COMMISSION 27 OF THE I.A.U.

INFORMATION BULLETIN ON VARIABLE STARS

Nos. 401-500

1969 November – 1970 December

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NUMBER 401

Konkoly Observatory
Budapest
1969 November 10

PHOTOELECTRIC OBSERVATIONS OF EV Lac

The results of photoelectric observations of the flare star EV Lac carried out at the Crimean Astrophysical Observatory in the period of 6-26 August 1969 are given here.

The observations were obtained in the B-band with the 64 cm meniscus telescope. The time coverage is shown in Table 1. The total coverage was 48^h15^m, and 15 flares were observed. Table 2 contains the flare characteristics according to (1). The light curves of the flares have the relative intensities $(I_{o+f}-I_o)/I_o$ as ordinates and Universal Time as abscissae.

Fig.1

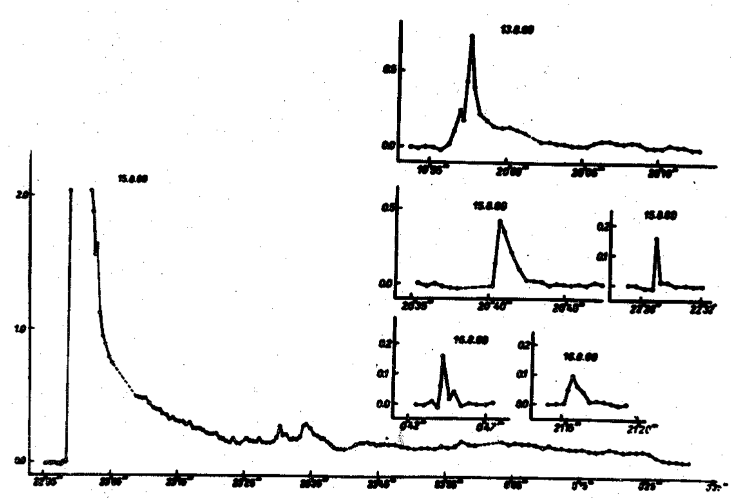

Table 1.

Date 1969 August	Coverage U.T.
6	22.18-34, 22.36-55, 22.57-23.15
8	20.24-21.36, 21.38-59, 22.01-09, 23.12-37
9	00.07-14, 00.16-1.10, 01.12-14, 21.17-25, 21.32-44, 21.47-23.20, 23.43-23.51, 23.56-24.00
10	00.00-00.06, 00.07-00.32, 00.33-00.52, 00.53-1.10, 1.12-17, 19.37-40, 19.42-57, 19.59-20.02,
11	18.27-29, 18.31-49, 18.51-55, 18.58-19.04, 19.05-07, 19.09-13, 19.23-42, 19.44-52, 19.55-20.11, 20.13-33, 20.34-55, 20.57-21.18, 21.20-27, 21.28-41, 21.43-22.02, 22.03-20, 22.27-31, 22.55-59,
12	19.39-57, 19.58-20.16, 20.17-39, 20.41-21.06, 21.07-16, 21.55-58, 22.38-47, 22.48-11, 23.15-35,
13	00.03-23, 00.25-47, 00.49-01.01, 01.03-10, 18.50-53, 18.55-19.13, 19.14-16, 19.18-40, 19.41-20.31, 20.33-53, 21.01-22, 21.24-46, 21.47-22.16, 22.18-56, 23.06-16, 23.48-60,
14	00.00-10, 00.11-32, 00.33-54, 00.56-01.05, 01.06-15, 21.20-25, 21.27-49, 22.22-29, 22.30-40,
15	18.19-26, 18.27-49, 18.50-58, 20.33-38, 20.40-60, 21.07-30, 21.31-44, 21.45-52, 21.54-22.16, 22.17-36, 22.38-59, 23.02-05, 23.08-41, 23.42-00.02,
16	00.04-33, 00.39-01.00, 01.10-13, 01.15-22, 01.24-30, *(19.34-46, 19.47-20.17, 20.21-24, 20.26-28, 20.43-49, 20.50-21.11, 21.12-21, 21.23-33, 21.35-55, 21.56-22.19, 22.20-25, 22.55-59)
17	*(21.19-21, 21.22-44, 21.45-22.12, 22.30-48, 22.49-23.14, 23.16-17, 23.18-38, 23.39-00.06)
18	00.10-31, 00.33-38, 00.40-56, 01.00-03, 01.04-15, 01.16-22, 01.23-29, 01.31-36, 21.02-07, 21.10-15, 21.22-29, 21.30-33, 21.35-51, 21.54-58, 22.00-06,
20	21.18-23, 21.24-45, 21.46-22.08, 22.15-21,
21	18.13-18, 18.19-26, 18.28-50, 18.55-19.17, 19.18-39, 19.40-20.01, 20.02-25, 20.27-47, 20.48-51, 21.12-21, 21.22-46, 21.47-22.08, 22.09-32, 22.34-37, 22.45-59, 23.00-22, 23.23-46, 23.47-56, 23.58-00.09,
22	00.10-32, 00.34-49, 00.55-58, 00.59-01.09, 01.14-25, 01.26-35,

*Cirrus

Date 1969 August	Coverage U.T. (cont.)
23	18.11-13, 18.20-30, 18.37-58, 19.00-22, 19.23-32, 21.55-22.01, 22.02-25, 22.52-23.14, 23.15-36, 23.37-58
24	00.00-20, 00.23-44, 00.46-01.09, 01.11-23, 01.27-32, 01.33-40, 18.28-48, 18.49-10, 19.12-45, 19.52-20.09, 20.11-26, 20.28-42, 20.45-21.08, 21.10-30, 21.32-52, 21.53-22.15, 22.18-33, 22.34-51, 22.52-23.13, 23.17-30, 23.32-55, 23.57-00.18,
25	00.19-28, 00.29-40, 01.30-37, 01.39-43, 21.23-22.34, 22.37-52, 22.54-59, 23.35-56, 23.57-00.11,
26	00,13-28, 00.30-38, 00.40-1.00

Fig.2

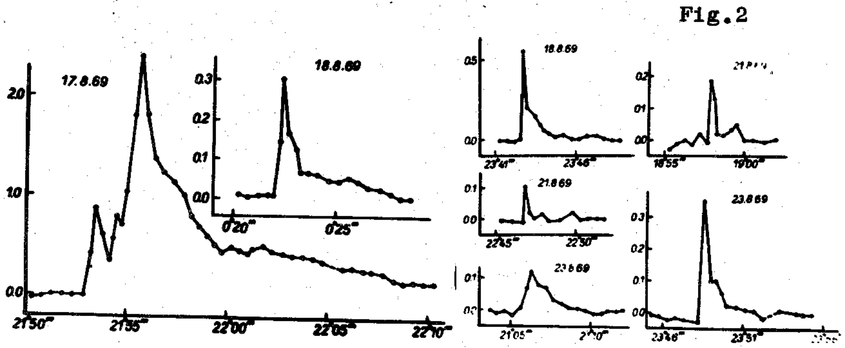

Fig.3

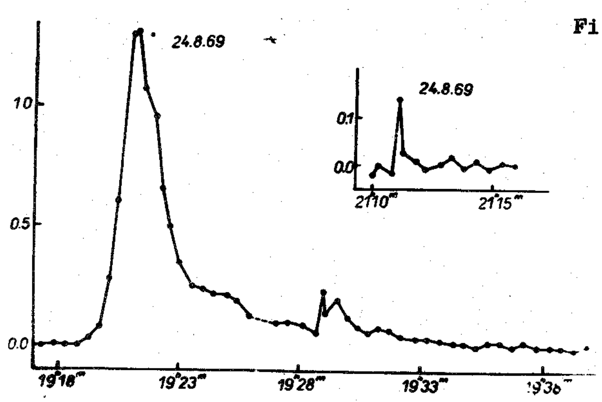

Table 2.

Date and U.T. of flare maximum 1969 August	Duration before maximum t_b	Duration after maximum t_a	m	m_{lim}	Integr. int. min.	Air mass
13 $19^h57^m.6$	$1^m.6$	$12^m.4$	0.60	0.03	1.34	1.42
15 20 40.7	0.4	1.8	0.38	0.03	0.46	1.27
22 29.0	0.2	1.0	0.12	0.04	0.05	1.05
23 00.0*	<3.0	>26.0	>1.21	0.02	>25.8	1.03
16 00 44.1	0.2	1.1	0.16	0.02	0.07	1.01
21 15.8**	0.5	2.0	0.10	0.02	0.09	1.09
17 21 55.7**	2.8	>14.5	1.27	0.07	>10.20	1.09
18 00 22.4	0.5	5.5	0.28	0.03	0.32	1.00
21 43.0	0.2	3.0	0.48	0.03	0.33	1.02
21 18 57.9	0.2	2.1	0.19	0.02	0.14	1.30
22 47.0	0.2	1.2	0.11	0.02	0.03	1.00
23 21 06.0	0.7	2.4	0.12	0.02	0.17	1.12
23 48.0	0.3	2.9	0.32	0.02	0.24	1.00
24 19 20.0	2.3	13.8	0.91	0.02	3.65	1.10
21 11.0	0.2	0.9	0.14	0.02	0.04	1.04

* Record out of scale
** Cirrus

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(1) A.D. Andrews, P.F.Chugainov, R.E.Gershberg, V.S.Oskanjan
I.B.V.S. No.326, 1969.

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Budapest
1969 November 11

V-OBSERVATIONS AND LIGHT ELEMENTS OF OMEGA Cen V78

V photographic observations (Kodak 103aD + Shott filter) of the eclipsing binary V78 in Omega Centauri were obtained at the Bosque Alegre Observatory with the 1.54 m reflecting telescope. Magnitudes were measured with a Zeiss iris-diaphragm photometer. They are in Woolley's system (Woolley, 1963) which is based on Eggen's photoelectric sequence (Eggen, 1963).

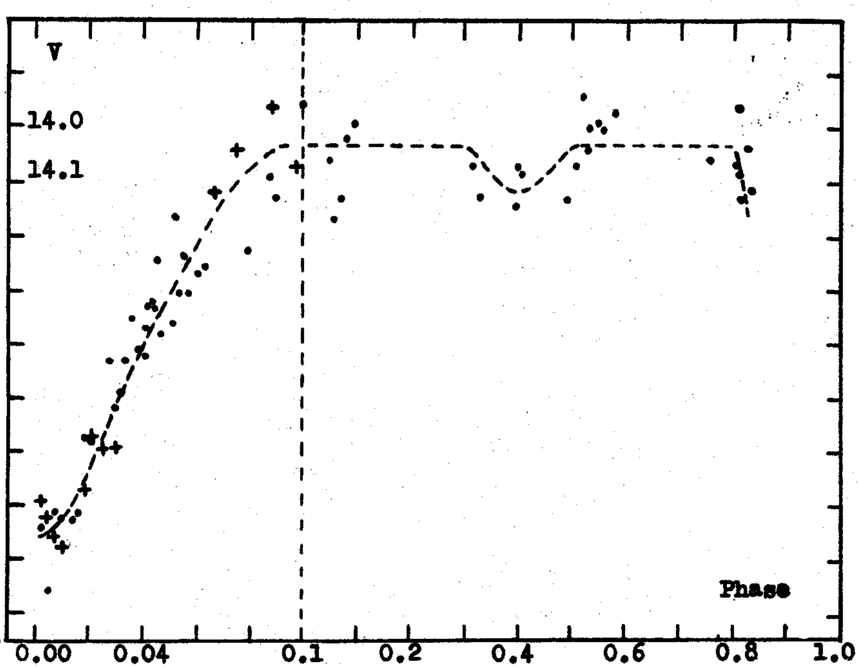

Figure 1. V-Observations of V78 in Omega Cen

Three times of minimum were obtained. They were derived from comparisons of individual observations at primary minimum with a mean light curve. Older Bpg minima (Sistero, 1968) and the three recently obtained are as follows:

	Minima	E	(O-C)
JD hel.	2426470.3099 ± 0.0067 m.e.	-6386	+0.009
	2427895.4165 ± 0.0036	-5166	-0.001
	2427943.3090 ± 0.0015	-5125	-0.002
	2427970.1714 ± 0.0037	-5102	-0.007
	2440055.6397 ± 0.0032	+5244	-0.001
	2440299.7790 ± 0.0099	+5453	-0.001
	2440395.5655 ± 0.0068	+5535	-0.001
	2440409.5882 ± 0.0077	+5547	+0.004

A least squares solution gives the light elements:

$$\text{Min} = \text{JD hel. } \underset{\pm .00}{2433929.9724} + \underset{\pm .000000}{1\overset{d}{.}16812901} \cdot E \quad \text{p.e.}$$

The V-light curve (Fig.1) is similar to the B already obtained; though, the V observations are not sufficient, especially at maximum, as to derive orbital elements. As Omega Cen is kept under observation we hope to cover the entire cycle by the next observing season.

1969 November 3

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Reference:

Eggen,O.,1963, unpublished, results given in Woolley, 1963.
Sistero,R.F., 1968, I.B.V.S. Comm.27 I.A.U. No 316.
Woolley, R.v.d.R., 1963, Roy.Obs.Ann., No 2.

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INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 403

Konkoly Observatory
Budapest
1969 November 12

OBSERVATIONS OF EV Lac DURING THE INTERNATIONAL CAMPAIGN SEPTEMBER 4-19, 1969

The results obtained from our photoelectric observations of EV Lac carried out at the Catania Observatory stellar station in Serra La Nave during the international patrol planned for the period September 4-19, are given below.

A quasi-cassegrain reflector of 61 cm aperture, a photometer employing an EMI 6256 S photomultiplier (spectral response S 13) and a BG 12 (1 mm thick) plus a GG13 (2 mm thick) Schott filters were used. The resulting effective wave length was 4300 A.

The total light of EV Lac plus its optical companion was measured. In order to eliminate the light contribution of the optical companion, the observed intensities were corrected with the following equation: $I_{EV\ Lac} = 0.70\ I_{observed}$, deduced according to the B magnitudes of the two above mentioned stars given by Andrews (1969).

The obtained data are given in Table 1 and 2. No transformations to the standard UBV system were applied, therefore the b lights quoted in the Tables are those of our natural system. The graphs show the light curves of the observed flares.

In the least column the sky condition is given by the following standards:

0 = very clear   2 = with some thin layers
1 = clear   3 = extended thin stratus

The following people have collaborated in the observations: A.Cali, R.Barbagallo and V.Stancanelli.

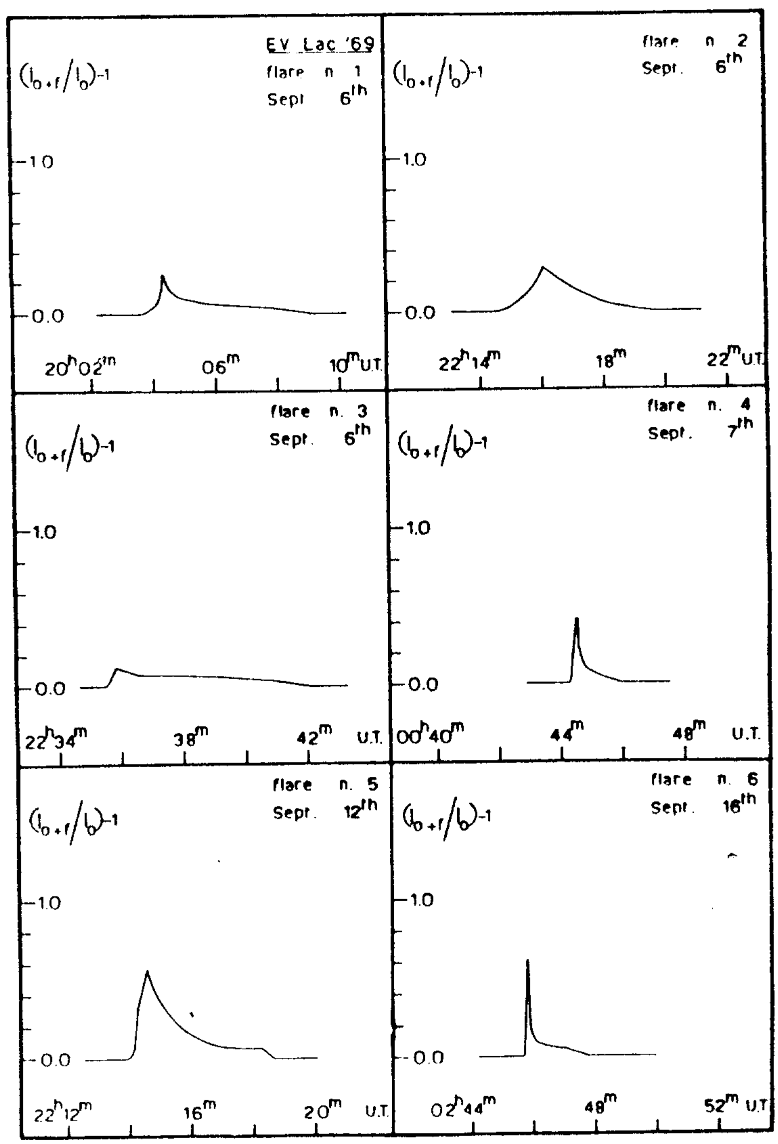
Table 1

Intervals of the effective time coverage.
(Interruptions shorter than 1^m are not noted)

Sept	Coverage (U.T.)	T.C	$\overline{m_{lim}-m_o}$
04	00^h00^h-0112; 0114-0228; 0237-0308; 0311-0329.	195^m	+ 4^m10
04-05	1956-2019; 2030-2042; 2050-2056; 2102-2114; 2154-2159; 2207-2214; 2216-2220; 2223-2333; 2337-2417; 2427-2626; 2628-2710; 2712-2714;	342	4.39
05-06	1907-1913; 1950-2022; 2027-2132.	103	4.20
06-07	1901-2016; 2023-2032; 2040-2209; 2213-2243; 2317-2338; 2352-0011; 0013-0110; 0117-0302; 0306-0313.	412	4.04
07-08	2322-0014.	52	4.01
11-12	1918-1928; 1931-1951; 2016-2108; 2128-2135; 2137-2202; 0129-0134; 0136-0213; 0215-0245; 0247-0300; 0312-0325.	212	4.24
12-13	1936-2019; 2027-2109; 2137-2222; 2228-2248; 2250-2330; 0034-0101; 0113-0130; 0205-0231; 0236-0249; 0251-0301; 0306-0330.	307	4.38
15-16	1945-2029; 2036-2114; 2123-2136; 2139-2159; 2218-2301; 2308-2346; 2350-0015; 0034-0038; 0055-0134; 0137-0142; 0144-0212; 0235-0257; 0259-0331.	351	4.47
16	1910-1919; 1921-1952; 1954-1956; 2004-2046; 2056-2134; 2141-2154; 2202-2211.	144	4.63
17-18	1936-2020; 2034-2117; 2126-2213; 2216-2227; 2240-2325; 2332-0016; 0049-0100; 0130-0214; 0227-0312; 0320-0335.	349	4.67
18-19	2011-2100; 2107-2204; 2217-2302; 2313-2323; 2331-0015; 0023-0118; 0123-0207; 0214-0258; 0305-0316; 0318-0334.	375	4.91
19	1926-2012; 2025-2110; 2118-2203; 2216-2225.	145	4.08

T.C = total coverage per night;

$\overline{m_{lim} - m_o} = -2.5 \log (3\, \sigma / \bar{I}_o)$, where σ represents the standard deviation of the random noise fluctuation for a night, and $\bar{I}_o$ represents the mean intensity of the quiet star during the same night.



EV Lac '69
flare n 1
Sept 6th
$(I_{o+f}/I_o)-1$
1.0
0.0
20h02m
06m
10m U.T.
flare n 2
Sept. 6th
22h14m
18m
22m U.T.
flare n. 3
Sept. 6th
22h34m
38m
42m
U.T.
flare n. 4
Sept. 7th
00h40m
44m
48m
U.T.
flare n. 5
Sept. 12th
22h12m
16m
20m
U.T.
flare n. 6
Sept. 16th
02h44m
48m
52m U.T.

Table 2

Observed flares

No	Sep.	t_b	t_{max}	t_e	$\underset{+}{m_1-m_o}$	$\underset{+}{(m_f-m_o)_m}$	P	secz	sky
1	06	$20^h03^m.7$	$20^h04^m.3$	$20^h09^m.0$	4.10	1.46	$0^m.33$	1.3180	0
2	06	22 14.6	22 16.05	22 19.5	4.16	1.38	0.51	1.0458	1
3	06	22 35.5	22 35.8	22 42.0	4.17	2.30	0.35	1.0288	1
4	07	00 44.3	00 44.5	00 46.0	4.11	0.97	0.17	1.0294	2
5	12	22 13.9	22 14.5	22 18.6	4.72	0.65	0.80	1.0379	0
6	16	02 45.7	02 45.8	02 47.8	4.37	0.55	0.19	1.3384	1

t_b = U.T. of the beginning; t_{max} = U.T. of the maximum intensity; t_e = U.T. of the end; $m_1-m_o = -2.5 \log (3\sigma/I_o)$ where σ and I_o indicate the standard deviation of the random noise fluctuation and the mean intensity of the quiet star, near the observed flare, respectively; $(m_f-m_o)_m = -2.5 \log \left[(I_{o+f}-I_o)/I_o\right]_{max}$, were I_{o+f} is the intensity deflection due to EV Lac (I_o) plus that of flare (I_f) at maximum; $P = \int (I_{o+f}-I_o)/I_o \; dt$, integrated intensity in minutes.

Catania Astrophysical Observatory, Italy
October 25, 1969

S.CRISTALDI and M.RODONO

<u>Reference</u>

Andrews,A.D. 1969, Comm. 27 IAU,Inf.Bull.var.Stars,No.370.

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NUMBER 404

Konkoly Observatory
Budapest
1969 November 12

OBSERVATIONS OF UV Cet DURING THE INTERNATIONAL CAMPAIGN OCTOBER 3-18, 1969

The flare star UV Cet was observed at our Observatory for 11.5 hours during the last session of the international campaign organized by the Working Group on flare stars (Andrews et al., 1968). The intervals of the effective time coverage are given in Table 1. According to the recommendations to flare star observers contained in Inf.Bull.var. Stars no 326, only interruptions longer than one minute are noted. But, we should like to point out that some flares of UV Cet last about one minute or less, and so it should be more suitable to notice the interruptions of more than half a minute.

In Table 2 we give thé data referring to the nine observed flares. The integrated intensity $P=\int(I_{0+f}-I_0)/I_0\,dt$ of the flare no.2 enclosed in brackets is a minimum value because the final part of the flare was lost. The light curves of the observed flares are shown in the Figures. When the observations are missing, even for short intervals, the corresponding part of the flare light curves are drawn with a broken line.

The notations in the tables are the same as in IBVS No.403.

As is known, UV Cet is the B component of the visual binary system L 726-8. The angular distance of the two components is less than 2", therefore the total light intensity of the system (I_A+I_B) was measured.

According to the B magnitudes given by Petit (1961) in his catalogue (m_A = 14.16, m_B = 14.71) we corrected the observed intensities using the following equation:

$$I_{B(UV\ Cet)} = 0.38\ (I_A + I_B)$$

Regarding the flare activity of UV Cet (number of flare events per hour of observation) we note that it was higher during the 1968 campaign than during the 1969 campaign. On the other hand, if we consider the integrated intensity, P, as another activity indicator, the situation is reversed, as is shown in the following Table:

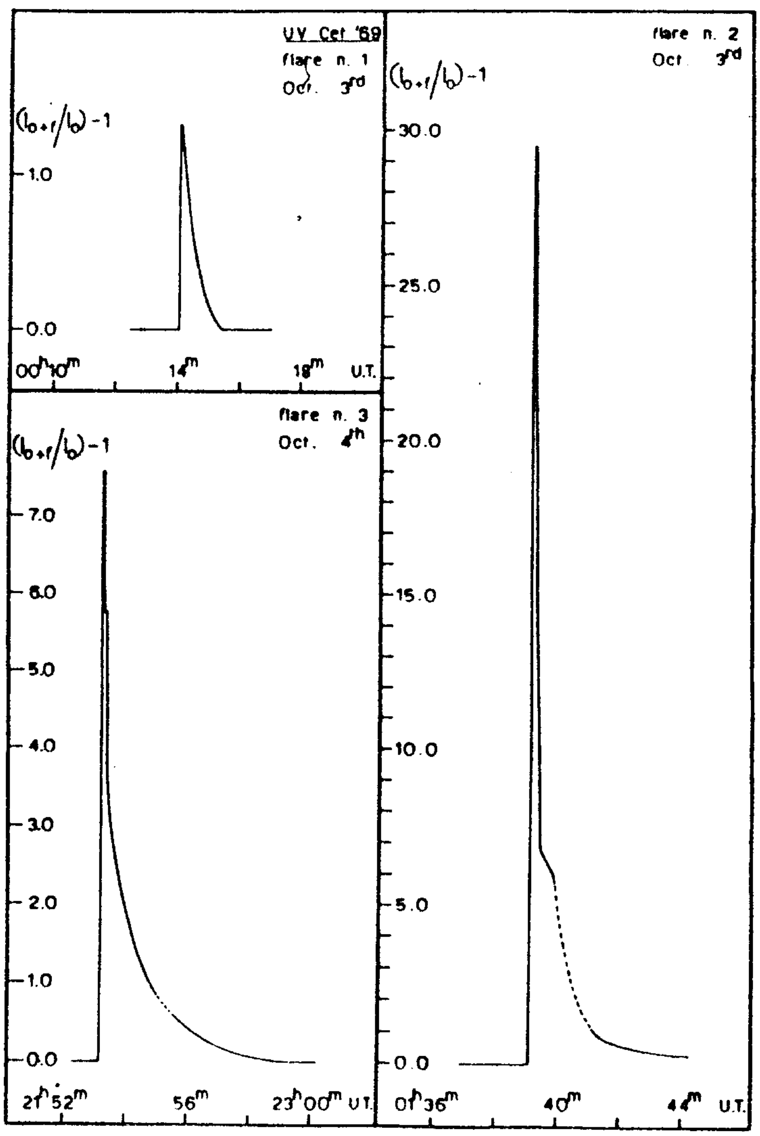
Campaign	Hours of observations	Frequency of flares per hour	Mean integr. intensity per hour
1968	51.2	1.3	$1^m.2$
1969	11.5	0.8	3.5

Mr. R.Barbagallo and Mr. V.Stancanelli have collaborated in the observations.

Table 1
Intervals of the effective time coverage
(Interruptions less than one minute are not noted)

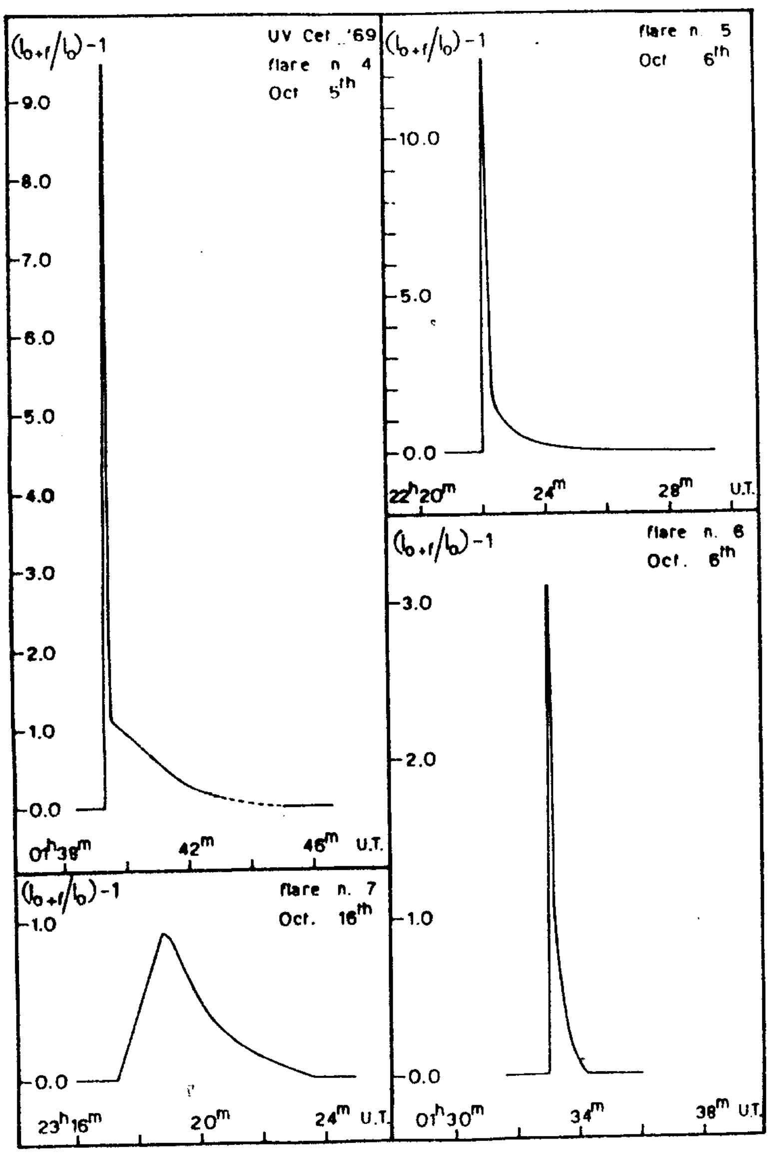
Date Oct 1969	Coverage (U.T.)	TC	$m_{lim}-m_o$
03	00^h02-0022; 0024-0049; 0051-0059; 0102-0108;		
	0123-0144;	80^m	1.9
04	2151-2205; 2208-2230; 2234-2247; 2249-2253;		
	2257-2303; 2305-2308; 2314-2317; 2319-2321;		
	2329-2338; 2352-2359;		
05	0007-0028; 0029-0035; 0108-0130; 0133-0143;		
	0145-0155; 0156-0217; 0228-0233; 0235-0243;		
	0255-0302; 0304-0306;	195	2.2
06	2220-2236; 2238-2246; 2259-2304; 2307-2334;		
	2337-2342; 2349-2354;		
07	0007-0009; 0028-0034; 0050-0054; 0056-0057;		
	0059-0110; 0120-0125; 0127-0130; 0131-0148;		
	0155-0220. 0222-0243; 0246-0300; 0303-0313;		
	0316-0322; 0324-0330; 0334-0338.	201	2.2
16	2217-2240; 2242-2342; 2346-2400;		
17	0000-0002; 0008-0018; 0020-0025; 0027-0118;		
	0127-0204; 0208-0219;	213	3.3
	Total coverage	11.5^h	

Fig.1



UV Cet '69
flare n. 1
Oct. 3rd
(I0+f/I0)-1
1.0
0.0
00h10m
14m
18m
U.T.
flare n. 2
Oct. 3rd
(I0+f/I0)-1
30.0
25.0
20.0
15.0
10.0
5.0
0.0
01h36m
40m
44m
U.T.
flare n. 3
Oct. 4th
(I0+f/I0)-1
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
21h52m
56m
23h00m
U.T.

Fig.2



$(I_{o+f}/I_o)-1$
UV Cet '69
flare n. 4
Oct 5th
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
01h38m
42m
46m
U.T.
flare n. 5
Oct 6th
10.0
5.0
0.0
22h20m
24m
28m
U.T.
flare n. 6
Oct. 6th
3.0
2.0
1.0
0.0
01h30m
34m
38m
U.T.
flare n. 7
Oct. 16th
1.0
0.0
23h16m
20m
24m
U.T.

Fig.3

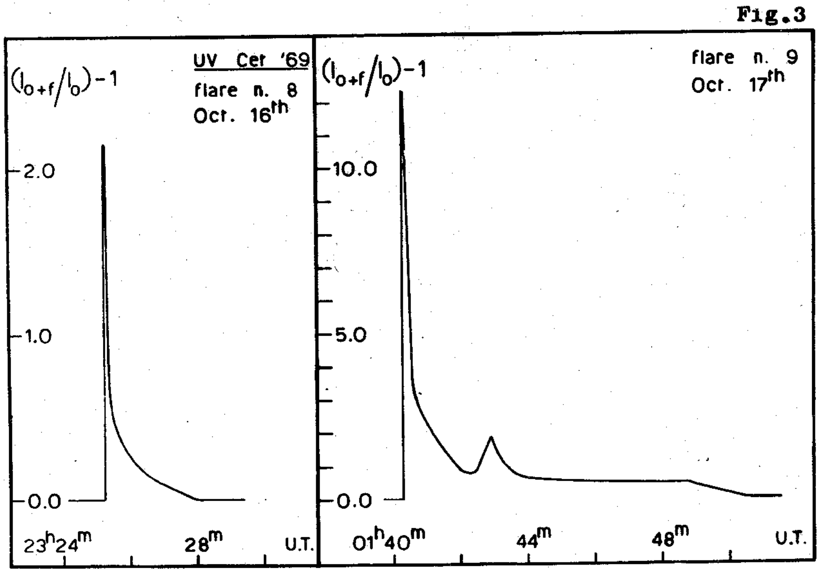


Table 2.
Observed flares

No	Date Oct 1969	t_b	t_{max}	t_e	m_1-m_o	$(m_1-m_o)_m$	P	Sky
1	03	$00^h14^m.1$	$00^h14^m.15$	$00^h15^m.6$	$1^m.9$	$-0^m.30$	0.63	2
2	03	01 40.1	01 40.3	?	1.9	-3.68	(14.10)	3
3	04	21 53.2	21 53.3	21 59.0	2.2	-2.32	5.10	2
4	05	01 39.3	01 39.5	01 45.0	2.2	-2.44	3.30	2
5	06	22 22.0	22 22.1	22 27.0	2.2	-2.75	3.54	2
6	07	01 33.0	01 33.05	01 34.2	2.5	-1.23	0.75	2
7	16	23 17.3	23 18.8	23 24.5	3.6	+0.92	2.20	1
8	16	23 25.3	23 25.35	23 28.0	3.8	+1.70	0.66	1
9	17	01 40.3	01 40.4	01 51.0	3.1	-2.72	10.23	2

<u>References</u>

Andrews,A.D., Chugainov,P.F., Gershberg,R.E., Oskanian V.S., 1968, Comm.27 IAU, Inf.Bull.var.Stars, No.318.
Petit,M., 1961, J.Observateurs, 44, 11.

Catania Astrophysical Observatory, Italy
October 31, 1969

S.CRISTALDI M.RODONO

COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 405

Konkoly Observatory
Budapest
1969 November 19

UV Cet

A continual photoelectric monitoring of the flare star UV Cet was done with the 91 cm reflector of Okayama Station from 18 to 21 September and from 3 to 12 October 1969, by the request of the Working Group of UV Cet stars. During the 33 hours of monitoring in the magnitude B, 30 flares were observed as shown in the following tables:

The definition of $m_f(B)$, P and σ are as follows:

$$m_f = m_o - 2.5 \log I_{o+f}/I_o$$

$$P = \int (I_{o+f}-I_o)/I_o \, dt$$

$$\sigma(\mathrm{mag}) = 2.5 \log (I_o+\sigma)/I_o .$$

Flares of UV Cet observed at Okayama
18 to 20 September, 1969

Date 1969 Sept.	Time of Monitoring (UT)	Time of max. (UT)	$m_f(B)$	Flares P	Duration	σ
18	$15^h51^m-19^h13^m$	$16^h15^m.4$	0.64^{mag}	0.45^{min}	1.2^{min}	0.10^{mag}
		16 29.5	0.52	0.10	0.2	0.15
		17 46.0	0.53	1.29	10.0	0.10
		18 19.3	0.67	4.43	20.0	0.11
		18 26.1	0.80			
19	15 37 -19 20	16 39.6	3.40	21.13	8.3	0.12
20	15 50 -19 06	15 20.7	1.26	0.41	0.7	0.27
		16 05.4	0.66	0.07	0.1	0.14
		17 46.1	1.33	0.55	2.1	0.16
		18 10.1	0.84	1.93	8.3	0.28
		18 58.8	1.53	1.24	1.8	0.35

Flares of UV Cet observed at Okayama
3 to 12 October, 1969

Date 1969 Oct.	Time of Monitoring (UT)	Time of max. (UT)	m_f(B)	P	Duration	σ
			Flares			
6	17^h42^m-18^h33^m					
8	17 00 -19 00	$18^h25^m.6$	0.70^{mag}	0.62^{min}	2.0^{min}	0.08^{mag}
		18 44.9	1.31	0.85	2.3	0.09
9	12 50 -18 30	13 37.5	0.69	0.14	0.5	0.12
10	11 53 -15 19	13 16.3	0.58	0.94	4.7	0.14
		13 45.3	0.89	0.43	1.8	0.12
		14 28.5	0.64	0.10	0.2	0.12
		14 35.3	1.21	0.60	2.7	0.13
	16 32 -18 40	17 03.9	0.60	0.08	0.8	0.13
11	15 47 -18 50	16 50.7	1.02	0.67	2.7	0.06
12	11 55 -18 01	13 51.7	0.58	0.09	0.4	0.09
		13 56.2	2.78	8.45	4.2	0.09
		14 13.9	0.45	0.05	0.5	0.12
		14 15.9	0.74	0.69	2.7	0.12
		15 14.2	1.05	1.02	4.0	0.06
		15 16.0	0.49			
		15 27.3	0.64	0.40	3.0	0.06
		16 00.0	0.80	0.65	2.6	0.06
		17 06.9	0.26	0.28	3.0	0.06
		17 44.1	0.36	0.04	0.2	0.06

The values of m_f, P and σ (mag) are all referred to the total luminosity of L726-8 A+B, and not to L726-8B (UV Cet) only.

Tokyo Astronomical Observatory
14 November 1969

K.OSAWA   K.ICHIMURA
T.NOGUCHI   E.WATANABE
T.OKADA   K.OKIDA

COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 406

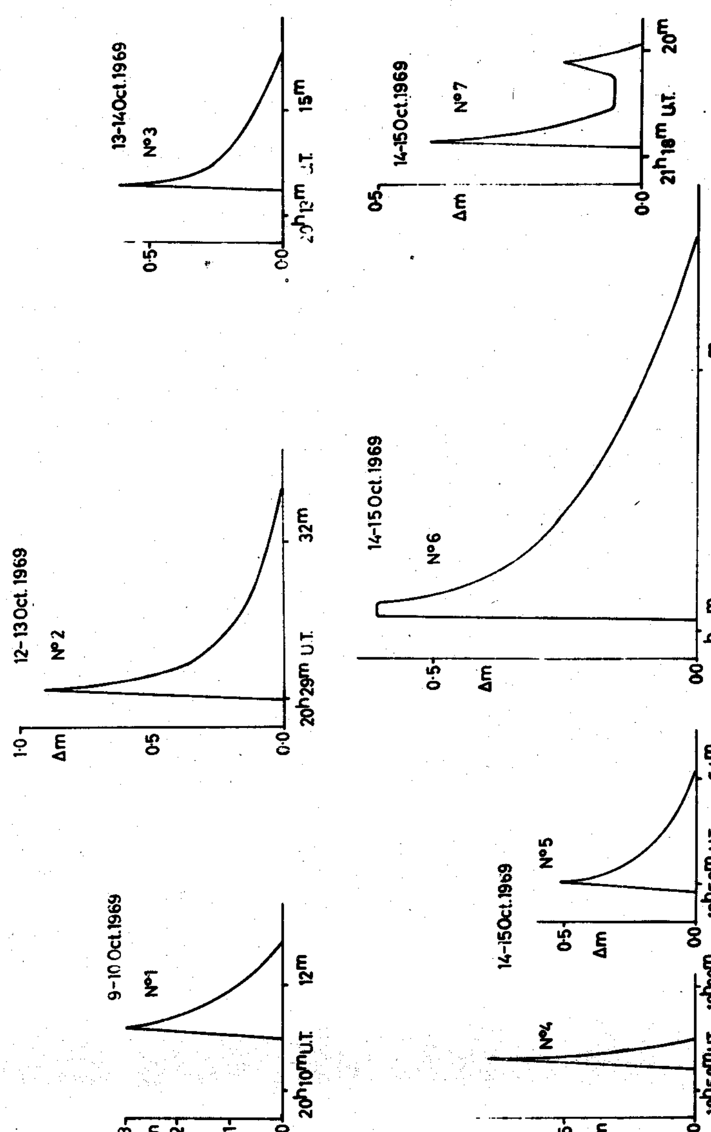
Konkoly Observatory
Budapest
1969 November 23

FLARE ACTIVITY OF UV Ceti

Observations of UV Ceti were made at Boyden Observatory during October 1969 as part of the International Patrol programme. The telescope used to monitor UV Ceti was the 40 cm Nishimura Reflector with a Johnson B. Filter and an E.M.I. type 6256 photomultiplier tube.

The monitoring details are given in the table, seven flares being observed.

Date		UT	Total hours per night	Flare No.	UT of flare	Duration	Δm
Sept	30	18^h14^m–19^h27^m	1^h13^m				
Oct	1	19 11 –20 50	1 39				
	3	18 22 –19 15	0 53				
	5	18 07 –19 41					
		20 00 –21 58	3 32				
	7	18 52 –19 33	0 41				
	9	18 10 –20 48					
		21 01 –21 24	3 01	1	$20^h11^m.0$	1.8^m	0.30
	12	18 11 –21 48	3 37	2	20 29.0	4.0	0.91
	13	20 03 –22 11	2 08	3	20 13.5	2.5	0.62
	14	18 04 –21 33	3 29	4	18 58.4	0.5	0.79
				5	19 51.8	2.4	0.52
				6	21 05.2	7.3	0.61
				7	21 18.2	2.0	0.40
		TOTAL	20^h13^m				



Boyden Observatory
Bloemfontein
Rep. of South Africa

A.H.JARRETT **J.P.EKSTEEN**

COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 407

Konkoly Observatory
Budapest
1969 November 25

VISUAL OBSERVATIONS OF THE FLARE STAR EV LACERTAE

During the September 1969 international observing session of the flare star, EV Lac, the star was patrolled for 32 hours by visual observers in the United Kingdom. Hours of coverage in Universal Time are tabulated below. Visual magnitude estimates using the comparison sequence given by Andrews and Chugainov (Ref.1) revealed no brightness variations greater than about $+0^m.1$. The 12th magnitude optical companion a few seconds of arc to the west of EV Lac was well resolved at Armagh, and the flare star estimated to be at magnitude 10.0 throughout the observing period. Although this result suggests that EV Lac was brighter by $0^m.25$ than given photoelectrically (Ref.1) this difference cannot be established with certainty by our visual technique with the available standards.

1969		U.T.	Observers
Sept	7	2206-2400	A
	8	0000-0100, 0106-46	A
		2138-48, 2235-2305, 2313-2400	A
	9	0003-14	A
	10	2210-2335	G
	11	0015-0110, 2053-2400	G, J, JM, P, A
	12	0000-14, 0019-0146, 2335-55	G, J, JM, P, A
	13	0000-15, 2005-2400	G, E, C, J, PJ, P
	14	0000-07, 0011-0129	E, C, J, PJ, P
	15	2059-2109, 2302-55	L, A, JM
	16	0002-50, 2040-2152, 2300-55	L, PM, G, RLo
	17	2235-2355	G, AG, CM
	18	0000-0225, 1953-2205	G, JM, P
	20	2255-2355	L
	21	0007-0130	L
	24	2106-2230	L

Total Coverage 31^h57^m (Observers: A.D.Andrews, K.Y. Cheng, M.S.Ennis, J.S.Glasby, A.Grayson, P.Johnston, W.Johnston, R.J.Livesey, R.S.Lomas, J.McFarland, P.A.Moore, C.R.Munford, J.Perrott)

REFERENCE

1) A.D.Andrews and P.F.Chugainov, I.B.V.S. No.370 (1969).

