NSV 6177: FIRST ELEMENTS AND LIGHTCURVE

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NSV 6177 = SVS 1257 was discovered by Kurochkin (1959) in an investigation of new variables on 9 photographic plates of the field SA 57, centered at $13^h04^m+30°$ (1900). In this search 10 new variables were found with SVS 1257 among them. It was classified as a possibly RR Lyrae type variable with a brightness range between $12\overset{m}{.}3$ and $13\overset{m}{.}0$. An identification chart was given but no light-curve. Since elements were not published, SVS 1257 is listed as NSV 6177 in the New Catalogue of Suspected Variable Stars (Kholopov et al. 1982).

Almost 40 years later we put NSV 6177 on our observing program. The CCD observations were made with SBIG ST6 cameras without filters, attached to a 32-cm Ritchey-Chretien telescope with f = 1740 mm (W. Moschner) and a 12-cm astrograph with f = 509 mm (P. Frank). The integration time was 45 seconds at the RC-telescope and 90 seconds at the astrograph. Our CCD observations cover 44 days.

The shape of the light-curve reveals NSV 6177 surprisingly as variable of β Lyrae type (Figure 2). All minima times were calculated with the Kwee – van Woerden method (Kwee, van Woerden 1956). In the instrumental system of our CCD observations the depth of the primary and the secondary minima were found to be $0\overset{m}{.}48$ and $0\overset{m}{.}28$, respectively.

Based on our conclusion that NSV 6177 is of β Lyrae type, we reinterpreted Kurochkin's individual estimations in the following way: Each observation fainter than $12\overset{m}{.}85$ was considered to be a minimum. Weighting CCD minima 10 times higher than Kurochkin's photographic data, we obtained the following ephemeris:

$$\text{Min I} = \text{HJD}\,2450186.398 + 0\overset{d}{.}4068974 \times \text{E} \tag{1}$$
$$\pm 1 \qquad\qquad \pm 1$$

