54 s	.3045	13.89 s	.3655	13.94 s	.5184	14.09 t
.6233	13.56 s	.3056	13.91 s	.3666	13.93 s	.5196	14.11 t
.6248	13.56 s	.3067	13.90 s	.3678	13.95 s	.5208	14.13 t
.6279	13.59 s	.3079	13.89 s	.3689	13.93 s	.5220	14.13 t
.6294	13.55 s	.3091	13.92 s	.3701	13.94 s	.5232	14.15 t

Table 10. Continued.

JD*	R_C	JD*	R_C	JD*	R_C	JD*	R_C
16.5243	14.10 t	17.3254	14.28 s	17.4574	14.31 t	17.5339	14.29 t
.5255	14.12 t	.3258	14.25 s	.4591	14.30 t	.5356	14.30 t
.5267	14.13 t	.3753	14.29 t	.4608	14.32 t	.5373	14.29 t
.5282	14.08 t	.3770	14.29 t	.4625	14.30 t	.5390	14.31 t
.5294	14.10 t	.3787	14.29 t	.4642	14.32 t	.5407	14.27 t
.5306	14.14 t	.3804	14.27 t	.4659	14.32 t	.5424	14.30 t
.5317	14.11 t	.3821	14.29 t	.4677	14.31 t	.5441	14.30 t
.5329	14.13 t	.3995	14.26 t	.4694	14.29 t	.5458	14.29 t
.5341	14.09 t	.4012	14.30 t	.4711	14.31 t	.5510	14.28 t
.5353	14.11 t	.4029	14.30 t	.4728	14.28 t	.5527	14.27 t
.5365	14.09 t	.4047	14.31 t	.4745	14.30 t	.5544	14.28 t
.5377	14.09 t	.4063	14.30 t	.4762	14.28 t	.5561	14.26 t
.5389	14.09 t	.4080	14.32 t	.4779	14.29 t	.5578	14.30 t
.5400	14.07 t	.4097	14.36 t	.4796	14.28 t	.5595	14.29 t
.5412	14.08 t	.4115	14.34 t	.4813	14.29 t	.5612	14.28 t
.5424	14.09 t	.4131	14.32 t	.4830	14.30 t	.5629	14.27 t
.5436	14.10 t	.4148	14.32 t	.4855	14.30 t	.5647	14.27 t
.5448	14.09 t	.4166	14.31 t	.4872	14.30 t	.5664	14.31 t
.5460	14.10 t	.4183	14.30 t	.4889	14.29 t	.5683	14.27 t
.5472	14.09 t	.4200	14.27 t	.4906	14.29 t	.5700	14.30 t
.5483	14.09 t	.4217	14.28 t	.4923	14.31 t	.5717	14.30 t
.5495	14.08 t	.4234	14.27 t	.4940	14.31 t	18.3832	14.45 t
.5511	14.10 t	.4251	14.25 t	.4957	14.31 t	.3854	14.44 t
.5533	14.15 t	.4268	14.27 t	.4974	14.30 t	.3877	14.45 t
.5545	14.14 t	.4285	14.27 t	.4991	14.29 t	.3899	14.45 t
.5556	14.13 t	.4302	14.28 t	.5008	14.27 t	.3921	14.45 t
.5568	14.15 t	.4319	14.25 t	.5026	14.24 t	.3943	14.46 t
.5580	14.13 t	.4336	14.25 t	.5043	14.26 t	.3988	14.42 t
.5592	14.15 t	.4353	14.27 t	.5060	14.29 t	.4010	14.41 t
.5604	14.16 t	.4370	14.26 t	.5127	14.28 t	.4032	14.40 t
.5615	14.15 t	.4387	14.26 t	.5144	14.32 t	.4054	14.42 t
.5627	14.15 t	.4404	14.28 t	.5161	14.30 t	.4077	14.42 t
.5639	14.14 t	.4421	14.28 t	.5178	14.31 t	.4099	14.42 t
.5651	14.15 t	.4438	14.26 t	.5195	14.30 t	.4121	14.42 t
.5662	14.15 t	.4455	14.28 t	.5212	14.32 t	.4143	14.42 t
.5674	14.18 t	.4472	14.30 t	.5229	14.31 t	.4166	14.47 t
.5686	14.17 t	.4489	14.27 t	.5246	14.29 t	.4188	14.45 t
.5698	14.15 t	.4506	14.27 t	.5263	14.29 t	.4210	14.50 t
17.3232	14.28 s	.4523	14.29 t	.5280	14.31 t	.4232	14.48 t
.3245	14.28 s	.4540	14.30 t	.5305	14.29 t	.4254	14.46 t
.3249	14.30 s	.4557	14.31 t	.5322	14.30 t	.4277	14.45 t

Table 10. Continued.