Armagh Observatory
November 19, 1969.

A.D. ANDREWS

COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 408

Konkoly Observatory
Budapest
1969 November 27

THE VARIABILITY OF BV 516

The eclipsing binary BV 516 (HD 124195) was given the following ephemeris by Schöffel and Köhler (IBVS no.77, 1965):

$$\text{Min. I} = \text{JD } 2438524.410 + 1^{d}_{\cdot}49008$$

Photoelectric observations of BV 516 were made by the present author at the Mount John University Observatory in New Zealand on 10 nights during April, May, June, and July of 1966. The star HD 122844 was used as a comparison. Four times of minimum light were obtained. Combining these with the previously published times of minimum light, the following ephemeris was obtained:

$$\text{Min. I} = \text{JD } \underset{\pm\ 96}{2438524.4069} + \underset{\pm\ \ 20}{1^{d}_{\cdot}490096}\ \text{E.} \quad \text{p.e.}$$

The individual times of minimum light were as follows:

Hel. JD	E	O-C	Method	Obs.*
2438524.303	0	$-0^{d}_{\cdot}0139$	pg	S, K
530.340	4	-0.0272	pg	S, K
548.291	16	+0.0426	pg	S, K
2439262.0070	495	+0.0025	pe	Ch
264.9801	497	-0.0046	pe	Ch
282.8659	509	0.0000	pe	Ch
291.8084	515	+0.0019	pe	Ch

*S, K = Schöffel and Köhler; Ch = Chambliss

In New Zealand about 800 photoelectric observations of BV 516 were obtained in yellow and in blue light (400 in each color). BV 516 is a Beta Lyrae type eclipsing binary. The primary minimum is about $0^{m}_{\cdot}56$ deep in yellow light, and the secondary is about $0^{m}_{\cdot}25$ deep in the same color. The respective values for blue light are $0^{m}_{\cdot}58$ and $0^{m}_{\cdot}24$. However, large fluctuations were found in the light curve, particularly in the portions outside of the eclipses. These variations could be either intrinsic, or else, due to variability in the comparison star, HD 122844.

In July of 1969 photoelectric observations were made at the Cerro Tololo Inter-American Observatory in Chile of the star HD 122844 and a check star, HD 119727, to see if the former might be variable. No variations were found. Thus it appears that the large scatter found in the observations of BV 516 is due in part to intrinsic fluctuations in the light curve of BV 516.

The following magnitudes and colors were obtained for the stars mentioned:

	V	B-V	U-B	Spectrum
BV 516 (at max.)	5.96	+0.10	...	B9
HD 119727	6.45	+0.12	+0.09	A0
HD 122844	6.17	+0.25	+0.18	A3

The spectral types are those given in the Henry Draper Catalogue.

Further photoelectric observations will be necessary in order to determine the orbital elements of BV 516 and the nature of the fluctuations in its light curve.

November 21, 1969

CARLSON R. CHAMBLISS

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NOVA IN SAGITTARIUS

The Nova, reported in I.A.U. Information Bulletin on Variable Stars, Number 389, is in the Perth Astrographic Zone. The star is not shown on plates of the area exposed in 1902, 1904, 1910 and 1914, with limiting magnitude 13^m to 14^m. It is shown on a repeat plate exposed 1969 August 26.523 U.T. By visual comparison with other stars on the plate, which have magnitudes in the Yale Catalogue, we estimate a photographic magnitude of $9^m_.7 \pm 0^m_.1$.

November 18, 1969

M.P. CANDY

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Western Australia, 6076.

COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 409

Konkoly Observatory
Budapest
1969 December 21

ETOILES VARIABLES NOUVELLES AU NORD DE BETA TAURI

Treize variables nouvelles ont été trouvées sur une série de 13 photos prises avec la chambre de Schmidt de l'Observatoire de Haute Provence centrées sur la S.A. no.49. Les meilleures montrent les étoiles jusqu'à la 16^e m_{pg}.

La liste des variables est contenue dans le tableau suivant qui indique leur position pour 1900.0 et l'amplitude observée. Sauf une exception (no.12), il n'a pas été possible de déterminer le type de variation en raison du petit nombre des photos observées.

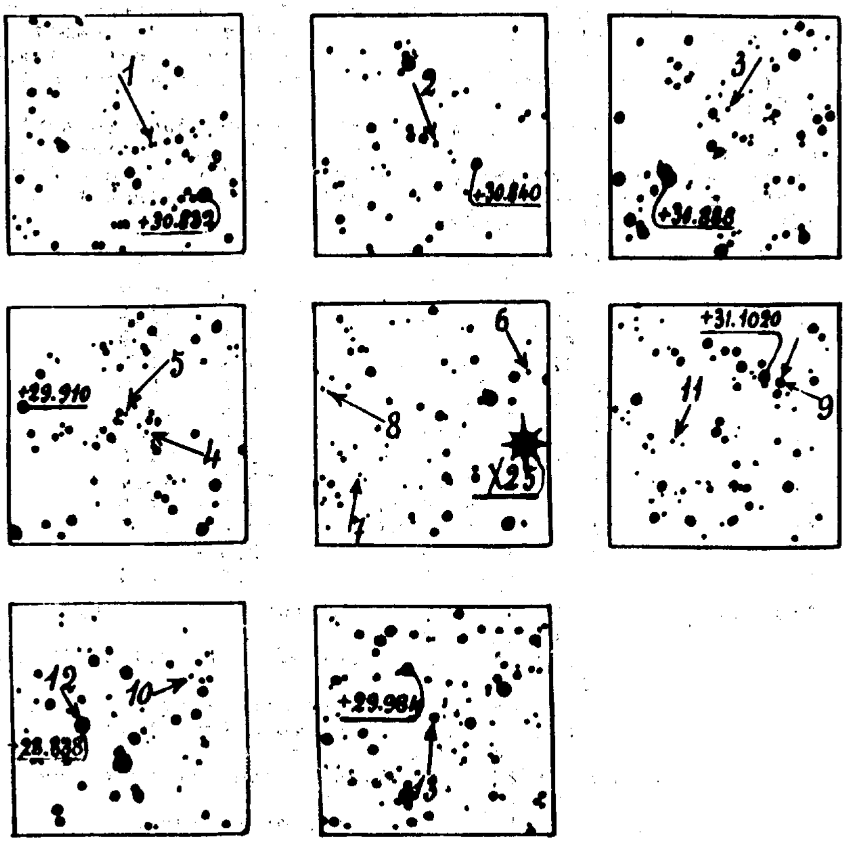
nos	positions 1900.0		amplitude
1	$5^h\ 8^m57^s$	+ 31° 3'50"	14.4 - 15.2
2	10 20	+ 30 6 08	13.1 - 14.0
3	18 45	+ 30 22 12	13.5 - 14.8
4	22 28	+ 29 43 43	14.9 - 15.5
5	22 43	+ 29 45 12	14.3 - 15.0
6	26 10	+ 32 20 30	12.5 - 13.0
7	27 32	+ 31 58 00	13.8 - 14.3
8	28 20	+ 32 8 58	12.9 - 14.8
9	31 21	+ 31 56 30	12.5 - 13.6
10	32 2	+ 28 35 50	13.9 - 14.5
11	32 7	+ 31 45 08	13.6 - 14.2
12	33 2	+ 28 28 20	9.9 - 13.2
13	39 13	+ 29 27 05	11.4 - 12.6

<u>Remarques:</u> 1. Etoile double. La variable est à l'Est.
2. Variations rapides.
3. Un seul minimum observé, le J.J.2 440 218. Algolide?
4. No.480 des S.A. de Harvard (vol.101)
5. No.504 des S.A. de Harvard (vol.101)
6. et 10. Amplitude faible.
12. BD +28°838. Algolide.Un seul minimum observé, 2 440 267.
13. Les variations paraissent rapides.

Les cartes sont des carres de 30' de côté. Le Nord est en haut. Dans chacune est une étoile BD pour permettre une identification facile.

Je remercie J.H.Bigay, directeur de l'Observatoire de Lyon, grâce à qui ce travail a été possible.

A. BRUN
Le Breuil, Allier, France


1
+30.837
2
+30.840
3
5
+29.910
4
6
8
7
X25
+31.1020
11
9
12
10
28.838
+29.984
13

COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS

NUMBER 410

Konkoly Observatory
Budapest
1969 December 30

PHOTOELECTRIC OBSERVATIONS OF EV Lac

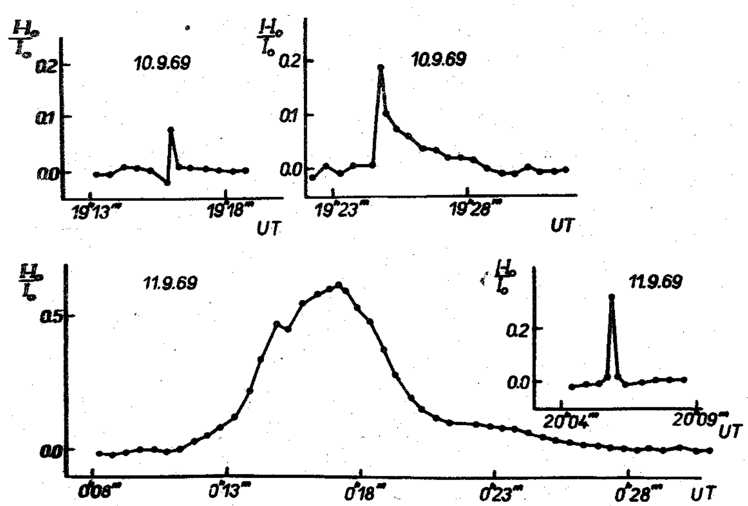
The photoelectric monitoring of the flare star EV Lac in the B photometric system was carried out in September 1969 according to the cooperative programme. The 64 cm meniscus telescope of the Crimean Astrophysical Observatory was used. The dates and UT of coverage are given in Table I. Table II contains the characteristics (I) of eight flares observed: moments of maxima (UT); durations of the flares before and after maxima t_b and t_a (in minutes); amplitudes of flares Δm_B in stellar magnitudes; standard deviations σ/I_0; integrated intensities P (in minutes) and the air masses M(z). The light curves of flares in relative intensities are given on the figures. It must be noted that EV Lac was observed always with its optical companion. Therefore the Δm_B values refer to the variation of the combined light of both stars.

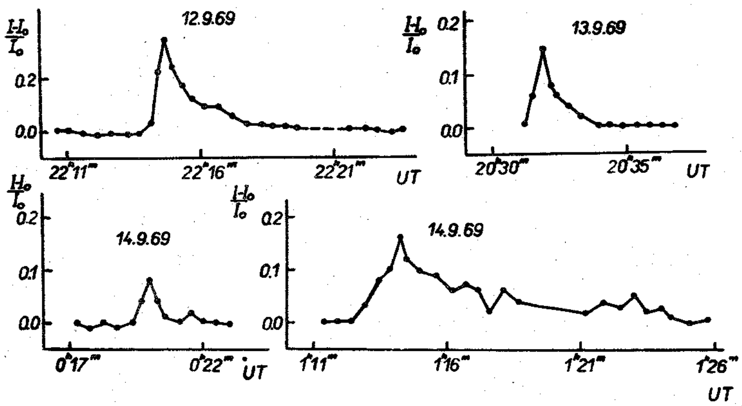
Table I

Date		UT of coverage
Sept.	4	19^h07^m-21^h29^m, 2150-2200, 2207-2323, 2339-2350,
	5	1847-1904, 1926-1931, 1934-1938,
	6	1729-1900,
	8	1723-2031, 2041-2324, 2326-2400,
	9	0000-0009, 0026-0048, 0050-0148, 0149-0157, 0159-0200, 1905-1922,
	10	1728-1813, 1816-1900, 1904-1920, 1921-2004, 2037-2100, 2105-2147, 2151-2311, 2328-2400,
	11	0000-0041, 0053-0137, 1723-1738, 1741-1750, 1755-1811, 1812-1828, 1831-1919, 1921-1936, 1939-2000, 2003-2038, 2039-2119, 2123-2231, 2246-2339, 2341-2400,
	12	0000-0021, 0024-0140, 0142-0200, 1718-1736, 1737-2101, 2108-2220, 2222-2330, 2357-2400,
	13	0000-0101, 0102-0200, 1739-1930, 1932-2037, 2039-2101, 2107-2119, 2123-2400,
	14	0000-0035, 0047-0200,
	15	1703-1733, 1741-2017, 2024-2027, 2052-2102, 2147-2211, 2218-2255,
	16	2145-2208, 2213-2237

Table II

Date and UT of flare maximum			t_b	t_a	m_B	σ/I_o	P	M(z)
Sept.	10	$19^h16^m.0$	0.1	0.7	0.08	0.01	0.02	1.02
	10	19 24.8	0.3	3.9	0.19	0.01	0.20	1.01
	11	00 17.1	6.7	10.0	0.52	0.02	3.59	1.31
	11	20 05.9	0.2	0.4	0.25	0.02	0.04	1.00
	12	22 14.7	0.7	4.7	0.26	0.01	0.21	1.06
	13	20 31.9	0.8	2.1	0.15	0.01	0.15	1.00
	14	00 20.0	0.6	1.0	0.08	0.01	0.06	1.32
	14	01 14.3	1.9	10.7	0.16	0.01	0.62	1.58





P.F.CHUGAINOV
N.I.SHAKHOVSKAYA
Crimean Astrophysical Observatory

(I) A.D.Andrews, P.F.Chugainov, R.E.Gershberg, V.S.Oskanjan, I.B.V.S. No.326, 1969

<u>Correction to IBVS 399:</u> For Sept. 15 the time of maximum should be read $17^h01^m.8$ (instead of $17^h31^m.8$).

COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 411

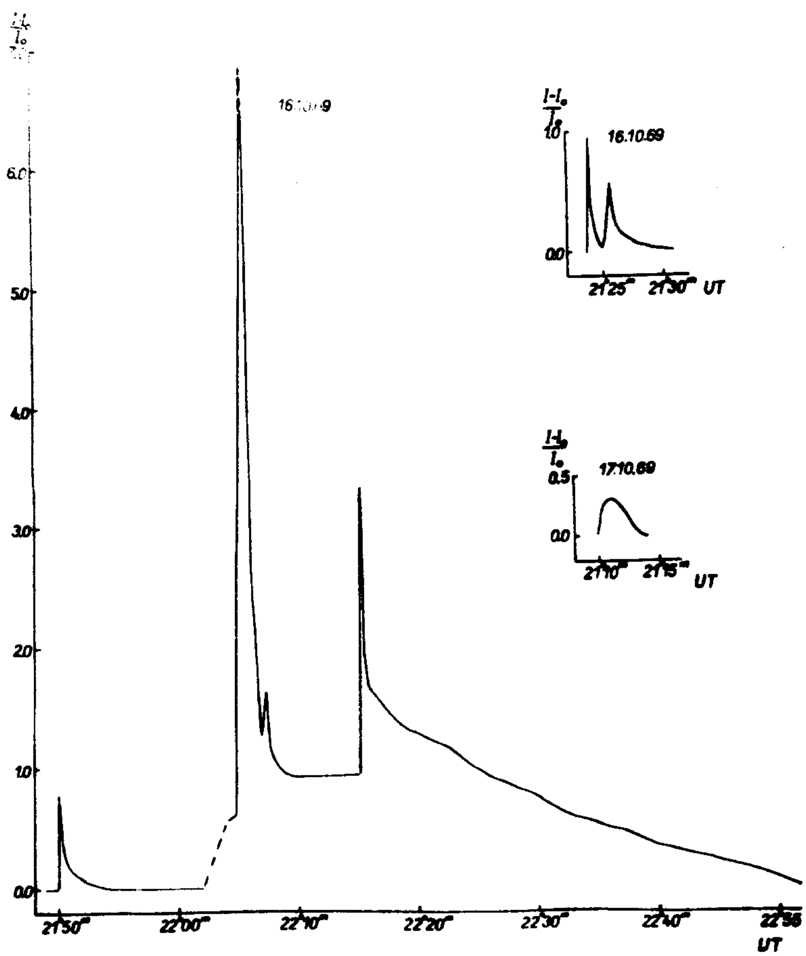
Konkoly Observatory
Budapest
1969 December 30

PHOTOELECTRIC OBSERVATIONS OF UV Cet

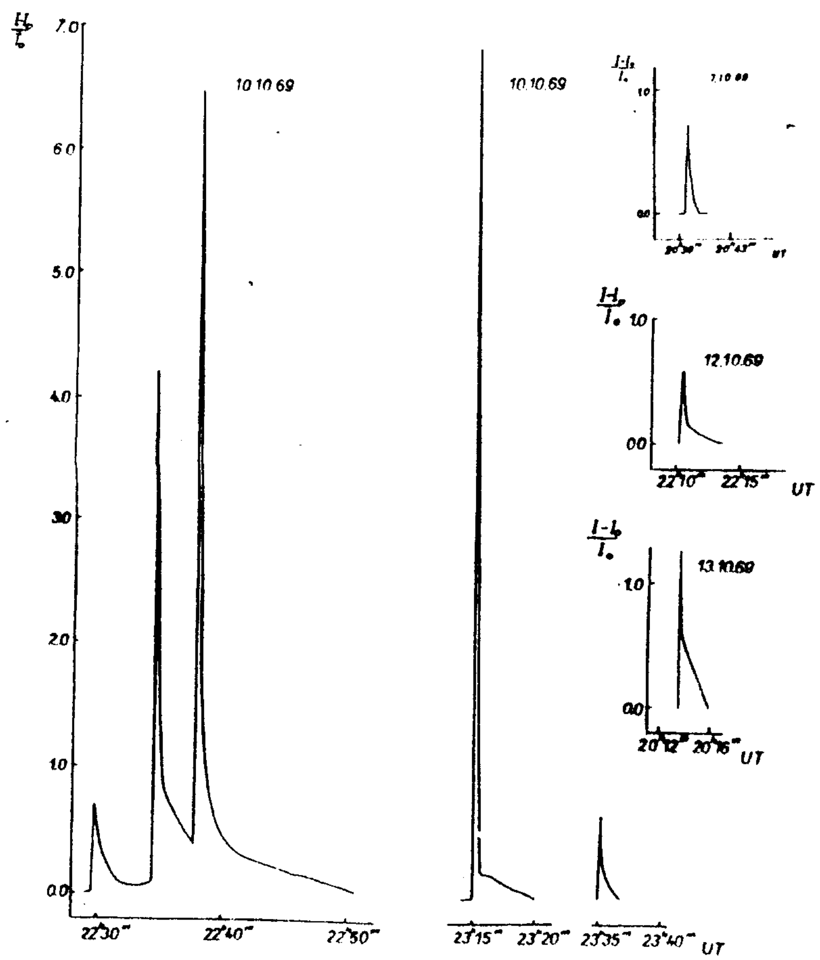
Twenty four flares of UV Cet were recorded in October 1969 when participating in the cooperative programme. Observations were carried out in the B photometric system using 64-cm meniscus telescope. The content of Tables I,II which follow is the same as for observations of EV Lac (1).

Table I

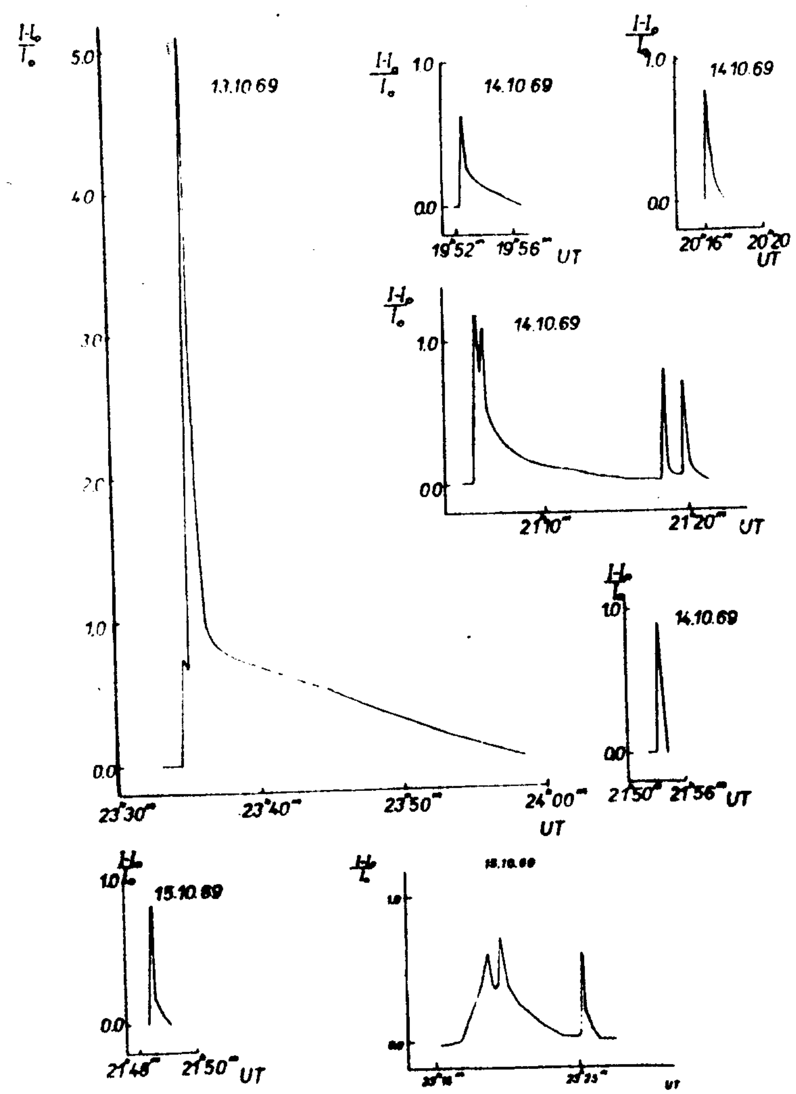
Date		UT of coverage
Oct.	7	19^h18^m–20^h24^m, 2026–2158, 2204–2210, 2319–2326, 2351–2400
	8	0000–0001, 1925–2043, 2046–2215, 2224–2232, 2234–2310, 2314–2335, 2337–2345, 2348–2355, 2357–2400
	9	0000–0004, 0008–0023, 0028–0057
	10	(1900–1944, 1948–2017, 2020–2101), 2105–2400,
	11	0000–0001, 0004–0102, 0105–0124, 1913–1949, 1951–2023
	12	2046–2049, 2054–2106, 2112–2118, 2121–2231, (2235–2252, 2254–2301, 2307–2333)
	13	1840–1913, 1915–2201, 2203–2235, 2240–2259, 2302–2304, 2308–2320, 2324–2331, 2333–2340, 2344–2400
	14	0000–0006, 0010–0049, 0053–0055, 1902–1903, 1906–1956, 1958–2209, 2212–2308, 2315–2400
	15	0000–0003, 0007–0024, 0027–0100, 1838–2328, 2332–2346
	16	0041–0050, 0054–0105,(1943–2057),2113–2201, 2204–2302, 2305–2400
	17	0000–0003, 0005–0006, 0010–0019, 0024–0031, 0034–0048, 0050–0053, 1831–2042, 2056–2336, (2338–2345)



16.10.69
6.0
5.0
4.0
3.0
2.0
1.0
0.0
21 50
22 00
22 10
22 20
22 30
22 40
22 56
UT
I-I₀ / I₀
16.10.69
1.0
0.0
21 25
21 30
UT
I-I₀ / I₀
17.10.69
0.5
0.0
21 10
21 15
UT



$\frac{H_p}{I_0}$
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
10.10.69
22ʰ30ᵐ
22ʰ40ᵐ
22ʰ50ᵐ
10.10.69
23ʰ15ᵐ
23ʰ20ᵐ
23ʰ35ᵐ
23ʰ40ᵐ
UT
$\frac{H_p}{I_0}$
1.0
0.0
12.10.69
22ʰ10ᵐ
22ʰ15ᵐ
UT
$\frac{I-I_0}{I_0}$
1.0
0.0
13.10.69
20ʰ12ᵐ
20ʰ16ᵐ
UT



13.10.69
14.10.69
14.10.69
14.10.69
14.10.69
15.10.69
UT

Table II

Date and UT of flare maximum			t_b	t_a	Δm_B	σ/I_o	P	M(z)
Oct. 7	20^h	$38^m.4$	<0.1	0.6	0.55	0.12	0.21	2.52
10	22	29.8	0.2	4.6	0.57	0.12	0.72	2.21
10	22	34.5	0.1	3.2	1.79	0.12	3.04	2.22
10	22	37.9	0.2	13	2.18	0.12	5.12	2.23
10	23	15.1	0.1	5.0	>2.23	0.10	2.32	2.36
10	23	35.2	0.2	1.5	0.55	0.09	0.34	2.48
12	22	10.5	0.3	3.1	0.50	0.07	0.48	2.20
13	20	13.5	<0.1	2.5	0.89	0.12	0.76	2.53
13	23	35.3	0.9	23	1.96	0.10	12.4	2.58
14	19	52.4	0.2	4.1	0.54	0.10	0.60	2.69
14	20	16.1	0.1	1.3	0.63	0.10	0.36	2.48
14	21	05.3	0.3	13.2	0.87	0.12	2.36	2.25
14	21	18.4	0.2	1.2	0.63	0.10	0.24	2.22
14	21	19.7	0.1	1.6	0.58	0.10	0.20	2.22
14	21	54.2	0.2	0.6	0.70	0.09	0.36	2.19
15	21	48.9	0.3	1.3	0.66	0.09	0.36	2.19
15	23	19.4	2.8	5.0	0.54	0.06	1.92	2.51
15	23	25.5	1.1	1.7	0.37	0.06	0.52	2.56
16	21	23.9	0.2	1.1	0.73	0.11	0.34	2.20
16	21	25.6	0.6	5.4	0.50	0.11	0.72	2.20
16	21	50.0	0.1	4.0	0.63	0.11	0.48	2.20
16	22	05.3	(3.3)	9.9	>2.18	0.09	16.9	2.44
16	22	15.2	0.1	37	1.59	0.09	25.6	2.51
17	21	11.0	1.0	3.0	0.28	0.10	0.72	2.21

P.F.CHUGAINOV
N.I.SHAKHOVSKAYA
Crimean Astrophysical Observatory

(1) P.F.Chugainov, N.I.Shakhovskaya "Photoelectric observations of EV Lac", I.B.V.S. No.413, 1969

Correction to IBVS 405: The time of monitoring of 1969 Sep 20 should be read 15^h05^m–19^h06^m (instead of 15^h50^m).

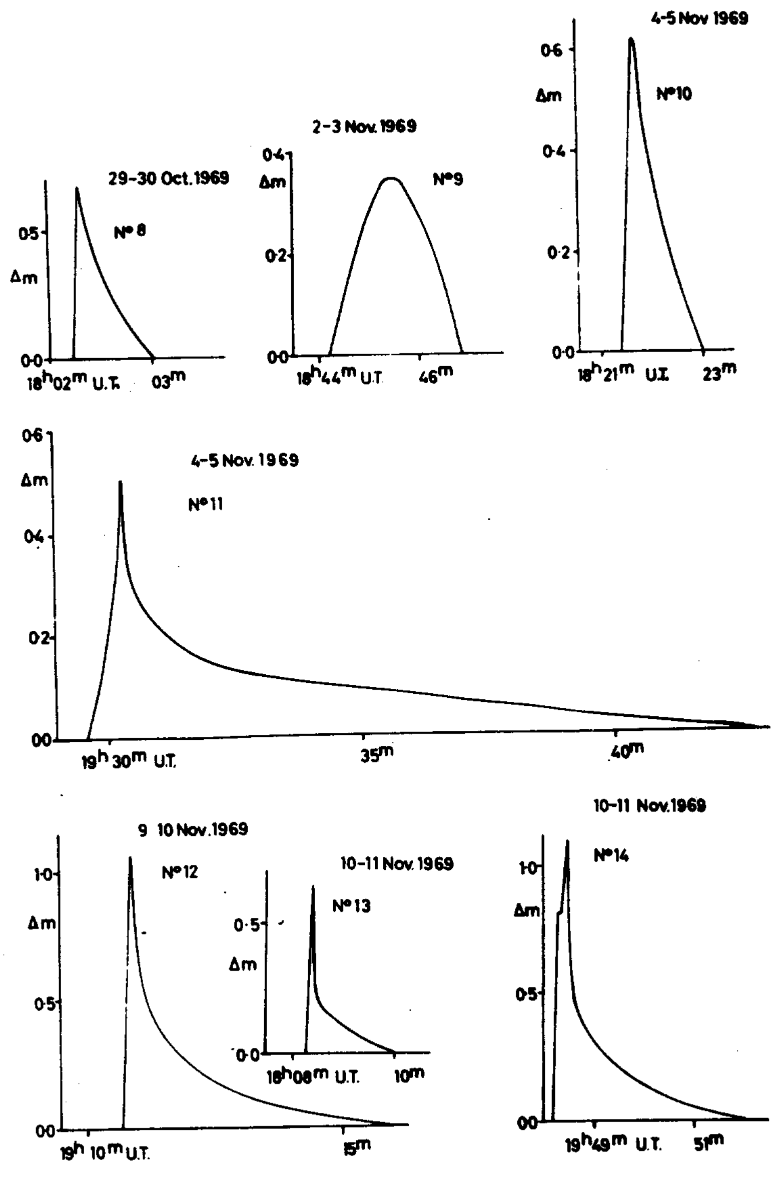
COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 412

Konkoly Observatory
Budapest
1970 January 7

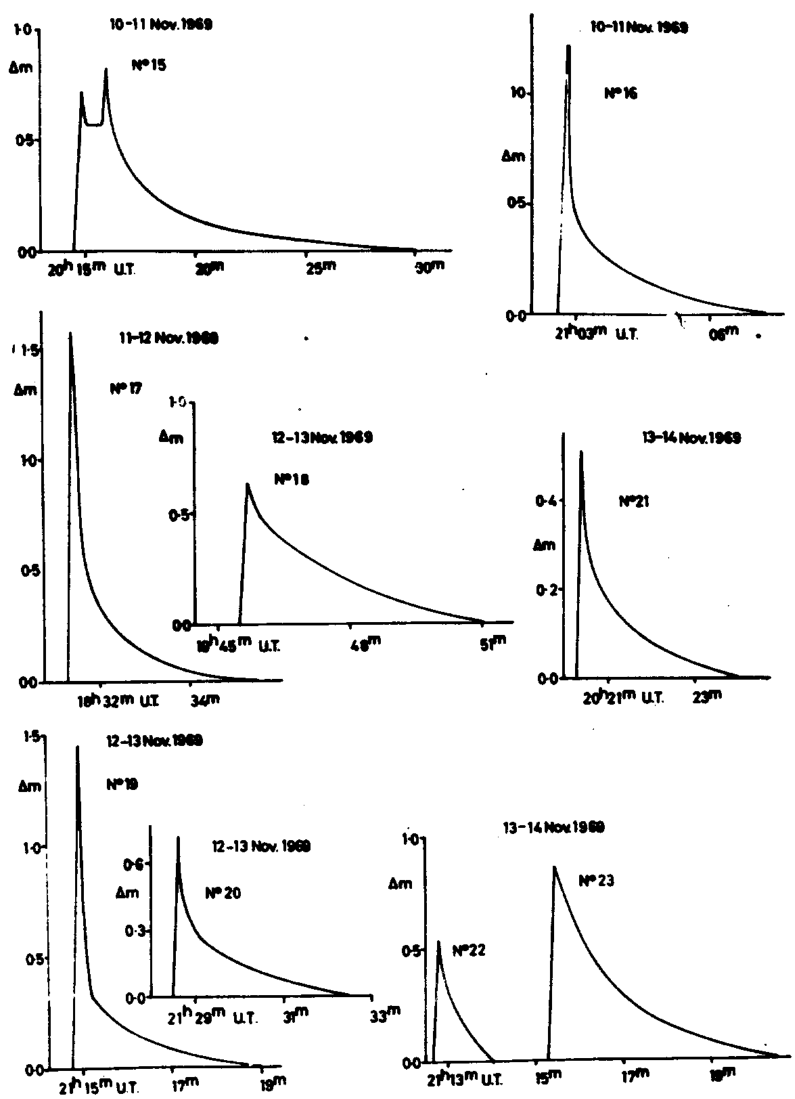
FLARE ACTIVITY OF UV Ceti

Further observations of UV Ceti were made at Boyden Observatory following the recent International Observational period of 3 - 18th October, as part of the flare star programme of the Department of Astronomy of the University of the Orange Free State. The seven flares observed during that period were the subject of a previous communication to IBVS. Relevant details are given in the table. A total of 18 flares were recorded over the period.

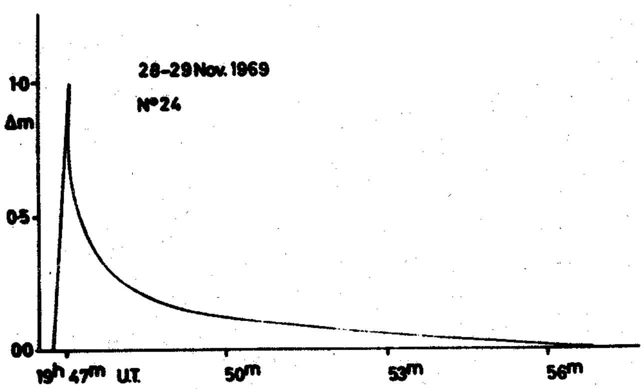
Date	U.T.	Total hours per night	Flare No.	U.T. of flare	Duration	Δm
Oct. 28	$18^h22^m-19^h00^m$	0 38				
29	1750-2017	2 27	8	$18^h02^m.5$	0.75	0.68
30	1840-2112	2 32				
Nov. 2	1800-2106,2120-2139	3 25	9	18 44.2	2.80	0.35
4	1806-2053,2117-2230	4 00	10	18 21.4	1.60	0.62
			11	19 29.6	12.90	0.52
9	1900-2035,2051-2151	2 35	12	19 10.7	5.30	1.06
10	1806-1952,2007-2030 2041-2136	3 04	13	18 08.3	1.70	0.65
			14	18 48.2	3.80	1.10
			15	20 14.5	15.50	0.82
			16	21 02.6	4.40	1.22
11	1808-1923	1 15	17	18 31.3	4.20	1.58
12	1800-2021,2029-2228	4 20	18	19 45.5	5.50	0.64
			19	21 14.8	4.20	1.45
			20	21 28.5	4.00	0.72
13	1834-2014,2019-2258	4 1[illegible]	21	20 20.3	3.70	0.51
			22	21 12.7	1.30	0.54
			23	21 15.3	5.20	0.87
28	1822-2056	2 34	24	19 46.8	10.20	1.0
30	1955-2128	1 32	25	20 40.9	22.10	1.04
	Total	32^h41^m				

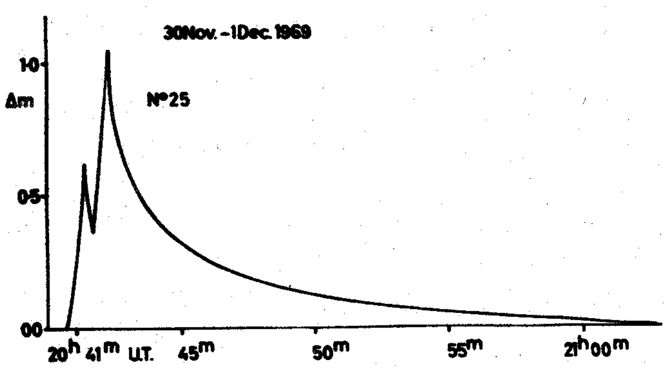


29-30 Oct. 1969
N° 8
Δm
18h02m U.T.
03m
2-3 Nov. 1969
N° 9
Δm
18h44m U.T.
46m
4-5 Nov 1969
N° 10
Δm
18h21m U.T.
23m
4-5 Nov. 1969
N° 11
Δm
19h 30m U.T.
35m
40m
9 10 Nov. 1969
N° 12
Δm
19h 10m U.T.
15m
10-11 Nov. 1969
N° 13
Δm
18h08m U.T.
10m
10-11 Nov. 1969
N° 14
Δm
19h49m U.T.
51m



10-11 Nov. 1969
N° 15
Δm
1·0
0·5
0·0
20h 15m U.T.
20m
25m
30m
10-11 Nov. 1969
N° 16
Δm
1·0
0·5
0·0
21h 03m U.T.
06m
11-12 Nov. 1969
N° 17
Δm
1·5
1·0
0·5
0·0
18h 32m U.T.
34m
12-13 Nov. 1969
N° 18
Δm
1·0
0·5
0·0
19h 45m U.T.
48m
51m
13-14 Nov. 1969
N° 21
Δm
0·4
0·2
0·0
20h 21m U.T.
23m
12-13 Nov. 1969
N° 19
Δm
1·5
1·0
0·5
0·0
21h 15m U.T.
17m
19m
12-13 Nov. 1969
N° 20
Δm
0·6
0·3
0·0
21h 29m U.T.
31m
33m
13-14 Nov. 1969
N° 22
N° 23
Δm
1·0
0·5
0·0
21h 13m U.T.
15m
17m
19m





The 40 cm Nishimura reflector was used to monitor the flares along with a Johnson B. Filter and E.M.I. type 6256 photomultiplier tube.

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BLOEMFONTEIN. Rep. of South Africa.

COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 413

Konkoly Observatory
Budapest
1970 January 9

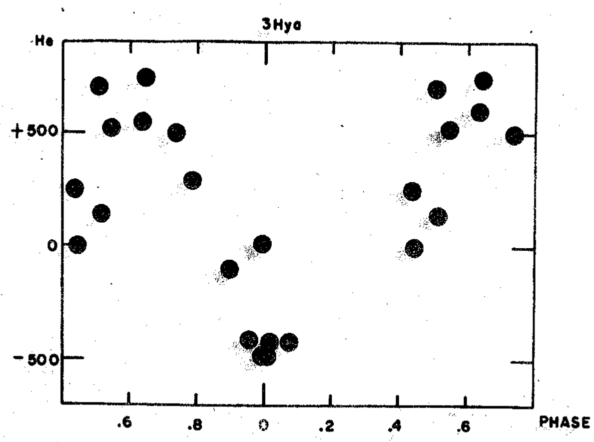
3 HYA = HD 72968

We wish to announce the period of magnetic variation of 3 Hya (=HD 72968), which we have found to be $4^{d}.606$. The analysis was carried out on the published measurements of field intensities as reported by Babcock (Ap.J.Suppl.,3, 141, 1958). The method by which such data are analyzed will be published elsewhere.

The ephemeris is given by

$$\text{J.D. (magnetic minimum)} = 2433002.63 + 4^{d}.606\ E.$$

The accompanying graph shows the magnetic measurements with phases computed from the above formula.



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Israel

COMMISSION 27 OF THE I.A. U.
INFORMATION BULLETIN ON VARIABLE STARS

NUMBER 414

Konkoly Observatory
Budapest
1970 January 14

ELEMENTS OF BRIGHT SOUTHERN CEPHEIDS

Photoelectric UBV photometry of 29 bright southern Cepheids has been carried out principally to provide accurate present epoch phases. The new observations enabled existing periods to be checked and revised periods were derived where necessary. The period, its probable error and the range in Julian date over which the period is valid are given in columns 3, 4 and 5 of the table. Column 2 gives the JD_{max} of the visual light curve only for those Cepheids whose period differed significantly from the value quoted in the second edition of the General Catalogue of Variable Stars. Apart from SZ Mon and RY Sco both of which are known to have a variable period, the remaining Cepheids showed no evidence of any variation in the period.

Two recent determinations of the periods of Cepheids by Tsarevsky (1967) and Cousins (1968) have stars in common with the present Cepheids. Our agreement with Cousins is good but on comparing with Tsarevsky's conclusions significant differences are found in many cases.

The detailed observations are to be published in Monthly Notices of the Royal Astronomical Society.

References

Cousins,A.W.J., 1968. Mon.Not.astr.Soc. South Afr., 27, 97,
Kukarkin,B.V., Parenago,P.P., Efremov, Yu.I. and Kholopov, P.N., 1958. The General Catalogue of Variable Stars, 2nd Ed., Moscow.
Tsarevsky,G.S., 1967. Inf.Bull.var.Stars, I.A.U., 176.

TABLE

Cepheid		JD_{max} 2 400 000 +	P (days)	ΔP (days) $\pm$	JD 2 400 000 +
V496	Aql	--	6.80703	0.00013	>28000
UX	Car	--	3.68225	0.00002	10000
ER	Car	40277.88	7.71855	0.00015	24000
V	Cen	40308.60	5.49392	0.00004	13000
XX	Cen	40366.24	10.95550	0.00015	19000
KN	Cen	40391.22	34.035	0.002	25000
V381	Cen	--	5.07878	0.00004	27000
V419	Cen	40281.16	5.50710	0.00010	28000
V659	Cen	40348.77	5.62180	0.00015	30000
R	Cru	--	5.82574	0.00003	12000
S	Cru	40301.19	4.68997	0.00003	12000
T	Cru	--	6.73331	0.00006	15000
*SZ	Mon	40241.39	32.69	0.02	36000
S	Mus	40299.42	9.66007	0.00011	24000
SY	Nor	--	12.6452	0.0003	25000
BF	Oph	--	4.06784	0.00002	19000
YZ	Sgr	--	9.55360	0.00015	19000
AP	Sgr	40390.31	5.05793	0.00004	19000
BB	Sgr	--	6.63699	0.00008	19000
V350	Sgr	--	5.15424	0.00004	19000
RV	Sco	--	6.06133	0.00004	14000
*RY	Sco	40365.12	20.3157	0.0005	35000
V482	Sco	--	4.52786	0.00004	28000
V636	Sco	--	6.79671	0.00007	18000
R	TrA	--	3.38930	0.00001	04000
S	TrA	--	6.32347	0.00003	15000
V	Vel	--	4.37101	0.00002	15000
RY	Vel	40246.67	28.1270	0.0012	19000
AH	Vel	--	4.22717	0.00003	26000

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January, 1970.