The resulting O−C diagram (Figure 3) shows a large scattering of the photographic data. This is caused by the interpretation of dim magnitudes as minima (the related moments may not be the exact minima times) as well as the rather long exposure times of the photographic plates (not given by Kurochkin, but we assume some 60 minutes) compared to the short period of the star.
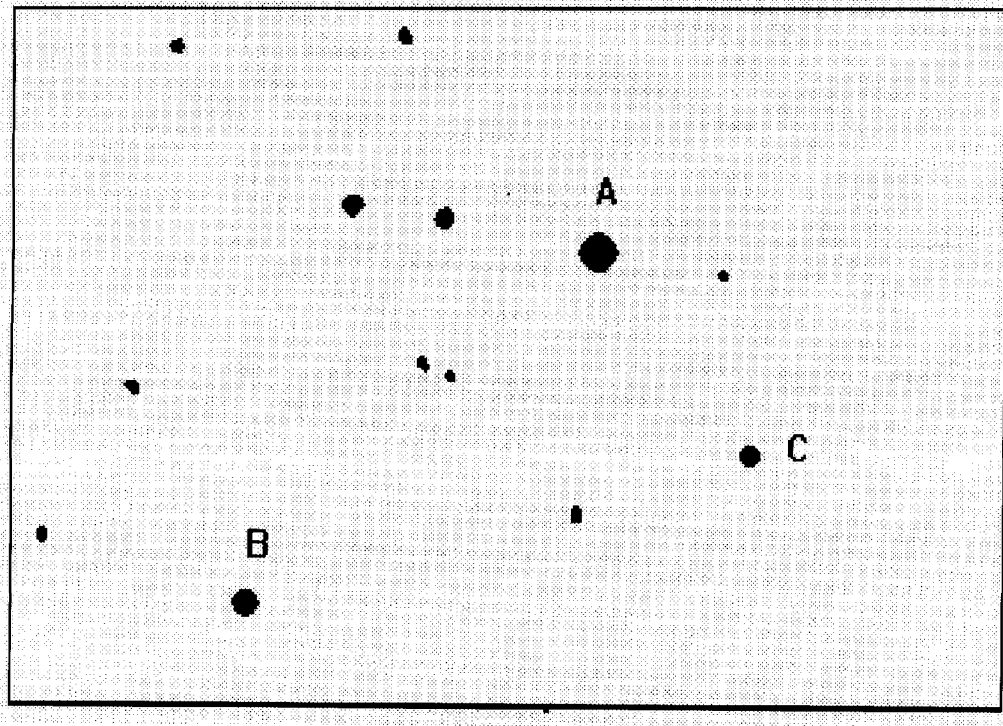
Figure 1. Identification chart for NSV 6177 (A), comparison (B) and check star (C). The size of the frame is 12×16 arcmin, North is on top.
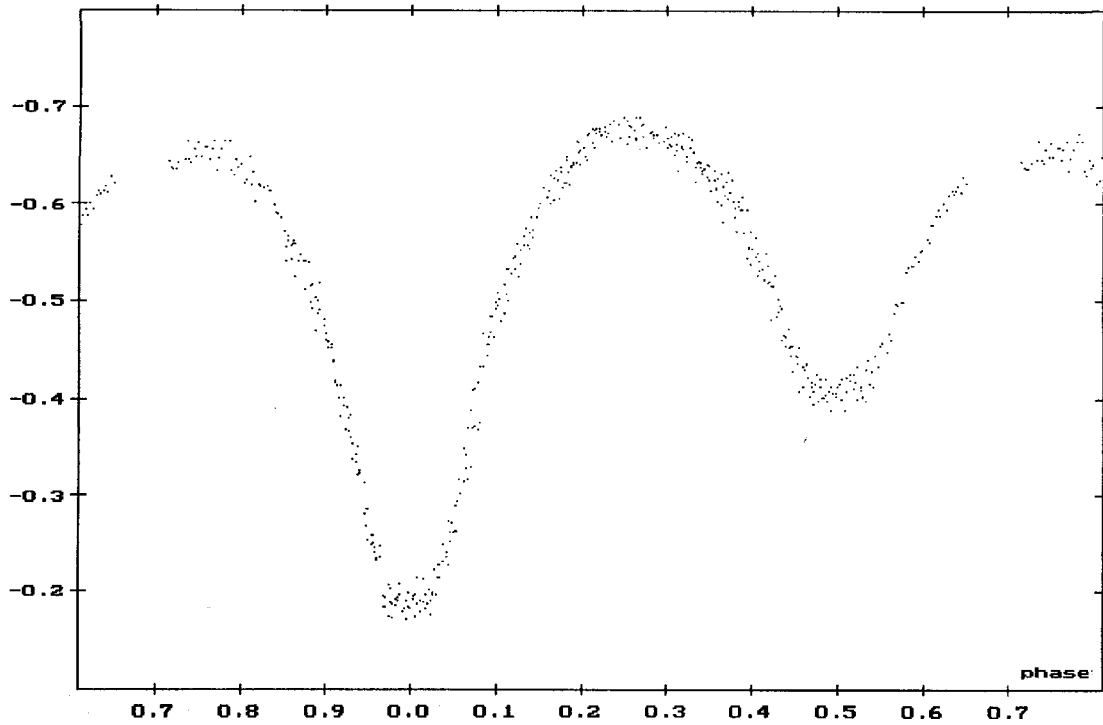

Figure 2. Differential light curve of NSV 6177 computed with respect to the first elements

Table 1. Observed times of minima for NSV 6177, epochs and residuals computed with respect to the ephemeris derived in this paper