JD*	R_C	JD*	R_C	JD*	R_C	JD*	R_C
18.4300	14.44 t	19.3593	14.50 s	19.4911	14.54 s	19.6198	14.52 s
.4322	14.42 t	.3624	14.51 s	.4942	14.56 s	.6260	14.53 s
.4344	14.42 t	.3655	14.49 s	.4974	14.54 s	.6292	14.59 s
.4366	14.41 t	.3687	14.55 s	.5005	14.52 s	21.3884	14.73 t
.4389	14.43 t	.3718	14.51 s	.5036	14.53 s	.3910	14.74 t
.4411	14.42 t	.3781	14.52 s	.5068	14.54 s	.3936	14.74 t
.4433	14.45 t	.3812	14.57 s	.5099	14.54 s	.3961	14.74 t
.4456	14.46 t	.3844	14.50 s	.5130	14.52 s	.3987	14.77 t
.4478	14.48 t	.3875	14.51 s	.5162	14.52 s	.4014	14.73 t
.4500	14.45 t	.3906	14.50 s	.5193	14.53 s	.4040	14.76 t
.4522	14.46 t	.3938	14.50 s	.5225	14.52 s	.4066	14.74 t
.4545	14.44 t	.3969	14.53 s	.5256	14.51 s	.4091	14.77 t
.4567	14.44 t	.4001	14.51 s	.5287	14.53 s	.4117	14.71 t
.4589	14.43 t	.4032	14.54 s	.5319	14.51 s	.4143	14.73 t
.4611	14.41 t	.4063	14.53 s	.5350	14.54 s	.4169	14.73 t
.4634	14.42 t	.4095	14.52 s	.5382	14.51 s	.4195	14.72 t
.4656	14.43 t	.4126	14.52 s	.5413	14.53 s	.4220	14.72 t
.4678	14.42 t	.4158	14.51 s	.5444	14.53 s	.4246	14.74 t
.4700	14.43 t	.4189	14.49 s	.5476	14.53 s	.4277	14.73 t
.4729	14.44 t	.4220	14.48 s	.5507	14.55 s	.4303	14.77 t
.4751	14.45 t	.4252	14.53 s	.5539	14.53 s	.4329	14.78 t
.4774	14.46 t	.4283	14.53 s	.5570	14.53 s	.4355	14.76 t
.4796	14.44 t	.4315	14.54 s	.5601	14.55 s	.4381	14.73 t
.4818	14.45 t	.4346	14.51 s	.5633	14.52 s	.4407	14.74 t
.4840	14.45 t	.4377	14.55 s	.5664	14.52 s	.4432	14.76 t
.4863	14.45 t	.4409	14.56 s	.5695	14.52 s	.4458	14.74 t
.4885	14.42 t	.4440	14.52 s	.5727	14.51 s	.4484	14.76 t
.4907	14.43 t	.4472	14.52 s	.5758	14.55 s	.4510	14.76 t
.4929	14.41 t	.4503	14.50 s	.5790	14.48 s	.4538	14.77 t
.4952	14.45 t	.4534	14.52 s	.5821	14.52 s	.4564	14.74 t
.4996	14.43 t	.4566	14.54 s	.5852	14.51 s	.4590	14.74 t
.5041	14.43 t	.4597	14.52 s	.5884	14.52 s	.4615	14.76 t
.5063	14.44 t	.4628	14.55 s	.5915	14.51 s	.4641	14.73 t
19.3342	14.54 s	.4660	14.53 s	.5947	14.50 s	.4667	14.74 t
.3373	14.50 s	.4691	14.54 s	.5978	14.54 s	.4760	14.77 t
.3404	14.55 s	.4723	14.51 s	.6009	14.53 s	.4786	14.74 t
.3436	14.51 s	.4754	14.50 s	.6041	14.55 s	.4812	14.73 t
.3467	14.54 s	.4785	14.55 s	.6072	14.55 s	.4847	14.73 t
.3498	14.52 s	.4817	14.54 s	.6103	14.55 s	.4873	14.74 t
.3530	14.54 s	.4848	14.54 s	.6135	14.51 s	.4899	14.76 t
.3561	14.52 s	.4879	14.54 s	.6166	14.53 s	.4924	14.74 t

Table 10. Continued.

JD*	R_C	JD*	R_C	JD*	R_C	JD*	R_C
21.4950	14.78 t	23.2769	14.85 s	23.3904	14.81 t	23.5083	14.80 t
.4976	14.77 t	.2789	14.80 t	.3930	14.82 t	.5109	14.83 t
.5002	14.77 t	.2801	14.79 s	.3955	14.84 t	.5134	14.85 t
.5028	14.78 t	.2814	14.82 t	.3981	14.88 t	.5161	14.88 t
.5053	14.77 t	.2840	14.82 t	.4007	14.88 t	.5187	14.93 t
.5079	14.78 t	.2866	14.85 t	.4032	14.89 t	.5213	14.92 t
.5151	14.82 t	.2892	14.86 t	.4058	14.90 t	.5238	14.89 t
.5176	14.82 t	.2918	14.92 t	.4084	14.91 t	.5264	14.95 t
.5202	14.78 t	.2944	14.93 t	.4088	15.00 s	.5290	14.96 t
.5228	14.79 t	.2970	14.92 t	.4110	14.92 t	.5316	14.94 t
.5254	14.80 t	.2995	14.95 t	.4122	14.94 s	.5341	14.98 t
.5280	14.79 t	.3021	14.97 t	.4135	14.94 t	.5367	14.98 t
.5305	14.76 t	.3078	15.02 t	.4151	14.93 s	.5393	15.05 t
.5331	14.76 t	.3104	14.98 t	.4179	14.88 s	.5435	14.99 t
.5357	14.73 t	.3130	14.99 t	.4206	14.91 s	.5461	14.99 t
.5383	14.74 t	.3156	14.98 t	.4234	14.76 s	.5487	14.95 t
.5410	14.74 t	.3182	14.97 t	.4262	14.95 s	.5512	14.93 t
.5436	14.77 t	.3216	14.94 t	.4289	15.07 s	.5538	14.86 t
.5462	14.82 t	.3222	14.91 s	.4344	14.82 s	.5564	14.85 t
.5487	14.79 t	.3242	14.89 t	.4372	14.77 s	.5590	14.78 t
.5513	14.78 t	.3268	14.86 t	.4399	14.69 s	.5616	14.77 t
.5559	14.82 t	.3293	14.79 t	.4402	14.83 t	.5641	14.79 t
.5585	14.82 t	.3357	14.79 t	.4427	14.71 s	.5667	14.81 t
.5619	14.79 t	.3383	14.84 t	.4428	14.82 t	.5696	14.87 t
.5645	14.82 t	.3409	14.84 t	.4454	14.80 t	.5722	14.90 t
.5671	14.79 t	.3435	14.85 t	.4480	14.79 t	.5748	14.89 t
.5701	14.82 t	.3460	14.86 t	.4506	14.80 t	.5774	14.89 t
.5726	14.81 t	.3486	14.91 t	.4532	14.84 t	.5799	14.88 t
.5752	14.82 t	.3512	14.89 t	.4558	14.87 t	.5825	14.88 t
.5784	14.84 t	.3538	14.93 t	.4583	14.87 t	26.3081	15.04 c
.5810	14.82 t	.3563	14.93 t	.4609	14.88 t	.3090	15.20 c
.5836	14.82 t	.3589	14.95 t	.4639	14.92 t	.3145	15.22 c
23.2523	15.01 t	.3646	15.01 t	.4664	14.93 t	28.4076	15.12 c
.2575	14.97 t	.3672	15.04 t	.4871	14.96 t	.4916	15.18 c
.2601	14.94 t	.3698	15.00 t	.4903	14.93 t	.4447	15.44 s
.2626	14.93 t	.3724	14.97 t	.4928	14.94 t	.4484	15.38 s
.2653	14.94 t	.3750	14.99 t	.4954	14.87 t	.4545	15.36 s
.2669	14.86 s	.3775	14.95 t	.4980	14.83 t	.4617	15.26 s
.2705	14.83 t	.3827	14.86 t	.5006	14.81 t	32.4099	15.80 c
.2731	14.82 t	.3852	14.84 t	.5031	14.76 t	.4813	15.68 c
.2757	14.80 t	.3878	14.82 t	.5057	14.77 t	33.3662	15.79 a

Table 10. Continued.