R.S.STOBIE

COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 415

Konkoly Observatory
Budapest
1970 January 21

HIGH-FREQUENCY STELLAR OSCILLATIONS. III. A BRIEF REPORT

Our program, which is an extension of one begun at the Princeton University Observatory by Lawrence, Ostriker and Hesser (and Reported in ApJ. 148, L161, 1967; 153, L151, 1968; and 155, 919, 1969), consists of acquiring long ($\sim$7200 sec), continuous, digitized records of the apparent luminosity of various stars in the lower left-hand portion of the HR diagram. These records are searched for low-amplitude, periodic variability using modern autocorrelation and power spectrum techniques; various noise statistics are also derived which help to distinguish objects possessing intrinsic but non-coherent variability from either quiet objects or objects exhibiting periodic behaviour superimposed upon an otherwise quiescent radiation field. During a two-month run on Cerro Tololo in early 1969 we surveyed a large number of central stars of planetary nebulae (CSPN), white dwarfs, old novae, U-Geminorum stars, optical candidates for X-ray sources and pulsars, and peculiar blue stars. We were able to take advantage of the experience gained at Princeton and, in so doing, we feel our techniques have been measureably improved over what we reported at the scientific meeting of Commission 27 at Prague.

A partial summary of our results to date would include:

1) Discovery of a new, blue, short-period variable star, G44-32, whose proper motion, magnitude and colors led Eggen and Greenstein (ApJ 141, 83, 1965) to include it in their catalogue of white dwarfs (EG 72). The star is variable with amplitudes of about 2 % and periods in the range from 10 to 27 minutes. Our results have been described in detail elsewhere (ApJ 158, L171, 1969). Spectroscopy and further photometry are needed to clarify its nature and relationship to other short period blue variable stars such as HZ 29. Should other investigators be interested in acquiring substantial blocks of photometric data on G44-32 during the forthcoming season in a form suitable for time series analysis (in particular, equi-spaced data points), we would be pleased to consult with them concerning the possibilities of analysing their data with our computer programs.

2) A comparative study of the power spectra of white dwarfs and CSPN in the period range from 4 to $\sim$ 720 sec has been made in which we have found that the CSPN are extremely quiet with regards to both intrinsic flickering and

coherent, low amplitude variability. For many objects observed, individual Fourier amplitudes in the relevant period range were much less than 0.001 mag. Thus, in constrast to tentative results previously reported and based upon data taken under conditions of poor seeing, at Princeton, we find that the power spectra of the CSPN more nearly resemble those of the white dwarfs than they do the old novae: we are, however, presently attempting to appropriately characterize the mean continuous power spectra of the various types of objects observed in order to learn if more subtle differences exist which are difficult to isolate in the high resolution spectra.

3) Observations were obtained of old novae, U-Geminorum stars and optical candidate for X-ray sources and pulsars. In particular, extensive data on WX Cen were obtained in the period range of ~ 900 sec > period > 4 sec and some exploratory data were obtained which extend this range to 0.2 sec. We find that in the more common frequency range WX Cen is only marginally noisier than comparison objects and that it exhibits no coherent noise. Its general noise level was significantly less on the nights of observation than corresponding noise levels determined for Sco X-1 by ourselves and other investigators. The dissimilarities between the optical power spectra of Sco X-1 and WX Cen suggests that the latter's identification with Cen X-2 (Eggen, Freeman and Sandage, ApJ 154, L27, 1968) remains tentative.

4) For Sco X-1 the power spectrum was computed from a data set 44 min long recorded at the 60-inch telescope with 0.1 sec. time-resolution. This spectrum shows no periodic activity with amplitude greater than 0.002 mag for 120 > period > 0.2 sec. Combining this result with that of Hiltner and Mook (ApJ 150, 851, 1967), we note that Sco X-1 is aperiodic for the range, $3600 > P > 0.2$ sec, where P is the period. We can interpret the continouous power spectrum for $205 > P > 0.2$ sec to consist of two parts: a flat component due to the photon statistics of observing, and a decaying part with power spectrum proportional to f^{-2} for $P > 45$ sec. For $P < 45$ sec, the decaying part of the spectrum cannot be seen over the flat component. Data from more active phases of Sco X-1 are needed to extend the analysis to smaller periods.

5) An attempt to identify optically the pulsar, PSR 0833-45, gave a null result (see Nature 223, 485, 1969).

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COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 416

Konkoly Observatory
Budapest
1969 January 22

PROGRAMME OF COOPERATIVE OBSERVATIONS OF FLARE STARS FOR 1970

The Working Group on Flare Stars will continue to operate in the year 1970. From consultation with members of the international network an observing schedule for 1970 has been prepared as follows:

Principal Programmes

YZ CMi	January 31 - February 13
AD Leo	March 1 - March 15
V 1216 Sgr	June 26 - July 10
EV Lac	August 23 - September 9
UV Cet	September 22 - October 9

Additional Programmes

Wolf 359	March 30 - April 14
BD+13°2618	April 15 - April 28
Wolf 424	April 29 - May 13
V 645 Cen	May 28 - June 12

Further suggestions and requests for special programmes by the international network should be addressed to the Chairman of the Working Group. Acquaintance with the "Proposals to Flare Star Observers" (Ref. 1) may be useful to persons intending to join the Working Group.

REFERENCE

1) A.D.Andrews, P.F.Chugainov, R.E.Gershberg, V.S.Oskanjan, I.B.V.S. No.326, 1969

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COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 417

Konkoly Observatory
Budapest
1970 January 23

V 362 Her

V 362 Her = SVS 1248 was discovered in 1958 by Tsesevich (Astr. Circ. 195, 18, 21). He gave the following elements (contained in GCVS Index 1, 1960):

$$\text{Max.} = \text{J.D. } 2436344.489 + 0^{d}.61902 \cdot E$$
$$\text{RRab; } 13^{m}.2 - 14^{m}.2 \text{ ph}$$

He published 9 maxima (ph) and magnitudes for comparison stars.

On 118 plates of the 40cm astrograph of Sonneberg Observatory I examined this variable star and found that the above mentioned elements are incorrect.

New elements: $\text{Max.} = \text{J.D. } 2439098.447 + 0^{d}.718332 \cdot E$
$$\text{RRab; } M - m = 0^{P}.20$$
$$13^{m}.45 - 14^{m}.70 \text{ ph}$$

Observed maxima:

J.D. 24...	E	O–C
38 501.509	– 831	$-0^{d}.004$
532.396	– 788	– 5
560.426	– 749	+ 10
817.558	– 391	– 21
940.423	– 220	+ 9
39 184.646	+ 120	– 1
238.535	+ 195	+ 13
40 039.452	+1310	– 10
067.462	+1349	– 15

The elements do not represent the observed maxima from Tsesevich. Particulars will be published in "Mitteilungen der Bruno-H.-Bürgel-Sternwarte Hartha" Heft 2.

BUSCH, H.

Bruno-H.-Bürgel-Sternwarte Hartha

NP Her

NP Her = 482.1934 = P 4025 = DO 15453 (N) was discovered classified as a longperiodic variable by Morgenroth (AN __254__, 371, 1934). GCVS 1958 contains the following elements:

Max. = J.D. 2427560 + $2200^{d}/n$ (Mira type)

On 125 plates (panchromatic) of the Sonneberg Sky Patrol (J.D. 2438083 - 2440068) the little known variable was examined and 5 maxima were observed. We obtained the elements:

Max. = J.D. 2436976 + 448^{d} . E (M - m = $0\overset{p}{.}5$)

Observed maxima:

J.D. 24....	E	O-C
38300	+ 3	- 20^{d}
38820	+ 4	+ 52
39238:	+ 5	+ 22
39643	+ 6	- 21
40080:	+ 7	- 32

Further particulars will be published in "Mitteilungen der Bruno-H.-Bürgel-Sternwarte Hartha" Heft 2.

BUSCH, H. HÄUSSLER, K.

Bruno-H.-Bürgel-Sternwarte Hartha

COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 418

Konkoly Observatory
Budapest
1970 January 23

AUTOCORRELATION ANALYSIS OF DQ Her AND RW Tri

The photoelectric observations of DQ Her and RW Tri made by M.Walker [1,2,3] were subjected to autocorrelation analysis. Observations with yellow filter were used. To investigate only intrinsic variations all observations at eclipse (phases from 0.90 up to 1.10) were excluded.

The standardized coefficient of correlation $r(\tau)$ was calculated by using the formula:

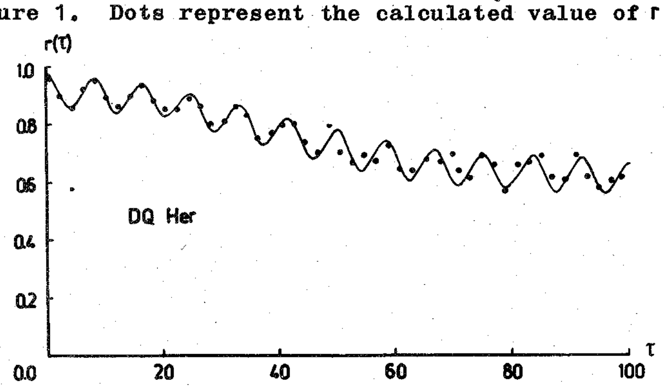
$$r(\tau) = \frac{\sum u_i \cdot u_{i+\tau}}{\sqrt{\sum u_i^2 \cdot \sum u_{i+\tau}^2}}\ ; \qquad \tau = n \cdot \Delta t\ ; \qquad u_i = m_i - \bar{m}\ ;$$

where: $n = 1, 2, 3, \ldots\ldots 100.$
$\Delta t = 0^d.0001 = 8^s.64$
m_i = observed brightness at a moment i
$\bar{m}$ = mean quantity of brightness.

The method of correlation analysis for the series with gaps was described in [4] . Being applied to the observations concerned such treatment gives a possibility to reveal periods from 0.5 up to 30 minutes. All calculations were performed on the M - 220 computer.

DQ Her

Correlation function for DQ Her is shown on Figure 1. Dots represent the calculated value of $r(\tau)$ while



the solid line is the function

$$r_0(\tau)=0.86\cdot\exp\left[-\left(\frac{\tau}{153}\right)^2\right]+0.07\,\mathrm{Cos}\left(\frac{2\pi\tau}{116}\right)+0.06\,\mathrm{Cos}\left(\frac{2\pi\tau}{8.5}\right)$$

Thus, on the time scale from 0.5 up to 30 minutes the process of light variation of DQ Her may be mathematically represented as a sum of three independent processes:

a) accidental fluctuations. The term $\left\{e^{-\left(\frac{\tau}{153}\right)^2}\right\}$ in the expression of $r_0(\tau)$ corresponds to this process.

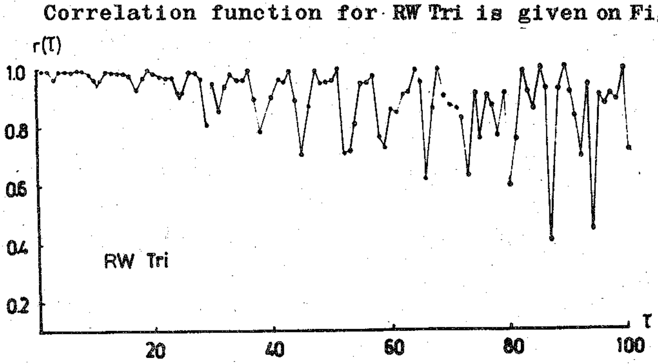
b) harmonic variations $\left\{\mathrm{Cos}\left(\frac{2\pi\tau}{116}\right)\right\}$ with the period about 17 minutes, but perhaps with random phase.

c) short-period sinusoidal oscillations $\left\{\mathrm{Cos}\left(\frac{2\pi\tau}{8.5}\right)\right\}$ with the period $71^{s}.71 \mp 0^{s}.68$.

Relative energy contribution of each process is accordingly 1.0 : 0.3 : 0.2.

RW Tri

Correlation function for RW Tri is given on Figure 2.



It seems hardly possible to select any analytical expression for this curve. From the examination of the fig.2 one may conclude that there are two processes:

a) accidental fluctuations,

b) short-period variations with the period $60^{s}.48 \mp 0^{s}.35$.

As stated above 1.2 - minute variations of DQ Her have harmonic shape (see also [5] while 60^{s} variations of RW Tri reveal pulse features. Neither amplitude nor polarity of these shortest variations were possible to determine.

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REFERENCES

1. M.F.Walker, 1956, ApJ 125, N1.
2. M.F.Walker, 1958, ApJ 127, N2.
3. M.F.Walker, 1963, Contr.Lick Obs., N 145.
4. F.I.Lukatskaya, 1967, Perem. Zv., (SU), 16, N 2.
5. R.E.Nather, B.Warner, 1969, MN, 143, 145.

COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 419

Konkoly Observatory
Budapest
1970 February 19

PHOTOELECTRIC MINIMA OF ECLIPSING VARIABLES

In the table, fourteen photoelectric minima of 11 eclipsing binaries are given. The data were obtained at the Bucharest Astronomical Observatory. (O-C)-s were computed with the elements from the "Rocznic Astronomiczny 1969"

J.D.	E	(O-C)	n	Observer
44i Boo				
2440325,4556	11052	+0.0222	42	Al.Dumitrescu
333.3541	11081.5	+0.0212	46	Al.Dumitrescu
339.3816	11104	+0.0219	31	Al.Dumitrescu
U Oph				
392.4230	2185	-0.0020	60	Al.Dumitrescu
ZZ Boo				
410.3757	1911	-0.0026	16	Al.Dumitrescu
839 Oph				
421.4220	9926	+0.0099	15	H.Minti
448.4129	9992	+0.0072	23	H.Minti
836 Cyg				
455.3740	21285	-0.0013	28	Al.Dumitrescu
U Sge				
463.4436	1067	+0.0035	53	Al.Dumitrescu
S Equ				
466.3637	727	-0.0044	42	Al.Dumitrescu
Z Vul				
475.3629	6118	+0.0086	52	H.Minti
β Per				
477.4796	491	+0.0047	48	H.Minti
TV Cas				
502.3569	11246	+0.0029	35	H.Minti
Y Cyg				
504.2845	460	+0.0109	51	Al.Dumitrescu

PHOTOELECTRIC MAXIMA OF XZ DRA

2440385.4663	2884	+0.0316	Al.Dumitrescu, N.Lungu
386.4271	2886	+0.0394	H.Minti, N.Lungu

January 21, 1970

C. POPOVICI

Bucharest Observatory
Astrophysical Section

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Budapest
1970 February 20

THE 3323 VARIABLE STARS IN OR PROJECTED ON THE MAGELLANIC CLOUDS DOWN TO -0.8 ABSOLUTE MAGNITUDE

From 1895 till 1950 the Harvard College Observatory searched variable stars in the Magellanic Clouds, rounding up more than 3000 variables to which 150 were added during the investigation from 1962 performed by Cecilia Payne-Gaposhkin and myself. We thoroughly "sieved" all announced variables by making more than two million photographic and more than 10,000 photovisual observations on some 2000 plates. The final results are in the table, expressing the distribution of eleven classes of variability in the two nearest galaxies.

Class of Variables	Large Magellanic Cloud	Small Magellanic Clou
Classical Cepheids	1128	1116
Irregular Normal	314	162
Irregular Important	88	?
Eclipsing Variables	76	32
Questionables	72	25
Long Periodic	50	24
Possibly Cepheid	33	60
RR Lyrae Variables	30	31
Link-Cepheids	2?*	39
Undecods	23	?
W Virginis	16	2
Total	1832	1491

*These are RR Lyrae in one of the mini star clusters and included as the Link-Cepheids only because this cluster is situated almost exactly between the Cloud and the Milky Way.

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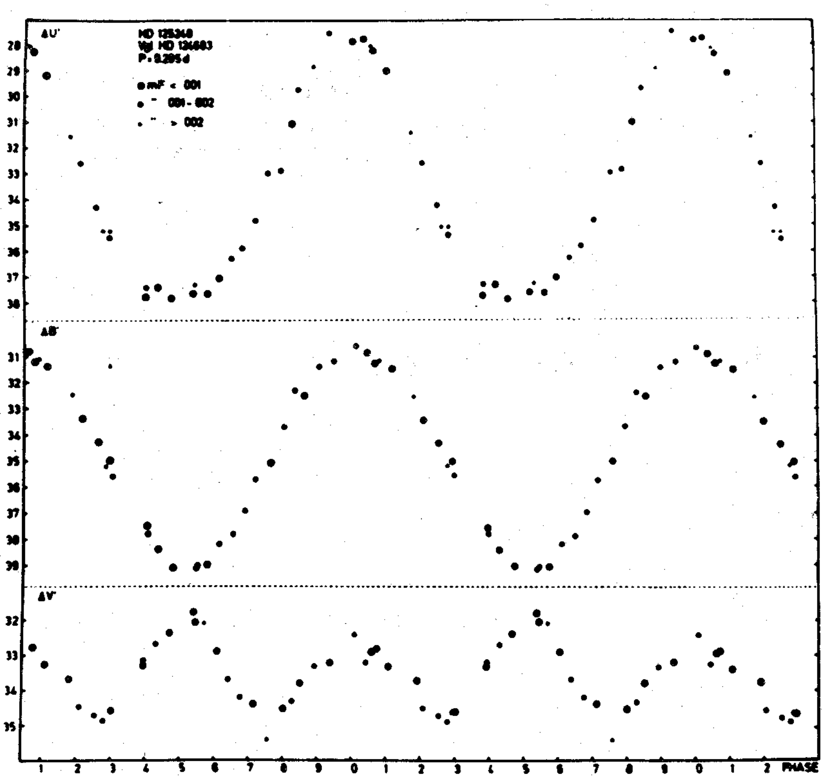
Budapest
1970 February 26

OBSERVATIONS PHOTOELECTRIQUES DE HD 125248

Continuant et complétant les observations photoélectriques dans la lumière integral par STIBBS (1) j'ai obtenu des mesures dans le système UBV de la variable magnétique HD 125248 avec le 24"-telescope cassegrain d'Institut Astronomique de l'Université de Bochum a La Silla, Chile. 28 registrations dans un interval de plus que 4 périodes avec l'étoile de comparaison HD 124683 donnent les resultats suivants:



1) La période determinée par STIBBS (1) a été confirmée entre les limites d'erreur.
Le maximum bleu: JD 2440382.25 + $9^{d}.295$E.

2) La courbe de lumiere visuelle montre une "double-onde", où le maximum secondaire a une amplitude majeure que le maximum primaire.

3) Les variations d'intensité dans le système d'observateur se montent à: $\Delta U = 0^{m}104$, $\Delta B = 0^{m}084$, $\Delta V = 0^{m}024$ (moyenne)

4) Le maximum d'intensité ultra-violette arrive presque 0.025 phase plus tôt que ce en B.

La courbe de lumière est presentée par la figure 1. Une publication detaillée apparaîtra dans "Astronomy and Astrophysics".

H.M.MAITZEN

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(1) STIBBS, D.W.N. M.N. 110, 395, 1950.

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1970 March 4

ON FOUR VARIABLE STARS IN THE GLOBULAR CLUSTER M 2

Four variable stars (V18, 19, 20 and 21) were discovered in 1967 by R.Margoni and R.Stagni (1) and preliminarily investigated by myself (2). According to 160 estimates on Moscow plates obtained in 1960, 1963, 1968 and 1969 and about 170 estimates in B and 90 in V by R.Margoni and R.Stagni (3) (1965-1968) the following results were established:

V 18 Very interesting star with strong variable period and light curve. The following four systems of linear elements were obtained:

I. Before JD 2437450	t_0=2437162.392+$0^d.36201$. E
II. From 2437450 to 39250	t_0=2438282.178+0.36189. E
III. From 2439250 to 39950	t_0=2439351.255+0.36205. E
IV. From 2439950 to	t_0=2440088.467+0.36226. E

V 19 Two systems of linear elements represent all observations very well.

I. Before JD 2438850	t_0=2437162.373+$0^d.319299$.E
II. After JD 2438850	t_0=2439089.384+0.319403.E

V 20 The following linear elements represent satisfactorily all available observations from JD 2437087 to 2440478:

$$t_0 = 2437162.281 + 0^d.2863224.E.$$

V 21 Two systems of linear elements were determined:

I. Before JD 2439700	t_0=2437162.376+$0^d.712154$.E
II. After JD 2439700	t_0=2439789.516+0.712178.E

The symbol t_0 denotes the moment of the median magnitude on the ascending branch of the light curve.

References:
1. R.Margoni, R.Stagni, IBVS 239, Dec.9, 1967
2. B.Kukarkin, IBVS 253, Febr.8,1968 and 254, Febr.16,1968.
3. R.Margoni, R.Stagni, Asiago Contr. 213, 1969.

Crimean Station of Sternberg Astronomical Institut
February 1970

B.KUKARKIN

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NUMBER 423

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Budapest
1970 March 20

PHOTOELECTRIC OBSERVATIONS OF THE FLARE STAR YZ CMi

In this Bulletin we give preliminary results of our photoelectric observations of the flare star YZ CMi carried out at the Catania Astrophysical Observatory during the co-operative campaign organized by the Working Group on Flare Stars for the period January 31 to February 13, 1970 (Andrews and Chugainov, 1970).

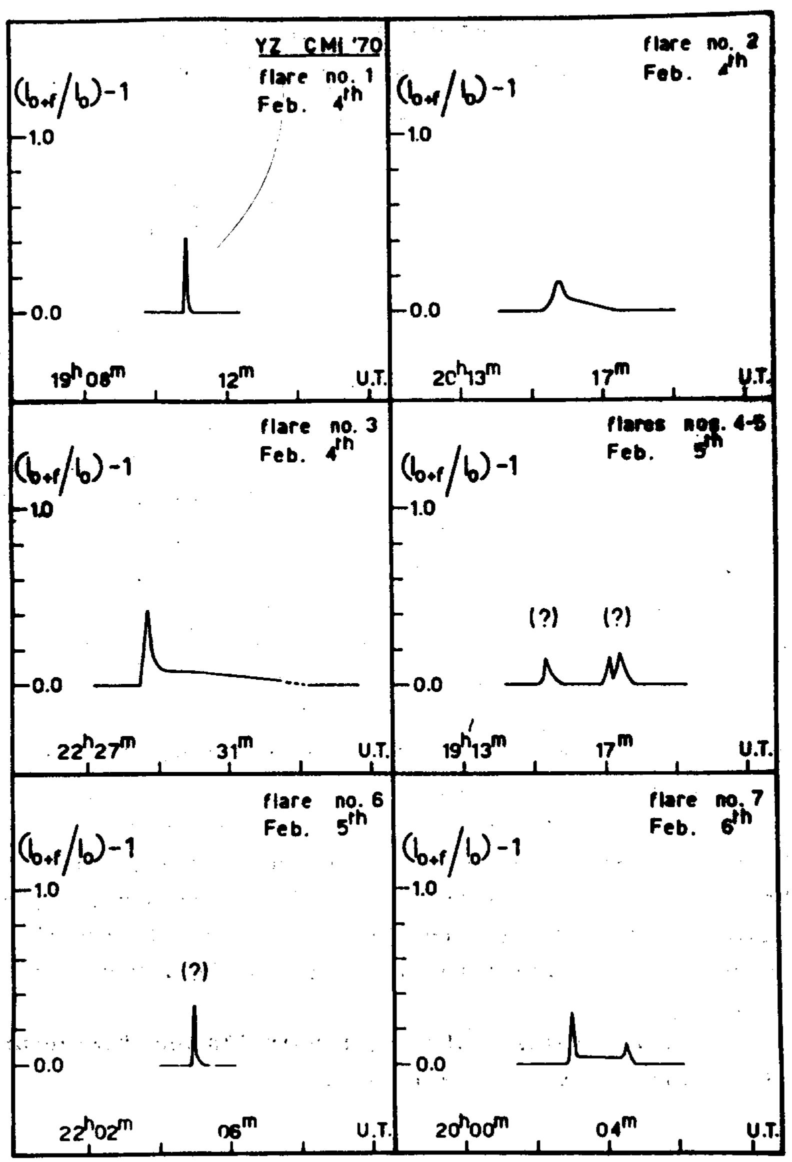
The observations were performed with an EMI 6156 A photomultiplier attached to a 61 cm of aperture quasi-cassegrain reflector. As a rule,a Schott filter combination (BG 12/1 + GG 13/2) was used. Some short V measurements, which were carried out in order to determine the colour index of YZ CMi are also included.

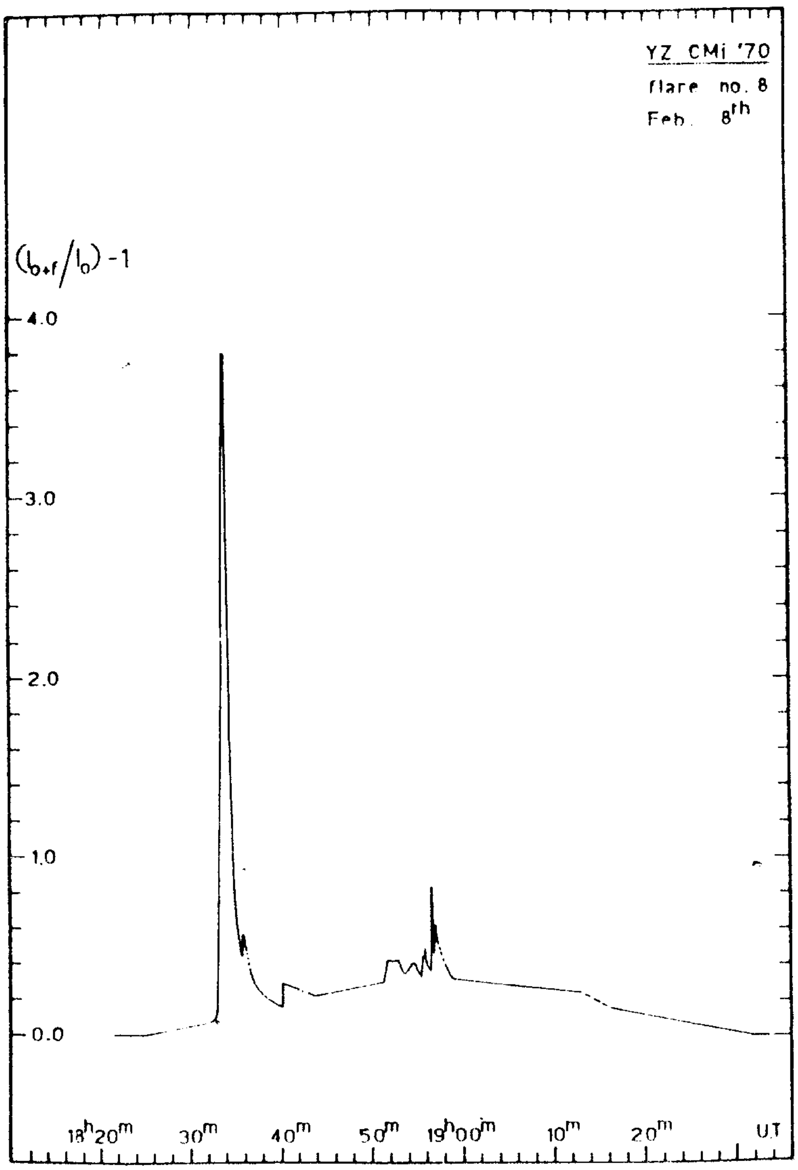
In Table 1 the effective time coverage is given. The total number of observation hours is 35.7. In Table 2 the characteristics of the 11 observed flares are reported. Figures 1, 2 and 3 give the light curves of the observed flares in the relative intensity scale versus Universal Time.

C. Lo Presti, G.Russo, F.Spinella and V.Stancanelli collaborated in the present work.

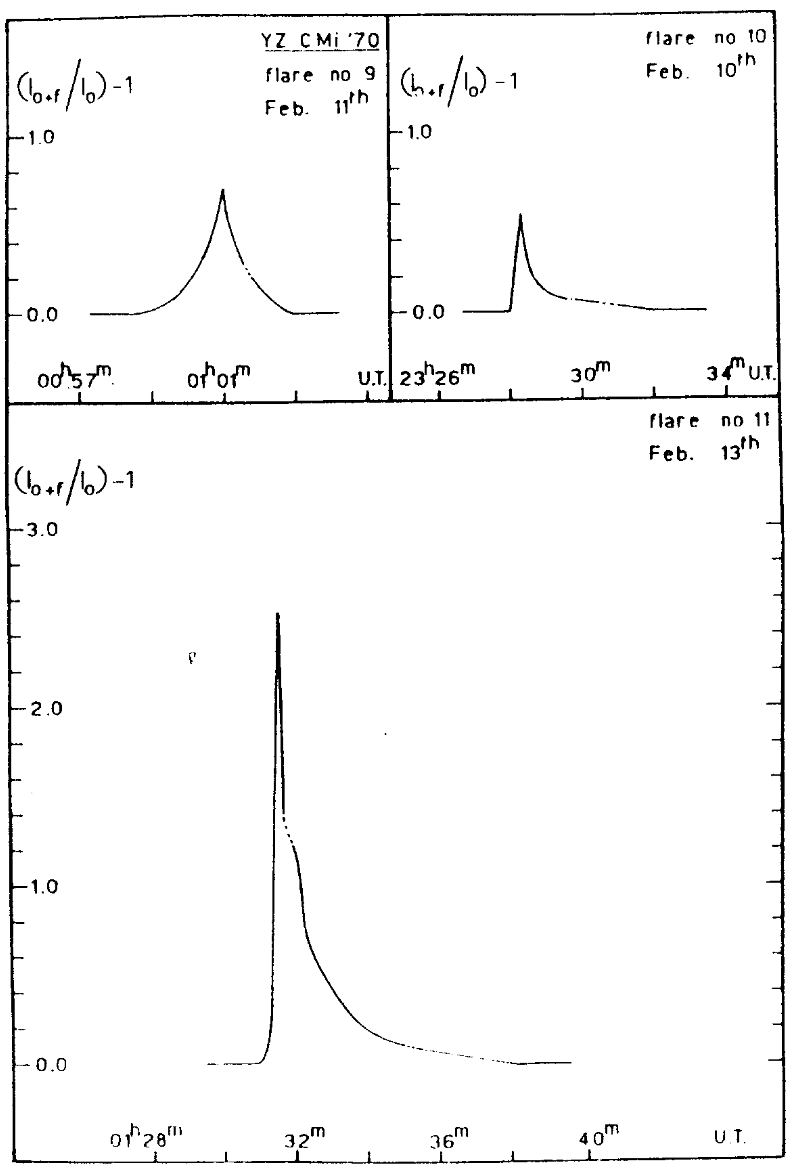
Reference

Andrews,A.D., Chugainov,P.F. 1970. Comm.27 IAU Inf.Bull. Var.Stars. No.416.


YZ CMi '70
flare no. 1
Feb. 4th
$(l_{o+f}/l_o)-1$
1.0
0.0
19^h08^m
12^m
U.T.
flare no. 2
Feb. 4th
20^h13^m
17^m
flare no. 3
Feb. 4th
22^h27^m
31^m
flares nos. 4-5
Feb. 5th
(?)
(?)
19^h13^m
17^m
flare no. 6
Feb. 5th
(?)
22^h02^m
06^m
flare no. 7
Feb. 6th
20^h00^m
04^m



YZ CMi '70
flare no. 8
Feb. 8th
$(I_{o+f}/I_o)-1$
4.0
3.0
2.0
1.0
0.0
18h20m
30m
40m
50m
19h00m
10m
20m
UT



YZ CMi '70
flare no 9
Feb. 11th
$(I_{o+f}/I_o)-1$
1.0
0.0
00h57m
01h01m
U.T.
flare no 10
Feb. 10th
$(I_{o+f}/I_o)-1$
1.0
0.0
23h26m
30m
34m U.T.
flare no 11
Feb. 13th
$(I_{o+f}/I_o)-1$
3.0
2.0
1.0
0.0
01h28m
32m
36m
40m
U.T.

TABLE 1

Date 1970 Feb.	F	COVERAGE (U.T.)	$\overline{m_{lim} - m_o}$
2	B	19^h58^m–20^h02^m; 2004–2008; 2015–2016;	
		2017–2018; 2029–2039; 2040–2054;	
		2103–2108; 2117–2129; 2140–2144;	+ 3^m02
3	B	2254–2301; 2303–2314; 2320–2354;	
		2357–2359	+ 3.23
4	B	0000–0049; 0053–0137; 1823–1915; 1921–1932;	
		1957–2018; 2020–2039; 2041–2100;	+ 3.23*
		2109–2130; 2132–2149; 2213–2242;	
		2243–2252; 2258–2348;	+ 3.54
	V	1945–1946; 1947–1948; 2208–2209; 2210–2211	+ 4.61
5	B	0010–0020; 0022–0059; 0104–0118; 0130–0200	+ 3.54*
		1832–1928; 1955–1959; 2001–2012;	
		2014–2120; 2156–2241; 2256–2352	+ 3.89
	V	0006–0007; 0008–0009; 1950–1953; 2140–2143	+ 4.61
6	B	0023–0050; 0052–0144; 1915–1919; 1936–2015;	
		2033–2116; 2118–2212; 2215–2230;	+ 3.89*
		2233–2245	+ 3.74
	V	0018–0022	+ 4.70
8	B	1803–1913; 1916–1932; 1956–2059;	
		2100–2236; 2243–2314; 2317–2353	+ 3.88
	V	1952–1953; 1954–1955	+ 4.72
9	B	0019–0116	+ 3.88
	V	0012–0013; 0014–0015; 0138–0139; 0140–0141	+ 4.72
10	B	2222–2243; 2303–2350; 2359–2400	+ 3.58
11	B	0000–0024; 0032–0044; 0102–0132.	
		2021–2041; 2107–2157; 2205–2225; 2227–2244;	+ 3.58*
		2246–2304; 2305–2324; 2326–2400	+ 3.35
12	B	0000–0003; 1934–1936; 1938–2037;	
		2041–2110; 2124–2233; 2243–2333;	+ 3.35*
		2335–2400	+ 3.04
	V	1807–1906; 1913–1932	+ 3.62
13	B	0000–0007; 0009–0043; 0107–0202	+ 3.04*
		1802–1813; 1814–1852; 2359–2400	+ 2.82
14	B	0000–0015; 0017–0028; 0030–0045;	
		0106–0115; 0118–0128; 0129–0143	+ 2.82

F = Schott filters (B = BG 12/1 + GG13; V = GG 14/2) $\overline{m_{lim}} - \overline{m_o} = -2.5 \log (3\sigma/I_o)$, where σ represents the standard deviation of the mean random noise fluctuation for a night and I_o represents the mean intensity of the quite star during the same night.

*The underlined values of $\overline{m_{lim} - m_o}$ refer to the underlined coverage.

TABLE 2

no	t_{max} 1970 Feb	d_b	d_a	$m_{lim}-m_o$	$(m_f-m_o)_{max}$	P	a	b
1	4, $19^h10.8^m$	0.01^{min}	0.2^{min}	$+3^m.36$	$+0^m.92$	0.03^{min}	-	0
2	4, 20 15.8	0.3	1.6	+3.63	+1.92	0.11	4	0
3	4, 22 28.7	0.2	4.5	+3.45	+0.94	0.33	-	0
4	5, 19 15.3	0.05	0.5	+3.75	+2.06	0.03	1	0
5	5, 19 17.4	0.2	0.4	+3.75	+1.86	0.07	1	0
6	5, 22 05.0	0.1	0.2	+3.96	+1.20	0.02	1	0
7	6, 20 03.0	0.1	1.9	+3.73	+1.34	0.10	2	2
8	8, 18 33.5	0.7	59.0	+3.57	-1.45	16.99	3	1
9	9, 01 01.0	2.4	1.9	+3.37	+0.38	0.64	4	0
10	10, 23 28.3	0.3	3.6	+3.53	+0.67	0.38	-	1
11	13, 01.31.5	0.5	6.3	+3.70	-1.00	2.29	-	0

t_{max} = date and U.T. of the flare maximum; d_b = duration of the flare before maximum; d_a = duration of the flare after maximum including whatever post-maximum activity; $m_{lim} - m_o = -2.5 \log (3\sigma/I_o)$ where σ and I_o indicate the standard noise fluctuation and the mean intensity of the quiet star near the observed flare, respectively; $(m_f-m_o)_{max} = -2.5 \log [(I_{o+f} - I_o)/I_o] max$, where I_{o+f} is the intensity deflection due to the quiet star (I_o) plus that of flare (I_f) at maximum; $P = \int (I_{o+f} - I_o)/I_o \, dt$, integrated intensity in minutes; a = flare feature: 1 - uncertain, 2 - double, 3 - multiple, 4 - complex structure; b = sky condition with the following standard: 0 - very clear, 1 - clear, 2 - with some cirrus.

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COMMISSION 27 OF THE I. A. U.
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1970 March 31

THE HIGH VELOCITY VARIABLE QT CrA

Ahnert (1) drew attention to the fact that of the stars listed as galactic cepheids in the Variable Star Catalogue (2), QT CrA has an exceptionally long period (79 days). Besides being of interest for this reason, the star has recently assumed some importance as being used in a comparison of SMC cepheids with their galactic counterparts (3). Suspicion that the star may not be a normal population I cepheid is aroused by the fact that the period is known to vary ($78^d.57$ to $79^d.14$) and that the (objective prism) spectral type is given variously as Ae or Fe to K (4) and Me (5). Possibly these considerations led Petit (6) to classify the star as a type II cepheid. The period would of course be unusually long for this type of star also. The star has been observed spectroscopically a few times during recent years with the 1.88m (74 inch) Radcliffe reflector. Three spectra at 48 A/mm at $H\gamma$ (Cassegrain, two-prism spectrograph) are listed in the Table. None of the spectra are suitable for accurate spectral classification but the spectrum seems to be peculiar and probably that of a metal weak G type star. These three plates in the blue region all show hydrogen in absorption although the spectrum on 1967 May 3 shows very weak emission wings on either side of $H\beta$. The last plate listed in the Table covers the red region at 82 A/mm (coudé, grating spectrograph with f/1 camera). This shows $H\alpha$ to be double in emission with the red component strongest. Judging from the report of $H\gamma$ and δ in emission on one objective prism plate (M.W. Mayall see (4)), the hydrogen emission can at times become quite intense. The chief point of the present note is to draw attention to the very large, negative, radial velocity of the variable. The measured velocities are listed in the Table with the number of lines used in brackets. For the blue spectra the lines recommended by the Victoria workers for late type stars (7) were used. The measures on the red plate refer to $H\alpha$ and it is clear that the absorption (or gap) between the two emission peaks agrees reasonably well with the absorption velocities in the blue region. The peculiar spectroscopic features and the high velocity show that the star should not be classed

TABLE

48 A/mm spectra (blue region)		Radial Velocity km/sec
1966 May 30		-362 (5)
1967 May 30		-361 (10)
1967 May 17		
82 A/mm spectra (red region)		
1969 Aug. 2	Hα	em -465
		abs -373
		em -280

with population I cepheids. Further work (especially photometric observations) should allow the star to be classified more exactly. It seems likely however that the star belongs to the SRd class or (like TY Vir for instance (8) (9)) is related to this class. These stars are high velocity metal poor objects lying in the HR diagram near the termination point of the giant branch of halo globular clusters. The mean radial velocity of QT CrA is -362 km/sec or, corrected for local solar motion, -354 km/sec. Since the star lies close to the direction of the galactic centre ($l^{II} = 352°.6$ $b^{II} = -09°.8$), the measured radial velocity (of which only a small amount is likely to be due to atmospheric pulsation effects) must chiefly reflect a very high velocity radially outwards in the Galaxy (the U component). Comparison with the data for halo stars discussed by Oort (10) or Eggen (11) suggests that the U component velocity of QT CrA must be amongst the largest known.

Radcliffe Observatory,
Pretoria,
March 1970.

M.W.FEAST

1. P.Ahnert, Kleine Veröff. Remeis - Sternwarte (1965 Bamberg Colloquium) Bd IV no 40, 237, 1965.
2. B.V.Kukarkin, P.P.Paranago, Yu.I.Efremov, and P.N.Kholopov, General Catalogue of Variable Stars Moscow 1958.
3. A.M. van Genderen, B.A.N. 20, 317, 1969.
4. C. Payne-Gaposchkin H.A. 115, 149, 1952.
5. A.J.Cannon and M.W.Mayall,HA 112 Chart 191 (HDE 325013), 1949.
6. M.Petit, Ann Astrophys. 23, 681, 1960.
7. J.K.McDonald, J.R.A.S. Canada 42, 220, 1948.
8. J.A. Wright and P.C.Keenan, Ap.J. 127, 506, 1958.
9. G.Preston and G.Wallerstein, Ap.J. 138, 820, 1963.
10. J.H.Oort in Galactic Structure Ed. A. Blaauw and M.Schmidt, University of Chicago Press 1965 p.455.
11. O.J.Eggen, Royal Obs.Bul. no.84, 1964.

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INFORMATION BULLETIN ON VARIABLE STARS

NUMBER 425

Konkoly Observatory
Budapest
1970 March 31

PHOTOGRAPHIC OBSERVATIONS OF UV Ceti
(October, 3-18, 1969)

According to the program published in the Inf.Bull. IAU Comm. 27 (1) photographic observations of UV Ceti have been carried out at Abastumani Astrophysical Observatory from 3- to 18 October 1969. Through the use of a special automatic camera adjusted at the primary focus of the telescope almost continuous photography of the star was performed.

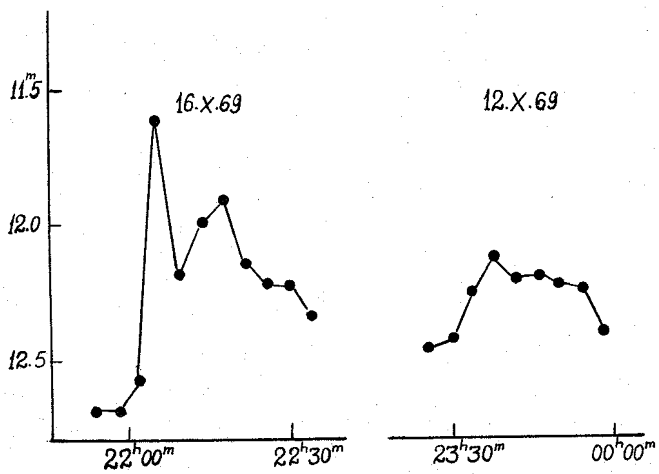
The photographs were obtained on KH-3 film without a filter, the exposures, in most cases, being 4 minutes. Time intervals are given in the table below, when continuous observations were carried out over 9 nights.

8.10.69	19^h53^m - 21^h48^m	13.10.69	00^h00^m-00^h24^m
	22 06 - 22 46	14.10	19 00 -24 00
9.10	19 10 - 20 22	15.10	00 00 -01 04
10.10	18 58 - 24 00		18 53 -24 00
11.10	00 00 - 01 04	16.10	00 00 -01 00
	19 28 - 21 32		19 00 -24 00
	21 54 - 22 12	17.10	00 00 -00 58
12.10	19 00 - 20 00		19 22 -24 00
	20 09 - 24 00	18.10	00 00 -00 34

The total length of continuous observations amounts to 40^h51^m. More than 600 photonegatives are obtained. A flash at 23^h38^m (U.T.), 12 October with an amplitude about 0.3 magn. and a flare at 22^h06^m, 16 October with an amplitude of about 1 magn. have been fixed.

Mean moments of exposure are indicated here, for the cases of greatest brightness. Microphotometry of the photographs, obtained at the moments near to flares, has been done.

The comparison stars were used from (2). The results of microphotometric estimations of magnitudes are given in table and on the diagram (see figure).