N	JD hel 2400000+	W	T*	Epoch	O−C	Observer
1	18062.431	1	P	−78949.5	−0.028	[1]
2	18446.394	1	P	−78005.0	+0.028	[1]
3	19116.370	1	P	−76359.5	+0.047	[1]
4	19122.387	1	P	−76344.5	−0.039	[1]
5	19153.377	1	P	−76268.5	+0.026	[1]
6	33034.425	1	P	−42153.0	−0.027	[1]
7	34116.361	1	P	−39494.0	−0.031	[1]
8	34117.362	1	P	−39492.5	−0.047	[1]
9	34118.411	1	P	−39489.0	−0.016	[1]
10	34126.324	1	P	−39470.5	−0.037	[1]
11	34127.361	1	P	−39467.0	−0.017	[1]
12	34130.377	1	P	−39460.5	−0.053	[1]
13	34420.542	1	P	−38747.5	−0.006	[1]
14	34472.405	1	P	−38619.0	−0.022	[1]
15	34477.334	1	P	−38607.0	+0.024	[1]
16	34485.446	1	P	−38587.0	−0.002	[1]
17	34826420	1	P	−37749.0	−0.008	[1]
18	34834552	1	P	−37729.0	−0.014	[1]
19	35219486	1	P	−36783.0	−0.005	[1]
20	35246368	1	P	−36717.0	+0.022	[1]
21	35540541	1	P	−35994.0	+0.008	[1]
22	35547439	1	P	−35977.0	−0.011	[1]
23	35550.290	1	P	−35970.0	−0.009	[1]
24	35598.307	1	P	−35852.0	−0.005	[1]
25	35907.563	1	P	−35092.0	+0.009	[1]
26	35907.394	1	P	−35093.5	+0.043	[1]
27	35923.419	1	P	−35053.0	−0.004	[1]
28	35929.544	1	P	−35038.0	+0.017	[1]
29	35930.340	1	P	−35036.0	−0.001	[1]
30	35930.354	1	P	−35036.0	+0.013	[1]
31	35932.382	1	P	−35031.0	+0.007	[1]
32	35933.408	1	P	−35029.5	+0.016	[1]
33	35954.350	1	P	−34977.0	+0.002	[1]
34	35956.379	1	P	−34972.0	−0.003	[1]
35	35956.401	1	P	−34972.0	+0.019	[1]
36	50157.5094	10	E	−71.0	+0.0011	[2]
37	50163.4073	10	E	−57.5	−0.0010	[2]
38	50180.4990	10	E	−15.5	+0.0010	[3]
39	50186.3980	10	E	0.0	+0.0000	[3]
40	50188.4319	10	E	5.0	−0.0006	[3]
41	50189.4515	10	E	7.5	+0.0018	[3]
42	50199.4185	10	E	32.0	−0.0002	[3]
43	50201.4534	10	E	37.0	+0.0002	[3]

* E denotes CCD observed maxima, P are photographic; W – relative weight.

[1]: Kurochkin (1959),
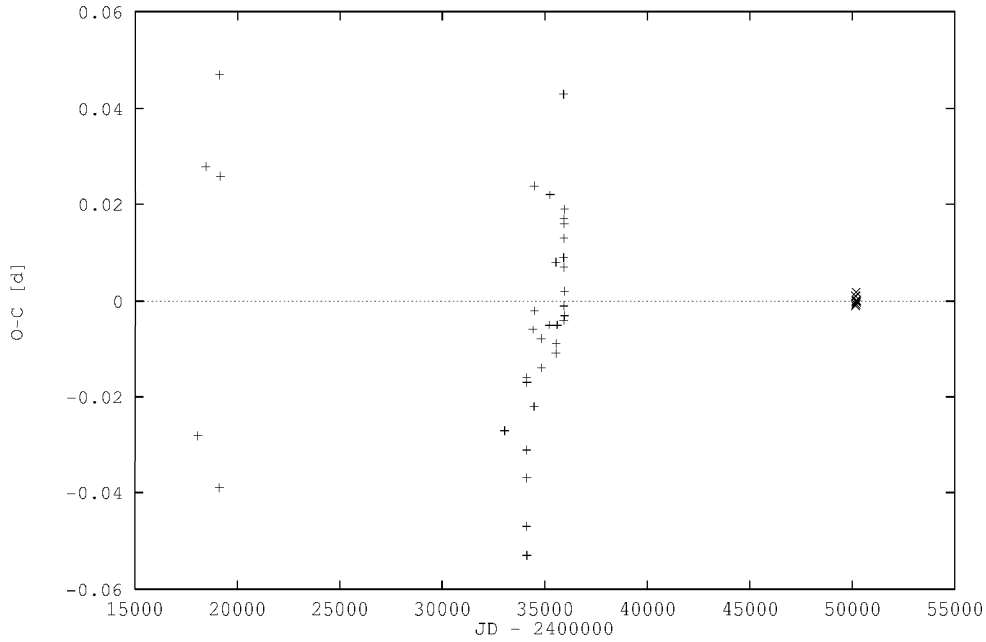[2]: P. Frank: this paper,
[3]: W. Moschner: this paper.

Figure 3. O−C diagram of NSV 6177. + – photographic minima by Kurochkin, × – CCD by the authors

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