JD*	R_C	JD*	R_C	JD*	R_C	JD*	R_C
33.3711	15.80 a	34.3769	16.01 a	34.4431	16.05 a	35.4447	17.03 c
.3724	15.80 a	.3782	15.92 a	.4442	16.06 a	.4501	16.93 c
.3737	15.71 a	.3795	15.96 a	.4453	16.11 a	.4525	17.04 c
.3751	15.80 a	.3808	15.92 a	.4465	16.10 a	.4547	17.09 c
.3764	15.89 a	.3822	15.90 a	.4476	16.09 a	.4569	17.13 c
.3777	15.76 a	.3835	15.98 a	.4487	15.96 a	.4592	17.15 c
.3790	15.61 a	.3848	15.99 a	.4499	15.99 a	.4614	17.15 c
.3803	15.83 a	.3861	16.02 a	.4510	16.05 a	.4636	17.13 c
.3816	15.76 a	.3868	16.03 c	.4521	16.05 a	.4658	17.17 c
.3829	15.81 a	.3874	15.93 a	.4533	15.99 a	.4680	17.19 c
.3842	15.84 a	.3887	15.93 a	.4544	15.93 a	.4702	17.21 c
.3855	15.85 a	.4080	15.95 a	.4556	16.06 a	.4724	17.20 c
.3868	15.79 a	.4098	15.97 a	.4567	16.05 a	.4747	17.16 c
.3881	15.79 a	.4109	16.05 a	.4578	16.04 a	.4769	17.16 c
.3894	15.81 a	.4121	15.98 a	.4596	16.02 a	.4791	17.18 c
.3901	15.79 c	.4132	16.01 a	.5015	16.09 c	.4813	17.15 c
.3908	15.75 a	.4143	16.07 a	.5041	16.12 c	.4835	17.10 c
.3921	15.75 a	.4155	16.04 a	35.3819	16.97 c	.4857	17.08 c
.3922	15.81 c	.4166	16.23 a	.3876	17.06 c	.4879	17.06 c
.3934	15.73 a	.4177	16.01 a	.3926	17.12 c	.4901	17.05 c
.3947	15.80 a	.4189	15.99 a	.3948	17.08 c	.4924	17.10 c
.3960	15.72 a	.4200	16.15 a	.3971	17.07 c	.4946	17.14 c
.3971	15.78 c	.4211	16.05 a	.3993	17.07 c	.4968	17.08 c
.3973	15.81 a	.4223	16.07 a	.4015	16.95 c	.4990	17.08 c
.3986	15.80 a	.4234	15.96 a	.4037	16.87 c	.5048	16.99 c
.3999	15.81 a	.4245	15.99 a	.4059	17.26 c	.5071	17.05 c
.4012	15.74 a	.4257	15.94 a	.4081	17.18 c	.5093	17.09 c
.4025	15.68 a	.4268	16.06 a	.4103	17.34 c	.5115	17.15 c
.4038	15.71 a	.4279	15.95 a	.4126	16.99 c	.5137	17.14 c
34.3609	15.99 a	.4291	15.96 a	.4181	17.18 c	.5159	17.15 c
.3625	16.05 a	.4302	15.94 a	.4203	17.17 c	.5181	17.09 c
.3638	16.03 a	.4313	16.00 a	.4225	17.13 c	.5203	17.09 c
.3651	15.97 a	.4325	16.08 a	.4248	17.11 c	.5225	17.16 c
.3664	16.39 a	.4339	16.09 a	.4270	17.13 c	.5282	17.10 c
.3677	16.09 a	.4351	16.05 a	.4292	16.92 c	.5305	17.16 c
.3690	16.02 a	.4362	16.03 a	.4314	17.11 c	.5327	17.14 c
.3704	16.04 a	.4374	16.05 a	.4336	17.13 c	.5349	17.12 c
.3717	16.01 a	.4385	16.01 a	.4358	17.13 c	.5371	17.07 c
.3730	16.03 a	.4396	16.03 a	.4380	17.08 c	.5393	17.06 c
.3743	16.04 a	.4408	16.02 a	.4402	17.08 c	.5415	17.12 c
.3756	15.90 a	.4419	16.04 a	.4425	17.15 c	.5438	17.14 c

Table 10. Continued.

JD*	R_C	JD*	R_C	JD*	R_C	JD*	R_C
35.5488	17.13 c	37.4020	17.65 c	37.4510	17.59 c	37.5569	17.78 c
.5510	17.14 c	.4027	17.87 a	.4532	17.63 c	.5591	17.81 c
.5532	17.13 c	.4040	17.71 a	.4554	17.64 c	.5613	17.80 c
.5554	17.17 c	.4042	17.68 c	.4576	17.68 c	.5635	17.81 c
.5576	17.18 c	.4053	17.58 a	.4598	17.73 c	.5657	17.78 c
.5598	17.20 c	.4064	17.74 c	.4620	17.75 c	.5679	17.78 c
.5620	17.21 c	.4066	17.71 a	.4665	17.77 c	.5979	17.67 c
.5642	17.16 c	.4079	17.99 a	.4687	17.77 c	.6001	17.63 c
.5665	17.18 c	.4086	17.72 c	.4709	17.84 c	.6023	17.59 c
.5687	17.22 c	.4092	17.52 a	.4731	17.64 c	.6045	17.62 c
.5731	17.16 c	.4105	17.62 a	.4753	17.73 c	.6068	17.60 c
37.3669	17.49 a	.4108	17.68 c	.4775	17.68 c	.6090	17.60 c
.3713	17.42 a	.4118	17.77 a	.4798	17.69 c	.6112	17.55 c
.3728	17.50 a	.4131	17.65 c	.4820	17.68 c	.6134	17.55 c
.3741	17.55 a	.4132	17.76 a	.4842	17.68 c	.6156	17.51 c
.3755	17.57 a	.4151	17.44 a	.4864	17.74 c	.6178	17.51 c
.3768	17.54 a	.4153	17.69 c	.4912	17.50 c	.6200	17.71 c
.3781	17.76 a	.4162	17.34 a	.4939	17.50 c	38.2339	17.66 c
.3792	17.91 a	.4175	17.56 c	.4961	17.60 c	.2362	17.68 c
.3807	17.39 a	.4177	17.56 a	.4983	17.62 c	.2444	17.81 c
.3820	17.29 a	.4184	17.61 a	.5005	17.56 c	.2467	17.77 c
.3833	17.59 a	.4197	17.48 c	.5027	17.57 c	.2550	17.70 c
.3846	17.71 a	.4197	17.48 a	.5050	17.54 c	.2573	17.63 c
.3859	17.44 a	.4219	17.66 c	.5072	17.57 c	.2681	17.77 c
.3861	17.45 c	.4241	17.64 c	.5094	17.59 c	.2703	17.62 c
.3872	17.77 a	.4263	17.55 c	.5116	17.50 c	.2725	17.79 c
.3883	17.48 c	.4286	17.53 c	.5138	17.65 c	.2747	17.71 c
.3885	18.00 a	.4308	17.48 c	.5160	17.71 c	.2769	17.72 c
.3909	17.50 c	.4330	17.52 c	.5239	17.77 c	.2792	17.70 c
.3915	17.58 a	.4337	17.50 a	.5261	17.82 c	.2814	17.72 c
.3931	17.52 c	.4350	17.50 a	.5283	17.75 c	.2836	17.76 c
.3933	17.54 a	.4363	17.56 a	.5305	17.74 c	.2858	17.74 c
.3948	17.86 a	.4366	17.73 a	.5327	17.82 c	.2880	17.68 c
.3954	17.57 c	.4376	17.74 a	.5357	17.69 c	.2902	17.67 c
.3961	17.51 a	.4389	17.65 a	.5379	17.70 c	.2924	17.69 c
.3975	17.67 a	.4399	17.54 c	.5401	17.77 c	.2946	17.72 c
.3976	17.51 c	.4402	17.77 a	.5423	17.75 c	.2969	17.72 c
.3988	17.54 a	.4421	17.50 c	.5445	17.87 c	.2991	17.71 c
.3998	17.61 c	.4443	17.59 c	.5467	17.90 c	.3013	17.72 c
.4001	17.86 a	.4466	17.62 c	.5524	17.74 c	.3043	17.73 c
.4014	17.93 a	.4488	17.61 c	.5547	17.76 c	.3188	17.68 c