16.10.1969

No	U.T.	m_{pv}
1	21^h54^m	$12^m.68$
2	21 58	12.69
3	22 02	12.58
4	22 06	11.61
5	22 10	12.18
6	22 14	11.99
7	22 18	11.91
8	22 22	12.14
9	22 26	12.22
10	22 30	12.23
11	22 34	12.35

12.10.1969

No	U.T.	m_{pv}
1	23^h26^m	$12^m.46$
2	23 30	12.44
3	23 34	12.26
4	23 38	12.14
5	23 42	12.21
6	23 46	12.20
7	23 50	12.24
8	23 54	12.26
9	23 58	12.43

Mean square error of one estimation equals to $\pm 0^m.05$.

References

1. A.D.Andrews, P.F.Chugainov, V.S.Oskanian
   Comm.27, IAU Inf.Bull.Var.Stars, 1968, No.318
2. W.J.Luyten, AphJ 109, 532, 1949.

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NUMBER 426

Konkoly Observatory
Budapest
1970 April 6

FLARES OF YZ CMi OBSERVED AT OKAYAMA, 31 JANUARY TO 13 FEBRUARY, 1970

A continual photoelectric monitoring of the flare star YZ CMi was done with the 91 cm reflector of the Okayama Station from 31 January to 13 February, 1970. During the 68 hours of monitoring in B, 20 flares were observed as shown in the following table.

Date 1970	time of monitoring (UT)	time of max (UT)	$m_f(B)$	P	Duration	σ
Jan. 31	10^h37^m-11^h42^m					0.05^{mag}
Feb. 1	10 10 -10 46	$10^h22^m\!.6$	0.64^{mag}	0.8^{min}	5^{min}	0.05
	11 21 -12 13					0.05
	13 04 -13 39					0.05
	14 01 -14 28					0.05
	14 33 -14 48					0.05
	14 56 -15 05					0.05
	15 13 -15 28					0.05
	15 46 -18 02	16 11.2	>4.3	>141	>94	0.05
		17 28.9	>0.37			cloudy
2	11 59 -12 55					0.03
	14 40 -14 51					0.03
	15 20 -18 40					0.03
3	9 58 -13 48	11 37.3	0.27	3.5	2.5	0.04
	15 11 -16 10					0.04
	16 38 -17 28					0.04
4	9 58 -14 28	10 36.9	0.43	1.1	10	0.04
		13 12.9	0.31	0.2	3	0.04
		13 18.8	0.15	0.05	1	0.04
	15 15 -15 43					0.04
5	9 03 -12 40	11 14.6	0.34	1.7	15	0.03
	17 05 -18 40					0.03
6	9 36 -10 10					0.06
	10 21 -18 10	11 13.4	0.34	0.2	0.5	0.05
		16 54.2	0.45	0.3	2	0.05
8	10 40 -15 34	14 17.0	0.27	0.5	3.5	0.04
		14 50.5	0.44	0.2	1.5	0.04
9	15 35 -17 40					0.04
10	10 42 -11 50					0.02
	12 28 -14 34	13 26.2	0.40	0.2	1.5	0.02

Date 1970	time of monitoring (UT)	time of max (UT)	m_f(B)	P	Duration	σ
Feb.11	$10^h45^m-17^h40^m$	$11^h35^m.5$	0.14^{mag}	0.6^{min}	8^{min}	0.03^{mag}
		13 38.5	0.33	0.1	1	0.03
		13 48.7	0.23	0.3	4	0.03
		13 59.3	0.31	0.2	2.5	0.03
		15 35.6	0.10	0.1	1	0.03
		15 42.0	0.13	0.4	5	0.03
		16 09.6	0.18	0.1	0.6	0.03
12	9 44 -13 28	9 48.5	>0.93	>8	19	0.04
	14 13 -18 13					0.04
13	9 45 -18 15					0.04

The definitions of m_f(B) and σ are as follows:

$$m_f = m_o - 2.5 \log I_{o+f}/I_o,$$

$$P = \int (I_{o+f} - I_o)/I_o \cdot dt,$$

$$\sigma(\text{mag}) = 2.5 \log (I_o + \sigma)/I_o.$$

Tokyo Astronomical Observatory
17 March 1970

K.OSAWA K.ICHIMURA
T.NOGUCHI E.WATANABE
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COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS

NUMBER 427

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Budapest
1970 April 12

LIST OF PROBABLE DELTA SCUTI STARS

There is recently a tremendous progress in the search of Delta Scuti stars. Some years age only five stars of this type were known, today their number already reached almost fourty.

Below a list of 45 bright stars which are probable variables of Delta Scuti type is given. Published photoelectric data for these stars permit us to suspect light variability with the typical amplitude of some hundredths of a magnitude. All these stars have spectral classes in the range A0-F6 and luminosity classes III-V (or other indications of the luminosity in this range). Colour indices (B-V) and (U-B) of the suspected variables indicate the typical location of Delta Scuti stars in the (U-B)-(B-V) diagram: somewhat below the main sequence. Radial velocities of these stars are as small as those of Delta Scuti variables.

In column seven of the Table the absolute magnitudes based on the values of the trigonometric parallax ($\pi \geq 0\overset{''}{.}030$) are represented. If the M_V value is not "trigonometric" that is explained in the remarks, which are indicated by asterisks. In column eight the values of the radial velocities are given.

No	HD	CSV	V	B-V	Sp	M_V	V_r
1	1404	100011	4.53	0.05	A2V	-	- 8 km/s
2	6763	-	5.67	0.32	F2V	+2.6	+ 7
3*	6961	100091	4.32	0.17	A7V	-	+ 9
4*	11636	100146	2.64	0.13	A5V	+1.6	- 2
5	16765	102388	5.80	0.51	dF6	-	+ 8
6	16861	100212	6.30	0.06	A2V	-	+ 6
7*	17584	-	4.22	0.34	F2III	+1.75	+14
8	17904	102394	5.34	0.43	F4IV	-.	+ 6
9*	19978	100263	5.45	0.19	A4n	+1.8	+ 4
10	21447	100281	5.08	0.05	A1V	-	0
11*	23567	102421	8.28	0.36	A9V	-	+10
12*	26015	102432	6.01	0.40	F3V	-	+36
13	27290	6101	4.25	0.32	F2IV	+2.9	+27
14*	30020	6130	6.83	0.38	F5III	+1.6	+40
15*	40873	100709	6.45	0.18	A7III	+1.54	+20
16	43378	102500	4.47	0.01	A2V	+2.2	- 4

No	HD	CSV	V	B-V	Sp	M_V	V_r
17	48737	100763	3.34	0.44	F5IV	+1.8	+25 km/s
18	55130	102547	6.44	0.46	dF6	-	-13
19*	56537	100844	3.58	0.11	A5V	+1.7	- 9
20*	57749	-	5.84	0.35	gF3	+0.25	+11
21*	60489	6589	6.53	0.23	Am	+1.26	+46
22*	71297	100957	5.58	0.22	dF0	+2.50	+27
23*	87696	6770	4.48	0.19	A7V	+2.37	-18
24	97603	101190	2.55	0.13	A4V	+0.6	-21
25	99028	101199	3.93	0.41	F2IV	+2.3	-10
26	102647	101225	2.12	0.09	A3V	+1.5	0
27*	107259	101264	3.88	0.03	A2V	-	+ 2
28	111604	6964	5.90	0.15	A2V	-	-14
29*	116842	101383	4.01	0.16	A5V	+1.91	- 8
30	118232	101392	4.70	0.12	A5V	+2.1	-12
31	125161	101436	4.75	0.20	A7V	+3.0	-17
32	128167	-	4.45	0.36	F2V	+3.5	0
33*	137391	-	4.30	0.30	F0V	+1.9	-10
34*	142105	101534	4.31	0.04	A3V	-	-16
35*	148898	7382	4.45	0.12	A7p	+1.8	+ 2
36*	159561	101662	2.08	0.15	A5III	+0.8	+13
37	164136	-	4.48	0.39	F2III	-	-22
38*	173648	101763	4.37	0.18	A4m	+0.76	-26
39*	182640	101835	3.36	0.32	F0IV-V	+2.4	-30
40	192514	102988	4.83	0.10	A5IIIn	-	-21
41*	192696	-	4.32	0.12	A3V	-	-26
42*	202444	102076	3.73	0.38	F5IV	+2.0	-21
43*	210418	102151	3.52	0.08	A2V	+1.6	- 6
44*	217782	103110	5.08	0.08	A3Vn	+3.7	+ 2
45	222602	102277	5.88	0.10	A3Vn	-	+ 1

Remarks

3 = HD 6961 : Spectroscopic binary.

4 = HD 11636: Spectroscopic binary.

7 = HD 17584: O.J.Eggen (ApJ 155,701, 1969) considers this star to be a Delta Scuti variable and gives M_V(s) from ubvy-photometry

9 = HD 19978: M_{vis} is obtained from the spectroscopic parallax (W.S.Adams et al., ApJ 81, 187, 1935).

11 = HD 23567: In the Pleiades cluster (HII No 1266).

12 = HD 26015: In the Hyades cluster.

14 = HD 30020: F-component of the double system. O.J. Eggen (ApJ 155, 701, 1969) considers this star to be a Delta Scuti variable and gives M_V(s) value from the ubvy-photometry.

15 = HD 40873: I.J.Danziger and R.J.Dickens (ApJ 149, 55, 1967) suspected light variability. M_V(s) from ubvy-photometry.

19 = HD 56537: Spectroscopic binary.
20 = HD 57749: M_V(s) from ubvy-photometry.
21 = HD 60489: Metallic star. M_V(s) from ubvy-photometry.
22 = HD 71297: Probable metallic star. M_V(s) from ubvy-photometry.
23 = HD 87696: M_V(s) from ubvy-photometry. Amplitude of light variation is about $0^m.09$. Mean period is near $0^d.1$ according to G.Jackisch (VSS 5, H.1, 1963).
27 = HD 107259: Spectroscopic binary.
29 = HD 116842: Member of UMa cluster.
33 = HD 137391: Spectroscopic binary.
34 = HD 142105: Light variahility suspected by R.H.Baker (PASP 38, 95, 1926) from photoelectric data.
35 = HD 148898: Sr, Cr-star.
36 = HD 159561: Spectroscopic triple with P = $0^d.96$.
38 = HD 173648: A-component of a Beta Lyrae system. Spectroscopic binary with P = $4^d.30$. Metallic star. M_V from C.R.Tolbert (ApJ 139, 1105, 1964).
39 = HD 182640: Spectroscopic binary. V_r varies with P=3^h48^m and amplitude of 40 km/s.
41 = HD 192696: Probable spectroscopic binary.
42 = HD 202444: Spectroscopic binary with P = $0^d.143$.
43 = HD 210418: Probable spectroscopic binary.
44 = HD 217782: B-component of ADS 16467 system.

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Astronomical Council
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Budapest
1970 April 12

THE SPECTRUM OF NOVA SERPENTIS 1970

A series of spectra of the bright Nova Serpentis 1970 was obtained with the one-prism spectrograph attached to the 99.5 cm reflector f/15 of the Hamburg Observatory between March 10th and 21th, 1970 with a dispersion of 70 A/mm at H_γ. The spectral range between 3900 A and 5250 A was studied.

The emission lines of hydrogen, H and K lines of Ca II and those of ionised iron are the most conspicuous features of the spectrum of Nova Ser 1970. The most intense emissions of Fe II belong to the multiplets 27, 28, 37, 38 and 42. Furthermore, emission lines of He I λ4471.477 A (multiplet 14), those of Ti II multiplets 19 and 41, and those of Cr II multiplet 44 are present. The investigation of the fine structure of the emission lines has shown that the line profiles are formed by superimposing of emissions of different radial velocities. The velocities of these emissions derived from red wings (violet being distorted by the absorption) are given in Table 1.

Table 1.

Radial velocities in km/s

Date	I	II	III	IV
1970 March 10.186	614	939	1272	1959
12.179	690	886	1432	
14.154	782	933	1268	
21.134	675		1364	1872

The values in columns I-III correspond to data communicated by J.Grygar and J.B.Hutchings in Circ.Bur.Cent.Int.Telegr. Astr. No.2220 for the dates Feb.20th and 22th. A further emission system was derived from Fe II multiplet 42 lines and from hydrogen lines, their values are listed in column IV of Table 1. Both profiles with higher velocities were not observed for H and K lines of Ca II. The emission profile III seems to be multiple. The width of Hδ is affected by the absorption line due to λ4122.638 A Fe II (28). The shape of the bright emission is regular; only that of H_γ is distorted by superimposed emission and absorption of the line λ4351.764 A Fe II (27).

The strongest absorption lines belong to H I, Ca II, Fe II multiplets 27, 28, 37, 38 and 42, Ti II multiplets 19, 31 and 41, Cr II multiplet 44, and the line 4481 A of Mg II multiplet 4. The principal as well as the diffuse enhanced spectrum were developed when Hamburg's observation began. Both systems were observed for H I, Fe II and Ca II lines; for Ti II only principal and for Mg II line λ4481 A diffuse enhanced spectrum were observed. The last line is blended by the λ4488.319 A Ti II line. The absorption due to the diffuse enhanced spectrum during the whole observational period was stronger than the principal absorption except for Ca II and H_γ lines; the principal absorption of the latter is affected by the diffuse enhanced absorption λ 4351.764 Fe II (27). The interstellar absorption of Ca II was also present. The velocities of the principal and the diffuse enhanced spectrum corrected for the orbital velocity of the Earth are given in the Table 2.

Table 2.
Radial velocities derived from absorption lines

Date	H I	FeII+ TiII	CaII (U)	HI+ FeII	MgII	CaII (K)
1970 March 10.186	884	786		1662	1674	
12.179	827	746		1548	1503	
14.154	832	775	785	1613	1619	1466
21.134	792	728	616	1616	1589	

As can be seen from Table 2, the velocities of the principal spectrum derived from H I lines are higher than those derived from the Fe II and Ti II lines.

Two additional spectra were obtained on 1970 April 4.123. An investigation showed the following differences to the previous spectra; the emissions of Fe II became stronger compared to the $H\beta$ emission and new emission lines appeared around λ4660 A. The Mg II absorption line λ4481 A weakened substantially and also Fe II absorption lines became fainter. The principal absorption of H I is strenghtened relative to the diffuse enhanced one. Emission and absorption lines of Ti II did not change.

For the difinitive study of the correlation between brightness of the nova and radial velocity changes it is most desirable to give radial velocity data corrected for the orbital velocity of the Earth, and to give the time of the observation with an accuracy of one hundredth of a day at least.

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1970 April 14

NOVA SERPENTIS

The photoelectric photometry of Nova Serpentis was carried out at Okayama and Dodaira Stations, and the preliminary results for the period earlier than 18th February have already been reported in the IAU Circular. In the present report the summary of the results in about one month after the nova cutburst is presented.

Table 1. Photometry of Nova Serpentis

1970 UT	V	B–V	U–B	Tele-scopes	Obser-vers	Notes
Feb.						
16.86	4.88	+0.84	+0.33	91	I, S	1
17.84	4.56	.96	.53	30	W	1
18.83	4.7:	1.2:	.7:	30	W	2,3
19.84	4.59	1.04	.55	30	W	2
28.83	4.99	.75	–.10	30	W	2
Mar.						
4.78	5.44	.71	–.18	30	W	2
4.81	5.35	.67	–.20	D 91	Ns	1
5.80	5.46	.72	–.22	30	W	2
5.83	5.48	.72	–.24	D 91	Ns	1
6.82	5.32	.69	–.28	D 91	Ns	1
6.83	5.32	.71	–.24	30	Ng, W	2
7.82	5.54	.74	–.31	D 91	Ns	1
8.84	5.50	.70	–.33	D 91	Ns	1
18.81	5.74	.66	–.38	91	I	2
18.81	5.76	.67	–.39	30	W, Nk	2
19.82	6.06	.66	–.41	30	W	2
20.82	5.95	.66	–.43	D 91	K	2
22.77	5.85	.71	–.42	91	Ng, I	1

Telescopes: 91 and 30 are for the 91 cm and 30 cm reflectors of the Okayama Station, respectively, D 91 is for the 91 cm reflector of the Dodaira Station.

Observers: I: K.Ichimura, K: M.Kiyokawa, Ng: T.Noguchi, Nk: M.Nakagiri, Ns: S.Nishimura, S: M.Shimizu, W: E.Watanabe.

Notes: 1. Comparison with H.L.Johnson's photometric standards.
2. Repeated comparison with 74 Oph in 30–90 minutes. V=4.84, B–V=+0.91, U–B=+0.63 (B.Iriarte et al.: Sky and Telescope, 30, 21, 1965) was assumed for 74 Oph.
3. Values uncertain because of thin clouds.

Tokyo Astronomical Observatory,

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FREQUENCE DES SURSAUTS DES ETOILES DU TYPE UV CETI

La surveillance des étoiles du type UV Cety s'est considérablement accrue ces dernières années, et permet de préciser la fréquence des sursauts.

Tout d'abord, nous definissons une limite d'amplitude des sursauts, choisie arbitrairement comme étant $\Delta B > 0,5m$; afin d'éliminer les variations faibles, souvent douteuses.

Le tableau suivant présente les résultats obtenus sur 6 étoiles, qui ont fait l'objet d'observations suivies depuis 1967: D est la durée totale de la surveillance, n(1) et n(0,5) le nombre observe de sursauts d'amplitude> 1m et >0.5m; f(1) et f(0,5) la frequence, définie en nombre de sursauts observés pour 100 heures de surveillance.

Les observations utilisées ont été en grande partie, publiées ici même.

	D	n(1)	n(0,5)	f(1)	f(0,5)
YZ CMi 1968/69	415h	14	27	3,4	6,5
DO Cep 1968/69	42,5	3	6	7,1	14,1
V645 Cen	75	7	12	9,3	16,0
UV Cet 1967/69	522	76	157	14,5	30,0
EV Lac 1969	197	4	10	2,0	5,1
AD Leo 1969	202	2	11	1,0	5,5

La magnitude absolue de ces étoiles étant connue avec précision, on peut les classer par luminosité décroissante:

	Sp	M(V)	f(1)	f(0,5)
AD Leo	M4e	10,8	1,0	5,5
EV Lac	M4e	11,6	2,0	5,1
YZ CMi	M4,5e	12,3	3.4	6,5
DO Cep	M4,5e	13,4	7,1	14,1
V645 Cen	M5e	15,4	9,3	16,0
UV Cet	M6e	15,8	14,5	30,0

La corrélation entre la magnitude absolue et la fréquence des sursauts parait nette; elle est presque linéaire pour f(1). Il serait interessant de pouvoir l'étendre à un plus grand nombre d'étoiles.

M.PETIT

(1) voir notamment: pour YZ CMi, IBVS 264,266 à 268,274, 305,307,321,331,332,338,339,352; DO Cep, IBVS 329; UV Cet: IBVS 296,297,310,315,317,338,343,349,354,404 à 406,411,412; EV Lac, IBVS 399,401,403,407,410; AD Leo, IBVS 333,334,336, 340,345,364,367.

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1970 April 19

ETOILES MAINES ROUGES VARIABLES

A deux reprises (1, 2), j'ai signalé des naines rouges pour lesquelles des discordances importantes dans les magnitudes données par divers catalogues font penser a une variabilité possible.

Voici 11 autres étoiles dont la variabilité est probable ou certaine. Les données relatives à la parallaxe π (exprimée en 0"001) et au spectre, sont extraites de l'importante liste de Gliese (3); Δ est l'importance des discordances observées, après réduction des observations à la même échelle.

DESIGN.	AR (1950)	Dec	V	μ	π	Sp	M(V)	Δ
AC+75°1146	$3^h03^m15^s$	+75°51!8	9.76	0"32	51±7	MOV	8,3	0,5v
-48°1011	3 33 26	-48 35.3	8,57	0.50	88 6	K7V	8,3	0,7v
Ross 409	5 29 53	+29 21.4	10,1	0.26	53 10	K7	8,7	3 pg
G 102-32	5 47 16	+ 6 46,0	13,5	0.31		m		1,0pg
Ross 989 B	7 28 40	+36 19.8	11,76	0.44	88 7	M4,5e	11,5	0,5v
+36°2322B	12 55 18	+35 29.6	13,16	0.28	51 7	M4e	11,9	0,5pv
L1130-30B	16 04 18	+ 8 31.2	14,0	0.49	52 10	m	12,6	0,6pv
LDS 678B	19 17 53	- 7 45.6	12,75	0.22	104 10	M5V	12,8	0,6V
Wolf 1084	20 41 53	+55 08.8	15,1	1.96	73 14	M5e	14,4	0,6pg
Wolf 1561B	22 14 42	- 9 03.0	13,5	0.55	103 10	M4e	13,6	0,6 V
+45°4378	23 56 07	+46 27.0	9,62	0.32	63 6	MOV	8,6	0,5v

Remarques

AC+75°1146 Observée photoélectriquement: V=10,05, B=10,96 (Eggen) V=9,76, B=11,08 (Mumford)

-48°1011. Banaire spectroscopique VR > 43 km/s. Spectre avec CaII en émission (4); mpv varie de 8,3 à 9,0

Ross 409. Notée de mpg 11,0 (Luyten) et 14,0 (Giclas)

G 102-32. Varie de mpv 12,9 à 13,7; confirmée par Giclas (5). Type UV Cet probable.

Ross 989. Mouvement propre commun avec BD +36°1638. Ecart. 38"6. Varie de mv 11,3 à 11,8; un sursaut a été observé sur spectre par Dyer (6).

+36°2322=Bz 131. Ecartement 10"; B notée de mpv 12,6 à 13,1 Des variations de spectre ont été observées par Dyer (7). Type UV Ceti probable.

L 1130-30. Couple serré (2"); A (V=11,6, Sp M3e) est binaire spectroscopique; c'est probablement B qui varie

LDS 678 B. Ecartement 27"5. Varie de mpv 12,2 à 12,8; confirmée par les mesures photoélectriques: V=12,75, B=14,36 (Johnson), V=12,12, B=13,75 (Eggen); A est naine blanche

Wolf 1561. Mouvement lent. Ecartement 8"5; B varie, avec une amplitude de 0,6 m.

-45°4378. Le spectre présente CaII en émission; mpv varie de 9,3 à 9,8

On notera que le type UV Ceti semble probable pour trois de ces étoiles (GI02-32, Ross 989, +36°2322); deux autres suspectes (Wold 1084 et Wolf 1561) ont également un spectre Me.

M. PETIT

(1) M.Petit, DOB 6,4,3,1953
(2) M.Petit, IBVS 320, 1968
(3) W.Gliese, Heidelberg Ver.22, 1969
(4) J.Sahade, ApJ 117,234,1953
(5) Giclas, Burnham et Thomas: Lowell Bull 120, 1963
(6) W.Bidelman, ApJ Sup I,7,1954
(7) E.Dyer, AJ 59,220, 1954

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AD Leo

A continual photoelectric monitoring of the flare star AD Leo was done with the 30 cm reflector of the Okayama Station from 1 to 14 March 1970. During the 29 hours of monitoring in the magnitude B, 2 flares were observed as shown in the following table.

Date 1970 March	Time of Monitoring (UT)	Time of max. (UT)	Flares $m_f(B)$	P	Duration	σ
1	$12^h38^m-18^h30^m$					0.08^{mag}
4	10 10 -12 29	$11^h03^m.9$	0.33^{mag}	0.5^{min}	3^{min}	0.07
	13 02 -14 24					0.06
	15 13 -16 18	15 25.4	>2.5	>71	52	cloudy
	17 33 -18 24					0.07
6	11 56 -17 07					0.06
7	10 20 -16 52					0.09
8	11 53 -18 08					0.05
10	16 26 -17 45					cloudy

The definition of $m_f(B)$, P and σ are as follows:

$$m_f(B) = m_o - 2.5 \log I_{o+f}/I_o$$

$$P = \int (I_{o+f}-I_o)/I \cdot dt$$

$$\sigma\,(mag) = 2.5 \log (I_o + \quad)/I_o$$

Tokyo Astronomical Observatory
7 March 1970

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PHOTOMETRY OF AD Leo

Over the period 1st to 15th March 1970, observations were made at Boyden Observatory of AD Leo as part of the International Co-operative Programme.

The 40 cm Nishimura Reflector was used in this work fitted with a Johnson B. Filter and a solid CO_2 cooled E.M.I. 6256 photomultiplier tube.

As evident from the table the monitoring time totalled 41^h07^m. Three flares were recorded, each of low intensity.

Flare No.1. is interesting in that it was of relatively long duration (approximately 13 minutes) similar to one previously reported (A.H. Jarrett and J.P.Eksteen MNASSA Vol XXVIII, page 70).

Monitoring table of AD Leo

1970 March	U.T.	Total hours per night	Flare no.	U.T. of flare	Duration	Δm
1	18.31-19.50,20.54-21.25	1^h50^m				
2	18.18-20.42,21.05-23.00	4 19	1	$19^h24^m.4$	$12^m.6$	0.31
3	18.07-23.05,23.22-00.12	5 48				
4	20.40-23.48	3 08				
5	18.05-21.57,22.04-00.34	6 22	2	14 41.9	5.1	0.30
6	18.01-21.20,21.32-22.32	4 19	3	21 53.2	4.1	0.28
9	17.56-22.45,22.52-00.15	6 12				
10	17.47-22.45	4 58				
11	17.52-22.03	4 11				
	Total	41^h07^m				

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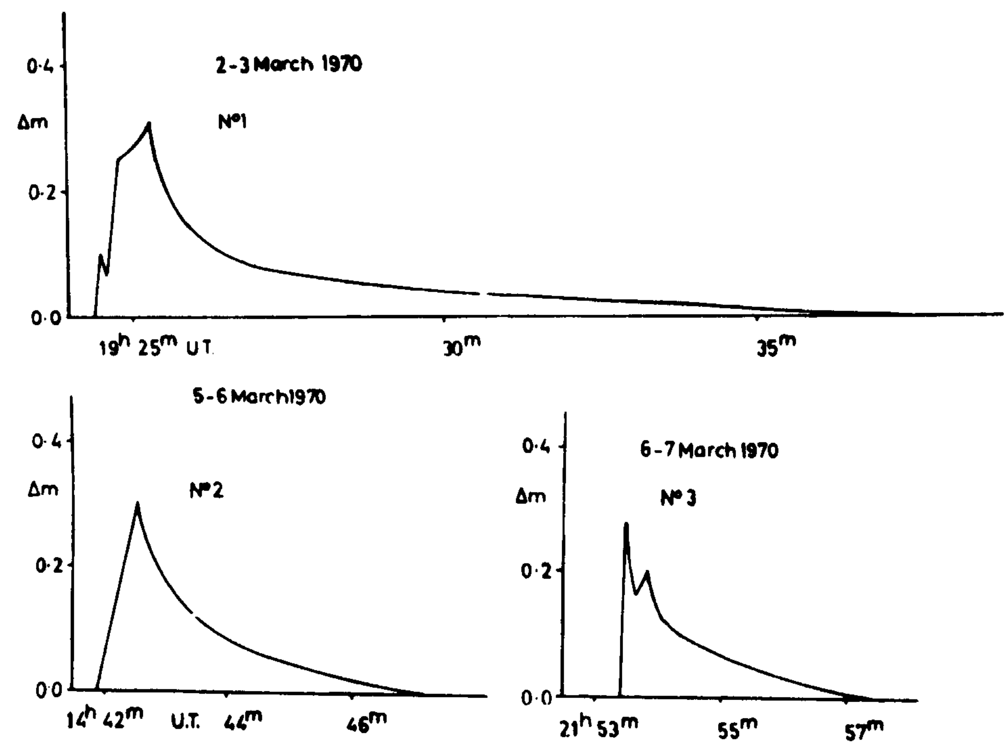
2-3 March 1970
N°1
0·4
Δm
0·2
0·0
19h 25m U.T.
30m
35m
5-6 March 1970
N°2
0·4
Δm
0·2
0·0
14h 42m
U.T.
44m
46m
6-7 March 1970
N° 3
0·4
Δm
0·2
0·0
21h 53m
55m
57m

COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 434

Konkoly Observatory
Budapest
1970 April 28

FLARE PHOTOMETRY OF UV CETI

Recent observations have been made from Boyden Observatory of UV Ceti over the period 6 - 11th December, 1969.

The 40 cm Nishimura Reflector was used for these observations along with a Johnson B.Filter and a CO_2 cooled E.M.I. type 6256 photomultiplier tube.

Over a monitoring time of 7^h28^m, seven flares were recorded. These observations were undertaken as part of the flare star programme of the Department of Astronomy of the University of the Orange Free State.

UV Ceti

Date Dec	U.T.	Total hours per night	Flare no.	U.T. of flare	Duration	Δm
9	18^h44^m - 19^h29^m	0^h45^m	1	$19^h09^m.5$	$1^m.9$	0.66
10	18 35 - 22 02	3 27	2	19 50.7	1.5	0.64
			3	20 41.0	3.0	1.00
11	18 42 - 21 58	3 16	4	20 09.1	4.9	0.78
			5	20 23.3	2.2	0.60
			6	20 28.0	1.5	0.50
			7	21 14.5	8.5	1.58
	Total	7^h28^m				

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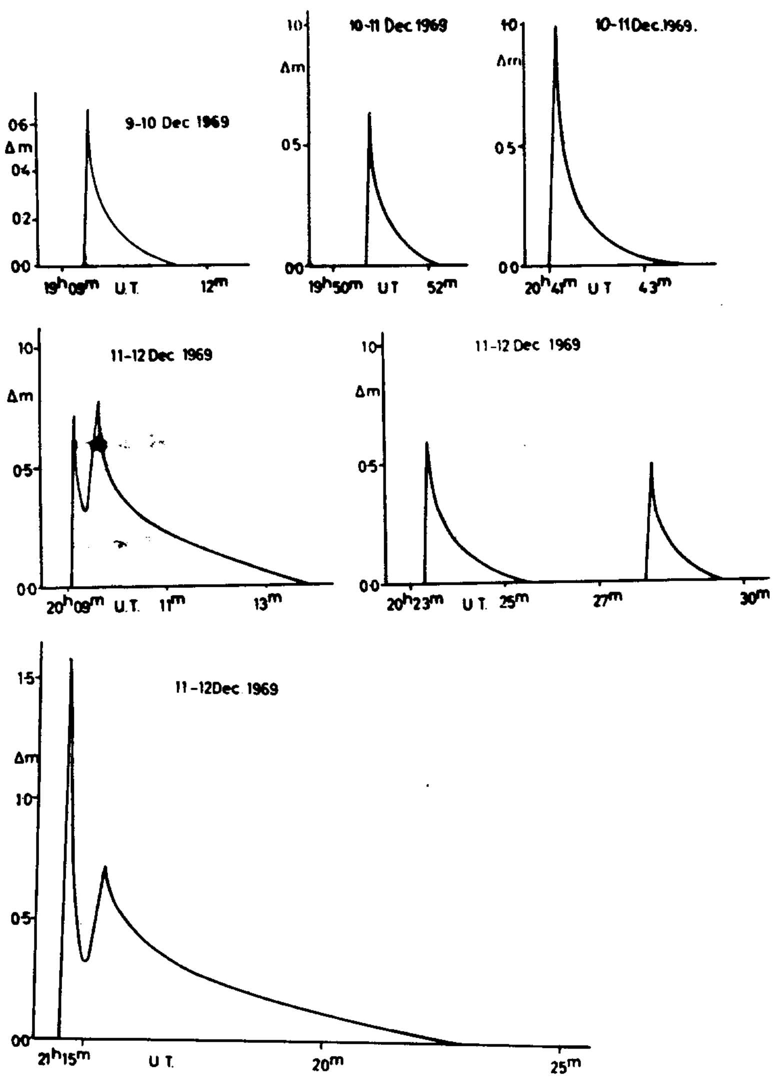

9-10 Dec 1969
Δm
U.T.
10-11 Dec 1969
Δm
UT
10-11 Dec. 1969.
Δm
UT
11-12 Dec 1969
Δm
U.T.
11-12 Dec 1969
Δm
UT
11-12 Dec 1969
Δm
U.T.

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INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 435

Konkoly Observatory
Budapest
1970 April 30

THE MAGNETIC VARIABLE BETA CrB

Beta CrB was observed photoelectrically in three colours with the 60 cm reflector of the Bologna Observatory for 24 nights during the years 1968 and 1969, using Theta CrB as comparison star. It shows light variations with an amplitude of $0^m.022$ in yellow, $0^m.030$ in blue, $0^m.026$ in ultraviolet with the same period as found by Preston and Sturch (1) for the magnetic variation. Differing from what occurs for most magnetic variables, the light minimum takes place about $0^p.1$ after the negative maximum of the magnetic field.

The light curves were plotted with the phases calculated by the formula

$$\text{Min} = \text{JD } 2440335.0 + 18^d.487 \text{ E}$$

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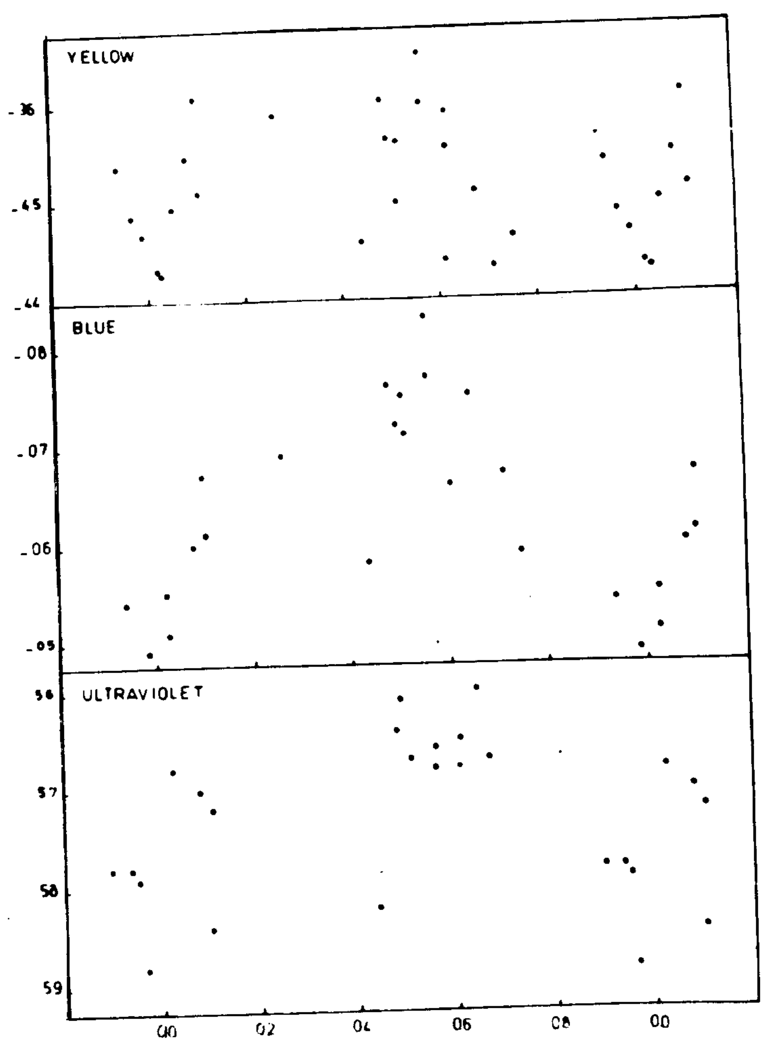
P. BATTISTINI
R. PECORARI

Observatorio Astronomico
Universitario di Bologna

1) Preston, G.W., Sturch, C., The magnetic and related stars, Cameron R.C., Ed., Baltimore, 1967. p.111.



YELLOW
BLUE
ULTRAVIOLET

COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 436

Konkoly Observatory
Budapest
1970 May 11

KM CASSIOPEIAE

In the Third Edition of the General Catalogue of Variable Stars (1), the spectral type of KM Cas is given as M6eα. Objective-prism observations of the spectrum have been reported from Mt.Wilson (2), Tonantzintla (3), the Crimean Astrophysical Observatory (4) , and Hamburg (5) , (6),, and are summarized in the following table:

Name	Spectral Type and Remarks	Magnitude		Reference
KM Cas	M6eα	12.3–13.1 photogr.		(1),(7)
AS 59	Hα emission of moderate strength		10 vis.	(2)
GG1 174	Hα emission weak			(3)
BŠ +61°161	cB1	12.38 photogr.	11.36 vis.	(4)
LS I +61°270	OBce; Hα emission not seen	12.2 photogr.		(5),(6)

KM Cas is listed as of type SRa, with a period of about 720^d derived from the magnitudes listed by Holopov (7). Given the observed absence of a very strong Hα emission line heretofore, one is not led to suggest that KM Cas is a symbiotic object. It will be of interest, however, to search for the other emission lines which are to be expected in the spectrum of a luminous binary of VV Cephei type.

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References

(1) B.V.Kukarkin, P.N.Holopov, Ju.N.Efremov, N P.Kukarkina, N.E.Kuročkin, G.I.Medvedeva, N.B.Perova, V.P.Fedorovič and M.S.Frolov; General Catalogue of Variable Stars.

(2) P.W.Merrill and C.G.Burwell; 1950 Astrophys.J. 112, 72.

(3) G.Gonzales and G.Gonzales; 1954 Bol.Obs. Tonantzintla y Tacubaya 1, No.9, 3.

(4) E.S.Brodskaja and P.F.Sajn; 1958 Izvest.Krymsk.Astrofiz. Obs. 20, 299.

(5) J.Hardorp, K.Rohlfs, A.Slettebak and J.Stock; Luminous Stars in the Northern Milky Way. I., Hamburg-Bergedorf 1959.

(6) H.H.Voigt; Hα Emission of 'Luminous Stars in the Northern Milky Way.I.', Hamburg-Bergedorf 1965.

(7) P.N.Holopov; 1949 Peremenn. Zvezdy, 7, 101.

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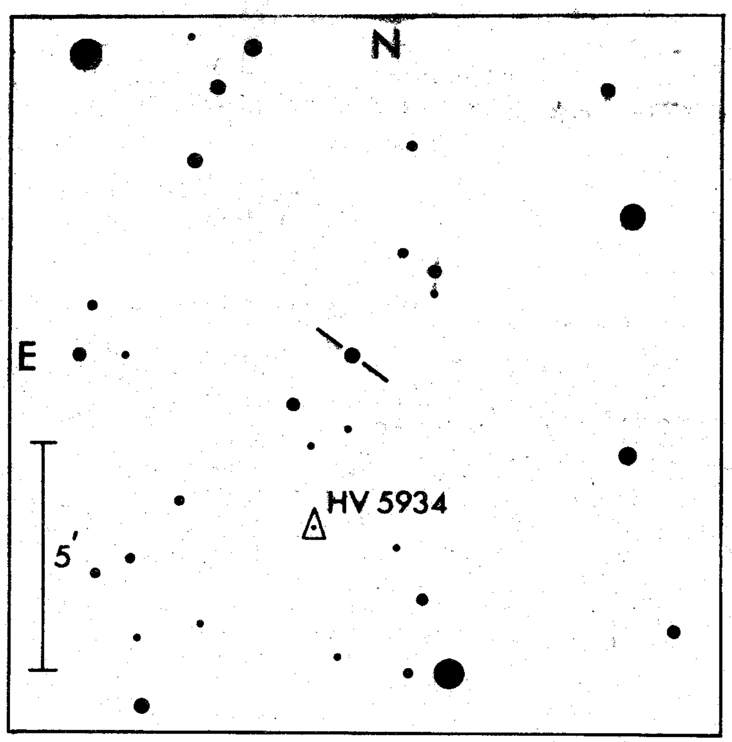
NUMBER 437

Konkoly Observatory
Budapest
1970 May 11

A NOVA IN THE LARGE MAGELLANIC CLOUD

Nova Mensae 1970 was discovered on an objective-prism plate taken by Sr. Arturo Gómez with the Curtis Schmidt-type telescope of this University currently on loan to the Cerro Tololo Interamerican Observatory in Chile. The discovery plate was taken on the night of March 8 (U.T.), 1970, and the most recent plate of the area with which to compare the nova plate was taken on February 8, 1970; the earlier plate shows nothing in the position of the nova down to the limiting magnitude of about m_{pg} 13.8. Both the discovery and comparison plates are of type IIa-O exposed one hour through a GG 5 filter; the spectral region covered is approximately $\lambda\lambda$ 4500-5000 A with a dispersion of about 400 A/mm at 4800 A. Measured relative to the 1975 coordinate grid on the Uppsala-Mt.Stromolo Atlas, the approximate position is: RA = $5^h33^m.5$, D = $-70°36'$. On the Hodge-Wright Atlas of the LMC it is about 1.2 cm north and 0.3 cm west of H.V. 5934 and is fainter than their plate limit of m_{pg} 17.5. The chart shows the position and brightness as drawn from the discovery plate; no direct plate is available. The nova is about $0.^{\circ}5$ south of the center of the Bar and $0.^{\circ}5$ southwest of Nova Doradus 1948.

The spectrum on the discovery plate appears as follows: H is very bright, flat-topped, and broad, and faint, broad Fe II emission at λ4924 and λ5018 is present. No other emission or absorption features are evident in this spectral range at our dispersion. According to the spectral criteria given by McLaughlin (1), our discovery plate seems to have been obtained during the stage of "principal" spectrum probably within one magnitude and several days of maximum. The magnitude of the nova at discovery is about m_{pg} 12 as estimated from comparison with several OB stars near the nova having magnitudes assigned by Sanduleak (2). With a distance modulus of 18.7 for the LMC and maximum apparent magnitude of 11, the nova would have attained M_{max} about -7.7 which is in good agreement with the mean probable absolute magnitude (-7.6) of the nine Magellanic Cloud novae discussed by Henize, Hoffleit, and Nail (3). Discounting Nova Hydri 1935 which may have been a supernova in the spiral galaxy NGC 1511, there are now six novae known in the LCM and four in the SMC. The ratio of novae in the two Clouds (3:2) compares well with



that of planetary nebulae as given by Westerlund (4) although the ratio of masses is about four to one. Thus, the frequency of both novae and planetary nebulea per unit mass is higher by a factor of about three in the SMC than in the LMC.

I wish to express thanks to Dr. N.Sanduleak of the Warner and Swasey Observatory for making the finding chart and to Drs.Sanduleak, C.B.Stephenson, and A.P.Cowley for helpful discussions. The support of the National Science Foundation is gratefully acknowledged.

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(1) McLaughlin, D.B. 1960, Stellar Atmospheres, ed. J.L. Greenstein (Chicago: The University of Chicago Press), chap. 17.
(2) Sanduleak, N. 1969, Cerro Tololo Contr. No.89.
(3) Henize,K.G., Hoffleit, D., and Nail,V. McK. 1954, Proc. U.S. Nat. Acad. Sci. 40, 365; Harvard Repr. No.387.
(4) Westerlund,B.E. 1968, I.A.U. Symp. No.34, 23.

COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 438

Konkoly Observatory
Budapest
1970 June 4

PHOTOELECTRIC PERIOD FOR BV 346

The eclipsing binary BV 346 (BD 54°2489, HD 202 000) was observed photoelectrically on seventeen nights between June 21 and July 17, 1969, with the No.3 16-in.telescope of the Kitt Peak National Observatory. Four minima were observed, from which the period was calculated; W.Strohmeier, Director of the Remeis Observatory, Bamberg, Germany, provided fourteen more minima which confirm the proposed period and increase the accuracy.

