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CF Cas = NSV 14787

During my work on *PICA project* (Precise Identification and Coordinate Adjustment of about 7000 variables) I have found that *CF Cas* is identical with *NSV 14787*.

CF Cas = 347.1931 = SVS 256 is a well known classical cepheid located in the open cluster NGC 7790. It was discovered by Beljawsky (1931) and soon received its final designation (Guthnick, Prager, 1934). From the time of its discovery the star was included in many photometric and spectroscopic researches.

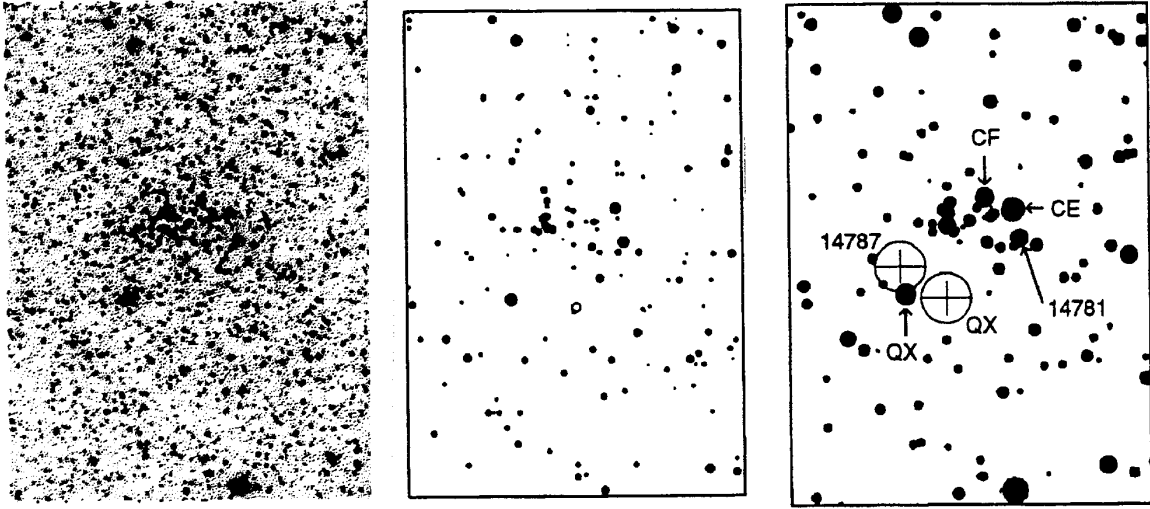
NSV 14787 is listed as star No. 750 in a catalogue of proper motions of stars in the region of open clusters NGC 7788 and NGC 7790 (Ishmukhamedov, 1966). Neither chart nor equatorial coordinates were published for this star in his paper. Later it was included in the New Catalogue of Suspected Variable Stars (Kholopov et al., 1982).

While working on field variable stars around *QX Cas* I have noticed that coordinates reported in NSV for *NSV 14787* are about 1' north of the star I have earlier identified as *QX Cas*. To find additional information, usable for correct identification, I have checked Ishmukhamedov's paper (the only one found for *NSV 14787* at all). He gives there the used procedures and also a catalogue, listing star sequence number, photographic magnitude, approximate *xy* coordinates in mm, proper motion components and a short remark. From the *xy* coordinates and magnitudes I have plotted a chart, covering field around star No. 750 (see Figure 1, in the middle). Comparison of this plot with scanned paper copy of POSS plate O-1233 (Figure 1, left) gave following results :

- star No. 692 without *var* remark was identified as *NSV 14781*.
- star No. 705 without *var* remark was identified as *CEab Cas*.
- star No. 840 with *var* remark was identified as *QX Cas*.
- star No. 750 = *NSV 14787* with *var* remark has no suitable optical counterpart at the plotted position.

From this it is clear that *NSV 14787* cannot be identical with *QX Cas*. From the comparison one can also see that the coordinates given in NSV for *NSV 14787* are erroneous. So where is this star ?

Another comparison of plot and scanned POSS shows that while star No. 750 is superfluous in it's location, one bright star (by chance variable *CF Cas*) is missing on the plot. Close look shows that plotted stars do NOT exactly match their counterparts on the sky. This can explained partly by the fact that catalogue *xy* coordinates are only approximate, having the precision stated to be 0.1 mm, but in fact a bit worse. But such errors can't help us. Therefore I have checked the whole catalogue for evident misprints – and found 13 of these (stars Nos. 87, 113, 161-165, 282, 609, 793, 847, 1055 and 1072), out of 1088 listed stars. I have found also some other misprints in the text part so I have checked the possibility there is a misprint in *xy* coordinates of stars No. 750 and I have found a solution. The printed *y* coordinate is -6.0 , while at -2.0 (and same *x* coordinate) is the



Left: Scanned POSS plate O-1233. The picture was processed after scanning to eliminate the faintest stars. Middle: Plot from catalogue of Ishmukhamedov (1966). The open circle marks the position of star No.750 on its original place. Right: Plot from GSC. Arrowed stars are CEab Cas, CF Cas, QX Cas and NSV 14781, while crossed circles mark the (bad) GCVS and NSV positions for QX Cas and NSV 14787. The area covered by all the charts is the same – about $15' \times 20'$ with north up.

Table 1. Comparative table of *original* data for NSV 14787, GSC 4281.1902, GSC 4281.1230, CF Cas and QX And. CF Cas and QX And. Data concerning NSV 14787 are from NSV, data for CF Cas and QX Cas are from GCVS, data for CF Cas (Plaut) are by Plaut (1977) and data for GSC 4281.1902 for GSC 4281.1902 and GSC 4281.1230 are from GSC. Photometric system code 1 for GSC represents the Kodak IIa-D plate with W12 filter. Coordinates printed in italics were computed from the above stated data sources.

Name	Position (B1950)		Position (J2000)		Type	Max mag	Min mag	Phot. system
	h m s	° ' "	h m s	° ' "				
NSV 14787	23 56 12	+60 54.0	<i>23 58 44</i>	<i>+61 10.7</i>	-	12.0		P
CF Cas	23 55 46	+60 56.6	<i>23 58 18</i>	<i>+61 13.3</i>	δ Cep	10.80	11.47	V
CF Cas (Plaut)	23 55 45.88	+60 56 34.2	<i>23 58 18.09</i>	<i>+61 13 15.9</i>				
GSC 4281.1902	<i>23 55 45.79</i>	<i>+60 56 34.4</i>	<i>23 58 18.00</i>	<i>+61 13 16.1</i>		11.00		1
QX Cas	23 55 58	+60 52.8	<i>23 58 30</i>	<i>+61 09.5</i>	EA/DM	10.19	10.70	V
GSC 4281.1230	<i>23 56 10.76</i>	<i>+60 52 58.3</i>	<i>23 58 43.20</i>	<i>+61 09 40.0</i>		10.00		1

bright star, having up to this moment no counterpart in catalogue. I suppose these stars are identical for these reasons :

- after correction the match with real star is quite good.
- misprints are often in the paper of Ishmukhamedov.
- star No. 750 has a *var* remark and *CF Cas* is variable.
- the photographic magnitude of star No. 750 does not contradict B magnitudes of *CF Cas*.

Summary information can be found in Table 1. Following cross-identifications are valid:

CF Cas = 347.1931 = SVS 256 = NSV 14787 = Vat ph 23^h52^m+61°No. 39660 =
GSC 4281.1902

QX Cas = SVS 969 = CSV 5816 = GSC 4281.1230

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