Table 10. Continued.

JD*	R_C	JD*	R_C	JD*	R_C	JD*	R_C
38.3210	17.69 c	38.4684	17.83 c	38.5683	17.95 c	41.3470	17.71 c
.3232	17.63 c	.4706	17.77 c	.5705	17.85 c	.3496	17.80 c
.3254	17.54 c	.4728	17.80 c	.5727	17.93 c	.3521	17.87 c
.3276	17.50 c	.4750	17.82 c	.5749	17.84 c	.3547	17.81 c
.3299	17.49 c	.4773	17.87 c	.5771	17.88 c	.3573	17.90 c
.3321	17.48 c	.4795	17.77 c	.5794	17.83 c	.3598	17.89 c
.3343	17.50 c	.4817	17.79 c	.5816	17.85 c	.3624	17.96 c
.3365	17.55 c	.4839	17.82 c	.5839	17.72 c	.3649	17.93 c
.3387	17.66 c	.4861	17.85 c	.5862	17.73 c	.3675	17.98 c
.3409	17.78 c	.4883	17.82 c	.5885	17.78 c	.3768	17.70 c
.3431	17.83 c	.4906	17.79 c	.5910	17.76 c	.3785	17.96 c
.3453	17.76 c	.4928	17.77 c	.5932	17.78 c	.3813	18.11 c
.3476	17.71 c	.4950	17.76 c	.5954	17.82 c	.3839	18.13 c
.3498	17.68 c	.4972	17.80 c	.5976	17.85 c	.3865	18.19 c
.3520	17.66 c	.4994	17.73 c	.5998	17.86 c	.3890	18.09 c
.3542	17.68 c	.5016	17.65 c	.6021	17.82 c	.3916	18.11 c
.3564	17.69 c	.5038	17.60 c	.6043	17.86 c	.3941	18.02 c
.3586	17.58 c	.5060	17.64 c	.6065	17.83 c	.3967	18.02 c
.3608	17.55 c	.5083	17.68 c	.6087	17.92 c	.3993	18.02 c
.3630	17.62 c	.5105	17.63 c	.6109	17.98 c	.4018	18.00 c
.3653	17.64 c	.5127	17.66 c	.6131	17.86 c	.4044	18.08 c
.3675	17.69 c	.5149	17.63 c	.6154	17.97 c	.4069	18.13 c
.3697	17.66 c	.5171	17.59 c	.6176	17.92 c	.4095	18.01 c
.3847	17.47 c	.5193	17.70 c	39.3663	17.77 c	.4121	18.00 c
.4303	17.79 c	.5299	17.53 c	.3694	17.79 c	.4146	18.04 c
.4325	17.71 c	.5321	17.61 c	.3755	18.02 c	.4172	18.11 c
.4348	17.67 c	.5343	17.64 c	.3815	17.98 c	.4197	18.08 c
.4374	17.70 c	.5365	17.86 c	.3848	18.03 c	.4223	18.09 c
.4396	17.73 c	.5387	17.66 c	.3874	17.91 c	.4249	18.07 c
.4418	17.79 c	.5410	17.66 c	.3900	17.92 c	.4274	18.08 c
.4440	17.85 c	.5432	17.73 c	.3925	17.85 c	.4300	18.09 c
.4463	17.80 c	.5454	17.76 c	.3938	17.77 c	.4326	18.22 c
.4485	17.91 c	.5484	17.76 c	.3951	17.79 c	.4351	18.21 c
.4507	17.98 c	.5506	17.72 c	.3964	17.90 c	.4377	18.27 c
.4529	17.96 c	.5528	17.81 c	.3977	17.82 c	.4402	18.25 c
.4551	17.95 c	.5550	17.68 c	.3990	17.80 c	.4428	18.19 c
.4573	17.81 c	.5572	17.69 c	.4002	17.99 c	.4454	18.07 c
.4595	17.88 c	.5594	17.66 c	41.3065	17.94 c	.4479	18.05 c
.4618	17.87 c	.5617	17.85 c	.3298	17.57 c	.4511	18.05 c
.4640	17.88 c	.5639	17.80 c	.3345	17.67 c	.4537	18.02 c
.4662	17.88 c	.5661	17.93 c	.3444	17.60 c	.4562	17.94 c

Table 10. Continued.