Observed minima

Minimum	Epoch	O-C	Observer
JD 242 6861.315	-10 811	-0^d073	S
6946.452	-10 743	-0.098	S
6985.396	-10 712	0.022	S
7034.231	-10 673	0.013	S
7298.437	-10 462	-0.034	S
.451		-0.020	S
7305.442	-10 456.5	0.083	S
7367.315	-10 407	-0.037	S
356		0.004	S
7719.274	-10 126	0.001	S
8126.319	- 9 801	0.020	S
340		0.041	S
8752.518	- 9 301	0.025	S
9193.299	- 8 949	-0.034	S
JD 244 0400.944	0	0.000	T
0407.836	5.5	-0.004	T
0409.713	7	-0.003	T
0415.974	12	-0.002	T

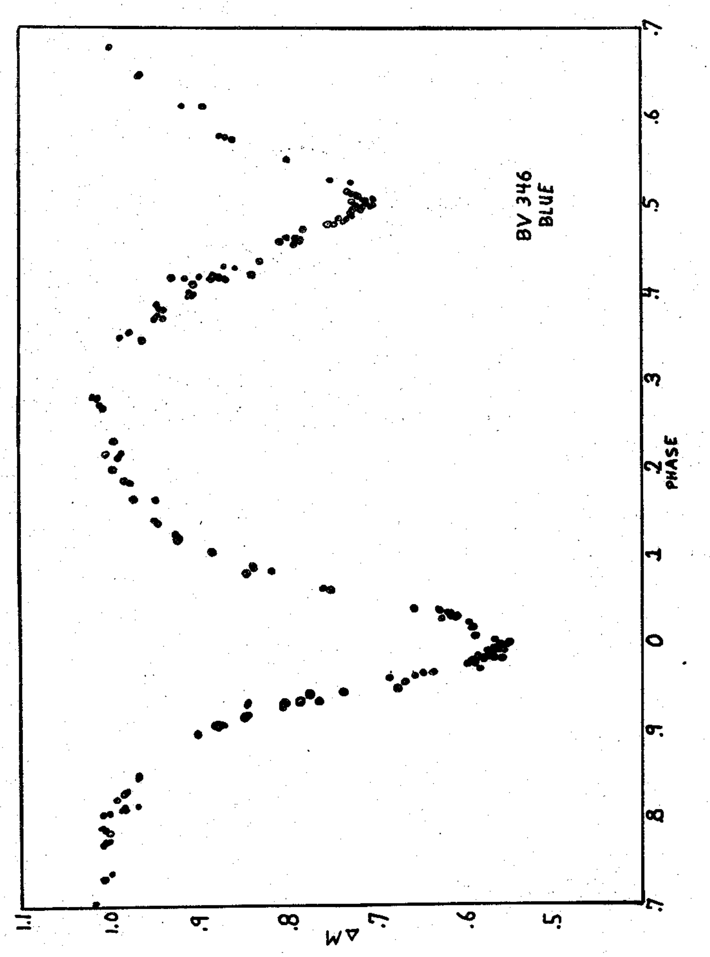
S = W. Strohmeier
T = R. Tate

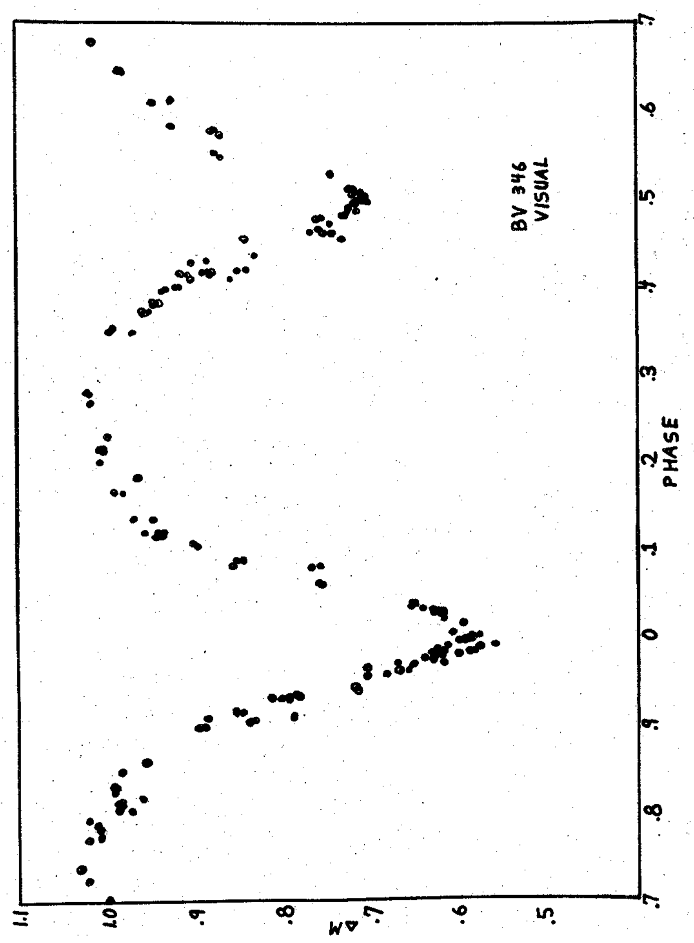
The elements are:

$$\text{Min.} = \text{HJD } 244\ 0400.944 + 1^d252387E$$
$$\pm .005 \pm .000005$$

As can be seen from the visual and blue light curves, the star varies $0^{m}.445$ in the visual and $0^{m}.455$ in the blue. The prime comparison star is BD 54°2488 (SAO 033193). These curves are corrected for atmospheric extinction and heliocentric time and have been converted to the standard magnitude system.

We are continuing work on this star.





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and King College Observatory
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U.S.A.

COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 439

Konkoly Observatory
Budapest
1970 June 5

PHOTOELECTRIC PATROL OF THE FLARE STAR BD +13°2618

During the period (April 15-18,1970) of cooperative observations planned by the Working Group on Flare Stars (Andrews and Chugainov, 1970), the flare star BD +13°2618 was observed photoelectrically at our Observatory with a 91 cm and a 30 cm cassegrain telescope feeding similar photometers equipped with EMI 6256 photomultipliers (Spectral response S 13). As a rule, the observations were carried out in b light using the Shott filters combination BG 12/1 + GG 13/2. A few measurements in v light were also made using a GG 14/2 Shott filter.

No flare activity was detected during the 17.2 hours of patrol in b light and the 0.5 hour of patrol of v light. The Table overleaf contains the intervals of effective monitoring time and, for each night, the difference between the limiting magnitude (m_{lim}) and the magnitude of the quiet star (m_0), as defined by $m_{lim}-m_0=-2.5 \log (3\sigma/I_0)$, where σ represents the standard deviation of the mean random noise fluctuation and I_0 the mean intensity of the quiet star.

F. Spinella and V.Stancanelli have collaborated in the observations.

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95123 Catania

May 9th, 1970

Reference:

Andrews,A.D., Chugainov,P.F., 1970, Comm. 27 IAU, Inf.Bull. Var.Stars, No.416

Date	F	Tele-scope	Coverage (U.T.)	$\overline{m_{lim}-m_o}$
1970				
Apr. 19	b	91cm	20^h19^{min}-20^h38^{min}	+ 4.42^m
Apr. 23	b	91	1924-1925;1926-1932;2015-2017;	
			2019-2137;2142-2147;2148-2226;	+ 4.62
	v		2013-2015;	+ 5.61
Apr.24/25	b	91	2221-2226;2236-2240;2258-0032;	
			0033-0047;0055-0058;0103-0107;	
			0108-0205	+ 4.15
Apr.25/26	b	30	1944-2106.	+ 4.35
	b	91	2306-2308;2338-0040;0058-0233;	
			0238-0244;0246-0248.	+ 4.38
	v		2303-2305;0055-0057.	+ 5.12
Apr.26/27	b	91	2001-2003;2009-2104;2115-2153;	
			2156-2204;2207-2210;2219-2241;	
			2243-2245;2246-2336;2346-0024;	
			0027-0038;0041-0052;0106-0140;	
			0143-0209	+ 6.30
	v		2003-2008;2111-2114;2216-2218;	
			2344-2346;0104-0107.	+ 5.32
Apr.27/28	b	91	2005-2007;2063-2101;2117-2227;	
			2237-2252.	+ 5.00
	v		2007-2012;2112-2116.	+ 5.13
Apr. 28	b	91	2324-2341.	+ 3.55

COMMISSION 27 OF THE I. A. U.
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NUMBER 440

Konkoly Observatory
Budapest
1970 June 10

BAV - Mitteilungen Nr. 22

NEW ELEMENTS FOR SS Ari

Observations of SS Ari made by BAV-members in the years 1965 to 1968 show large positive and increasing $O-C_1$ against elements given by E.N. KRAMER in Astron. Circ. 79, 9 Moscow 1949:

$$\text{Min} = \text{JD } 2430\ 948.318 + 0^d.405\ 989\ 7 \cdot E .$$

The well observed minima (s.Table) - lead to the provisional elements

$$\text{Min} = \text{JD } 2439\ 028.395 + 0^d.405\ 997\ 02 \cdot E .$$

These elements are instantaneous; residuals are given in the Table as $O-C_2$. They represent the BAV-observations well, but the starting point of KRAMER's elements is badly represented ($O-C_2 = +0^d.076$). Therefore a change of period is supposed.

Time of min (JD 24.....)	Min.	obs.	n	$O - C_1$	$O - C_2$
39 028.385	I	Le	11	$+0^d.060$	$-0^d.010$
.389	I	Br	14	+0.064	-0.006
029.608	I	Ec	12	+0.065	-0.005
.610	I	Br	13	+0.067	-0.003
053.362	II	Br	21	+0.068	-0.002
055.394	II	Br	14	+0.070	0.000
068.396	II	Br	6	+0.081	+0.010
184.301	I	Br	11	+0.076	+0.003
389.535	I	Br	9	+0.082	+0.006
403.536	I	Br	10	+0.076	-0.001
407.393	II	Se	12	+0.077	-0.001
776.435	II	Br	14	+0.074	-0.010
.436	II	Hr	13	+0.075	-0.009
40 065.518	II	Br	7	+0.092	+0.004

Observers are Br = W.Braune, Ec = W.Eckert, Hr = J. Hübscher, Le = P.Lehmann, Se = M.Seidl. n is the number of individual estimates used for timing the respective minimum.

A complete description of the observations shall be published in BAV-Rundbrief no. 2/1970.

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COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 441

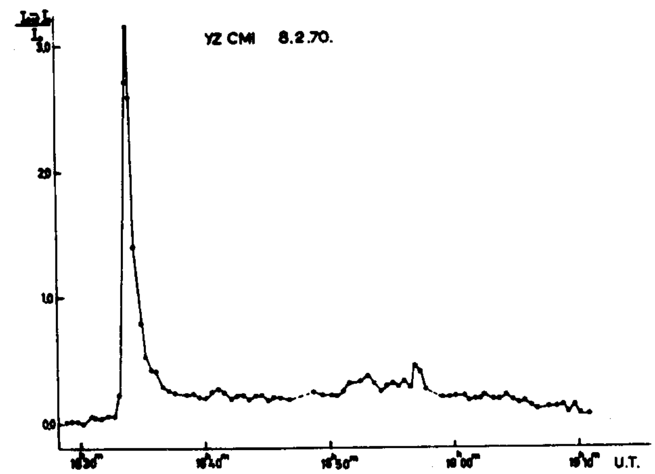
Konkoly Observatory
Budapest
1970 June 29

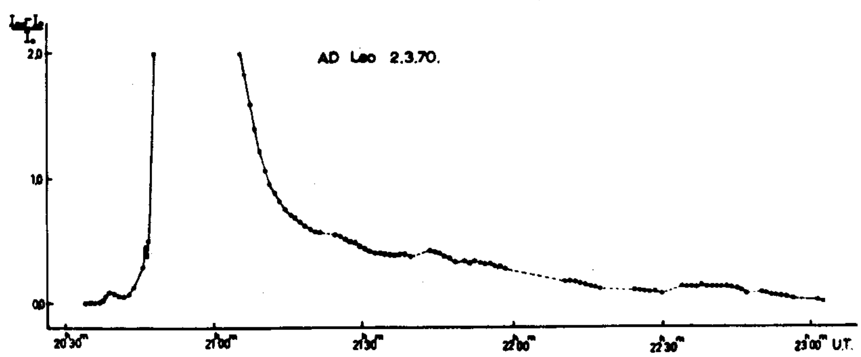
PHOTOELECTRIC OBSERVATIONS OF FLARE STARS

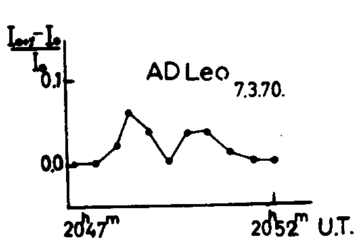
YZ CMi, AD Leo and BD +13°2618 were monitored photoelectrically with the 64-cm meniscus telescope of the Crimean Astrophysical Observatory during (and partly outside) the periods of cooperative observations in 1970. The photometric system was the same (similar to B) as in our previous observations. The dates and UT of coverage are given in Table I. Table II contains the following characteristics of flares: moments of maxima (UT); durations of flares before and after maxima, t_b and t_a (in minutes); amplitudes of flares Δm_B in stellar magnitudes; the limiting amplitude of a flare Δm_{lim} which could be detected; integrated intensities P (in minutes); and the air masses M(z). The detailed description of the manner in which these characteristics should be obtained was given earlier (1). The light curves of flares in relative intensities are given on the figures.

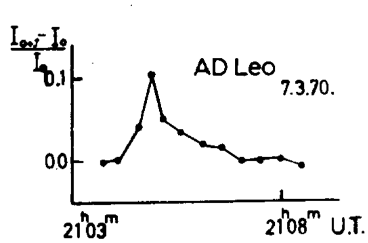
Table I

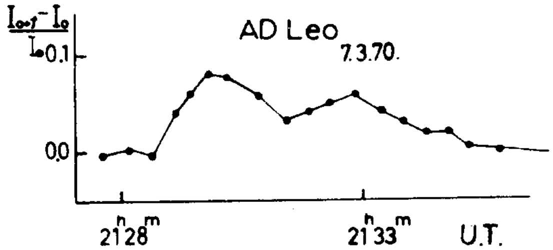
Date 1970	UT of coverage
	YZ CMi
Febr 8	1710-1913
	AD Leo
March 2	2028-2138, 2140-2203, 2210-2217, 2223-2231, 2233-2247, 2249-2255, 2303-2306, 2310-2317, 2332-2338, 2346-2357, 2359-0000
March 3	0000-0009, 0013-0045, 0048-0130, 0133-0143
March 4	1707-1816, 1818-1830
March 7	1805-1817, 1841-1911, 1916-1930, 1932-1950, 2009-2304, 2307-2311, 2321-2332, 2343-0000
March 8	0000-0200, 1809-1830, 2217-2250, 2302-2315, 2326-2346
March 10	1700-1715, 1730-1747, 1752-1812, 1824-1846, 1847-1900, 1903-1916
March 12	1654-1753, 1801-1945, 1959-2019, 2031-2038, 2048-2218, 2339-0000
March 13	0000-0014
	BD +13°2618
March 31	1847-2017, 2035-2045, 2052-2131, 2132-2231, 2233-2344
April 1	0002-0024, 0025-0045, 0050-0100
April 9	1855-1907, 1909-2024, 2027-2101, 2103-2130, 2132-2152, 2202-2217, 2223-2347, 2355-2402

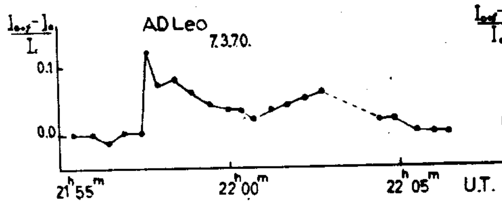

YZ CMi 8.2.70.
U.T.


AD Leo 2.3.70.
2,0
1,0
0,0
U.T.


AD Leo 7.3.70.
0,1
0,0
U.T.


AD Leo 7.3.70.
0.1
0.0
U.T.


AD Leo
7.3.70.
0.1
0.0
21h28m
21h33m
U.T.


AD Leo
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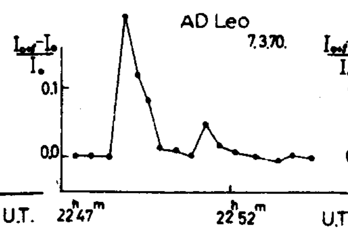
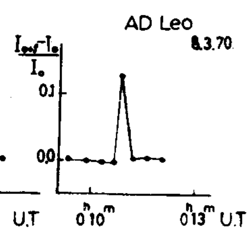
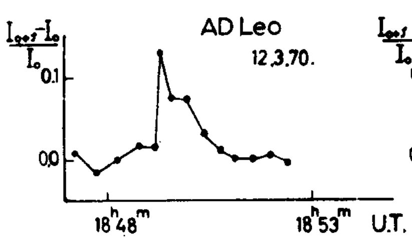
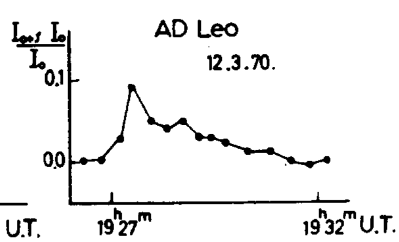
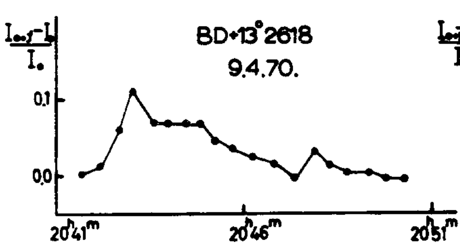
0.1
0.0
21h55m
22h00m
22h05m
U.T.


AD Leo
7.3.70.
0.1
0.0
22h47m
22h52m
U.T


AD Leo
8.3.70
0.1
0.0
0h10m
0h13m
U.T


AD Leo
12.3.70.
0.1
0.0
18h48m
18h53m
U.T.


AD Leo
12.3.70.
0.1
0.0
19h27m
19h32m
U.T.


BD+13°2618
9.4.70.
0.1
0.0
20h41m
20h46m
20h51m

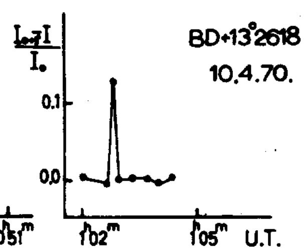

BD+13°2618
10.4.70.
0.1
0.0
1h02m
1h05m
U.T.

Table I - Continued

Date 1970	UT of coverage
April 10	0004-0047, 2104-2146, 2230-2300
April 21	1836-1931, 1936-2023, 2030-2315
April 25	1832-1941, 1944-2002, 2004-2132, 2135-2232
April 26	1854-1942, 2019-2054
April 27	2230-2242, 2244-2349, 2357-2416
April 28	0028-0047, 0055-0102, 1845-1905, 1928-2130, 2219-2238, 2240-2311, 2325-2335, 2339-2447
April 29	0053-0101

Table II

Date and UT of flare maximum		t_b	t_a	Δm_B	Δm_{lim}	P	M(z)
Febr 8	18 33.7	1.0	36	1.25	0.06	10.8	1.5
March 2	20 55.0	10:	65	>0.75	0.05	>316	1.1
7	20 48.5	0.7	2.7	0.06	0.04	0.09	1.1
7	21 04.9	0.7	2.1	0.10	0.04	0.09	1.1
7	21 29.8	1.2	5.2	0.08	0.04	0.28	1.1
7	21 57.6	0.2	7.6	0.12	0.04	0.40	1.1
7	22 48.8	0.2	3.7	0.20	0.04	0.17	1.2
8	00 10.8	0.2	0.4	0.12	0.04	0.04	1.5
12	18 49.3	0.5	1.7	0.13	0.04	0.11	1.1
12	19 27.5	0.7	3.5	0.09	0.04	0.14	1.1
April 9	21 43.0	1.0	6.0	0.11	0.03	0.25	1.2
10	01 02.8	0.1	0.2	0.13	0.03	0.02	1.3

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(1) A.D.Andrews, P.F.Chugainov,R.E.Gershberg, V.S.Oskanjan, IBVS No.326, 1969.

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Konkoly Observatory
Budapest
1970 July 2

FLARE ACTIVITY OF -32°16135, YZ CMi AND LPM 63

YZ CMi

Continuous U-band photometry of flare activity on YZ CMi was carried out in late 1969 and early 1970 so as to correspond as closely as possible to the effort of the working group on flare stars of I.A.U. commission 27. 63 flares were observed in a total of 27.5 hours of monitoring.

Observing and data processing methods are identical to those described earlier (Kunkel, 1968). In addition to the data presented earlier, the areas under the flare light curves were planimetered to derive a measure of the total energy radiated by a flare. It could not be shown that these measures are free from systematic bias. This bias takes the form of underestimating the flare areas of weaker events. The origin of the problem lies in the difficulty of locating the quiescent level in the presence of (1) noise from the discrete photoelectric process and (2) slow stationary variations in light which affect some stars significantly more than others. Since the bias is dependent on signal amplitudes, it clearly depends also on the telescope aperture and photometric band used. Only those measures of the integrated intensity are given where there is some assurance that the underestimate is less than five percent. These estimates appear in column 9 of the flare abstract, according to

$$P = \frac{I}{I_o} \int (I_f - I_q)\, dt \text{ minutes},$$

where I_f is the record of combined flare light and quiescent light, I_q is nominally the quiescent light, which in practice consists of all light not attributed to the flare under study, and I_o is an estimate of the true quiescent light (absence of any flare activity whatever is assumed). I_q and I_o are generally different: I_q is measured directly from the chart near the event studied, while I_o is determined by examining the probability distribution of the U-light of the stars from several nights, referenced to comparison stars. The value selected is that which appears to correspond to a total absence of any activity on the star. For YZ CMi (Epoch 1970.0) I_o has been chosen to correspond to U_o=13.85.

Observing was done in two runs separated by about 40 days. Originally it had been intended to combine the data from both to form a single estimate of flare activity at Epoch 1970.0. Activity during the later run was markedly weaker, so that each run was processed separately, at a loss of accuracy incurred by the reduced sample size. The flare incidence equation

$$R(u) = \exp\left[a(u - u_o)\right] \text{ events per hour}$$

shows the phenomenon clearly in the differing values of u_o; (values of a are sufficiently similar so as to influence the estimate of change in flare activity very little).

Table I. Activity on YZ Canis Minoris

Epoch	Sample Size Hours	Sample Size Events	U_{lim}	a	u_o	Remarks
1969.97	16.06	25	15.0	.87	14.65	24-inch reflector
1970.08	11.44	30	16.0	1.03	15.26	36-inch reflector

Graphically the result is shown in figure 1, a plot of the flare magnitude at peak light, u, as a function of the rate R(u). Data from the earlier and later epoch are shown by circles and crosses, respectively.

Tabulated in the flare abstract for each night are (columns 1, 2, and 3) the event U.T., the airmass, and the U-magnitude at peak light (quiescent light I_q subtracted). Columns 4 and 5 list the flare durations at 0.5 and 0.1 peak light, respectively. Flare decay rates at 1, 2, and 3 magnitudes below peak light are listed in columns 6, 7, and 8, respectively. They are expressed as the common logarithm of the decay in magnitudes per minute. A colon has been used whenever uncertainty in an estimate was judged to exceed 10 percent.The letter "c" has been used to denote a complex time history affecting the estimate, so that its numerical value may have little significance.The integrated intensity P is given in column 9, in minutes of time. No description of flare rise characteristics has been attempted, since instrumental limitations tend to distort the later portions of the rise in the more rapid events.

Completeness of the record is controlled as before (Kunkel 1968), except that now the level of 90 percent completeness is given by U_{lim} as in Table 1.

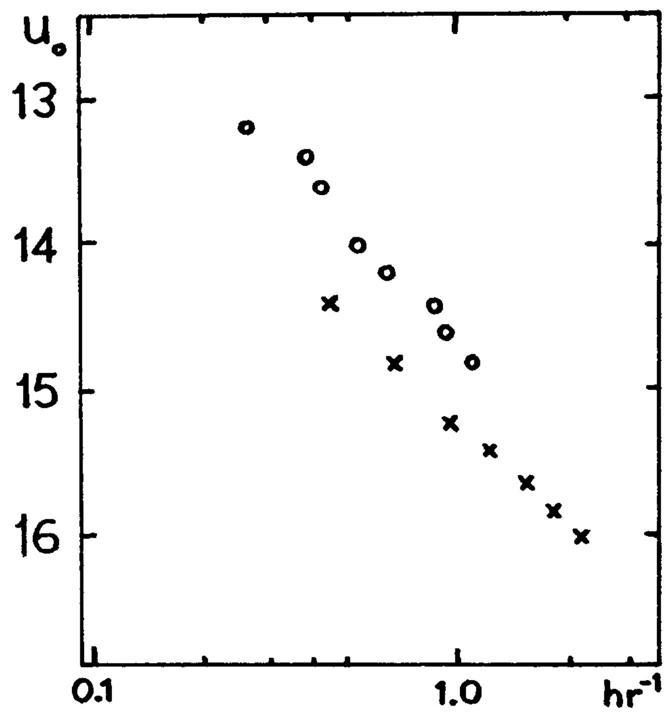

Figure 1

Flare incidence of YZ CMi, Data for fewer than five flares are not shown. Circles represent epoch 1969.97 observations, and crosses represent observations of epoch 1970.08.

Flare Abstract, YZ Canis Minoris

Event U.T.	Air-mass	U_{peak}	$T_{0.5}$	$T_{0.1}$	τ_1	τ_2	τ_3	P
18 Dec.1969	$04^h02.4-07^h39.9$		k_u=0.58,	7 events			T=$3^h.625$	
$4^h35^m.78$	1.41	14.92	2.2	–	–			–
5 16.55	1.285	12.98	.87	4.8	–.07	–.20	–.9:	4.16
6 19.71	1.21	14.90	.27	–	–			–
6 37.78	1.21	15.5	.3:		–			–
6 52.48	1.21	13.87	.40	c	–.21			note 1
6 55.97	1.21	14.26c	.6	–	–			note 1
6 58.3	1.21	14.39c	3.7	–	–			note 1
19 Dec.1969	$03^h36^m.2-08^h01^m.7$		k_u=0.53,	10 events			T=$4^h.423$	
$3^h54^m.45$	1.58	13.93	1.8	–	–.20	–.71	–	2.51
4 11.06	1.49	14.81	.3		–			–
4 32.12	1.40	14.84	.25		–			–
5 17.21	1.275	14.12	.08	2.:	+.86	–.46		–
5 32.78	1.25	11.43	.16	2.1	+.55	+.47	–.49	5.33
6 13.73	1.21	13.24	.65	7.2	–.04	–.73	–.80	4.16
6 22.35	1.21	15.24	.65		–			–
6 35.00	1.21	14.50	.22		+.52			–
7 41.5	1.26	15.72	1.3:		–			–
7 45.10	1.27	13.26	1.7	10.6	–.23	–.42	–.72:	1.99
20 Dec.1969	$04^h40^m.4-08^h04^m.4$		k_u=0.51,	7 events			T=$3^h.400$	
$4^h44^m.0$	1.34	<15.03	–		–			note 2
5 32.02	1.245	14.12	.55		–.05			–
6 53.29	1.21	13.87	.50	c	–.01	–.64:		2.05
7 05.70	1.22	14.16	.55	c	–.35	c		1.11
7 07.88	1.22	13.14	.41	3.2	+.06	–.52c	–.9:	2.58
7 15.23	1.24	14.94	.28		–			–
7 39.16	1.27	12.53	.62	5.8	–.07	–.66	–1.1	9.27
21 Dec.1969	$03^h39^m.0-08^h15.6$		k_u=0.58,	5 events			T=$4^h.61$	
$3^h53^m.50$	1.54	13.29	.11	.44	–			–
4 16.30	1.42	14.71:	.5:		–			–
4 54.86	1.31	14.56	.25		–			–
6 04.25	1.21	13.54	.15	3.	+.05	–.53c	–	1.33
8 02.70	1.33	13.03	.28	1.6	.00	+.10		2.93
27 Jan.1970	$02^h21^m.3-06^h41.2$		k_u=0.55,	12 events			T=$4^h.33$	
$2^h27^m.5$	1.31	15.95	3.6		–			–
2 36.52	1.29	14.62	.59	2.5	+.02			–
2 42.55	1.28	15.27	.54		–.04:			–
3 32.69	1.21	15.97	2.5:		–			–
3 36.32	1.21	15.25	.23		+.12:			–
3 55.63	1.21	13.01	1.27	5.6	–.54	–.44	–.57	5.36

Flare Abstract, YZ Canis Minoris (Cont.)

Event U.T.	Air-mass	U_{peak}	$T_{0.5}$	$T_{0.1}$	τ_1	τ_2	τ_3	P
27 Jan.1970, continued								
$4^h33^m.50$	1.22	15.98	.9:		-			-
4 49.14	1.24	14.75	.18	c	+.11	-.26	c	
5 21.67	1.29	14.24	.17	.83	+.70	+.13:		-
5 28.5:	1.31	<12.36	<.3:		+.55:	-.56:	-.62:	note 3
5 44.76	1.36	15.25	.40	c	+.19			-
6 31.97	1.56	15.18	.42		-			-
28 Jan.1970 $2^h42^m.2$-$4^h46^m.1$ and $4^h49^m.3$-$6^h24^m.6$ k_u=.52, 14 events T=$3^h.82$								
$2^h53^m.65$	1.23	15.09	.23c		c			-
2 57.56	1.23	14.34	.27	1.14	+.72	+.08		-
3 04.9	1.22	16.03	1.3:		-			-
2 48.60	1.24	15.88	.55		-			-
3 32.94	1.21	16.37	.35		-			-
4 29.13	1.22	15.12	.20		+.49			-
4 31.91	1.22	15.51	.55:		-			-
4 35.46	1.23	15.29	.95		-.51:			-
5 01.01	1.26	14.30	.24		-			note 4
5 19.24	1.30	15.36	.23		-			-
5 25.76	1.31	14.77	.23	1.65	+.16	-.26:		-
5 33.73	1.33	15.75	.29		-			-
5 36.31	1.34	15.13	2.1:		-.54			-
6 12.3	1.47	16.18	3.6		-			-
29 Jan.1970 $3^h05^m.5$-$6^h25^m.5$, k_u=0.61 9 events T=$3^h.29$								
3^h20^m	1.21	15.43	8.6		-.94			note 5
3 $38^m.1$	1.21	15.92	1.2:		-			-
4 34.3	1.23	15.68	.36		-			-
4 35.2	1.23	15.53	.52		-			-
4 51.3	1.26	16.04	3.:		-			-
4 54.56	1.26	14.24	.55	c	+.60	.0:		-
5 46.7	1.39	16.31	2.1		-			-
5 54.36	1.42	15.70	.6		-			-
6 17.8	1.47	15.43	.95		-			-

Notes

1) These three events form peaks on a general rise in light. Together their combined integrated intensity is 6.09.
2) Peak was lost while taking sky measure.
3) Peak was lost while taking sky measure; decay rates, while accurately measured, where referenced to a presumed peak of 12.06. Integrated intensity was larger than 6.40.
4) This event had a decline as rapid as the rise: a spike; rare.
5) This is the slowest event recorded. $T_{0.2} >$ 23 minutes.

$\underline{-32^\circ 16135A,B}$ = Gliese 799

As on a past occasion (Kunkel, 1969) this star has shown itself as the most active flare star so far observed. So pronounced is the activity that for more than half of the monitoring time the contribution of flare light to the U-band was greater than 0.05 magnitudes. 54 flares were recorded in 16.31 hours, of which 49 were brighter than U_{lim}=15.8. The activity during this run (Epoch 1969.70) is not significantly different from that recorded earlier (Epoch 1967.72). The flare incidence parameters, based on events fainter than U=13.8 are a=0.67 and u_0=14.11. A plot of R(u) (see figure 2) shows an apparent deficiency in flares brighter than u=13.8; the change of slope is nearly a factor of two. The number of events contributing to the bright portion of the curve is too small, however, to permit an inference that the phenomenon may be attributed to activity of the star in general. The 1967 do not show it, for instance.

Data for individual flares are presented as for YZ CMi. The 90 percent completeness level has been put at U_{lim}=15.8. No integrated intensities are given because the difficulty in locating the quiescent level is extreme, many flares occurring during the decline of one or more preceding events.

Quiescent level magnitudes and colors are V=10.22±.02, B-V=1.59±0.01, and U-B=1.09±03.

Flare Abstract, $-32^\circ 16135$

Event U.T.	Air-mass	U_{peak}	$T_{0.5}$	$T_{0.1}$	τ_1	τ_2	τ_3	Notes
12 Sept. 1969	$0^h04^m.8-3^h24^m.7$ and $3^h28^m.5-6^h02^m.8$, k_u=.52 18 events T=$4^h.90$							
$0^h38^m.06$	1.05	15.16	.4		-			
0 42.96	1.04	14.9:	.35		-			note 1
0 45.37	1.04	14.04	1.2	21	-.65	-.88:		
1 11.60	1.02	15.51	1.2:		-			
1 29.8:	1.00	16.37	3:		-			note 2
1 57.3	1.00	16.17	5.5:		-			note 2
2 19.5	1.00	16.02	4:		-			
2 28.7	1.01	15.70	3.0		-			
2 39.7	1.01	14.72	12	27.:	-1.06	-.82::		note 3
2 43.97	1.02	15.08	.4		-.24			note 4
2 49.7	1.02	15.76	1.2		-			
2 59.72	1.03	13.39	.25	8.5	+.33	-.72	-1.11	
3 17.4	1.04	15.39c	.9c		-			note 1
3 28.4	1.06	<13.68	-	-	(-.16)	(-1.13)		note 5

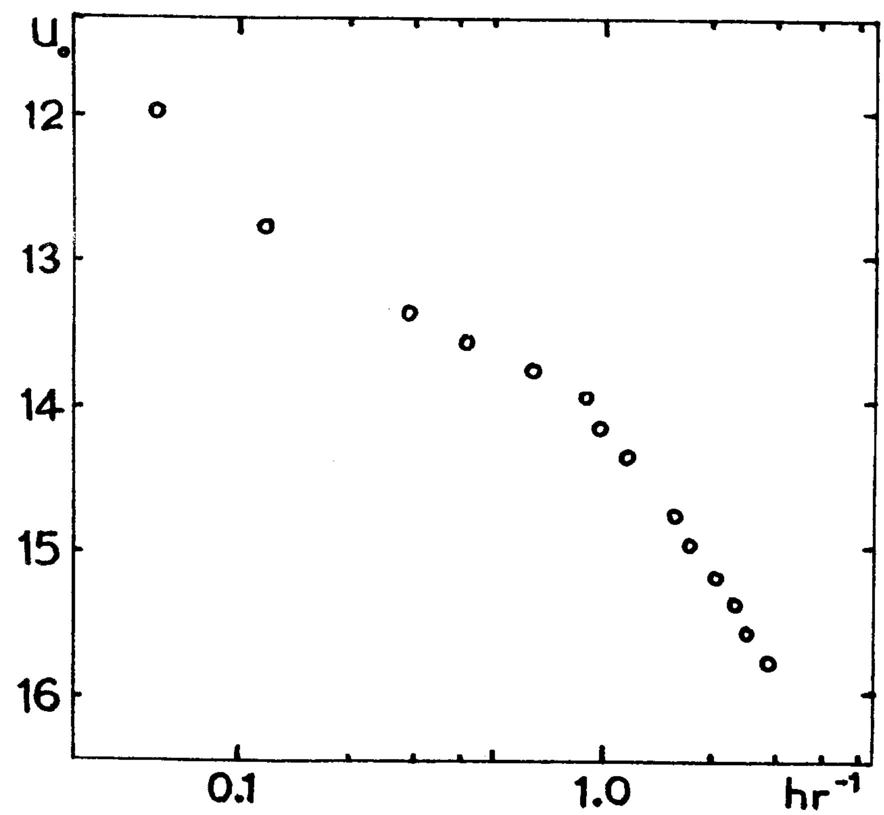

Figure 2

Flare incidence of $-32°16135$A,B, epoch 1969.70 for both stars together. The abcissa is the frequency in events per hour brighter than magnitude u_0, the ordinate.

Flare Abstract, $-32°16135$ (Cont.)

Event U.T.	Air-mass	U_{peak}	$T_{0.5}$	$T_{0.1}$	τ_1	τ_2	τ_3	Notes
12 Sept.1969, continued								
$3^h54.42$	1.10	13.79	1.0	c	+.01	c		note 6
3 56.94	1.11	14.11	3.0:		c	-.85:		note 4
4 20.8	1.16	15.66	2.4:		-			
5 07.40	1.30	14.21	1.4	6.8	-.17	-.21		

13 Sept.1969 $0^h13^m.8$-$5^h04^m.0$ and $5^h10^m.6$-$5^h57^m.2$, k_u=.54
16 events T=$5^h.61$

Event U.T.	Air-mass	U_{peak}	$T_{0.5}$	$T_{0.1}$	τ_1	τ_2	τ_3	Notes
0^h15^m57	1.07	13.26	.67	c	-.91	-1.38	c	note 7
0 50.31	1.03	13.90	2.25		-.41	-.81		
1 16.15	1.01	13.81	2.2	15.5:	-.57	-1.05		
2 10.5	1.00	13.96	1.8	12.3:	-.23	-.94		
2 41.75	1.02	15.65	6.:		-			note 2
2 44.14	1.02	15.17	.35		-			note 4
2 56.5	1.03	15.97	3.:		-			note 4
3 02.38	1.03	15.47	1.1		-			
3 09.0	1.04	15.69	1.7		-			
3 43.03	1.09	14.97	2.3		-.70			
3 52.6	1.11	15.65	6.0	13.	-			
4 30.22	1.19	13.46	1.95	16.c	-.61	-1.15	-1.1:	
4 37.85	1.22	12.77	.38	.85	+.68	+.27	-.31	note 4
5 11.60	1.34	13.64	.87	c	+.23	c		note 1
5 14.7	1.35	13.75	4.1	27.9	-.75	-1.26		
5 26.28	1.41	13.28	.94	4.5	-.19c	-.33	-.59	

14 Sept.1969 $0^h01^m.6$-$4^h54^m.0$ and $4^h58^m.7$-$5^h54^m.2$, k_u=.52
20 events T=$5^h.80$

Event U.T.	Air-mass	U_{peak}	$T_{0.5}$	$T_{0.1}$	τ_1	τ_2	τ_3	Notes
0^h14^m74	1.07	13.56	.55	1.9	+.47	+.05	c	
0 18.0	1.06	15.29	2.2		-.36:			
0 25.98	1.05	15.33	1.5		-			
0 45.8	1.03	15.50	4.8		-			note 2
1 12	1.01	13.01	13.:		-			note 2
1 14.86	1.01	14.32	.11	2.6	+.34	-.31		note 4
1 24.13	1.00	15.35	.7		-			
1 27.75	1.00	14.61	1.8	10.2	-.46	-.78		
2 00.0	1.00	14.80	15		-1.27			note 2
2 23.1	1.01	14.83	25.3c		-1.45			note 8
2 31.9	1.01	14.75						
3 03.75	1.02	14.66	1.7		-.29			
3 37.05	1.08	11.69	4.6	25.	-.39	-.84	-1.51c	note 9
3 50.05	1.10	13.71	.4	c	+.20	-.10		note 4
3 54.20	1.12	14.65	1.1		-			

Flare Abstract, -32°16135 (Cont.)

Event U.T.	Air-mass	U_{peak}	$T_{0.5}$	$T_{0.1}$	τ_1	τ_2	τ_3	Notes
14 Sept. 1969, continued								
$4^h05.88$	1.14	14.69	.27					
4 29.53	1.20	15.05	.25					
4 33.2	1.22	15.49	1.2					
5 18.12	1.37	15.08	2.1					
5 41.25	1.52	14.28	.17	9.6:	c	-.93		

Notes
1) On rising part of the following flare
2) Slow event of long duration with smooth, rounded peak.
3) τ_2 measured near next following event.
4) Superposed on a previous event of slow decline.
5) Peak lost on sky measure.
6) Decline covered by following flare.
7) Quiescent level uncertain.
8) Very slow flare. The two events ($2^h23^m.1$ and $2^h31^m.9$) appear to be peaks of the same protracted event.
9) The measure for τ_3 is covered by the next three events. A measure of τ_4=-1.1.

LPM 63 = Gliese 54.1

This is the least active flare star so far monitored from Cerro Tololo. Data are sufficient to yield only a preliminary incidence function R(u). In 12 hours of monitoring with the 36-inch reflector only seven events were recorded brighter than U_{lim}=17.0. The somewhat uncertain estimates of the incidence parameters are a=0.9 and u_o=17.0, the lowest value ever recorded. The rate growth coefficient a appears quite average, and is not likely to be in error by more than 0.15, while the probable error on u_o is about 0.2 magnitudes. A plot of the flare data appears in figure 3.

A listing of individual flares, under the same controls as given before, follows.

Flare Abstract, LPM 63

Event U.T.	Air-mass	U_{peak}	$T_{0.5}$	$T_{0.1}$	τ_1	τ_2	τ_3	Notes
13 Sept.1969	$06^h47^m.2-09^h25^m.1$		k_u=.54		2 events		$T=2^h.63$	
$9^h11.1$	1.29	15.91	1.15		-.10			
9 16.0	1.31	16.05	.9		-.29			
14 Sept.1969	$3^h35^m.0-7^h14^m.4$ and $7^h16^m.4-9^h21^m.1$ 1 event $T=2^h.73$						k_u=.52	
$6^h55^m.10$	1.04	14.82	.4	5.	+.61	-.14	-.82	note 1
16 Sept.1969	$2^h36^m.1-5^h12^m.4$ and $5^h16^m.1-9^h14^m.5$ 4 events $T=6^h.58$						k_u=.55	
$3^h40^m.30$	1.25	15.88	.4	13.5:	+.19:			
6 35.62	1.02	16.10	.83	9.1	+.09	-.45:		
6 56.55	1.03	16.98	.7		-			
8 29.7	1.20	16.78	.95		-			

note 1) A long standstill $1^m.7$ magnitude below peak light lasting three minutes made measurement of τ_2 difficult.

Contribution from the Cerro Tololo Inter-American Observatory No.117

Observatorio Interamericano de Cerro Tololo*
1970 June 13

WILLIAM E. KUNKEL

* Operated by the Association of Universities for Research in Astronomy, Inc., under contract with the National Science Foundation.

References

Kunkel,W.E., 1968 I.B.V.S. No.315
Kunkel,W.E., 1969 Bull. A.A.S. 1, 197

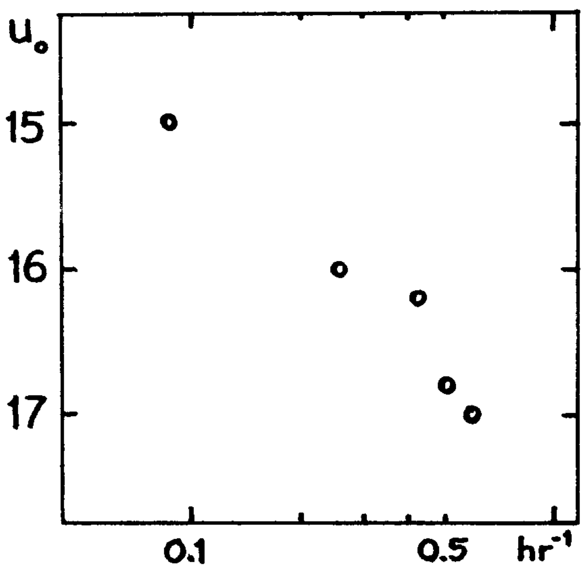

Figure 3
Flare incidence of LPM 63, epoch 1969.70

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INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 443

Konkoly Observatory
Budapest
1970 July 3

THE PERIOD OF TW DRACONIS FROM 1880 TO 1970

It is long known that the period of this eclipsing binary is increasing. In 1910 Graff found the period

$$2^{d}.80654 \qquad (1910)$$

In the last edition of Rocznik Astronomiczny (SAC 40, 1969) the following period is given:

$$2^{d}.806687 \qquad (1958)$$

If new elements were calculated in the past 50 years, a few years later the O-C has become positive.

As a part of a joint photoelectric programme of the Observatories Nürnberg (Germany) and Izmir (Turkey) a few minima of TW Dra were determined. Table 1 gives the observed time of minima and the O-C against the elements given in SAC 40.

Table 1

Min (helioc)	O-C (SAC 40)	
2438 539.4451	+ 0^{d}.009	Nürnberg, pe
671.3698	+ 0.011	" "
39 979.3515	- 0.009	Izmir, "
40 080.3995	- 0.009	" "
473.352	- 0.018	Nürnberg, "

The last 3 minima show negative (O-C)-values. It appears that the period of TW Dra is now becoming shorter. That is why we reconsider here the O-C diagram using all published minima.

From 134 published minima I formed 14 normalminima listed in Table 2. The minima 15 to 19 are the photoelectric minima from Table 1.

Table 2

Normalminima and photoelectric minima

No.	Min (helioc.)	E	n	O-C(P)	O-C (I-IV)	
1	2414 935.225	0	2 pg	$0^{d}.000$	$+0^{d}.005$	
2	18 754.885	1361	5 pg	-0.253	-0.019	
3	19 543.538	1642	39 vis	-0.282	0.000	I
4	20 169.407	1865	28 vis	-0.306	+0.014	
5	22 810.398	2806	5 vis	-0.416	+0.005	
6	23 711.324	3127	6 vis	-0.439	+0.002	II
7	24 746.958	3496	5 vis	-0.476	-0.012	
8	26 627.422	4166	3 vis	-0.499	+0.007	
9	27 629.414:	4523	3 pg	-0.497:	-	
10	33 310.238	6547	8 vis	-0.426	0.000	
11	33 759.340	6707	13 vis	-0.395	+0.002	
12	34 208.438	6867	8 vis	-0.369	0.000	III
13	34 876.4683	7105	1 pe	-0.332	-0.005	
14	35 951.510	7488	7 vis	-0.255	+0.003	
15	38 539.4451	8410	1 pe	-0.093	-0.0006	
16	38 671.3698	8457	1 pe	-0.083	+0.0028	
17	39 979.3515	8923	1 pe	-0.021	-0.0006	IV
18	40 080.3995	8959	1 pe	-0.015	+0.0013	
19	40 473.352	9099	1 pe	0.000	-0.003	

Column 4 (n) gives the number of single minima used for forming a normalminimum. The O-C values in column 5 were calculated with a mean period and the normalminimum 1 as E = 0, i.e.

$$\text{Min} = 2414\ 935.225 + 2^{d}.8066960.E$$

(s. Figure 1.)

For the epochs I to IV linear elements were calculated using the method of least squares. Table 3 gives the corresponding elements together with the mean errors and the mean epochs.

Table 3

$$\text{Min} = 2414\ 935.220 + 2^{d}.806527.E \quad (I) \qquad \bar{E}= 930$$

$$\text{Min} = 2422\ 810.\overset{\pm 16}{\bar{3}93} + 2^{d}.806\overset{\pm 12}{\bar{6}34}.E \quad (II) \qquad \bar{E}=3490$$

$$\text{Min} = 2433\ 310.\overset{\pm 8}{\bar{2}38} + 2^{d}.806\overset{\pm 10}{\bar{8}742}.E \quad (III) \qquad \bar{E}=7020$$

$$\text{Min} = 2438\ 539.\overset{\pm 26}{\bar{4}457} + 2^{d}.806\overset{\pm 43}{\bar{8}352}.E \quad (IV) \qquad \bar{E}=8750$$

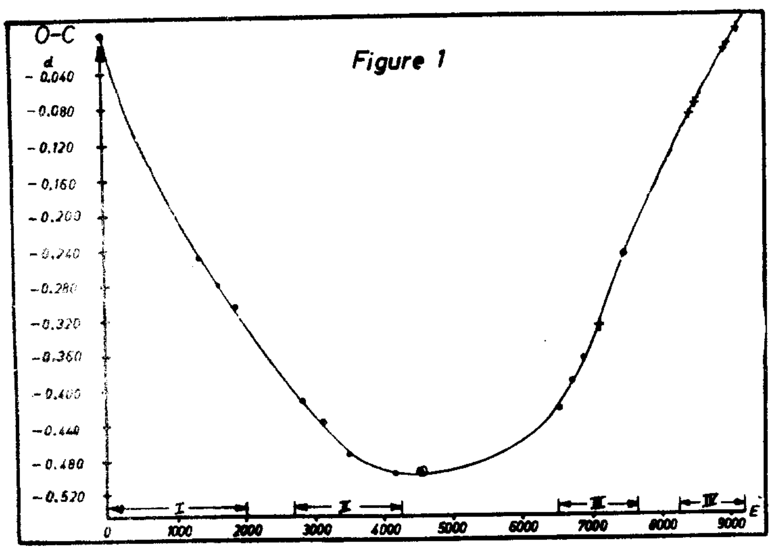

Figure 1

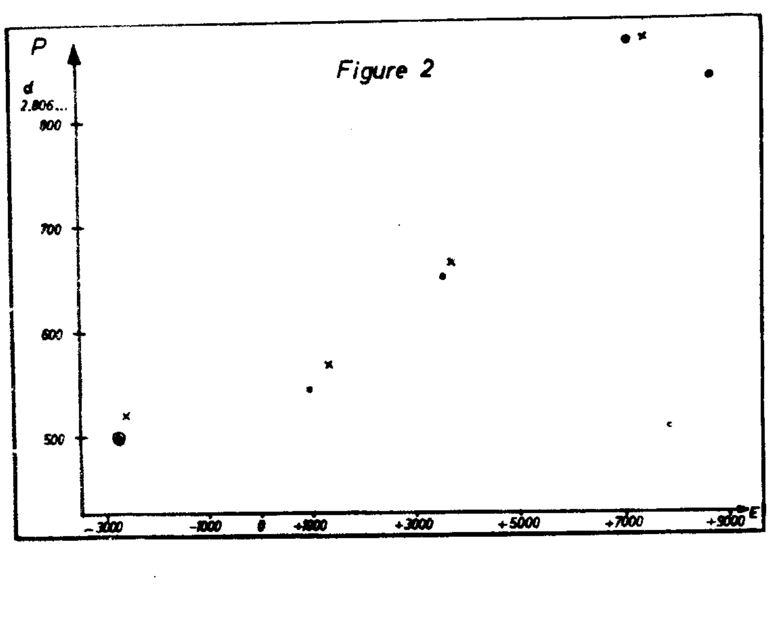

Figure 2

The O-C values are given in column 6 of Table 2; the elements (IV) give a good representation of the observed minima from 1964-1970.

Figure 2 shows the change of period; dots give the periods I to IV (Table 3), the period represented by a dot in circle at E = -2800 was calculated only from 2 minima. Crosses represent the periods published by Schneller (MVS 1, page 187; 1966) which are in very good accordance with our values.

Figure 2 and Table 3 show very clearly that

1) Between E = -3000 and +1000 (1876-1907) the period of TW Dra was nearly constant.
2) Between E,= +1000 and +7500 (1908-1958) the period has considerable increased.
3) At present (E >8000) the period of TW Dra is decreasing.

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BD +28°838

Dans le Bulletin No.409, j'ai publié une liste de 13 variables nouvelles, dont l'une, BD +28°838, était signalée comme Algolide avec un seul minimum observé le j.j. 2440 267. Trois observateurs suisses, N.N. Locher, Disthelm et Wälke, n'ayant pas remarqué d'éclipse, j'ai fait un fort agrandissement de la photo du minimum (x17): une légère auréole blanche autour de BD +28°838 indique peut-être un défaut dans l'émulsion, ce qui fait que la variable est douteuse.

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COMMISSION 27 OF THE I. A. U.
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Number 444

Konkoly Observatory
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1970 July 6

HR 2989: A NEW DELTA SCUTI STAR

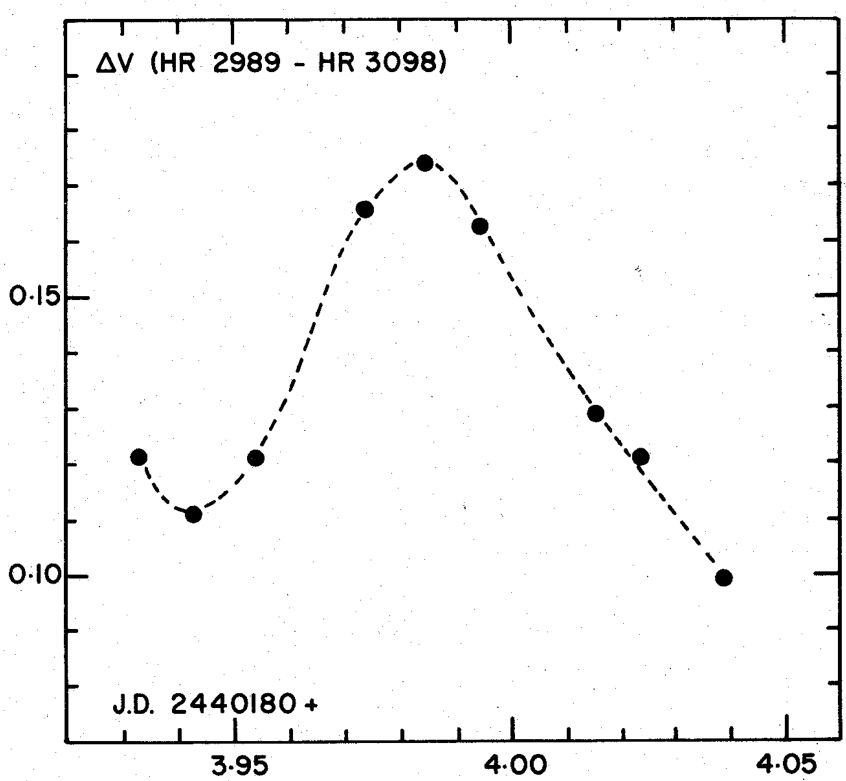
In the course of a search for Delta Scuti variables among nearby A and F stars, the star HR 2989 /HD 62437; m_v = 6.47; spectral type F0/, which was being used as a comparison star in the search program, was found to vary in brightness. The star was observed on the night of November 21-22, 1970, using a 41-cm. reflector at Kitt Peak National Observatory. The instrumentation and observing procedure have been described elsewhere /Percy, J.R. 1969,J.R.A.S.C. 63, 233/. The observations, made through a V filter relative to HR 3098,are listed in Table 1 and shown in Figure 1. The constancy of HR 3098 was determined by means of a check star HR 2711.

The period of HR 2989 is about 0.12 day, and the amplitude is about 0.1 magnitude, large enough so that simultaneous spectroscopic and photometric observations might profitably be made.

TABLE 1

Observations of HR 2989; November 22, 1970

U.T.	Heliocentric J.D.	Δ V/2989-3098/
10:24	2440183.933	0.121
10:37	3.942	0.111
10:54	3.954	0.121
11:22	3.974	0.165
11:38	3.985	0.174
11:54	3.994	0.162
12:21	4.015	0.129
12:33	4.024	0.122
12:55	4.038	0.099



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COMMISSION 27 OF THE I. A. U.
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Konkoly Observatory
Budapest
1970 July 8

TIME OF MINIMUM FOR WY HYDRAE

The eclipsing binary WY Hya was observed photoelectrically on the UBV system on one night in March, 1970 at the No. 1 16-inch telescope of the Cerro Tololo Inter-American Observatory. There are just enough observations to roughly determine a time of secondary minimum. Solovyev's /1958/ star "a" was used for the primary comparison star.

Column 1 in Table A lists the heliocentric Julian date. Columns 2, 3 and 4 list the differential V, /B-V/ and /U-B/ magnitude and color indices in the sense variable minus comparison.

Table A

HJD	Δ V	Δ /B-V/	Δ /U-B/
2440676.5689	+1.262	+0.336	-0.126
.5713	1.317	.326	-0.112
.5758	1.409	.292	-0.082
.5780	1.399	.338	-0.102
.5849	1.526	.329	-0.048
.5868	1.532	.331	-0.143
.6006	1.396	.308	-0.130
.6030	1.284	.368	-0.112
.6080	+1.205	+0.334	-0.078

The derived heliocentric Julian Day time of secondary minimum is HJD 2440676.587 ± 0^{d}001. Based upon the ephemeris quoted by Koch, Sobieski and Wood /1963/, the O-C for this secondary minimum is -0^{d}029.

This work was supported by the National Science Foundation.

References

Koch, R.H., Sobieski, S., and Wood, F.B. 1963, Publ. of Univ. of Pennsylvania, Astronomical Series, Vol.9.

Solovyev, A.V. 1958, Peremennye Zvezdy, 12, 262.

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COMMISSION 27 OF THE I. A. U.
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Konkoly Observatory
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1970 July 8

PHOTOELECTRIC TIME OF MINIMUM FOR AI CRUCIS

The eclipsing binary AI Cru was observed photoelectrically on the UBV system on one night in March 1970 at the No.1 16-inch telescope of the Cerro Tololo Inter-American Observatory. A finding chart is given by Wesselink /1969/ wherein AI Cru is Wesselink's star No. 1 and the comparison star used by me is Wesselink's star No.2.

Table A

HJD	ΔV	Δ/B-V/	Δ/U-B/
2440676.7489	+0.125	-0.016	-0.077
.7510	.161	-0.020	-0.079
.7554	.156	-0.008	-0.078
.7575	.202	-0.032	-0.095
.7618	.201	-0.015	-0.086
.7641	+0.214	-0.018	-0.084
.7696	.258	-0.019	-0.062
.7718	.268	-0.005	-0.078
.7764	.317	-0.033	-0.063
.7786	.311	-0.032	-0.050
.7836	+0.353	-0.039	-0.044
.7858	.358	-0.022	-0.062
.7900	.377	-0.020	-0.044
.7923	.398	-0.031	-0.047
.7971	.440	-0.028	-0.046
.7991	+0.438	-0.018	-0.050
.8033	.435	+0.005	-0.059
.8055	.457	-0.007	-0.053
.8114	.450	+0.001	-0.030
.8135	.434	+0.025	-0.061
.8184	+0.464	-0.022	-0.045
.8208	.452	-0.014	-0.043
.8403	.356	+0.022	-0.084
.8428	.353	0.000	-0.062
.8479	.318	-0.019	-0.051
.8503	+0.312	-0.012	-0.070
.8570	.254	+0.001	-0.072
.8591	.250	-0.020	-0.085
.8819	.091	+0.013	-0.091
.8840	.096	-0.001	-0.084
.8879	+0.076	-0.022	-0.058
.8900	.054	-0.006	-0.068

Column 1 in Table A lists the heliocentric Julian Date. Columns 2, 3 and 4 list the differential V, /B-V/ and /U-B/ magnitude and color indices in the sense variable minus comparison. The times of observation are accurate to a few seconds. The accuracy of the photometry is within ± 0.02 magnitudes

The derived heliocentric Julian Day time of primary minimum is HJD 2440676.813 ± 0.001 as derived by the technique outlined by Kwee and van Woerden /1956/. When compared to the ephemeris quoted by Koch, Sobieski and Wood /1963/, the O-C for this primary minimum is $+0\overset{d}{.}018$.

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References

Koch, R.H., Sobieski, S., and Wood, F.B. 1963. Publ. of Univ. of Pennsylvania, Astronomical Series, Vol.9.

Kwee, K.K., and van Woerden, H. 1956, Bull. Astron. Inst. Neth. 12, 327 /No.464/.

Wesselink, A.J. 1969 M.N.R.A.S. 146, 329.

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LIGHT VARIATIONS OF BD + 39°2193

In the process of obtaining photometry for 173 program stars, light variation was detected for BD + 39°2193 = = HD 77443. Presented below are the magnitudes and colors for BD + 39°2193 with the heliocentric Julian Day for the V magnitude.

The average deviation for the five V observations listed was $0^m.047$, whereas, the average deviation of the V observations for the program stars was $0^m.009$. The observations presented here have a range of 0.175 magnitude in the V, 0.214 in B, and 0.160 in U.

The HD catalog gives the spectral type of BD +39°2193 as Mb, similar to that of Rho Persei. Rho Persei is a known SRb type variable, a designation given to semi-regular variables of late spectral types. These stars are giants with typical brightness variations of 0.7 magnitude.

HJD	V	B-V	U-B
244 0565.010	6.709	1.549	1.344
244 0567.989	6.777	1.548	1.321
244 0666.762	6.602	1.509	1.375
244 0682.686	6.745	1.471	1.308
244 0683.730	6.740	1.473	1.302

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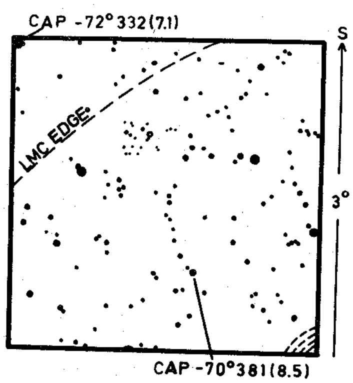
A NOVA IN THE LARGE MAGELLANIC CLOUD, BV 1261

Nova Mensae 1968 was discovered on Bamberg plates taken by I.Paterson with the 10 cm Aero Tessar cameras located at Mount John University Observatory. Exposures of 60 minutes were all made with Gevaert 67 A50 plates. The limiting magnitude on the plates is approximately m_{pg}=13.7. The position of the nova is: RA =$5^h11^m.5$, D = $-71°47'$ (1900). The magnitudes were determined by the use of an iris photometer. The Argelander Step Method was used in conjunction with the selected areas of Brun and Vehrenberg (1). The results are given below. Plates taken with the 10-inch Metcalf camera located at Boyden Observatory were examined for the determination of the pre-nova magnitude. The dates covered by the plates were from November 1965 to November 1966. These Gevaert 67 A50 plates were all 30 minute exposures and showed the nova to be at a constant magnitude of 15.7. Unfortunately, plates are not available for the determination of the post-nova magnitude.

Date	Julian Date	Magnitude
1968 Dec. 13	2440203.0174	below 13.7
Dec. 15	205.0104	below 13.7
Dec. 17	207.0000	10.9
Dec. 17	207.0451	10.9
Dec. 18	208.0069	12.2
Dec. 20	210.9826	13.0
Dec. 21	211.0278	13.0
Jan. 18	239.9549	below 13.7

The total range in magnitudes from pre-nova to maximum is 4.8. Assuming that the distance modulus for the LMC is 18.7, the nova would have a pre-nova absolute magnitude of -3.0. With the assumption that the nova was first observed when at maximum,the nova would have attained M_{max}=-7.8 which is in good agreement with the mean probable absolute magnitude (-7.6) of the ten other LMC and SMC novae. This value is also in good agreement with novae in Messier 31 and for Milky Way novae with visible expanding envelopes (2). The total number of known novae in the LMC



is now seven. The ratio of novae in the two clouds (1:1.7) now differs slightly from that of planetary nebulae (1:1.5) as given by Westerlund (3). The drop of two magnitudes in four days is evidence that it is a very fast nova. One other very fast nova has been observed in the LMC, N Mensae 1951. Below is a comparison of the characteristics of the two novae and above the finding chart of nova Mensae 1968.

	m_{max}	M	Type	Dist.from Bar
N Mensae 1951	11.95	-7,0	very fast	0°1
N Mensae 1968	10.9	-7.8	very fast	2.4

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(1) Brun,A., and Vehrenberg, H. 1965, Atlas of Harvard-Groninger Selected Areas (Düsseldorf:Treugesell-Verlag).
(2) Henize,K., Hoffleit,D., and Nail,V. McK. 1954, Proc. US Nat. Acad.Sci. 40, 3651; Harvard Repr. No.387.
(3) Westerlund, B.E. 1968, IAU Symp. No.34, 23.

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Konkoly Observatory
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PHOTOGRAPHIC LIGHT ELEMENTS OF TX Cnc

Haffner[1] demonstrated that TX Cnc is a variable of the W UMa type. Properties of the system, which is a member of the Praesepe cluster, have been discussed by various authors (2, 3, 4). TX Cnc is a zero age W UMa variable and its position in the period colour diagram defies current theoretical explanation (5). It may be that a new spectroscopic determination of the masses of the components is desirable.

With this in mind, photographic observations were made at Herstmonceux using the 26" f/10 refractor and IIaO emulsion to check existing light elements. This system is a good approximation to the B magnitude. The plates were reduced by iris photometer against Johnson's (6) magnitudes for Praesepe and give B= 10.65 - 11.02. Combined with Haffner's light elements quoted by Popper (3), the new observations give

$$JD_{min} = 2440\,597.7605 + 0^d.3828813$$
$$\pm 25 \qquad\qquad \pm 3$$

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References

1. H. Haffner, Z.f.Ap. 14, 285, 1937
2. H. Haffner, A.N. 276, 233, 1950
3. D.M. Popper, Ap.J. 108, 490, 1950
4. F. Lenouvel and J. Daguillon, J. des Obs. 39, 1, 1956
5. J. Hazelhurst, D.L. Moss and J.A.J. Whelan, M.N. in press
6. H.L. Johnson, Ap.J. 116, 640, 1953

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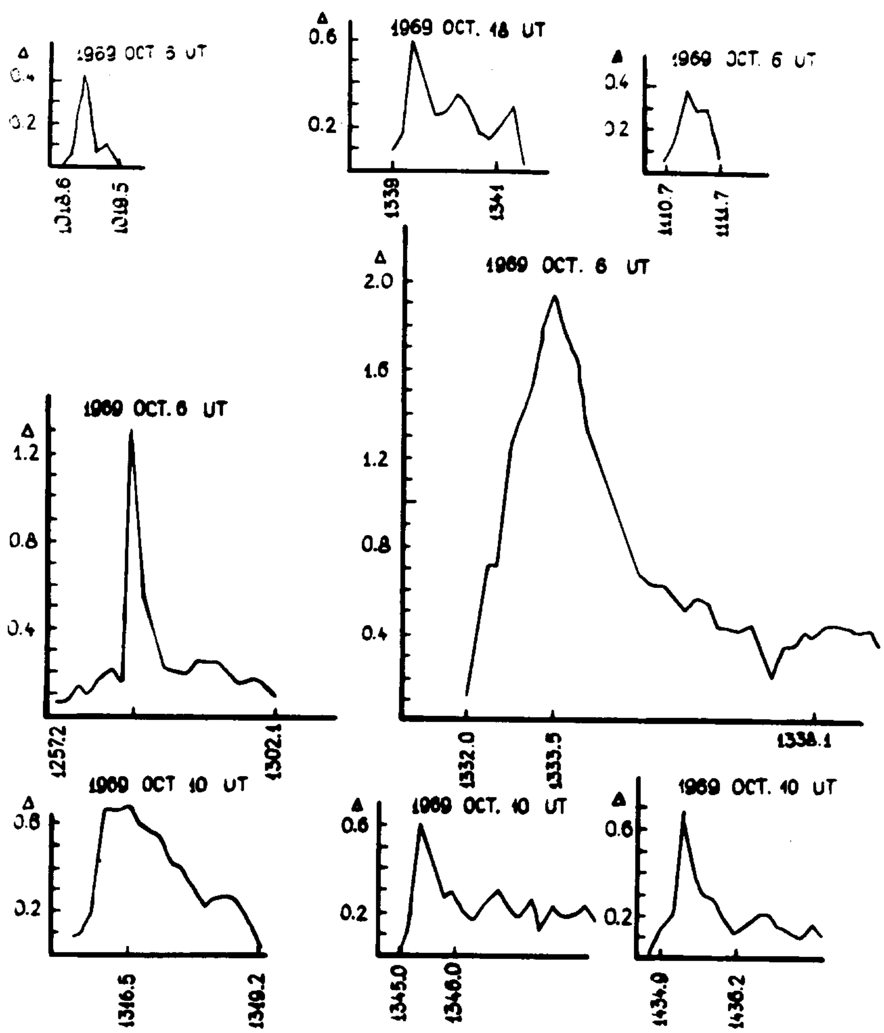
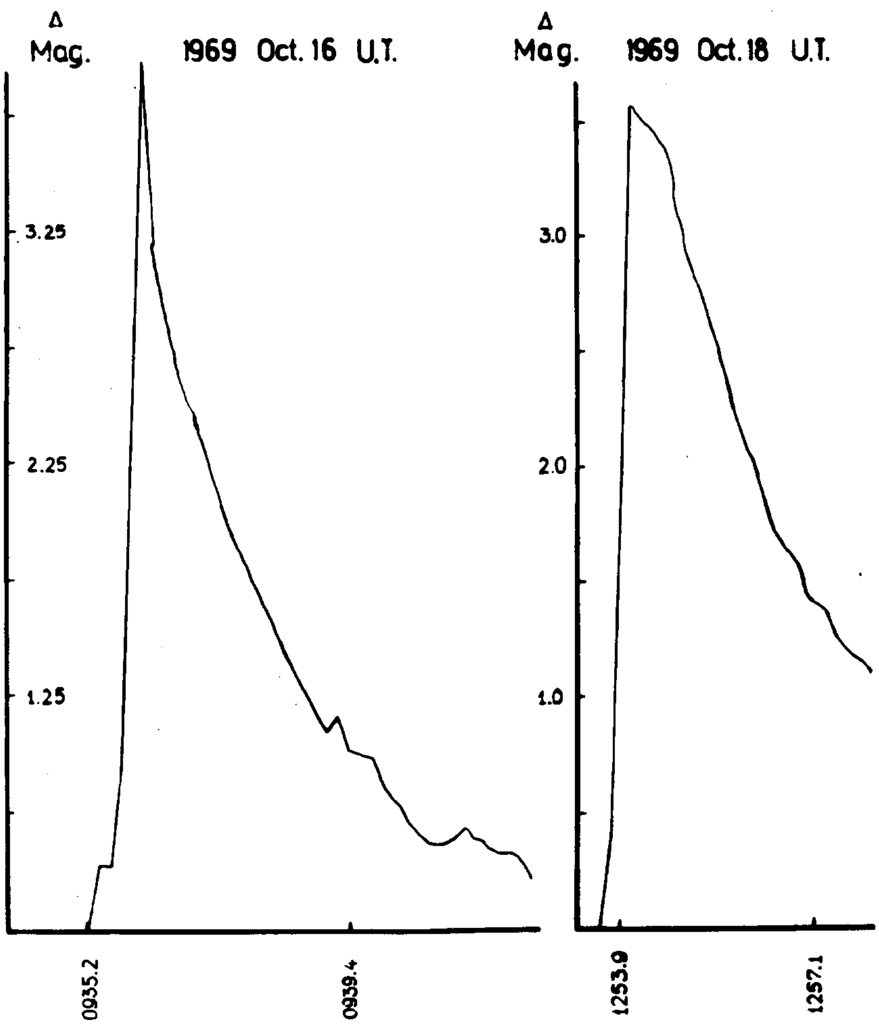
Konkoly Observatory
Budapest
1970 July 17

FLARE ACTIVITY OF UV CETI

Photoelectric monitoring of UV Ceti was carried out at the Auckland Observatory during the International period Oct. 3-18, 1969. The 50 cm Zeiss reflector was used together with an E.M.I. type 9502 photomultiplier tube and a standard B filter. Details of the eleven flares observed are given in the table below. A further fifteen very doubtful flares were recorded but these are not listed, because operating equipment troubles, makes it probable that they are spurious events.

Date U.T.	Coverage U.T.	Total hours	Flare No.	Flare max. U.T.	Dur-ation mins.	Δm B
1969						
Oct.3	1338-1350;	1^h20^m				
	1353-1410;1419-1536;					
	1441-1454;1456-1506;					
	1508-1513;1548-1554;					
5	1337-1350;1353-1411	0 52				
	1414-1435.					
6	0835-0843;0844-0854	5 59				
	0856-0910;1000-1020;		1	$10^h18^m56^s$	0.93	0.35
	1023-1045;1051-1123;		2	11 11 08	0.95	0.30
	1126-1146;1156-1238;					
	1241-1306;1314-1411;		3	12 59 39	2.68	1.15
	1429-1458;1505-1548;		4	13 33 31	12.65	1.85
	1554-1610;1612-1631;					
10	0945-1001;1004-1021;	4 39				
	1031-1034;1204-1242;					
	1245-1308;1312-1417;		5	13 16 32	3.06	0.55
			6	13 45 23	8.0	0.59
	1431-1526;1532-1620;		7	14 35 19	1.26	0.60
			8	15 13 28	?	0.30
	1628-1635;1638-1645;					
11	0921-0935;0936-0940;	3 56				
	0941-0942;0957-1011;					
	1012-1019;1021-1051;					
	1134-1143;1146-1226;					
	1231-1237;1244-1321;					
	1324-1329;1337-1358;					
	1500-1523;1525-1532;					
	1556-1612;1630-1635;					


1969 OCT. 6 UT
1969 OCT. 18 UT
1969 OCT. 6 UT
1969 OCT. 6 UT
1969 OCT. 6 UT
1969 OCT 10 UT
1969 OCT. 10 UT
1969 OCT. 10 UT



Δ Mag.
1969 Oct. 16 U.T.
3.25
2.25
1.25
0935.2
0939.4
Δ Mag.
1969 Oct. 18 U.T.
3.0
2.0
1.0
1253.9
1257.1

Oct.12	1033-1036;1154-1158;	0 7					
16	0859-0917;0920-0928;	2 18					
	0933-0944;0946-0952;		9	09 35 36	>7.5	3.80	
	0953-1004;1008-1016;						
	1017-1035;1038-1056;						
	1117-1135;1144-1156;						
	1232-1242;						
18	0855-0904;1134-1200;	1^h57^m					
	1246-1311;1319-1328;		10	$12^h53^m54^s$	$>13,5^m$	3.40	
	1334-1404;1410-1414;		11	13 39 24	2.10	0.40	
	1428-1442;						
Total		21^h08^m					

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Visual monitoring of UV Ceti was carried out by members of the V.S.S.,RASNZ.,during the 1969 International observing period. Times of monitoring are listed below. No major flares were recorded. Such minor brightenings as were observed were not beyond the inherent errors of visual observing and do not appear to have been flares.

1969. U.T.	Monitoring times U.T.		
Oct. 4	09^h00^m	to	09^h31^m
	10 16		10 20
	10 21.5		11 45
6	09 27.5		09 30
	09 31.5		09 36.5
	09 42		09 59.5
	10 04		10 52.5
8	10 00		10 59.5
	11 43.5		12 53
11	08 40		1023
	10 46		11 06.5
	11 19		11 39.5
	11 55		12 35.5

Oct.13	09 41.5	10 59.5
14	10 00	11 40
	Total	$11^h 23^m$

Observers: -R.W. Evans; D. Cameron; C.S. Lauder; R. Greiner; H. Keen.

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COMMISSION 27 OF THE I. A. U.
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1970 July 17

YZ CANIS MINORIS

Photoelectric monitoring of YZ CMi was carried out at the Auckland Observatory with the 50 cm reflector. The observations were made with an E.M.I. type 9502 photomultiplier tube and a standard B filter. The photometer uses a capacitor integrating circuit to convert the photomultiplier current into a square wave pulse whose frequency waves in proportion to intensity. This is monitored with a digital frequency meter in ten second integrating periods.

During 17 hours of monitoring three flares were observed. Table 1 lists monitoring times with remarks on seeing conditions.The details of observed flares are given in Table 2.

Table 1.

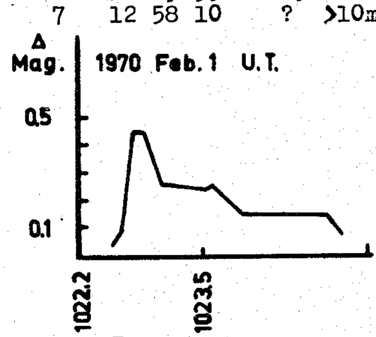
Date 1970. U.T.	Monitoring times U.T.	Remarks
Jan. 31	1234-1245;1331-1335 1414-1416.	Haze.
Feb. 1	0946-0949;0950-1032 1036-1115;1123-1203 1217-1244;1247-1303 1305-1322.	Clouds and haze at beginning; clearer for rest of night.
2	1044-1115;1117-1120;	Cirrus
3	1147-1216;1218-1227; 1259-1302;1309-1324;	Passing clouds
4	0920-0936;1038-1057;	Cloudy with clear patches
5	0906-0911;0936-0957;	Some cloud
	1013-1027;1027-1037; 1039-1104;1125-1136; 1140-1201;1214-1243; 1250-1345;1413-1446; 1454-1526;1539-1552.	Clear
6	1021-1056;	Cloudy.
	1104-1108;1112-1126; 1128-1146;1148-1200;	Clear
	1209-1233;1317-1319;	Cloudy
7	1028-1045;1046-1104; 1107-1116;1258-1321; 1325-1348.	Broken cloud

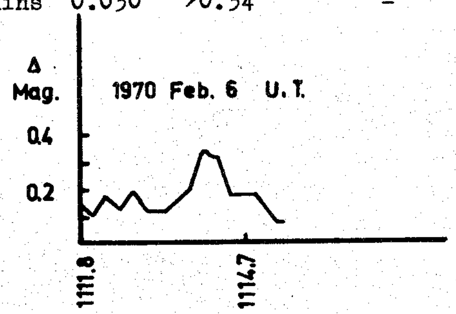
Feb. 8	0944-0945;0955-1025	Scattered cloud.
	1033-1100;1111-1129;	
	1130-1132;1139-1153;	Clear
	1156-1200	Clear
	1246-1247	Cloud
11	1128-1141	Cloud
	1248-1317;1321-1335;	Clear
	1337-1351;1357-1400;	
	1405-1500;1512-1523;	

Table 2.

Observed flares of YZ CMi

Date 1970 U.T.	Max. U.T.	d_b	d_a	S.D.	Max. Mag. B	Integ. Intensity mins .
Feb.1	$10^h22^m38^s$	$<20^s$	3^m15^s	0.023	>0.42	0.537
6	11 13 35	23	45	0.027	0.19	0.080
7	12 58 10	?	>10mins	0.030	>0.34	-





Times of maxima are + 6 seconds. d_b= duration of flare before maximum; da = duration of flare after maximum; S.D. - Standard deviation near flare in B; Max. Mag. = Intensity of max. in B as defined in IBVS 326; Integ. Intensity = Integrated intensity, in minutes, as defined in IBVS 326.

The first two flares are depicted in Figures 1 and 2. The commencement of the third flare was not observed.

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YZ CANIS MINORIS

During the 1970 International period YZ CMi was monitored visually by members of the Variable Star Section, RASNZ., as under. No definite flares were observed.

Date 1970 U.T.	Monitoring times U.T.	
Jan. 31	09^h08^m -	09^h18^m
	10 03	10 20
	10 23	11 53
Feb. 1	11 20	11 50
	12 50	13 10
2	10 00	10 10
	10 32	10 37
	11 57	12 02
3	11 57	12 12
	12 17	12 22
4	09 57	10 40
	12 02	12 18
5	08 54	09 54
	10 00	11 45
6	09 00	10 14
	10 16	10 17
	10 34	12 00
9	10 10	10 17
	10 24	11 12
	11 13	13 03
10	10 25	13 56
	Total	15^h08^m

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V 645 (PROXIMA) CENTAURI

V 645 Cen was monitored at the West Melton Observatory, Christchurch (N.Z.) with the 40 cm reflector. The output of the photometer was recorded on tape. No flares were observed.

1970 (U.T.)	Monitoring time U.T.
May 31	0900 to 1200
June 10	1040 to 1130

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COMMISSION 27 OF THE I. A. U.
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Konkoly Observatory
Budapest
1970 July 18

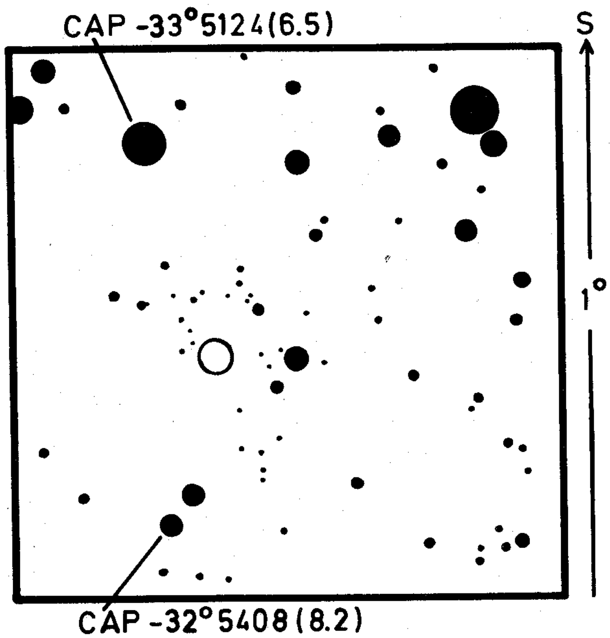
NOVA SAGITTARII 1969, BV 1262

Nova Sagittarii 1969 was discovered on Bamberg plates taken by I. Paterson with the 10cm Tessar cameras located at Mount John University Observatory, New Zealand. Exposures of 60 minutes were all made with Gevaert 67A50 plates. The limiting magnitude of these plates is about 12.8. The position of the nova is: RA=$18^h28^m.3$, D=$-32°39'$ (1950); $l^{II}=1°.52$, $b^{II}=-10°.42$(1950). The magnitudes were determined by use of an iris photometer. The Argelander Step Method was used in conjunction with the selected areas of Brun and Vehrenberg (1) and certain selected stars having published photoelectric magnitudes (2). The results are given below. Because of the

	Date	Julian Date	Magnitude
1969	23 June	2440395.0208	below 12.8
	8 July	410.0049	7.1
	10 July	412.9826	6.9
	13 July	415.9459	7.6
	6 Aug.	439.9125	8.7
	7 Aug.	440.9160	8.8
	16 Aug.	449.8806	8.8
	5 Sept.	469.8507	10.7

apparent brightness of the nova the selected areas of Brun and Vehrenberg could not be used and other comparison stars had to be found for the first three dates on which the nova could be seen. The published B magnitudes of HD 163667, HD 170040, HD 170279 and HD 170320 were then used for these three dates.

Application of Arp's results for nova in M31(3) to the rate of decline leads to M = -6.7 at maximum light and an apparent distance of 5300 parsecs. Lying as it does near the plane of the Galaxy, the nova may be appreciably obscured. The assumption has been made that the nova reached maximum light on JD 2440413. Below is the finding chart for Nova Sagittarii 1969 made from the plate taken at time of maximum brightness.



JOHN R. SIEVERS

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(1) Brun,A., and Vehrenberg, H. 1965, Atlas of Harvard-Groninger Selected Areas (Düsseldorf: Treugesell-Verlag).
(2) Blanco,V.M., Demers,S., and Fitzgerald,M.P.1968, Photoelectric Catalogue, Pub. of U.S. Naval Obs. 2nd series, Vol. XXI.
(3) Arp,H.C. 1956, A.J., 61,15.

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NUMBER 453

Konkoly Observatory
Budapest
1970 July 20

PHOTOELECTRIC TIMES OF MINIMA OF RR CENTAURI

The eclipsing binary RR Centauri = HD 124689 has been observed photoelectrically at the Bosque Alegre Station of the Córdoba Observatory. The observations were taken at the 154 cm reflecting telescope with a RCA 1P28 photomultiplier plus a GG14 Schott glass filter. The photoelectric signals were amplified through a Field Effect Transistor amplifier (Sisteró, 1970).

The primary minimum was observed on June 24 about U.T. 2^h20^m. From 69 peV observations the time of primary minimum was derived:

Min. I. = J.D. hel 2440761.6003
± 0.0028 m.e.

and from 80 observations on June 25 the time of secondary minimum was obtained:

Min.II. = J.D. hel 2440762.5158
± 0.0014 m.e.

From the observed times of minima new light elements were derived by comparisons with the elements in the finding list given by Koch, Sobieski and Wood (1963). The Knipe's elements given there, compared with the present observations, permit an improved re-determination of the period: P = $0.^d60569131 \pm 0.^d00000058$ m.e. Table I lists the minima with the given weights and the cycles and residuals from the linear light elements:

Min.I = J.D. hel 2438946.9535 + 0.60569131 . E
0020 ± .00000058 m.e.

We are continuing work on this star.

TABLE I

Min	J.D. hel	E	W	O - C
I	2437132.3014	-2996	4	- $0^{d}.001$
I	2440761.6003	+2996	1	- 0.004
II	2440762.5158	+2997.5	3	+ 0.003

R.F. SISTERÓ

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References

Koch, R.H., Sobieski, S. and Wood, F.B. 1963 , Pub. of the Univ. of Pennsylvania, Astr. Series Vol.IX.

Sisteró, R.F., 1970, in preparation.

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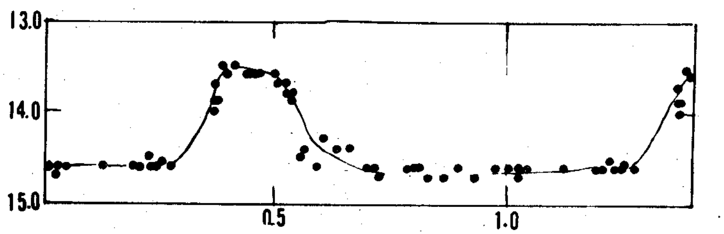
Konkoly Observatory
Budapest
1970 July 22

CONFIRMATION OF A SUSPECTED VARIABLE
IN COMA BERENICES

Variable suspect 1904 (Kukarkin, et. al., Catalogue of Suspected Variables, Moscow,1951) has been independently rediscovered with the new Rodman blink microscope at the Maria Mitchell Observatory. The period has been determined from approximately 50 plates talen between J.D. 2438531 and J.D. 2440766 and two Lick Sky Atlas prints for J.D. 2435136 and J.D. 2435168. The observations are satisfied by MAX = 2438887.686 + 0^{d}472469N. The star is an RR Lyrae type ab with a magnitude range of 13.5 to 14.7. The magnitudes were derived from Harvard-Groningen Selected Area 56.