JD*	R_C	JD*	R_C	JD*	R_C	JD*	R_C
41.4588	17.97 c	41.5715	17.92 c	42.3112	17.94 c	42.5099	17.94 c
.4614	17.99 c	.5740	17.94 c	.3138	17.91 c	.5125	17.99 c
.4639	17.88 c	.5766	18.01 c	.3163	17.93 c	.5150	18.13 c
.4665	17.93 c	.5792	17.95 c	.3189	17.90 c	.5176	18.07 c
.4690	18.01 c	.5824	18.00 c	.3215	17.91 c	.5201	18.21 c
.4716	18.00 c	.5850	18.02 c	.3240	17.93 c	.5227	18.09 c
.4742	17.94 c	.5875	18.03 c	.3266	17.93 c	.5253	18.05 c
.4767	17.99 c	.5901	17.88 c	.3317	17.90 c	.5290	18.15 c
.4793	18.11 c	.5926	17.96 c	.3343	17.85 c	.5316	18.20 c
.4818	18.13 c	.5952	17.97 c	.3368	17.88 c	.5341	18.11 c
.4844	18.18 c	.5978	18.00 c	.3394	17.86 c	.5367	18.11 c
.4870	18.14 c	.6003	17.98 c	.3420	17.87 c	.5392	18.10 c
.4895	18.17 c	.6029	18.09 c	.3445	17.82 c	.5418	18.04 c
.4921	18.13 c	.6054	18.03 c	.3471	17.95 c	.5444	18.06 c
.4946	18.08 c	.6080	17.97 c	.3496	17.91 c	.5469	18.11 c
.4996	17.98 c	.6106	17.94 c	.3522	17.95 c	.5495	18.07 c
.5050	17.96 c	.6131	18.03 c	.3548	17.95 c	.5520	17.98 c
.5076	17.90 c	.6157	17.89 c	.3573	17.93 c	.5546	18.03 c
.5101	18.10 c	.6182	17.83 c	.4454	18.02 c	.5572	18.00 c
.5127	17.96 c	.6208	17.86 c	.4524	17.94 c	.5597	17.96 c
.5152	18.01 c	42.2166	18.05 c	.4547	18.07 c	.5623	17.95 c
.5178	18.02 c	.2194	17.98 c	.4573	18.11 c	.5648	17.95 c
.5204	17.97 c	.2310	17.93 c	.4598	18.10 c	.5674	17.89 c
.5229	17.96 c	.2426	18.19 c	.4624	17.99 c	.5700	17.87 c
.5255	17.94 c	.2461	18.14 c	.4650	18.12 c	.5725	18.06 c
.5280	18.07 c	.2524	18.06 c	.4675	18.10 c	.5751	18.21 c
.5306	18.03 c	.2587	18.01 c	.4701	18.07 c	.5777	18.27 c
.5356	17.95 c	.2650	18.04 c	.4726	18.08 c	.5803	18.20 c
.5382	17.88 c	.2714	18.06 c	.4752	18.09 c	.5829	18.18 c
.5408	17.94 c	.2777	17.98 c	.4778	18.03 c	.5854	18.12 c
.5433	17.90 c	.2805	17.96 c	.4803	18.05 c	.5880	17.92 c
.5459	17.86 c	.2830	17.99 c	.4829	18.06 c	.5905	17.88 c
.5484	17.81 c	.2856	17.90 c	.4855	17.99 c	.5931	17.88 c
.5510	17.82 c	.2882	17.84 c	.4881	17.98 c	45.2011	17.82 c
.5536	17.85 c	.2907	17.86 c	.4907	18.03 c	.2089	18.27 c
.5561	17.81 c	.2933	17.78 c	.4933	18.05 c	.2114	18.44 c
.5587	17.72 c	.2958	17.93 c	.4958	18.03 c	.4922	18.27 s
.5612	17.69 c	.2984	18.03 c	.4996	18.07 c	.5019	18.22 s
.5638	17.77 c	.3010	18.10 c	.5022	18.00 c	.5148	18.03 s
.5664	17.71 c	.3061	17.96 c	.5048	17.92 c	.5278	18.06 s
.5689	17.85 c	.3087	18.00 c	.5073	17.93 c	.5407	18.09 s

Table 10. Continued.

JD*	R_C	JD*	R_C	JD*	R_C	JD*	R_C
45.5537	18.57 s	48.5833	18.23 c	49.2787	18.45 c	53.3339	18.37 c
.5666	18.48 s	.5869	18.09 c	.2859	18.52 c	.3373	18.48 c
.5795	18.14 s	49.2168	18.55 c	.2895	18.55 c	.3411	18.42 c
.5989	18.66 s	.2204	18.42 c	.2931	18.68 c	.3524	18.63 c
.6119	18.78 s	.2240	18.39 c	.2967	18.38 c	.3614	18.54 c
.6248	18.00 s	.2276	18.28 c	.3003	18.34 c	.3651	18.65 c
.6377	18.36 s	.2312	18.56 c	.3039	18.44 c	.3692	18.50 c
.6507	18.49 s	.2348	18.52 c	.3075	18.46 c	54.42	18.41 c
48.3230	18.52 c	.2384	18.33 c	.3111	18.67 c	56.3888	18.47 c
.3272	18.39 c	.2420	18.33 c	.3147	18.54 c	.3905	18.59 c
.3308	18.44 c	.2456	18.35 c	.3183	18.48 c	.3921	18.43 c
.3344	18.41 c	.2492	18.32 c	.3219	18.52 c	.3947	18.65 c
.3380	18.32 c	.2528	18.45 c	50.3607	18.61 c	.3977	18.63 c
.3416	18.25 c	.2571	18.45 c	.3633	18.81 c	.3994	18.66 c
.3452	18.33 c	.2607	18.31 c	.3667	18.73 c	.4032	18.76 c
.3488	18.17 c	.2643	18.32 c	.3703	18.46 c	79.34	18.86 c
.3524	18.54 c	.2679	18.56 c	51.2665	18.34 c	89.26	18.80 c
.5765	18.25 c	.2715	18.51 c	.2705	18.57 c		
.5797	18.16 c	.2751	18.45 c	53.3299	18.30 c		

We consider investigating photo-plate archives to find the possible superoutbursts of WZ Sge-type stars with the aim to determine their outburst and rebrightenings cycles. This study could test the idea of accumulation of the matter in the outer disc (Kato et al., 1998) that can cause rebrightenings.

In support of this suggestion, Uemura et al. (2008) discussed a superoutburst and a long rebrightening of the new WZ Sge-type system SDSS J102146.44 +234926.3 (J1021 in Table 5), which occurred in November 2006.

This object was observed very thoroughly in the optical region, R_C and for the first time also in J and K_s bands, using the 1.5-m KANATA telescope. J1021 showed a strong activity in the K_s-band and IR superhumps. They indicate the presence of additional matter in outer parts of the accretion disc.

Acknowledgements. This work was supported by VEGA grant 2/0038/10 and grants NSh-7179.2010.2, RNP-2906, RFBR-08-02-01220, RFBR-09-02-00225.
N. A. Katysheva and I. M. Volkov appreciate the scholarship of SAIA and the hospitality of the Astronomical Institute of the Slovak Academy of Sciences, Tatranská Lomnica. The authors are very grateful to Mr. D. Božik for the help with observations. Our special thank belongs to Dr. J. Tremko, referee of our paper, for valuable comments and suggestions.

Table 11. I_C magnitudes of V466 And. The symbols "s" is explained in Table 2. $JD_{hel} = JD^* + 2\,454\,700$.