I would like to thank the U.S. National Science Foundation for the grant which made this work possible.

MARCIA J. KEYES

Nantucket, Massachusetts, U.S.A.
July 9, 1970

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INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 455

Konkoly Observatory
Budapest
1970 July 26

CEPHEIDES DE FAIBLE AMPLITUDE

En 1968, Efremov (1) a décrit un sous-type de population I (Is) caractérisé par:
- une amplitude faible $\lesssim$ 0, 7 m
- une courbe de lumiere presque sinusoidale
  $(D = \frac{1.\text{phase Montée}}{P} > 40)$

J' ai cherché à établir le catalogue de ces étoiles. Après avoir éliminé quelques céphéides d' amplitude mal déterminée, on construit un tableau à double entrée D/ΔB. En fait deux tableaux ont été établis, l' un pour 314 céphéides de P < 9j, l' autre pour 141 étoiles de P > 9j. Le sous-type d' Efremov apparait nettement avec des ΔB faibles et des D élevés.

On a ainsi établi une liste de 69 céphéides de sous-type Is (les étoiles déja mentionnées par Efremov et par Makarenko (2) sont signalées par +); ΔB et ΔV sont les amplitudes dans le systeme U-B-V, D est l' asymétrie.

	log P	ΔB	ΔV	D	
SU Cas +	0, 290	0, 56	0, 39	38	A
GR Nor	292	0, 5		50	
EU Tau	323	0, 46	0, 35	40	
CU Ori	334	0, 86	0, 58:	50	
DT Cyg +	398	0, 44	0, 29	48	A
AX Vel +	0, 413	0, 74	0, 50	45	A
EK Pup +	419	0, 50	0, 35	45	A
NY Cas	451	0, 6		45	
BE Pup	458	0, 6		45	B
AX Aur	482	0, 62	0, 42	36	
AV Cir	0, 486	0, 6		40	
EV Sct +	490	0, 46	0, 30	55	
VZ CMa+	495	0, 69	0, 49	43	
DX Gem	496	0, 4		53	
SZ Tau +	498	0, 65	0, 45	43	B

	log P	ΔB	ΔV	D	
AZ Cen +	0, 507	0, 51	0, 35	48	A
BY Cas +	508	0, 55	0, 38	46	A
V532Cyg+	516	0, 50	0, 34	47	A
CI Per	528	0, 8		45	B
FZ Car	554	0, 51	0, 34	50	A
BD Cas	0, 562	0, 72	0, 50	48	
VV CMa	587	0, 6	0, 4	45	
EK Mon	597	0, 4		40:	
α UMi +	598	0, 25	0, 15	50	A
BB Cen +	601	0, 79	0, 54	49	
GZ Car +	0, 619	0, 53	0, 35	42	B
CS Mon	620	0, 45	0, 31:	40	
AH Vel +	626	0, 56	0, 38	49	A
GI Car +	646	0, 50	0, 38	46	
DG Sge	647	0, 61	0, 42	48	
FF Aql +	0, 650	0, 52	0, 34	46	A
AX Cir	722	0, 42	0, 30	50	
V1162Aql	730	0, 72	0, 49	50	
X Lac +	736	0, 61	0, 40	37	A
V419Cen+	741	0, 52	0, 33	36	A
V924Cyg	0, 746	0, 5		35	
V659Cen	750	0, 45	0, 31	43	
GH Car+	757	0, 47	0, 32	42	
GM Cas	782	0, 6		41	A
V1954Sgr	789	0, 4		35	
V733Aql	0, 790	0, 69	0, 45	45	A
CR Cep+	794	0, 59	0, 38	39	A
V378Cen+	810	0, 55	0, 36	40	A
V496Aql +	838	0, 59	0, 38	37	A
V1165Aql	834	0, 54	0, 35:	50	
BG Vel	0, 840	0, 75	0, 48	39	
V767Cen	849	0, 55	0, 37	39	
TW Mon	851	0, 7		40	
BH Vel	857	0, 4		33:	
IT Car	877	0, 60	0, 40	39	

	log P	ΔB	ΔV	D	
CR Car	890	0,80	0,53	55	A
η PsA	891	0,30	0,21	40	
IX Cas +	961	0,79	0,49	48	A
GH Lup	968	0,40	0,27	50	
V500Sco	969	0,91	0,56	48	
FN Aql +	0,977	0,91	0,65	48	A
S Mus	985	0,78	0,54	45	
DD Cas	991	0,95	0,60	48	A
CP Vel	993	0,7		50	
BY Cyg	1,006	0,79	0,54	50	B
SX Aur +	1,006	0,91	0,63	49	A
ζ Gem+	006	0,77	0,48	50	A
BI Cas	031	0,45:		53	
QQ Per	049	0,7		42	
GT Car	119	0,78	0,52:	50	
DD Vel	1,120	0,90	0,62	50	
IO Car	133	0,83	0,66	46	B
SZ Cas +	134	0,67	0,44	48	A
Y Oph +	233	0,77	0,49	47	A

La dernière colonne est relative a l'instabilité des périodes: la notation A correspond à des variations certaines de la période ou de la forme des courbes de lumière, B à des variations probables.

CARACTERES GENERAUX DE CE SOUS-TYPE

Ces caractères seront étudiés en détail dans une autre publication. On peut cependant les indiquer brièvement:

1) ces étoiles sont un peu moins lumineuses que la population I typique, mais plus lumineuse que la population II

2) l'instabilité des périodes est très marquée, comme le montrent les chiffres suivants:

	n.de var. de P	n.tot.	%
Céphei des I $P < 9j$	36	280	13
" I $P > 9j$	42	120	35
" Is	32	69	46

3) ces étoiles paraissent plus blanches que les céphéides typiques. Les variations de couleur entre le maximum et le minimum, Δ(B-V) et Δ(U-B) sont nettement plus faibles, de meme que l' amplitude des variations du spectre.

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(1) Yu. Efremov: VS 16.365.1968
(2) E. Makarenko: VS 16.388.1968

COMMISSION 27 OF THE I. A. U.
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Konkoly Observatory
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1970 July 26

PHOTOELECTRIC MINIMA OF ECLIPSING BINARIES

Introduction

Since 1963 photoelectric observations of eclipsing binaries were made at the Nürnberg Observatory/Germany. The photometer with 1P21 multiplier is mounted at a 34 cm Cassegrain-telescope. In 1965 a cooperation was arranged between the Nürnberg Observatory and a group of observers at the Ege University Observatory, Izmir/Turkey, where till August 1967 visual minima were derived. In the year 1968 a new 48 cm Cassegrain-telescope with photoelectric photometer (1P21) was mounted at the Ege University Observatory, which has very good climatic conditions. The complete instrument was financed by a NATO-Research Grant. This telescope is used by both observatories for the common program.

Minima of eclipsing binaries, observed at the Izmir- and Nürnberg-Observatory 1960-1967 were published in Astron. Nachr. 288.69 (1964), 289.191 (1966) and 291.111 (1968).

Observations

All minima listed here are photoelectric obtained during the period 1968/69. No filter were used, except for stars brighter than $7^m.0$ (Schott GG 11 = GG 495). In Nürnberg a Siemens-Kompensograph, in Izmir a Philips-recorder were used to record the measurements.

The table gives besides the heliocentric minima three different O-C's (see remarks at the end of table), the abbreviations of the names of the observers and the type of the instruments used (Izmir: 48 cm Cassegrain, Nürnberg: 34 cm Cassegrain).

Abbreviations of the Observers' Names

Al = A. Caliskan, Izmir
Ba = H. Baumbach, Nürnberg
Bi = A. Bickel, Nürnberg
En = C. Endres, Nürnberg
Gd = N. Güdür, Izmir
Gl = Ö. Gülmen, Izmir
Gn = E. Gencer, Izmir
Gö = G. Görz, Nürnberg
Gr = G. Grampp, Nürnberg
Hd = K. Held, Nürnberg
Hö = D. Hölzl, Nürnberg
Ib = C. Ibanoglu, Izmir
Ki = A. Kizilirmak, Izmir
Kt = M. Kurutac, Izmir
Ly = H. Loy, Nürnberg
Me = M. Meier, Nürnberg
Od = O. Demircan, Izmir
Pl = E. Pohl, Nürnberg
Ro = B. Roth, Nürnberg
Rz = H. Renz, Nürnberg
Zk = Z. Cetinkaya, Izmir

Star	Min(helioc.)	O-C (I)	O-C (II)	O-C (III)	Observ.	Instr. cm
RT And	2440 115.4755	$-0^d.0293$	$-0^d.0016$		Gd	48
	439.375	-0.030	-0.002		Gl/Od	"
XZ And	40 484.393	+0.072	-0.007		Gl	"
AB And	40 433.4725	+0.0726	+0.0023		Ib	"
	474.2940	+0.0719	+0.0010		Ib	"
BX And	40 100.398	+0.042	+0.005		Gd/Ib	"
	103.448	+0.041	+0.005		Gd/Ib	"
	133.344	+0.042	+0.005		Gd/Ib	"
	496.363:	+0.044:	+0.005:		Ki/Od	"
RY Aqr	40 476.324	-0.005	-0.009		Ib	"
KO Aql	40 435.4076	+0.0200	+0.0575		Al/Ib	"
KP Aql	40 098.471:	+0.066:	+0.031:		Ib/Kt	"
OO Aql	40 068.4638	-0.0380	-0.0165	-0.0002	Ib/Kt	"
	366.454	-0.044	-0.021	0.000	Ib	"
V337 Aql	40 408.370:	-0.025: =	-0.025:		Gd/Od	"
V346 Aql	40 149.306	-0.024	-0.009		Pl	34
	421.4738	-0.0222	-0.0072		Al/Gl	48
V805 Aql	40 036.441	+0.014 =	+0.014		Ib/Kt	"
SX Aur	40 162.3358	+0.0172	+0.0141		Gd/Ib	"
	289.396	+0.019	+0.016		Gö/Me	34
	491.478	+0.018	+0.015		Ib	48
WW Aur	40 288.298	+0.004	-0.001		Bi/Rz	34
AR Aur	40 498.4683	+0.0186=	+0.0186		Gl	48
i Boo	39 948.363		+0.010	-0.003	Bi	34
	956.400		+0.013	0.000	Gö/Me	"
	959.349		+0.016	+0.003	Gö/En	"
	959.481		+0.014	+0.001	Gö/En	"
	968.453		+0.014	+0.001	Bi/Me	"
	977.292		+0.016	+0.002	Kt/Pl	48
	40 316.346:		+0.021:	+0.007:	Pl/Gd/Ib	"
	319.296:		+0.022:	+0.008:	Pl/Kt/Ib	"
	331.346		+0.021	+0.006	Gd	"
	363.484:		+0.021:	+0.006	Ba/Me	34

Star	Min (helioc.)	O-C (I)	O-C (II)	O-C (III)	Observ.	Instr. cm
SV Cam	39 945.3718	-0.0198	+0.0016		Hö/Me	34
	977.3980	-0.0195	+0.0017		Kt/Pl	48
	40 092.4561	-0.0176	+0.0041		Gd/Ib	"
	127.4466	-0.0184	+0.0034		Ib	"
R CMa	39 935.307:	+0.012:	-0.001:		Gö/Hö	34
RZ Cas	40 054.4168	-0.0353	-0.0068		Ki/Kt	48
	127.3272	-0.0353	-0.0068		Ib	"
TV Cas	40 056.4558	+0.0038 =	+0.0038		Gd/Kt	"
	105.396	+0.004 =	+0.004		Gd/Ib	"
	105.3977	+0.0053 =	+0.0053		Bi/Me	34
	203.2770	+0.0036 =	+0.0036		Hd/Pl	"
	493.293	+0.002 =	+0.002		Gl	48
TW Cas	2440 104.432	-0.010	-0.011		Gd/Ib	48
	204.413	-0.012	-0.012		Bi	34
AB Cas	40 475.5216	+0.0763	+0.0108		Gl	48
DO Cas	39 917.284:	+0.047:	0.000:		Bi/Me	34
	40 051.475	+0.045	-0.003		Kt/Ib	48
	114.4687	+0.0498	+0.0005		Kt/Gd	"
	518.423	+0.055	+0.002		Gd	"
PV Cas	40 129.381		+0.061	+0.002	Ib	"
	227.4061		+0.0603	+0.0002	Ib/Kt	"
	416.456		+0.060	-0.001	Al/Ib	"
	479.475		+0.063	+0.001	Ib/Od	"
U Cep	40 086.4908	+0.1455	+0.0212		Gd/Ib	"
	101.4483	+0.1452	+0.0207		Bi/Hö	34
	136.3542	+0.1496	+0.0242		Gd	48
	141.335	+0.144	+0.019		Gd	"
VW Cep	39 987.4237	-0.0832	-0.007	-0.0003	Gd/Pl	"
	40 078.433	-0.084	-0.008	0.000	Gd/Ib	"
	137.435	-0.086	-0.009	0.000	Ib	"
	358.4148	-0.0916	-0.0128	-0.0017	Ib	"
	388.477	-0.088	-0.009	+0.003	Ib/Zk	"
	490.3378	-0.0919	-0.0121	+0.0005	Gd	"

Star	Min (helioc.)	O-C (I)	O-C (II)	O-C (III)	Observ.	Instr. cm
XX Cep	40 097.373	-0.090	-0.017		Ib/Ki	48
	139.442	-0.093	-0.020		Gd/Ib	"
	513.419	-0.090	-0.016		Ba/Gö	34
ZZ Cep	40 042.4714	0.0 =	0.0		Gd/Ib	48
EG Cep	40 050.4550		+0.0071		Gd	48
	201.316		+0.008		Bi/Me	34
	433.3246		+0.0087		Ib	48
	483.4284		+0.0075		Gl	"
U CrB	40 371.3752:	-0.0219:	-0.0246		Ib	"
Y Cyg	40 345.4774	-0.0051	+0.0086		Gd/Ib	"
	381.424:	-0.015:	-0.001:		Pl	34
	384.428	-0.007	+0.007		Ki/Zk	48
	423.379	-0.008	+0.006		Gd/Od	"
BR Cyg	40 377.4698	+0.0097=	0.0097		Gd/Ki	"
	437.4371:	+0.0117=	0.0117		Od	"
	501.398:	+0.010 =	+0.010:		Me/Ro	34
KR Cyg	40 420.4578	-0.0188	+0.0093		Al/Gl	48
MR Cyg	40 074.355	+0.002 =	+0.002		Gd/Ib	"
	364.480	0.000 =	0.000		Kt	"
V477 Cyg	39 983.4555	-0.0647	-0.0196	+0.0012	Kt	"
	40 091.4174	-0.0655	-0.0204	+0.0017	Kt/Gn	"
	382.4425	-0.0704	-0.0253	+0.0003	En/Gr	34
	422.3434:	-0.0687:	-0.0237:	+0.0024:	Gd/Od	48
V548 Cyg	40 109.474:	-0.054:	-0.021:		Bi/Hö	34
	185.295	-0.054	-0.021		Ib/Kt	48
	378.462	-0.050	-0.016		Ib	"
	434.421	-0.055	-0.021		Al/Od	"
V 836 Cyg	2440 057.444		-0.004		Gd	48
	406.369:		0.000:		Gl/Ki	"
Z Dra	40 346.3956	+0.0086	-0.0016		Ib	"
TW Dra	39 979.3515	-0.0084	-0.009	-0.0006	Pl	"
	40 080.3995	-0.0077	-0.0085	+0.0013	Gn/Kt	"
	473.352	-0.017	-0.018	-0.003	Me/Pl	34

Star	Min (helioc.)	O-C (I)	O-C (II)	O-C (III)	Observ.	Instr. cm
TZ Dra	40 394.353	-0.002	+0.001		Al/Gd	48
	419.4667	-0.0031	-0.0004		Hö/Ly	34
AI Dra	40 094.3910	+0.0174	+0.0060		Gd/Ib	48
	106.3783	+0.0165	+0.0052		Kt/Ib	"
	438.4491	+0.0160	+0.0046		Hö/Me	34
S Equ	40 411.387	+0.003	-0.004		Gd	48
YY Eri	40 201.4399	+0.0221 =	+0.0221		Ba/Bi	34
RX Her	40 037.4659	-0.0041	-0.0011		Gd/Ib	48
	110.3909:	-0.0005:	+0.0025:		Gö/Me	34
	334.4895	-0.0021	+0.0010		Ib	48
TX Her	39 979.518	-0.013	-0.004		Gd	"
	40 008.3573	-0.0115	-0.0018		Kt/Gd	"
	389.4232	-0.0105	-0.0008		Gd/Gl	"
	426.5015	-0.0087	+0.0009		Hö/Ro	34
UX Her	40 022.4201		-0.0320	-0.0002	Gd/Kt	48
	039.4564:		-0.0331:	-0.0004:	Ba/Me	34
	053.397		-0.032	0.000	Gd/Kt	48
	403.4372	-0.0309	-0.0335	-0.0001	Al/Ib	"
	431.3161:	-0.0316:	-0.0341:	-0.0005:	Ib	"
AK Her	39 980.419	+0.036	-0.011	+0.002	Gd/Kt	"
	981.4730	+0.0358	-0.0105	+0.0018	Kt/Gd	"
	40 368.429	+0.035	-0.014	0.000	Kt	"
	392.455	+0.034	-0.015	0.000	Ib	"
SW Lac	40 035.4224		-0.0028		Gd	"
	128.4540		-0.0023		Gn/Ib	"
	202.2197:		-0.0040:		Pl	34
	373.4866		-0.0062		Ib/Kt	48
	419.3502		-0.0067		Gd/Od	"
	497.2869		-0.0070		Gd	"
	515.246		-0.009		Pl	34
AR Lac	39 876.268	+0.041	-0.002		Me/Pl	"
CM Lac	40 048.386	-0.002 =	-0.002		Ib/Kt	48
	401.4195	-0.0010=	-0.0010		Ib	"

Star	Min (helioc.)	O-C (I)	O-C (II)	O-C (III)	Observ.	Instr. cm
UV Leo	39 940.3390	-0.0058	+0.0064		Bi/Pl	34
	978.445	-0.006	+0.006		Kt/Pl	48
	40 291.3880	-0.0068	+0.0060		Ib/Kt	"
TZ Lyr	40 418.417	+0.031	+0.030		Al/Gl	"
FL Lyr	40 079.519	-0.002	+0.004		Ib/Kt	"
	395.355	+0.001	+0.008		Al/Gd	"
U Oph	40 075.404	-0.013	-0.003		Gn/Kt	48
V451 Oph	2440 410.4204	+0.0074	-0.0242		Ib	48
	477.405	-0.004	-0.036		Me	34
V566 Oph	40 047.358	+0.115	+0.002		Gd	48
	049.4057	+0.1140	+0.0016		Kt/Ib	"
	418.4931	+0.0957	+0.0024		Ba/Me	34
FT Ori	40 274.3917	+0.0163	+0.0163		Hö/Me	"
U Peg	40 096.4534	-0.0081	-0.0044		Kt	48
	205.328	-0.008	-0.004		En/Me	34
UX Peg	40 425.479	-0.056	0.000		Gl/Od	48
AT Peg	40 407.438	-0.021	-0.044		Ib	"
	438.383	-0.020	-0.044		Ib	"
DI Peg	40 424.4746	-0.0056	+0.0218		Gd/Gl	"
β Per	39 918.358	-0.006	+0.019		En/Gö	34
	40 285.368	-0.016	+0.013		Gö/Me	"
V505 Sgr	40 055.3991	-0.0264 =	-0.0264		Gd/Ib	48
	087.3367	-0.0264 =	-0.0264		Gd/Ib	"
RW Tau	40 160.3758	+0.0108	+0.0218		Gd/Ib	"
CD Tau	40 135.425	-0.051	-0.011		Gd	"
W UMa	39 940.4262	+0.0091	-0.0004		Bi	34
	992.4750	+0.0103	+0.0008		Kt	48
	40 293.416	+0.010	0.000		Gd/Ib	"
	322.4450	+0.0127	+0.0024		Ib/Kt	"
TX UMa	40 357.343		-0.056	+0.001	Gd	"

Star	Min (helioc.)	O-C (I)	O-C (II)	O-C (III)	Observ.	Instr. cm
W UMi	40 325.3284	-0.0058 =	-0.0058		Ib	48
AH Vir	40 349.4590	+0.0573	+0.0008		Gd/Ki	"
Z Vul	40 362.4366	+0.0089 =	+0.0089		Ib	"
	362.439	+0.011: =	+0.011		Ly/Rz	34
RS Vul	40 514.317	+0.001 =	+0.001		Bi/En	"
DR Vul	40 109.3523		+0.0403		Gd	48
	370.441		+0.031		Gd/Ki	"

Remarks concerning O-C

O-C (I): GCVS, Moscow 1958; O-C (II): SAC 39/40, Krakow 1967/68; O-C (III): new elements, published in IBVS by Ibanoglu, Kurutac, Pohl:

OO Aql	IBVS 391 (1969) Pohl
i Boo	IBVS 209 (1967) Pohl
PV Cas	IBVS 386 (1969) Pohl
VW Cep	IBVS 369 (1969) Kurutac, Ibanoglu
V 477 Cyg	IBVS 226 (1967) Pohl
TW Dra	IBVS 443 (1970) Pohl
UX Her	IBVS 369 (1969) Kurutac, Ibanoglu
AK Her	IBVS 369 (1969) Kurutac, Ibanoglu
TX UMa	IBVS 185 (1967) = SAC 41 (1970) Pohl

The (O-C)'s for secondary minima (especially for W UMa-stars) were calculated on the supposition that they are symmetric between primary minima. The sign = between O-C (I) and O-C (II) indicates, that the elements (I) and (II) are equal. The sign: means that the time of minimum is uncertain.

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NUMBER 457

Konkoly Observatory
Budapest
1970 July 27

AUTOCORRELATIVE ANALYSIS OF LIGHT OF DQ Her, UX UMa AND RW Tri

Photoelectric observations of exnovae and similar stars were repeatedly analysed by means of statistical methods (1,2). These analyses were usually carried out for observations obtained during a few hours. The results of the autocorrelative analysis of the light variations of DQ Her (3,4), UX UMa (5,3) and RW Tri (7) are given in the present paper. They were obtained by the method described in (8), which can be applied to series with gaps. A unite correlative shift is equal to $0\overset{d}{.}0001$. The maximum shift equals $0\overset{d}{.}01$. For each of the three variables the analysis was performed twice: for all the observations and for observations that do not include eclipses. In the first case the autocorrelative function (r) essentially refers to the eclipse because of much larger dispersion of light variations owing to eclipse. The function obtained is close to a harmonic with a period near to the duration of the eclipse. The autocorrelative analysis of the observations outside eclipses gives the autocorrelative function of that component of the binary which has a larger light dispersion.

DQ Her: On Fig.1 (a,b) dots show r for two parts of the series of V observations. The dashed curves are cosinusoids with period of $P = 0\overset{d}{.}06$. Freed from the stochastic light variations the eclipse is the same for both parts of the series. On Fig.1 (c,d) the values if r were obtained after exclusion of the eclipses for V and U observations. The dashed curves are exponentials with relaxation times of $0\overset{d}{.}02$ and $0\overset{d}{.}0074$ for V and U bands, respectively. In addition to the known harmonic variation with the period $71\overset{s}{.}71 \pm 0\overset{s}{.}68$ (9) the autocorrelative analysis for DQ Her also reveals a pure stochastic light variation. The relaxation time of this stochastic process is larger for radiations of longer wave length.

UX UMa: On Fig.2 (a,b,c) dots show values of r for UBV series including eclipses. Dashed curves are cosinusoids with periods of $0\overset{d}{.}040$ and $0\overset{d}{.}037$. The eclipse in U is shorter. This is an argument in favour of the nonatmospheric nature of the eclipses. The difference between the eclipse durations may be caused by larger limb darkening on the brighter component in the U band. Curves d and e of Fig.2 represent values of r for UX UMa outside eclipses for V and B, respectively. The dashed curves are exponentials with

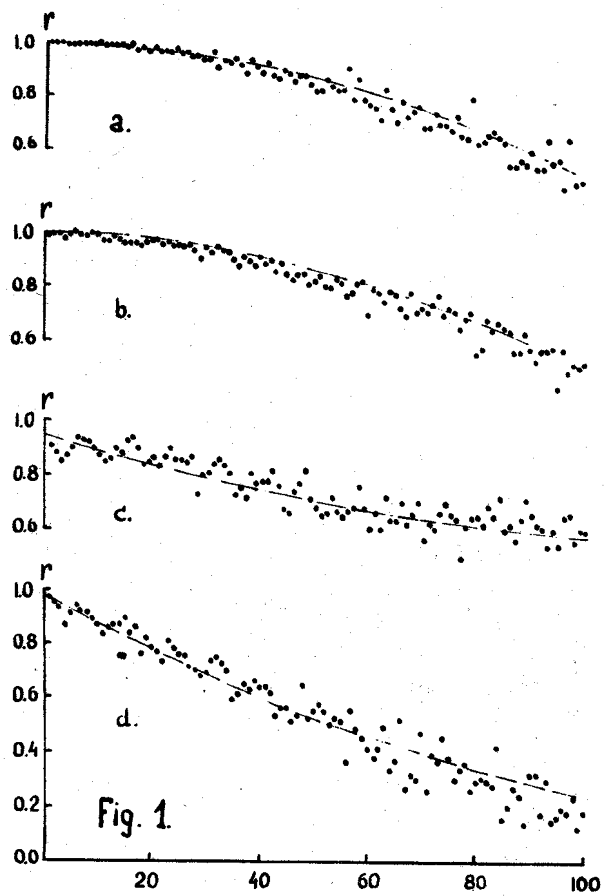

Fig. 1

relaxation times of $0^d.025$ and $0^d.0056$. As well as for DQ Her the light variation outside the eclipses possesses a longer relaxation time for radiations of longer wave lenghts.

RW Tri: On Fig.3 (a) dots show values of r for V observations including eclipses. The dashed curve is a cosinusoid with P = $0^d.05$. On Fig. 3 (b) dots show the r values outside eclipses. The dashed curve is an exponential with a relaxation time of $0^d.055$. It refers to the light variations of that component or a gas nebula which are uneclipsed in the primary minimum. That follows from in-

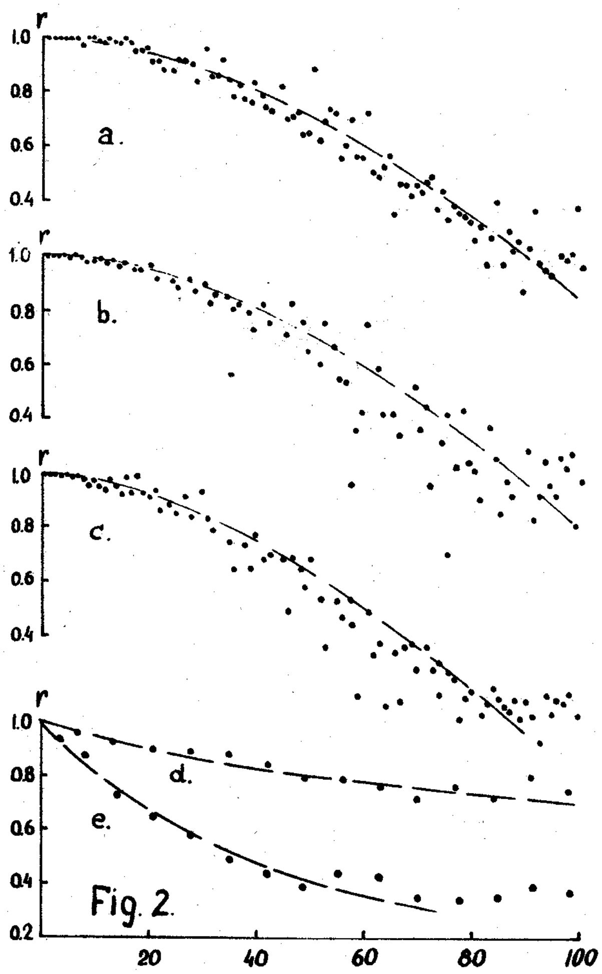

Fig. 2.

crease of the eclipse depth with decrease of brightness of RW Tri according to Walker (7). The 60^{s}-period of RW Tri that was pointed out previously (9), seems hardly real. Its appearance may be likely accounted for by the fact that observations (7) were carried out in intervals of the

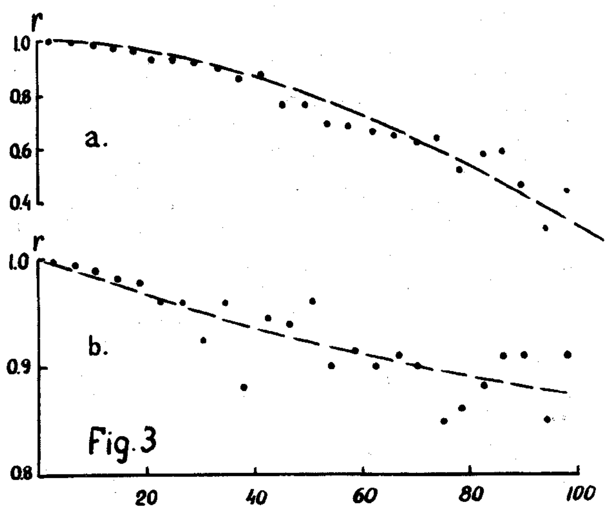

Fig.3

multiples of 1 minute. Pugach obtained during two hours about 600 observations of RW Tri using the counting technique. There was not any evidence of the 60s period.

Therefore, the three variables have stochastic components in their light variations. The autocorrelation functions of these stochastic processes are exponentials. Their relaxation times are equal to some thousandths of a day in B and decrease with wave length.

It is interesting that r for B observations of Sco X-1, which has the spectrum of an exnova, is also an exponential with relaxation time of 0^{d}3 (10).

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Literature:

(1) G.Mumford 1967, PASP 79, 283
(2) G.Lawrence et al.1968, ApJ 148, part 2, 161
(3) M.Walker 1956, ApJ 123, 68
(4) M.Walker 1958, ApJ 127, 319
(5) M.Walker, G.Herbig 1954, ApJ 120, N2
(6) W.Krzeminski, M.Walker 1963, ApJ 138, 146
(7) M.Walker 1963, ApJ 137, 485
(8) F.I.Lukatskaya 1967, Perem.Zv. (Russ) 16, N2
(9) A.F.Pugach 1970, IBVS Com.27 IAU, N418
(10) F.I.Lukatskaya et al. 1969, AC USSR, N512

COMMISSION 27 OF THE I. A. U.
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Konkoly Observatory
Budapest
1970 August 1

NOTE ON KM Cas

As pointed out by L. Wackerling in Information Bulletin No. 436, the spectral type of KM Cas is given as M6eα in the General Catalogue of Variable Stars although in several other publications it is classified as an OB star. On this account Wackerling suggested that the star might be of the VV Cephei type.

I have examined several infrared objective prism plates, taken in the early 1950's, that cover the position of this star. In no case does the star, identified from Kholopov's identification chart (Kholopov 1949), appear to be an M star, although its recognition as such would be quite unambiguous if the type were as late as M2. The small amplitude of the light variation precludes the possibility of spectral variation from M6 to M1, and the fact of the case appears to be that the GCVS simply erred in assigning the M6 type. This error evidently came about through assuming the variable to be identical with the M star Dearborn 25762 (Lee et al 1947), an identification made by Kukarkin et al (1949). The latter reference was suggested to me by W.P. Bidelman. The M star has also been classified and published by Nassau and Blanco (1954). My plates show both the variable and the M star.

The coordinates of both stars have been measured on a Burell Schmidt direct plate, using four nearby Smithsonian Astrophysical Observatory Catalogue stars as reference stars. The results are:

	Rect. (1900)	Decl.
KM Cas	$2^h21^m58^s.7$	$+61^\circ$ 2' 54"
Dearborn M 25762	2 21 42.4	+60 59 01
= Case M 140		

The position for KM Cas is in excellent agreement with that given in the GCVS; that for the M star differs by about 3' in each coordinate from the Dearborn position (which is also different from the GCVS position), but agrees well with the published Case position.

Since KM Cas is a B star, its variable classification as SRa is also in error. My plate material is insufficient to establish the correct classification.

July 22, 1970

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References:

Kholopov, P.N. 1949, Peremenn. Zvezdy, 7, 101.

Kukarkin, B. W., Parenago, P. P., Efremov, J. I., and Kholopov, P.N. 1949, 45th Name-List of Variable Stars (Akademia Nauk, Moscow).

Lee, O.J., Gore, T., and Bartlett, T.J. 1947, Ann. Dearborn Obs., V. Part 1C.

Nassau, J.J., and Blanco, V.M. 1954, Astrophys. J., 120.118.

COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 459

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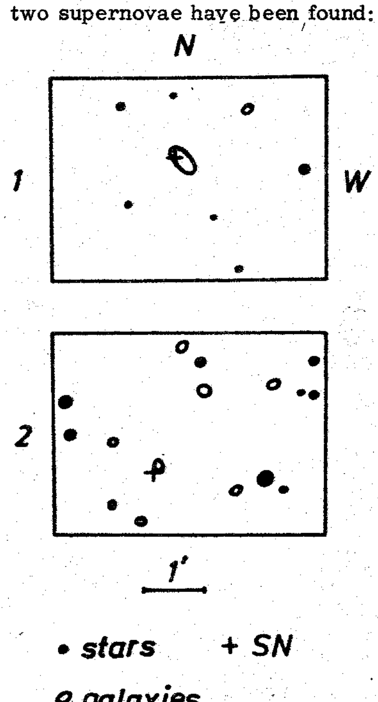
Budapest
1970 August 26

TWO SUPERNOVAE 1953 IN FAINT GALAXIES

By comparing plates of the Schmidt-telescope of the Karl-Schwarzschild-Observatory, Tautenburg, with the Palomar Sky-Survey prints two supernovae have been found:



1. SN in galaxy 16^{m} (Anon)

$$RA = 10^{h}\ 56^{m}\ 15^{s}$$
$$D = +50^{o}\ 31'.9 \qquad (1950)$$

SN about 10" NE of nucleus.

Magnitudes:

$16^{m}.5$ on 1953 Feb 13/14 (plate 0-673)
$18^{m}.0$: on 1953 Mar 15/16 (plate 0-709)

2. SN in galaxy $19^{m}.5$ (Anon)

$$RA = 11^{h}\ 00^{m}\ 45^{s}$$
$$D = +50^{o}\ 06'.7 \qquad (1950)$$

SN about 3" S of centre.

Magnitude:

$17^{m}.0$ on 1953 Mar 15/16 (plate 0-709)

From the second supernova radio emission has possibly been observed in the 5 C 2-survey. Its position coincides with the source 5 C 2.108. For details see P. Notni et al (1).

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(1) P. Notni, H. Oleak, G.- M. Richter, Proceedings of the IAU symposium No.44, 1970 (in press)

COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 460

Konkoly Observatory
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UBV OBSERVATIONS OF NOVA SERPENTIS 1970

Finding charts for Nova Serpentis 1970 have been given by Burkhead and Seeds (1970) and in the May, 1970 issue of Sky and Telescope, page 334. The UBV photoelectric observations reported herein were obtained on seven nights in May, 1970 at the No. 2 36-inch telescope of Kitt Peak National Observatory. Standard observational and reduction procedures were used (Landolt 1967). The observations were thoroughly tied into the UBV system each night via observations of some 16 UBV standards taken from the list of Johnson and Harris (1954). The external probable errors averaged ± 0.013 for V, ±0.007 for (B-V), and ±0.012 for (U-B), as determined from the UBV standard stars. May 9th U.T. was a poor photometric night as indicated by the colons in Table 1.

Table 1.

J.D.⊙ 2440700.+	V	B-V	U-B
14.9037	11.00	+1.01	-0.46
15.9450	11.09:	+0.92:	-0.47:
16.9201	11.13	+0.99	-0.55
17.9576	11.27	+1.01	-0.56
18.9635	11.31	+1.01	-0.55
19.9494	11.37	+0, 96	-0.49
20.9275	11.42	+0.98	-0.49

The heliocentric times of observation are given in column one. As the data indicates, 85 days after its outburst, the nova has declined 6.6 magnitudes from its maximum of V = 4.4 (Sky and Telescope, page 224, April, 1970), i.e. at a rate of 0.08 mag. per day. At the time the present observations were made, the nova was continuing to decline in brightness at nearly the same rate, a rate which is approximately twice as rapid as that for the recurrent nova T Pyxidis (Landolt 1970). The color indices remained effectively constant, although they are perhaps a few tenths of a magnitude more red than is usual for novae (Mumford 1967). This may be explained by the fact that the nova is near obscuring material as shown on the Palomar Sky Survey Prints.

This work was supported in part by the Louisiana State University Graduate Research Council and in part by the National Science Foundation.

References

1. Burkhead, M.S., and Seeds, M.A. 1970, Astrophys. J. Letters, 160, L51.
2. Johnson, H.L., and Harris, D.L., III 1954, Astrophys. J. 120, 196.
3. Landolt, A.U. 1967, Astron. J. 72, 1012.
4. Landolt, A.U. 1970. Publ. Astr. Soc. Pacific 82, 86.
5. Mumford, G.S. 1967, Publ. Astr. Soc. Pacific 79, 283.

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Corrections to Inf. Bull. No. 443 (TW Her)

Elements (III) and (IV) in Table 3 should be read:

$$\begin{array}{lllll} \mathrm{Min} = 2433\,310.238 & + \; 2\overset{d}{.}8068742 \cdot E & ; & \overline{E} = 7020 & \text{(III)} \\ \qquad\quad \pm .0026 & \;\; \pm .0000043 & & & \end{array}$$

$$\begin{array}{lllll} \mathrm{Min} = 2438\,539.4457 & + \; 2\overset{d}{.}8068352 \cdot E & ; & \overline{E} = 8750 & \text{(IV)} \\ \qquad\quad \pm .0018 & \;\; \pm .0000040 & & & \end{array}$$

COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 461

Konkoly Observatory
Budapest
1970 August 28

COOPERATIVE OBSERVATIONS OF THE FLARE STAR V 1216 Sgr

According to the observing schedule prepared by the Working Group on Flare Stars (Andrews and Chugainov, 1969), the star V 1216 Sgr was observed at the Catania Astrophysical Observatory from June 26 to July 10. A photometer equipped with an EMI 6256 photomultiplier (spectral response S 13) and the Schott filters combination BG 12/1 + +GG13/2 were used. The photometer was attached to the 91 cm Cassegrain telescope.

In Table 1 the detailed coverage and in Table 2 the characteristics of the observed flares are presented.

Some observations made outside the suggested period are also included.

The accompanying figure shows the light curves of the observed flares, three of which are uncertain.

R. Barbagallo and F. Spinella have collaborated in the observations.

August 15th, 1970

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M. RODONO
Catania Astrophysical
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Reference
Andrews, A. D., Chugainov, P. F. 1969, Comm.27. IAU, Inf. Bull. Var. Stars, No. 416

Table 1.

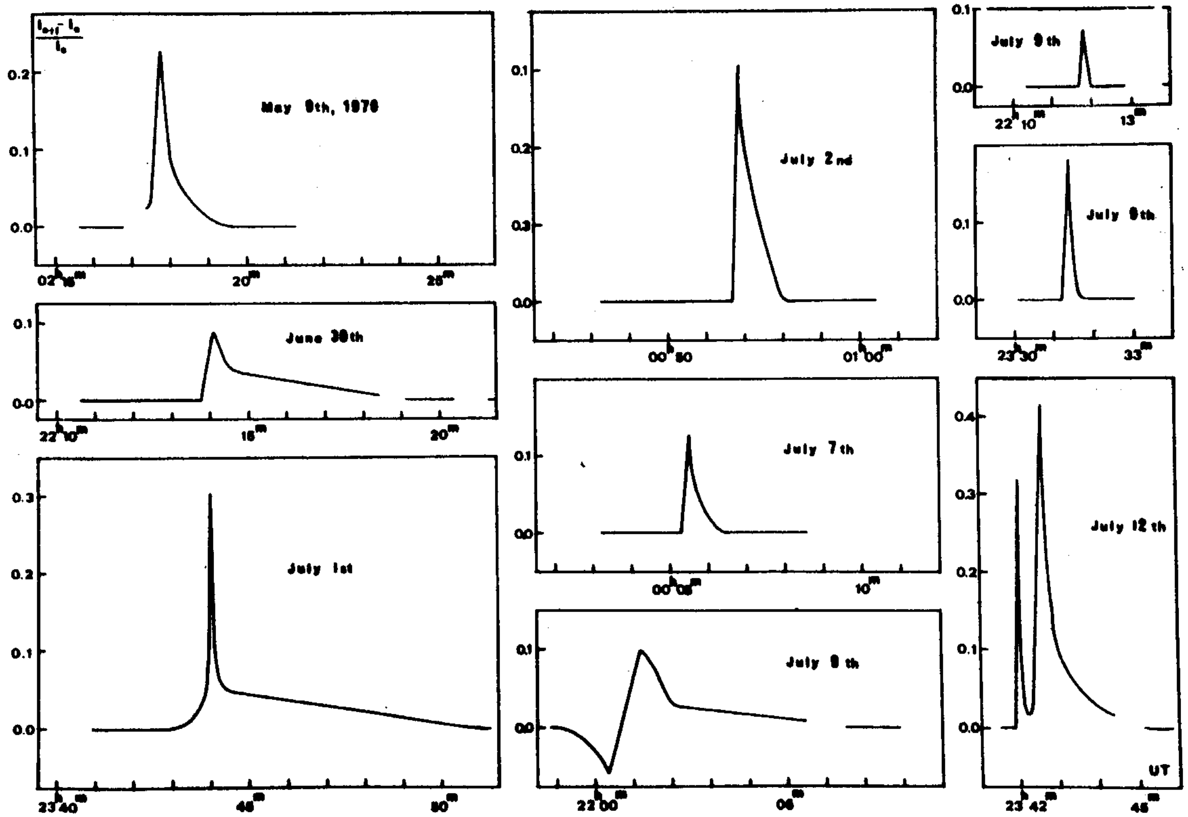
m	d	Coverage (U.T.)	TC	$\overline{m_{lim}-m_o}$ magn.
1970				
May	9	02^h17^m-02^h35^m; 0237-0242.	0^h32^m	+ 4.22
June	27	2315-2400;		
	28	0000-0044; 0046-0056; 0102-0126.	2 03	4.1
	28	2131-2158;		
	29	0038-0042; 0049-0219.	2 01	3.5
	29	2200-2218; 2222-2400;		
	30	0000-0005; 0025-0032; 0034-0124; 0126-0208.	3 40	3.9
	30	2202-2336; 2340-2400;		

Table 1. (Cont.)

m	d	Coverage (U.T.)	TC	$\overline{m_{lim}-m_o}$ magn.
July	1	0000-0003; 0005-0100; 0103-0125; 0127-0210.	3 57	3.7
	1	2202-2220; 2224-2334; 2336-2349; 2354-2400;		
	2	0000-0020; 0030-0053; 0126-0150; 0153-0200;		
		0203-0213.	3 10	3.8
	2	2053-2123; 2130-2344;		
	3	0017-0207.	4 34	3.7
	3	2138-2203; 2206-2217; 2220-2236;		
		2239-2308; 2318-2334;		
	4	0011-0048; 0051-0200.	3 23	3.7
	4	2301-2317; 2322-2335; 2337-2348; 2353-2400;		
	5	0000-0056; 0114-0118.	1 47	3.8
	5	2137-2257; 2314-2341; 2343-2348;		
	6	0004-0058	2 46	4.0
	6	2215-2236; 2238-2315; 2320-2324;		
		2330-2334; 2338-2346; 2349-2351; 2353-2400;	2 26	3.6
	7	0000-0029; 0114-0148.		
	7	2121-2230; 2249-2322; 2330-2340; 2345-2400;		
	8	0000-0002; 0005-0009; 0017-0050;		
		0052-0104; 0149-0211.	3 20	3.5
	8	2112-2345;		
	9	0005-0009; 0011-0115; 0119-0128; 0155-0200.	3 55	3.7
	9	2020-2224; 2258-2345; 2347-2356;		
	10	0000-0012; 0015-0021; 0044-0053; 0059-0107;		
		0109-0119; 0121-0130; 0133-0210.	4 41	3.8
	10	2116-2220; 2224-2230; 2331-2322.	1 11	3.1
	12	2308-2400;		
	13	0000-0012; 0031-0129; 0131-0139; 0143-0224.	1 59	3.0
	16	2006-2212.	2 06	3.0
	20	2052-2120; 2122-2138; 2139-2154; 2156-2209;		
		2211-2216; 2218-2232.	1 31	3.0
	21	2018-2120; 2123-2211; 2215-2258; 2300-2314;		
		2316-2400.	3 31	3.1

m = month; d = day; TC = total coverage per night;

$\overline{m_{lim}-m_o} = -2.5 \log (3\overline{\sigma}/I_o)$, where $\overline{\sigma}$ represents the standard deviation of the random noise fluctuation for a night, and I_o represents the mean intensity of the quiet star during the same night.