JD^*	I_C	JD^*	I_C	JD^*	I_C	JD^*	I_C
12.3679	13.18 s	14.4479	13.76 s	14.4930	13.73 s	16.3358	14.11 s
.3689	13.09 s	.4490	13.75 s	.4942	13.74 s	.3375	14.07 s
.3699	13.14 s	.4502	13.76 s	.4953	13.73 s	.3391	14.08 s
.3713	13.17 s	.4514	13.74 s	15.2740	13.92 s	.3463	14.07 s
.3725	13.17 s	.4525	13.76 s	.2761	13.96 s	.3483	14.05 s
13.4048	13.53 s	.4537	13.75 s	.2782	13.91 s	.3503	14.09 s
.4066	13.66 s	.4549	13.74 s	16.2749	14.07 s	.3523	14.09 s
.4084	13.54 s	.4560	13.73 s	.2780	14.09 s	.3543	14.07 s
.4103	13.49 s	.4572	13.69 s	.2815	14.13 s	.3563	14.07 s
.4174	13.49 s	.4583	13.72 s	.2872	14.01 s	.3583	14.06 s
14.3977	13.76 s	.4595	13.71 s	.2890	14.05 s	.3603	14.03 s
.4062	13.73 s	.4607	13.74 s	.2907	14.05 s	.3623	14.07 s
.4090	13.72 s	.4618	13.76 s	.2923	14.04 s	.3642	14.07 s
.4165	13.83 s	.4630	13.77 s	.2940	14.07 s	.3662	14.05 s
.4177	13.81 s	.4641	13.79 s	.2957	14.07 s	.3682	14.07 s
.4188	13.79 s	.4653	13.80 s	.2973	14.02 s	.3702	13.99 s
.4200	13.74 s	.4665	13.81 s	.2990	14.08 s	.3722	14.01 s
.4211	13.77 s	.4676	13.78 s	.3007	14.07 s	.3742	14.00 s
.4223	13.74 s	.4688	13.79 s	.3023	14.03 s	.3762	14.06 s
.4235	13.76 s	.4699	13.81 s	.3040	14.07 s	17.3282	14.20 s
.4246	13.79 s	.4711	13.80 s	.3057	14.03 s	.3286	14.21 s
.4281	13.74 s	.4723	13.81 s	.3074	14.05 s	19.3347	14.47 s
.4293	13.75 s	.4734	13.79 s	.3090	14.07 s	.3378	14.44 s
.4304	13.76 s	.4746	13.80 s	.3107	14.06 s	.3410	14.52 s
.4316	13.74 s	.4758	13.81 s	.3124	14.06 s	.3441	14.45 s
.4328	13.73 s	.4769	13.80 s	.3141	14.06 s	.3473	14.49 s
.4339	13.75 s	.4781	13.79 s	.3157	14.03 s	.3504	14.50 s
.4351	13.76 s	.4792	13.77 s	.3174	14.01 s	.3535	14.48 s
.4362	13.77 s	.4813	13.76 s	.3191	13.97 s	.3567	14.52 s
.4374	13.76 s	.4826	13.78 s	.3208	14.04 s	.3598	14.46 s
.4386	13.75 s	.4837	13.75 s	.3224	14.05 s	.3629	14.47 s
.4397	13.74 s	.4849	13.76 s	.3241	14.07 s	.3661	14.47 s
.4409	13.74 s	.4861	13.76 s	.3258	14.08 s	.3692	14.55 s
.4421	13.75 s	.4872	13.75 s	.3274	14.08 s	.3786	14.49 s
.4432	13.76 s	.4884	13.74 s	.3291	14.12 s	.3818	14.51 s
.4444	13.74 s	.4895	13.72 s	.3308	14.07 s	.3849	14.49 s
.4455	13.76 s	.4907	13.72 s	.3324	14.08 s	.3880	14.49 s
.4467	13.76 s	.4918	13.72 s	.3341	14.11 s	.3912	14.56 s

Table 11. Continued.

JD*	I_C	JD*	I_C	JD*	I_C	JD*	I_C
19.3943	14.47 s	19.4791	14.51 s	19.5638	14.50 s	23.4154	14.90 s
.3975	14.47 s	.4822	14.53 s	.5670	14.55 s	.4181	14.87 s
.4006	14.47 s	.4854	14.53 s	.5701	14.50 s	.4209	15.07 s
.4037	14.54 s	.4885	14.57 s	.5732	14.51 s	.4264	14.91 s
.4069	14.53 s	.4916	14.53 s	.5764	14.49 s	.4319	15.13 s
.4100	14.48 s	.4948	14.51 s	.5795	14.50 s	.4347	15.02 s
.4132	14.54 s	.4979	14.56 s	.5826	14.56 s	.4374	14.84 s
.4163	14.58 s	.5010	14.51 s	.5858	14.45 s	.4402	15.11 s
.4195	14.52 s	.5042	14.52 s	.5889	14.51 s	.4429	14.87 s
.4226	14.47 s	.5073	14.48 s	.5921	14.45 s	28.4500	15.22 s
.4257	14.51 s	.5105	14.51 s	.5952	14.57 s	.4629	15.24 s
.4289	14.51 s	.5136	14.50 s	.5983	14.49 s	45.5033	17.79 s
.4320	14.54 s	.5167	14.50 s	.6015	14.54 s	.5162	17.76 s
.4351	14.58 s	.5199	14.52 s	.6046	14.57 s	.5291	17.91 s
.4383	14.50 s	.5230	14.52 s	.6077	14.59 s	.5421	17.88 s
.4414	14.54 s	.5261	14.50 s	.6109	14.52 s	.5550	17.96 s
.4446	14.52 s	.5293	14.48 s	.6140	14.56 s	.5679	18.19 s
.4477	14.51 s	.5324	14.54 s	.6172	14.52 s	.5809	17.98 s
.4508	14.47 s	.5356	14.53 s	.6203	14.51 s	.5938	17.66 s
.4540	14.49 s	.5387	14.55 s	.6266	14.54 s	.6068	18.36 s
.4571	14.50 s	.5418	14.55 s	.6297	14.56 s	.6197	17.50 s
.4603	14.48 s	.5450	14.53 s	23.2698	14.67 s	.6326	17.68 s
.4634	14.54 s	.5481	14.52 s	.2745	14.85 s	.6456	18.19 s
.4665	14.53 s	.5513	14.54 s	.2775	14.72 s	.6553	17.61 s
.4697	14.50 s	.5544	14.54 s	.2807	14.72 s		
.4728	14.52 s	.5575	14.55 s	.4091	14.91 s		
.4759	14.48 s	.5607	14.53 s	.4124	15.04 s		

References

Andronov, I. L., Yushchenko, A. V., Niarchos, P. G., Gazeas, K.: 2001, *Odessa Astron. Publ.* **14**, 17A

Antipin, S. V., Samus, N. N., Kroll, P.: 2004, *Inf. Bull. Variable Stars* **5544**, 1

Araujo-Betancor, S., Gansicke, B. T., Hagen, H.-J., Marsh, T. R., Harlaftis, E. T., Thorstensen, J., Fried, R. E., Schmeer, P., Engels, D.: 2005, *Astron. Astrophys.* **430**, 629

Bisikalo, D. V., Boyarchuk, A. A., Kaygorodov, P. V., Kuznetsov, O. A., Matsuda, T.: 2005, *AIP Conf. Proc.* **797**, 295

Burleigh, M. R., Pye, J. P., Poulton, S. W., Sohl, K. B., Wheatley, P. J., Wynn, G. A.: 2001, *Mon. Not. R. Astron. Soc.* **325**, 1458

Challis, P., Kirshner, R. P., Garnavich, P.: 2008, *IAU Circ.* **8971**, 3

Chochol, D., Katysheva, N. A., Shugarov, S. Yu., Volkov, I. M.: 2009, *Contrib. Astron. Obs. Skalnaté Pleso* **39**, 43

Drake, A. J., Djorgovski, S. G., Mahabal, A., Beshore, E., Larson, S., Graham, M. J., Williams, R., Christensen, E., Catelan, M., Boattini, A., Gibbs, A., Hill, R., Kowalski, R.: 2009, *Astrophys. J.* **696**, 870

Galkina, M. P., Shugarov, S. Y.: 1985, *Perem. Zvezdy, Byull.* **22**, 225

Golovin, A., Price, A, Templeton, M., Cook, L., Crawford, T., Henden, A., James, R., Koppelman, M., Nelson, P. R., Oksanen, A., Pavlenko, E., Pickard, R., Quinn, N., Starkey, D. R.: 2005, *Inf. Bull. Variable Stars* **5611**, 1

Hiroi, K., Moritani, Y., Nogami, D., Imada, A., Hashimoto, O., Ueda, Y., Soejima, Y., Kinugasa, K., Honda, S., Narusawa, S., Sakamoto, M., Iizuka, R., Matsuda, K., Naito, H., Iijima, T., Fujii, M.: 2009, *Publications of the Astronomical Society of Japan* **61**, 697

Imada, A., Monard, L. A. G. B.: 2006, *Publications of the Astronomical Society of Japan* **58**, L19

Imada, A., Kubota, K., Kato, T., Nogami, D., Maehara, H., Nakajima, K., Uemura, M., Ishioka, R.: 2006,, *Publications of the Astronomical Society of Japan* **58**, L23

Ishioka, R., Kato, T., Uemura, M., Iwamatsu, H., Matsumoto, K., Stubbings, R., Mennickent, R., Billings, G. W., Kiyota, S., Masi, G., Pietz, J., Novak, R., Martin, B. E., Oksanen, A., Moilanen, M., Torii, K., Kimugasa, K., Kawakita, H.: 2001, *Publications of the Astronomical Society of Japan* **53**, 905

Ishioka, R., Uemura, M., Matsumoto, K., Ohashi, H., Kato, T., Masi, G., Novak, R., Pietz, J., Martin, B., Starkey, D., Kiyota, S., Oksanen, A., Moilanen, M., Martin B., Starkey D., Kiyota S., Oksanen, A., Moilanen, M., Cook, L., Kral, L., Hynek, T., Kolasa, M., Vanmunster, T., Richmond, M. Kern, J., Davis, S., Crabtree, D., Beaulieu, K., Davis, T. Aggleton, M., Gazeas, K., Niarchos, P., Yushchenko, A., Mallia, F., Fiaschi, M., Good, G. A., Boyd, D., Sano, Y., Morikawa, K., Moriyama, M., Mennickent, R., Arenas, J Ohshima, T., Watanabe, T.: 2002, *Astron. Astrophys.* **381**, L41

Kaigorodov, P. V., Bisikalo, D. V., Kuznetsov, O. A., Boyarchuk, A. A.: 2006, *Astronomy Reports* **50**, 537

Kato, T.: 1995, *Inf. Bull. Variable Stars* **4152**, 1

Kato, T., Nogami, D., Baba, H., Matsumoto, K.: 1998, *ASP Conf. Ser.* **137**, 9

Kato, T., Matsumoto, K., Stubbings, R.: 1999, *Inf. Bull. Variable Stars* **4760**, 1

Kato, T., Nogami, D., Lockley, J. J., Somers, M.: 2001a, *Inf. Bull. Variable Stars* **5116**, 1

Kato, T., Sekine, Y., Hirata, R.: 2001b, *Publications of the Astronomical Society of Japan* **53**, 1191

Kato, T., Uemura, M., Matsumoto, K., Kinnunen, T., Garradd, G., Masi, G., Yamaoka, H.: 2002, *Publications of the Astronomical Society of Japan* **54**, 999

Kato, T., Nogami, D., Matsumoto, K., Baba, H.: 2004, *Publications of the Astronomical Society of Japan* **56**, S109

Kato, T., Maehara, H., Monard, B.: 2008, *Publications of the Astronomical Society of Japan* **60**, L23

Kato, T., Imada, A., Uemura, M. et al.: 2009a, *Publications of the Astronomical Society of Japan* **61**, S395

Kato, T., Pavlenko, E. P., Maehara, H., Nakajima, K., Andreev, M., Shugarov, S. Y.,

de Ponthiere, P., Brady S., Klingenberg, G., Shears, J., Imada, A., Yanagisawa, K.: 2009b, *Publications of the Astronomical Society of Japan* **61**, 601
Katysheva, N. A., Shugarov, S. Yu.: 2009, *JOP Conf. Ser.* **172**, 012044
Kornilov, V. G., Volkov, I. M., Zakharov, A. I., Kozyreva, V. S., Kornilova, L. N., Krutyakov, A. N., Krylov, A. V., Kusakin, A. V., Leont'ev, S. E., Mironov, A. V., Moshkalev, V. G., Pogrosheva, T. M., Sementsov, V. N., Khaliullin, Kh. F.: 1991, *WBVR Catalog of bright northern stars*, Moscow University, Moscow
URL: Korotkiy, S., 2008, `http://www.astroalert.su/2008/09/01/nova-and`
Kurochkin, N. E.: 1984, *Astron. Tsirk.* **1325**, 5
Lin, D. N. C., Papaloizou, J.: 1979, *Mon. Not. R. Astron. Soc.* **186**, 799
Liu, W, Li, Z. Y., Hu, J. Y.: 1997, *Astrophys. Space Sci.* **257**, 183
Matsui, R., Uemura, M., Arai, A., Sasada, A., Ohsugi, T., Yamashita, T., Kawabata, K., Fukazawa, Y., Mizuno, T., Katagiri, H., Takahashi, H., Sato, S., Kino, M., Yoshida, M., Shimizu, Y., Nagayama, S., Yanagisawa, K., Toda, H., Okita, K., Kawai, N.: 2009, *Publications of the Astronomical Society of Japan* **61**, 1081
Mennickent, R. E., Tappert, C., Gallardo, R., Duerbeck, H. W., Augusteijn, T.: 2002, *Astron. Astrophys.* **395**, 557
Mickaelian, A. M., Gigoyan, K. S.: 2006, *Astron. Astrophys.* **455**, 765
Nogami, D., Kato, T., Baba, H., Matsumoto, K., Arimoto, J., Tanabe, K., Ishikawa, K.: 1997, *Astrophys. J.* **490**, 840
Nogami, D., Hiroi, K., Suzuki, Y., Moritani, Y., Soejima, Y., Imada, A., Hashimoto, O., Kinugasa, K., Honda, S., Ayani, K., Narusawa, S., Naito, H., Sakamoto, M., Iijima, T., Fujii, M., Narita, N.: 2009, *ASP Conf. Ser.* **404**, 52
Novak, R., Vanmunster, T., Jensen, L. T., Nogami D.: 2001, *Inf. Bull. Variable Stars* **5108**, 1
Osaki, Y.: 1989, *Publications of the Astronomical Society of Japan* **41**, 1005
Osaki, Y., Meyer, F.: 2002, *Astron. Astrophys.* **383**, 574
Patterson, J., Augusteijn, T., Harvey, D. A., Skillman, D. R., Abbott, T. M. C., Thorstensen, J.: 1996, *Publ. Astron. Soc. Pac.* **108**, 748
Patterson, J., Warner, B.: 1998a, *Publ. Astron. Soc. Pac.* **110**, 1026
Patterson, J., Kemp, J., Skillman, D. R. Harvey, D. A., Shafter, A. W., Vanmunster, T., Jensen, L., Fried, R., Kiyota, S., Thorstensen, J. R., Taylor, C. J.: 1998b, *Publ. Astron. Soc. Pac.* **110**, 1290
Patterson, J., Masi, G., Richmond, M. W., Martin, B., Beshore, E., Skillman, D. R., Kemp, J., Vanmunster, T., Rea, R., Allen, W., Davis, S., Davis, T., Henden, A. A., Starkey, D., Foote, J., Oksanen, A., Cook, L. M., Fried, R. E., Husar, D., Novak, R., Campbell, T., Robertson, J., Krajci, T., Pavlenko, E., Mirabal, N., Niarchos, P. G., Brettman, O., Walker, S.: 2002, *Publ. Astron. Soc. Pac.* **114**, 721
Patterson, J., Thorstensen, J. R., Armstrong, E., Henden, A. A., Hynes, R. I.: 2005, *Publ. Astron. Soc. Pac.* **117**, 922
Pavlenko, E. P., Shugarov, S. Yu., Katysheva, N. A.: 2000, *Astrophysics* **43**, 419
Pavlenko, E. P.: 2007, *Odessa Astron. Publ.* **20**, 168
Pavlenko, E., Shugarov, S., Katysheva, N., Nogami, D., Nakajima, K., Maehara, H., Andreev, M., Shimansky, V., Zubareva, A., Babina, Ju., Borisov, N., Golovin, A., Baklanov, A., Baklanova, D., Berezovsky, K., Kroll, P.: 2007, *ASP Conf. Ser.* **372**, 511
Pavlov, M. V., Shugarov, S. Yu.: 1985, *Astron. Tsirk.* **1373**, 8

Richter, G. A.: 1986, *Inf. Bull. Variable Stars* **2971**, 1
Rogoziecki, P., Schwarzenberg-Czerny, A.: 2001, *Mon. Not. R. Astron. Soc.* **323**, 850
Shafter, A. W., Babar, R., Burke, A. E., Fernandez, M., Girazian, Z. R. J., Heffner, C. M., Kadakia, S., Krogsrud, D. A., Marin, E., Rawls, M. L., Rice, J. S.: 2009, *Bull. Am. Astron. Soc.* **41**, 468
Shugarov, S., Volkov, I.: 2008, *IAU Circ.* **9873**, 3
Smak, J.: 2009, *Acta Astron.* **59**, 121
Smith, A. J., Haswell, C. A., Murray, J. R., Truss, M. R., Foulkes, S. B.: 2007, *Mon. Not. R. Astron. Soc.* **378**, 785
Soejima, Y., Nogami, D., Kato, T., Uemura, M., Imada, A., Sugiyasu, K., Maehara, H., Torii, K., Tanabe, K., Oksanen, A., Nakajima K., Novak, R., Masi, G., Hynek, T., Martin, B., Buczynski, D., Pavlenko, E. P., Shugarov, S. Yu., Cook L. M.: 2009, *Publications of the Astronomical Society of Japan* **61**, 659
Sterken, C., Vogt, N., Schreiber, M. R., Uemura, M., Tuvikene, T.: 2007, *Astron. Astrophys.* **463**, 1053
Uemura, M., Arai, A., Krajci, T., Pavlenko, E., Shugarov, S. Yu., Katysheva, N. A., Goranskij, V. P., Maehara, H., Imada, A., Kato, T., Nogami, D., Nakajima, K., Ohsug,i T., Yamashita T., Kawabata, K. S., Nagae, O., Chiyonobu, S., Fukazawa, Y., Mizuno, T., Katagiri, H., Takahashi, H., Ueda, A., Hayash, T., Okita, K., Yoshida, M., Yanagisawa, K., Sato, S., Kino, M., Sadakane, K.: 2008, *Publications of the Astronomical Society of Japan* **60**, 227
Vanmunster, T., Krajci, T., Monard, M. Cook, L. M., de Ponthiere, P., Boyd, D., Crawford, T. R., Armstrong, M. J., Rodriguez, D.: 2006, *The Society for Astronomical Sciences* **25**, 77
Wenzel, W.: 1991, *Inf. Bull. Variable Stars* **3689**, 1
Whitehurst, R.: 1988, *Mon. Not. R. Astron. Soc.* **232**, 35
Yamaoka, H., Itagaki, K., Korotkiy, S., Samus, N. N.: 2008, *IAU Circ.* **8971**, 2
Zharikov, S. V., Tovmassian, G. H., Neustroev, V. V.,Michel R., Zurita, C., Echevarria, J., Bikmaev, I. F., Pavlenko, E. P., Jeon, Y.-B., Valyavin, G. G., Aviles, A.: 2008, *Astron. Astrophys.* **486**, 505