Flares of V1216 Sgr

Table 2.

no	t_{max}	d_b	d_a	$m_{lim}-m_o$ magn.	$(m_f-m_o)_{max}$ magn.	P	M	a	b
	1970								
1	May 9, $02^h17.8^m$	0.3^m	1.7^m	+4.22	+1.62	0.11^m	2.118	-	2
2	June 30, 22 14.1	0.3	4.9	+3.94	+2.66	0.11	2.214	1	1
3	July 1, 23 44.0	0.2	6.7	+3.84	+1.29	0.22	2.137	-	4
4	July 2, 00 56.9	0.2	1.2	+3.74	+1.30	0.14	2.512	-	4
5	July 7, 00 05.5	0.2	0.9	+3.75	+2.60	0.04	2.288	1	1
6	July 9, 22 01.2	0.5	5.3	+4.06	+2.50	0.14	2.143	4	0
7	July 9, 22 11.8	0.1	0.2	+4.06	+2.83	0.01	2.122	1	0
8	July 9, 23 31.4	0.2	0.3	+3.68	+1.86	0.03	2.190	-	0
9	July 12, 23 42.6	0.3	2.6	+3.34	+0.95	0.24	2.292	2	0

no.= order number; t_{max} = date and U.T. at maximum of the flare; d_b = duration of the flare before maximum; d_a = duration of the flare after maximum including whatever post-maximum activity; $m_{lim}-m_o = -2.5 \log (3\sigma/I_o)$ where σ and I_o indicate the standard noise fluctuation and the mean intensity of the quiet star near the observed flare, respectively; $(m_f-m_o)_{max} = -2.5 \log [(I_{o+f} - I_o)/I_o]_{max}$ where $I_o + f$ is the intensity deflection due to the quiet star (I_o) plus that of flare (I_f) at maximum; $P = \int (I_{o+f} - I_o)/I_o dt$, integrated intensity (in minutes); M = air masses to sea level; a = flare feature: 1 = uncertain, 2 = double, 3 = multiple, 4 = complex structure; b = sky conditions with the following standards; 0 = very clear, 1 = clear, 2 = with some cirrus, 3 = extended cirrus, 4 = with some clouds, 5 = cloudy;

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Konkoly Observatory
Budapest
1970 September 1

FLARE ACTIVITY OF PROXIMA CENTAURI, 1969

Flare activity of Proxima Centauri was discovered by Shapley (1949, 1951, 1954) from a search of Harvard plate material. The activity reported is considerable, with Δm_{pg} greater than 0.5 magnitudes about six percent of the time. Photoelectric monitoring of Proxima was initiated at Cerro Tololo in 1969 to determine the present level of activity, and further, to expand the meager data on flare activity of the least luminous flare stars.

A listing of events recorded in 23.6 hours of U-band photometry during the 1969 observing season appears in table 2, following observational procedures described elsewhere (Kunkel 1968). A 90-cm reflector was used on the first two nights, and one of 40-cm aperture on the remaining nights. Comparison stars listed in table 1 and identified in figure 1 were used on all nights. Probable errors in V and (B-V) are 0.01,

Table 1. Comparison Stars for Proxima

Star	V	B-V	U-B
A	11.77	0.85	0.54
B	11.75	0.20	-0.33
C	11.33	0.75	0.26

and in (U-B) 0.015 magnitudes.

Given for each night in table 2 are the event U.T., the corresponding airmass, and the U-magnitudes at peak light, columns (1) through (3). Columns (4) and (5) list the durations at 0.5 and 0.1 peak light, respectively. R.m.s. uncertainties greater than ten percent are indicated by a colon. Decay rates at 1, 2, and 3 magnitudes below peak light appear in columns (6) through (8). They are expressed as the common logarithm of the decay in magnitudes per minute. A colon is used to indicate r.m.s. uncertainties greater than 0.1. A letter "c" indicates a complex time-history, such as events with multiple peaks or rapid changes in slope, denoting situations in which a meaningful measurement was difficult to make.

Completeness of the sample is bounded by two lines: (1) For each night sampling is at least 90 percent complete for events with u = 14.4 or brighter. (2) Descriptive parameters of flare light are not significantly biased by the recorder response (with a one second time constant) for events with $T_{0.5}$ greater than 0.08 minutes. Since no flares of so short a duration were recorded, the influence of instrumental response on estimates of peak light is assumed to be negligible.

A flare incidence relation giving the event rate for flares brighter than magnitude u, taking the form

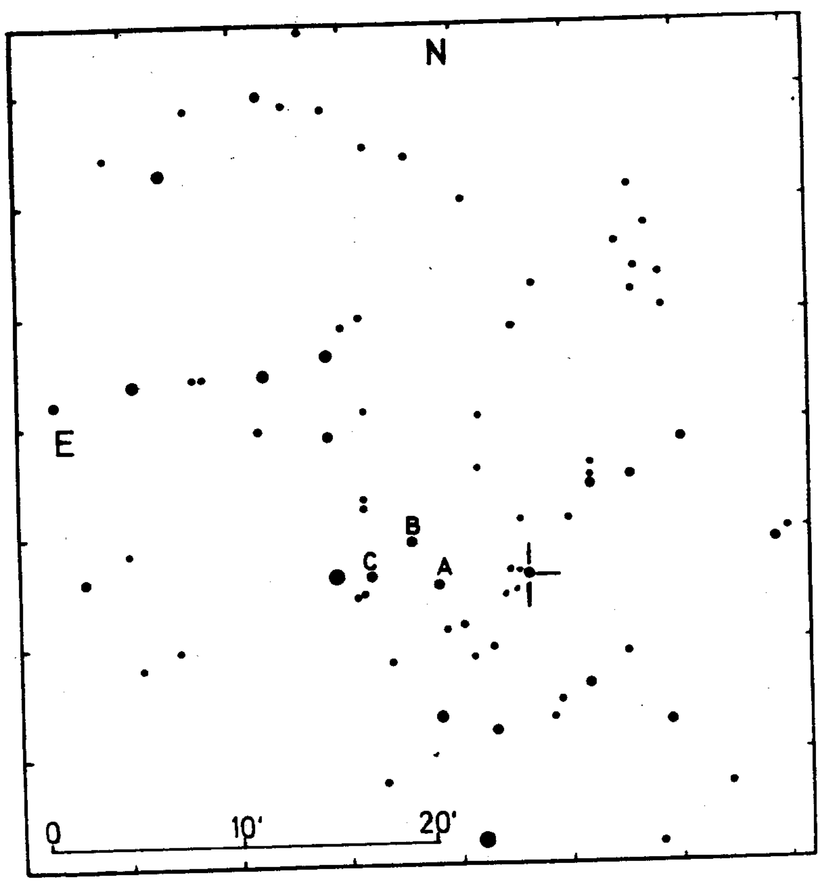
$$R(u) = \exp\left[a(u - u_o)\right] \quad \text{events hr}^{-1}$$

represents the observations well (see figure 2) above a 90 percent completeness level of $u_{lim} = 14.4$. The constants take the values $a = 0.78 \pm 0.12$ and $u_o = 14.69 \pm 0.15$.

Table 2. Flare Abstract, Proxima

Event U.T.	Air-mass	U_{peak}	$T_{0.5}$	$T_{0.1}$	τ_1	τ_2	τ_3	Notes
7 Feb. 1969	$7^h01^m.0$ - $9^h00^m.3$				3 events	$T = 1^h.988$		
$8^h22^m.60$	1.24	13.58	0.15	0.68	+0.99	+0.8:		
8 23.40	1.24	13.91	.52	2.6:	c			
8 43.53	1.22	14.46	.37		-			
8 Feb. 1969	$7^h03^m.1$ - $9^h00^m.5$				1 event	$T = 1^h.957$		
$8^h48^m.16$	1.21	15.05	0.13		-			
14 April 1969	$1^h52.6$ - $9^h41^m.4$				11 events	$T = 7^h.813$		
$2^h10^m.87$	1.47	14.29	1.5		-0.27			
2 29.32	1.40	12.10	.13	1.52	+0.96	-0.08	-0.46	note 1
3 02.98	1.33	11.87	-	1.9:	-	-	-0.09:	note 2
3 54.51	1.25	13.18	.31	1.35	+0.49	+0.45	.0:	
4 57.85	1.18	13.75	.40		+0.12			
5 29.0	1.18	14.17	13.2	32:	-1.05			
5 31.13	1.18	12.89	.39	2.0	+0.36	0.0	-0.21	
5 45.33	1.18	14.20	.18		-0.09			
5 46.96	1.18	13.03	.45	1.45	+0.5, c	+0.23	-0.21:	
7 50.69	1.28	15.26	2.2		-			
9 14.3	1.46	15.58	2.2:		-			
15 April 1969	$0^h25^m.4$ - $3^h52^m.4$				3 events	$T = 3^h.450$		
1^h02^m	1.70	14.34	4.		-			
1 22.5	1.60	12.72c	7.2	15.8	-0.68	-0.71	-0.82	note 3
3 01	1.32	15.02	11.5		-			
17 April 1969	$0^h57^m.6$ - $9^h18^m.5$				10 events	$T = 8^h.348$		
$1^h09.65$	1.62	12.77	0.14	3.7	+0.86	-0.41	-0.41	
1 32.78	1.54	14.64	.18		-			
1 50.35	1.48	14.54	.5:		-			
1 54.98	1.46	14.37c	.6, c		-			note 4
2 55.83	1.32	12.73	.4	4.4	+0.26	+0.07	-0.55	
4 08.20	1.22	14.05	.58		+0.18			
5 14.29	1.18	14.93	.3		-			
6 43.61	1.18	14.31	.09		-			
6 53.86	1.22	14.77	.40		-			
7 05.68	1.23	13.27	.10	1.04, c	+1.36	+0.57		

Note 1 τ_4 = -0.99:
2 τ_4 = -0.67: "fast event," peak lost while seeking proper gain setting.
3 Three peaks
4 Double peak separated by 2.5 minutes in time.


N
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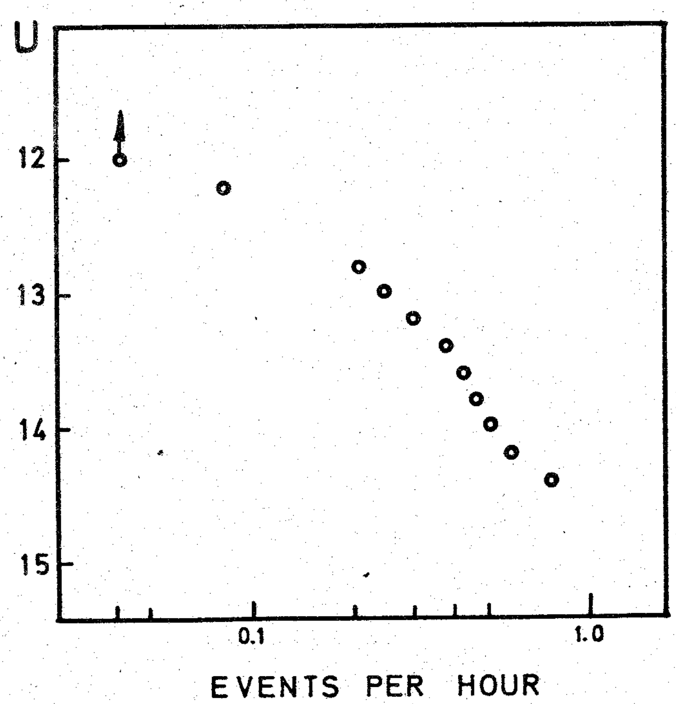

A direct comparison of the activity of Proxima Centauri with that of other flare stars of low luminosity is facilitated by a transformation of the flare activity parameter u_o to a scale of absolute magnitudes, $M_{u,o}$. If we assume that the constant "a" takes on a unique value for all stars (data presently available are not sufficient to reject this hypothesis), the value of $M_{u,o}$ serves as a comparative measure of flare activity: lower values denoting greater activity. Three stars of low luminosity for which measures of $M_{u,o}$ are available are Wolf 424A, B, UV Ceti, and Wolf 359, with $M_{u,o}$ = 17.8, 17.2 and 18.15 respectively. Activity of the binaries is assumed to be divided equally between components since the components are of practically equal luminosity. The value of $M_{u,o}$ for Proxima is 19.1, indicating a level of flare activity that is only moderate. It appears quite possible that flare activity was more pronounced at the time of Shapley's observations, since the upper limit in flare activity proposed by Kunkel (1970) for stars of the luminosity of Proxima is about $M_{u,o} = 17$.

Cerro Tololo Inter-American Observatory[+]
1970 August 21

WILLIAM E. KUNKEL

+ Operated by the Association of Universities for Research in Astronomy, Inc., under contract with the National Science Foundation.

References

Kunkel, W, E. 1968, I.B.V.S. No.315.

Kunkel, W.E. 1970, in press.

Shapley, H. 1949, Harvard Announcement Card No. 1010.

Shapley, H. 1951, Proc. National Academy of Sciences 37, 15.

Shapley, H. 1954, A.J. 59, 118.

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NUMBER 463

Konkoly Observatory
Budapest
1970 September 2

A PHOTOELECTRIC STUDY OF BETA PEGASI

Photoelectric V observations were made in 29 nights from June to February 1968/69 as tabulated subsequently. In October a minimum was registered lying remarkably outside the photoelectric V range as given in the remarks to the 1969 edition of the General Catalogue of Variable Stars (2.42 - 2.56, page 579).

Due to the smallness of the instrument (4 1/2 inch refractor) the probable error ist relatively large, near 0.03 magnitude. The comparison star was Eta Pegasi, V = 2.95.

Date		V	Weight	Date		V	Weight
1968				1968			
June	3.07	2.43	5	Sep.	1.88	2.50	4
	6.07	2.35	3		5.90	2.56	3
	12.07	2.40	5		7.99	2.70	4
	14.05	2.31	6		10.94	2.63	5
	18.06	2.39	6	Oct.	3.93	2.67	4
	23.04	2.37	5		8.03	2.74	4
	26.07	2.34	6		20.79	2.50	4
	30.06	2.37	5		24.75	2.63	3
July	9.08	2.38	3	Nov.	20.98	2.41	4
	29.04	2.38	6	Dec.	15.73	2.50	4
	30.89	2.45	4		29.86	2.43	3
Aug.	16.87	2.56	3	1969			
	19.96	2.56	5	Jan.	15.81	2.46	4
	21.95	2.47	4	Feb.	3.78	2.46	3
	23.91	2.51	4				
	26.86	2.56	4				

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PHOTOGRAPHIC OBSERVATIONS OF THE ECLIPSING VARIABLE HBV 434 = V 1171 Cyg

This variable was discovered by Wachmann (A.A., Abh. Hamb. Sternw. VI, 4, 328 1966) during his survey of the Cygnus-Cloud. Although he observed 8 minima, no period could be found. Photoelectric observations obtained by the author during May and June 1969 gave 5 more minima. A weighted least-square-solution gave the following elements together with their mean errors:

$$\text{Min}_{\text{hel}} = 244\,0380.5492 + 1^{d}.462\,123\,9 \cdot E$$
$$\pm 95 \qquad\qquad \pm 1\,9$$

Table I gives the observed times of minimum, the epochs, their weights and the observer, Wa denoting Wachmann and Bo denoting the author.

TABLE I

O	E	O - C	p	Obs.
243 3922.330	-4417.0	-0.021	1	Wa
4215.516	-4216.5	+0.009	1	"
4237.424	-4201.5	-0.015	1	"
4979.486	-3694.0	+0,020	1	"
4982.370	-3692.0	-0.020	1	"
5020.420	-3666.0	+0.014	1	"
5360.378	-3433.5	+0.029	1	"
5398.357	-3407.5	-0.007	1	"
244 0369.5695	-7.5	-0.0137	3	Bo
0372.5079	-5.5	+0.0004	5	"
0380.5527	0.0	+0.0035	10	"
0389.3114	+6.0	-0.0105	4	"
0394.4428	+9.5	+0.0035	10	"

The normals of Table II were formed out of Wachmann's photographic observations, n giving their number. The total phase at primary minimum is not verified by the photoelectric observations.

From Figure I the following characteristics of the light changes may by read:

Max I : $10^{m}.04$	Min I : $10^{m}.32$	Type : EA
Max II : $10^{m}.04$	Min II : $10^{m}.28$	

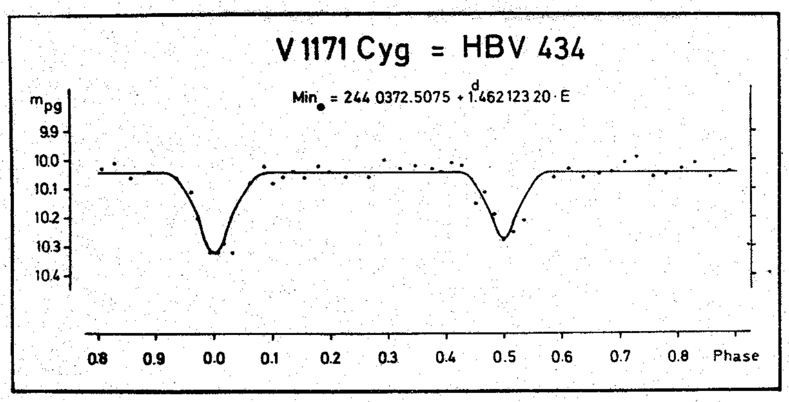

TABLE II

Phase	m_{pg}	n	Phase	m_{pg}	n	Phase	m_{pg}	n
0.0066	10.32	7	0.3219	10.03	10	0.6365	10.06	7
.0151	10.29	8	.3484	10.02	11	.6643	10.05	12
.0319	10.32	7	.3778	10.03	12	.6870	10.04	12
.0636	10.08	11	.3943	10.04	9	.7085	10.01	10
.0866	10.02	9	.4103	10.01	9	.7294	9.99	9
.1006	10.08	10	.4285	10.02	8	.7577	10.06	10
.1193	10.06	12	.4519	10.15	8	.7787	10.05	8
.1352	10.04	10	.4696	10.11	7	.8068	10.03	12
.1568	10.06	10	.4822	10.19	6	.8284	10.01	12
.1800	10.02	10	.4992	10.28	10	.8561	10.06	12
.1992	10.04	10	.5169	10.25	10	.8891	10.04	10
.2281	10.06	11	.5334	10.21	6	.9352	10.06	13
.2651	10.06	7	.5863	10.06	13	.9603	10.11	7
0.2947	10.00	9	0.6132	10.03	10	.9746	10.20	7
						0.9944	10.32	5

V 1171 Cyg will be further observed with the 60 cm photoelectric telescope of Hamburg Observatory for the sake of finding orbital elements.

The author is indebted to Prof. Dr.A.A. Wachmann for putting his photographic observations at the author's disposal.

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COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS

Number 465

Konkoly Observatory
Budapest
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VY CANIS MAJORIS -- A UNIQUE VARIABLE
(Preliminary Results)

By accident, the unique variability of Canis Majoris went unrecognized. The object was too faint to be included in Harvard's Milton Bureau, and the observations by Florja, Van Hoof and Deurinck did not span a sufficient time interval.

Recently, at the suggestion of G. Herbig, I observed VY Canis Majoris on about 2,000 plates in the Harvard collection. My sequence was based on photoelectric magnitudes of nearby comparison stars, kindly provided by G. Wallerstein, and extended to fainter stars through Selected Area 147. The average error of one estimate was about 0.1 magnitude. Good coverage on blue plates was available from 1893 to 1954, but adequate yellow plates were available only from 1913 to 1920.

The synoptic light curve (Fig.1) was prepared by plotting all observations, drawing a smooth curve through them, and reading the

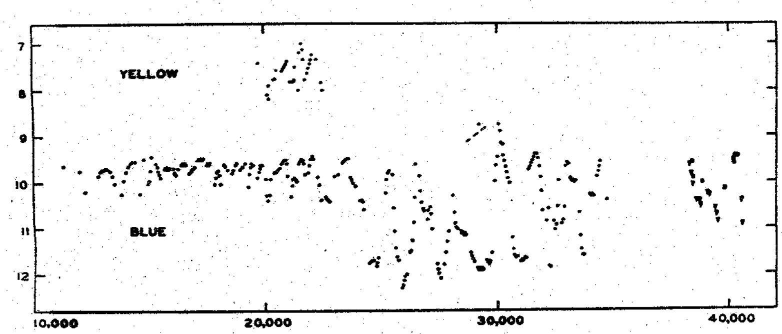

Fig. 1

magnitude at 50-day intervals. The details after 1954 are from 87 observations kindly made by Dieter Friedrich on plates at Remeis Observatory (triangles), as well as a few individual photoelectric measurements (boxes).

From about JD 2,411,300 to 22,000 (1889-1919), VY Canis Majoris exhibited variations of less than a magnitude. The cycles ranged from 200 to 1,000 days, with the average length of about 600 days. Then the character of the light curve changed dramatically. At least until the end of the Harvard patrol, longer cycles persisted, 400 to 1,900 days, with an average of 1,100 days. Though the range became as large as three magnitudes, a tendency for diminishing amplitude seems to have prevailed since JD 30,000. Note also the brightening trend of the major minima, about 0.1 magnitude per 1,000 days.

Probably the best evidence that the relatively minor features of the photographic light curve are real is the agreement between it and the yellow curve between 1913 and 1920.

VY Canis Majoris becomes redder as it fades. The large dots in Fig. 2 are photoelectric measurements; unfortunately they were all made when the star was bright. The other dots are from my data, determined from pairs of yellow and blue plates that were taken within five days of each other. Open circles indicate uncertain values.

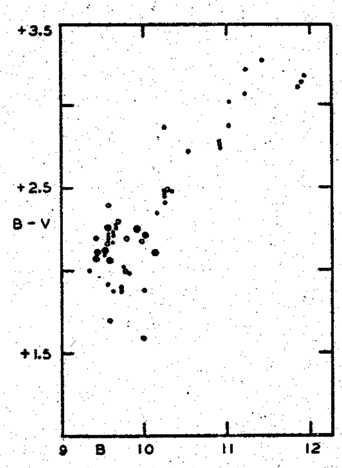

Fig. 2

Details of the brightest maximum and and faintest minimum are also shown. Each dot represents an individual magnitude estimate. Note in Fig. 3 the sudden rise of nearly one magnitude at JD 30,000. In Fig. 4 there are indications of more frequent short-term activity, particularly the well-defined peak at JD 25,650 and the marked dip at JD 26,350.

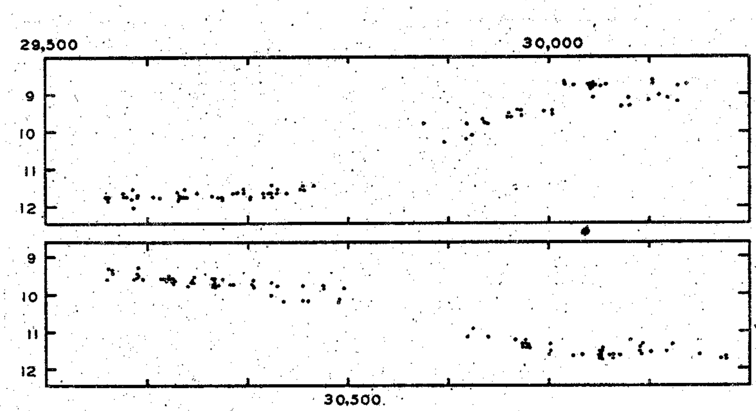

Fig. 3

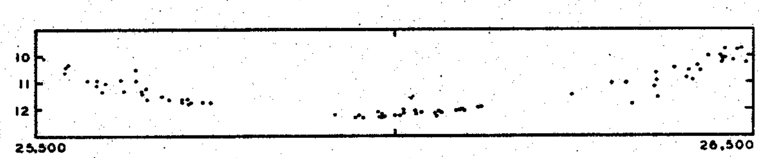

Fig. 4

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NASA's SAS-A spacecraft which is intended to conduct an all-sky survey in x-rays (2-20 keV) is now scheduled for launch early in December 1970. The instrumentation is capable of detecting emission of about 5×10^{-11} ergs/cm^2-sec ($\sim 5 \cdot 10^{-3}$ of the Crab Nebula) during a single pass across a source. The spacecraft has limited manuevering capability and we hope to be able to observe specified regions of the sky during prescribed time intervals, in particular, we hope to be able to have the spacecraft in position to view many of the flare stars that are included in the 1970 observing schedule published by the Working Group on Flare Stars (IBVS, No. 416). It is our plan to devote one or two days of continuous observing of a given object with the two week interval scheduled for the object. We also hope to publish in this bulletin the exact time interval during which the spacecraft will be viewing the object so that other observers may be able to record data simultaneously in the optical and radio wavelengths.

Interested parties can obtain more information concerning the capability of the SAS-A experiment and our observing plans by writing to Herbert Gursky, who will assume responsibility for the coordination with optical and radio observations during the life of the SAS-A satellite.

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REMARK ABOUT WZ Sge

WZ Sge is a binary star whose primary is a white dwarf with a mass of 0.59 M$_\odot$. The period is 81.5 minutes and the mass ratio is 0.05 (see Krzeminski and Kraft 1964). If we suppose that the secondary component is also a white dwarf (see Paczynski 1967) and that it fills up its Roche lobe then we can find the mass of the secondary. We can also find the rate of mass transfer and the rate of period change caused by gravitational waves. Computation were made using Salpeter's (1961) equation of state (zero temperature approximation), and with condition that all the mass lost by the secondary is transferred to the primary. The results are given below as a function of hydrogen content of the secondary.

X	$M_2/M_\odot$	dM_2/dt (g/sec)	dP/dt
0.0	4.34×10^{-3}	-5.90×10^{12}	2.00×10^{-15}
0.3	1.03×10^{-2}	-3.52×10^{13}	5.79
0.5	1.57	-8.35	9.52
0.7	2.24	-1.73×10^{14}	1.42×10^{-14}
1.0	3.51	-4.40	2.38

Here X denotes hydrogen content of the secondary.

A more detailed treatment of this problem will be given in Acta Astronomica.

Krzeminski,W., and Kraft,R.P. 1964 Ap. J., 140, 921
Paczynski,B., 1967 Acta Astron, 17, 287
Salpeter, E.E., 1961 Ap.J., 134, 669

Kraków, May 1970

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COMMISSION 27 OF THE I. A. U.
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NUMBER 468

Konkoly Observatory
Budapest
1970 October 5

A PERIOD CORRECTION FOR KP CYGNI

The RR Lyrae-type star KP Cygni ($20^h02^m14^s$, $+40°58'.2$, 1900) was rediscovered this summer with the new Rodman blink Comparator of the Maria Mitchell Observatory. The star was subsequently examined under the direction of Dr. Dorrit Hoffleit for a possible period correction; a period of $0^d.855933$ had originally been found for the interval from JD 2433617 to JD 2435299 (Whitney, Balfour S., Publ.Astr. Soc. Pas. 68, 1956, p.269.) Observations were made from approximately 950 plates taken with the 7.5" refractor of the Maria Mitchell Observatory; the plates covered the years 1926 to 1969 and ranged in Julian Days from 2424684.614 to 2440508.517. The brightness of the star varied between magnitudes 12.5 and 14.05 (pg).

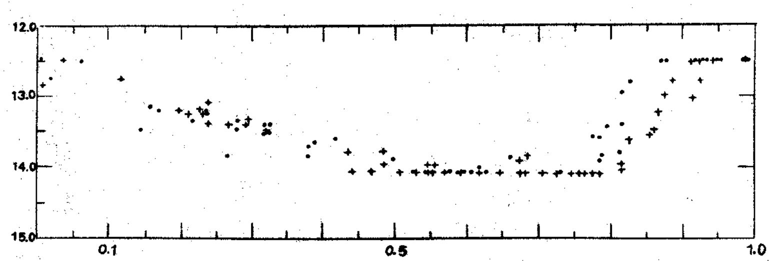

Fig. 1: Magnitude plotted against phase for the published period of $0^d.855933$. Dots are observations for the year 1939; crosses are observations for 1969.

These more comprehensive observations suggest a period correction as shown in Figures 1 and 2 for two selected years, 1939 and 1969. The new elements thus determined are:

$$\text{Max.} = 2426178.579 + 0^d.855936\ \text{E}.$$

Phases were computed using a reciprocal period of 1.168312.

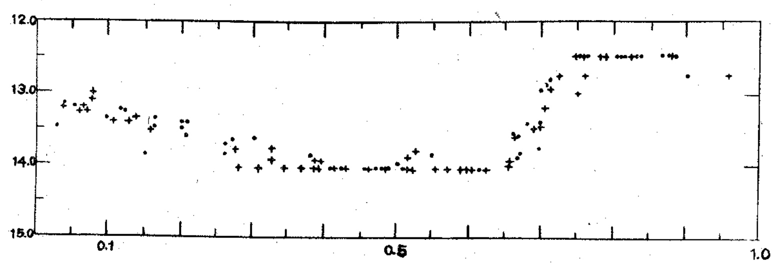

Fig. 2: Same as Figure 1 except for corrected period of $0\overset{d}{.}855936$.

I am deeply grateful to the National Science Foundation for the grant that made this work possible.

Nantucket, Massachussetts
August 28, 1970

MARGARET VOGT

COMMISSION 27 OF THE I. A. U.
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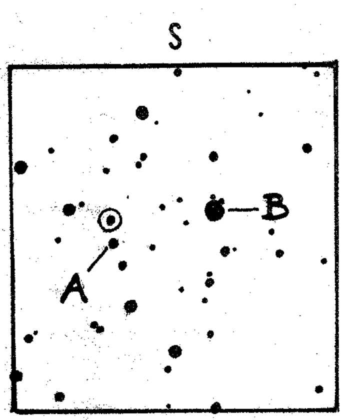
SYMBIOTIC STARS IN SAGITTARIUS EXAMINED FOR VARIABILITY

A paper by G.H.Herbig, "Emission-Line Objects Projected Upon the Galactic Bulge" (Contr.Lick Obs. No.299: Proc.Nat. Acad. Sci., U.S.A., 63, 1045, 1969) lists six probable symbiotic stars not previously examined for variability that are within or close to the boundaries of VSF 193 in Sagittarius. Dr. Herbig kindly supplied identification charts made from the Palomar Sky Survey. The results of the examination of the plates available at the Maria Mitchell Observatory are summarized in the Table. The first four columns are taken directly from Herbig's paper; in column 3, SS stands for symbiotic spectrum.

SYMBIOTIC STARS EXAMINED FOR VARIABILITY

Name	R.A. (1900)	Dec	Class	m_{pg}	Variability	Plates	Observer
T53	$18^h01^m19^s.7$	$-25°54'23''$	SS?	13	Susp.	200	3
AS 281	04 25.5	-27 58 56	SS?	15	Not Var.	50	3
AS 293	08 10.6	-29 51 03	SS?	14	13.2-[15.2	350	1-2
T21	14 05.5	-26 25 17	SS	12	Not Var.	600	2
AS 316	36 33.9	-21 23 31	SS	14	Susp.	500	1
MWC 960	42 00.2	-20 12 22	SS?	13	Susp.	50	1

1: D.Hoffleit, 2: Martha Clarke, 3: Marcia Keyes



Only one of the six stars has been found to be conspicuously variable, AS 293. Merrill and Burwell (Ap.J. 112, 72, 1950) described the star as being 1'.5 South of CoD -29° 14.700. Figure 1 is an identification chart based on Nantucket plates having a scale of 248"/mm. The observations, covering the interval July 1957 to September 1970, are satisfied by the relation

$$\mathrm{Min} = \mathrm{J.D.}\ 2437485 + 243^d n.$$

Fig.1: AS 293 marked with circle.
A=CoD-29° 14700 B=CoD-29° 14714

Although the period is typical of Mira-type stars, the light curve is not necessarily of this type. With the comparatively short duration of minimum (one third of the period) the star may be somewhat similar to the symbiotic stars, CI Cygni and AS 313, whose periods, however, are much longer, 850^d (Hoffleit, Irish Astr.Jour., 8 149,1968). For AS 293 there seems to be some evidence for a shorter period superposed on the long period. On the other hand, the star is far from the center of the plates (18^h23^m,-$23°3$) and accidental errors may be large.

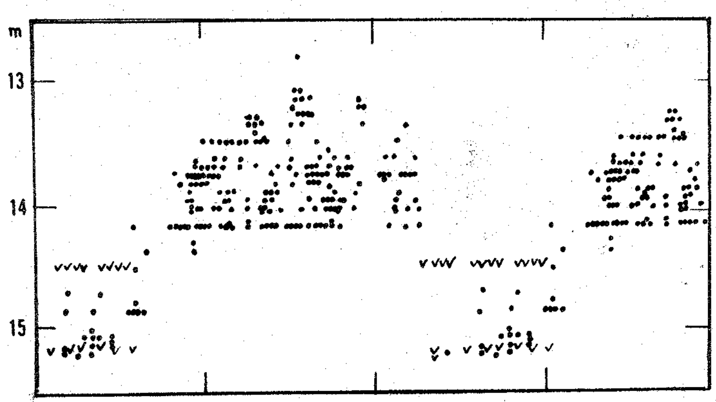


Fig. 2: Light curve of AS 293

Three of the other stars in the Table are suspected of variability, as noted in column 5. In all cases the estimates on our small scale plates were adversely affected by unresolved optical companions.Plates of higher resolution are necessary for definitive conclusions.

September 27, 1970

DORRIT HOFFLEIT

Maria Mitchell Observatory
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Mass., U.S.A.

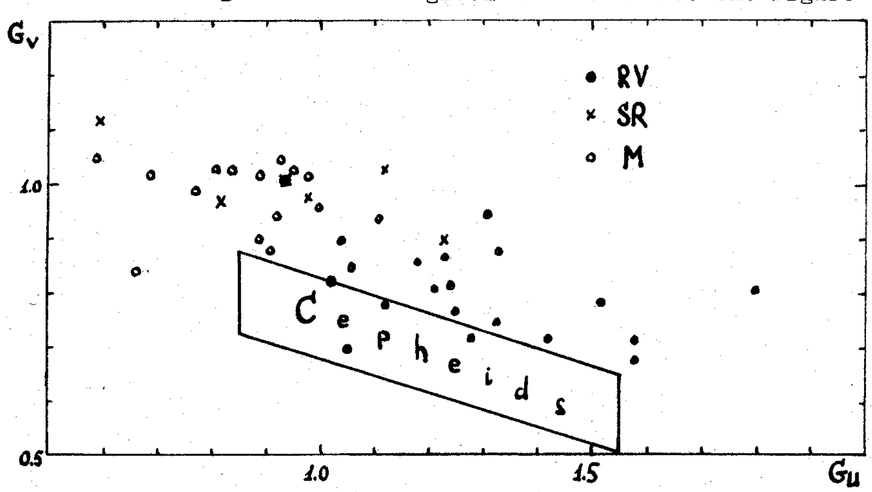
COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 470

Konkoly Observatory
Budapest
1970 October 8

GRADIENT DIAGRAM FOR PULSATING VARIABLES

Comparison of the series of the U,B-and V,B-magnitudes for different variable stars indicates in most cases a regressive dependence. Thus, one can characterize a variable star by constant light gradients $G_U = dU/dB$ and $G_V = dV/dB$. On the gradient diagram (G_u, G_V) variables of different types form definite sequences (1). The cepheid sequence is the one mostly studied (2, 3). As to another pulsating variables they are located above the cepheid sequence on the gradient diagram as it was shown in the papers (1,4).

In this connection series of the phe UBV-magnitudes of Mira-variables, semi-regular and RV Tau type stars were studied. The gradients are given in the Table. The Figure



shows the gradient diagram for pulsating variables. One can see that M,- SR- and RV-variables form a sequence which is situated over the cepheids.Inside this sequence RV Tau type stars distinguish rather well as a rule having $G_U > 1,15$. Mira stars and semi-regular variables are not separated and are located in the left side of the sequence with $G_U < 1,15$ where there are no RV Tau type stars practically.

It is interesting that in the new edition of GCVS (11) two of the RV Tau variables given in the Table, SX Her and UU Her, are classified as SRd. Actually, UU Her has gradients typical for semi-regular variables. But SX Her, according to its location on the gradient diagram, is a star of the RV Tau type.

TABLE

Star	G_u	G_v	Source
		M	
R Boo	0.84	1.03	7
R Cuc	0.89	1.02	8
R Car	0.69	1.02	8
S Car	1.11	0.94	5
X Cen	0.89	0.90	8
U Cet	0.93	1.05	8
o Cet	0.77	0.99	6
S CrB	0.59	1.05	7
X Cyg	0.94	1.04	6
R Dra	0.95	1.03	6
S Her	0.66	0.84	7
SS Her	0.98	1.02	7
R Hya	0.92	0.94	7
R Leo	1.06	0.85	8
RS Lib	0.83	1.03	8
T Nor	0.91	0.87	8
RU Sgr	1.00	0.96	8
R Vir	0.84	1.03	7
		SR	
T Cen	1.12	1.03	5
W Cyg	0.98	0.98	7
Ch Cyg	1.23	0.90	9
30 g Her	0.94	1.01	7
R Lyr	0.60	1.12	7
L_2 Pup	0.82	0.97	5
		RV	
EQ Cas	1.25	0.77	10
DF Cyg	1.21	0.81	10
V360 Cyg	1.24	0.82	10
SX Her	1.58	0.72	10

TABLE (continuation)

Star	G_u	G_v	Source
UU Her	1.05	0.70	10
AC Her	1.33	0.75	10
EG Lyr	1.31	0.95	10
EP Lyr	1.42	0.72	10
U Mon	1.18	0.86	10
TT Oph	1.80	0.81	10
TX Oph	1.28	0.72	10
UZ Oph	1.04	0.90	10
V453 Oph	1.12	0.78	10
V564 Oph	1.23	0.87	10
R Sge	1.58	0.68	10
R Set	1.33	0.88	10
V Vul	1.52	0.79	10

Kiev, September, 1970

I.G. KOLESNIK

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REFERENCES

(1) I.G.Kolesnik, F.I.Lukatskaya. Perem.Zvezdy, 17, 224 (1970)
(2) E.S.Kheilo. Inf.Bull.Var.Stars, No.356 (1969)
(3) I.G.Kolesnik, E.S.Kheilo. Perem.Zvezdy, 17,234 (1970).
(4) F.I.Lukatskaya. Astrometrija and Astrophysika, Kiev "Naukova Dumka", 9, (1970).
(5) O.Eggen. Roy.Obs.Bul., No.29 (1961).
(6) E.Mendoza. Bol.Obs.Tonantzintla y Takubaya, No.28 (1967).
(7) J.Smak. Ap J, Suppl. No.89, (1964).
(8) A.U.Landolt. PASP, 81, 443 (1969).
(9) B.Cester. Astrophys.Space Sci., 3, 198 (1969).
(10) G.W.Preston, W.Krzeminski, J.Smak. J.A.Williams, Ap.J, 137, 401, (1963).
(11) B.V.Kukarkin, P.N.Kholopov, Yu.N.Efremov, N.P.Kukarkina, N.E.Kurochkin, G.I.Medvedeva, N.B.Perova, V.P.Fedorovich, M.S.Frolov. General Catalogue of Variable Stars. Vol. I and II. The third edition, Moscow, 1969.

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CLASSIFICATION OF PULSATING VARIABLES BY LIGHT GRADIENTS

The gradient diagrams (G_u = dU/dB, G_v= dV/dB) of cepheids, Mira-stars, semi-regular and RV Tau type variables were investigated in papers (9-11). It was found that they form two sequences elongated along the G_u axis and located one over the other. Apart from this we have for the variables

lower sequence	RR	$G_u \lesssim 1.06$
	CW	$1.06 \lesssim G_u \lesssim 1.16$
	Cδ	$G_u \gtrsim 1.16$
upper sequence	M, SR	$G_u < 1.15$
	RV	$G_u > 1.15$

This fact may be used for classification of pulsation variables. This classification was carried out for the stars given in the Table. Here, in the second and third columns the gradients obtained are given, in the fourth one the type of the variable defined by gradients, in the fifth column the type given in the new edition of GCVS (3) are included. Finally remarks on individual variables and references to papers containing series of UBV-magnitudes are given.

TABLE

Star	GU	GV	Type	GCVS	Remarks	Source
DI Car	1.35:	0.79:	Cδ	Ins		5
V419 Cen	1.21	0.69	Cδ	Cep		6
V659 Cen	1.13	0.71	CW	Cep		6
EP Cyg	1.26	0.72	Cδ	Cδ		1
EU Cyg	1.03:	0.75	CW	Cδ		1
EX Cyg	1.31	0.70	Cδ	Cδ		1
EZ Cyg	1.40	0.64:	Cδ	Cδ		1
GH Cyg	1.29	0.69	Cδ	Cδ		1
GI Cyg	1.41:	0.59	Cδ	Cδ		1
GL Cyg	1.18	0.72	Cδ	Cep	According to gradients it may be CW. Eggen (1) also assumes it may be CW	1
IU Cyg	1.16	0.72	CW	Cδ	Eggen (1) assumes it may be CW	1
IY Cyg	1.24	0.74:	Cδ	Cδ		1
QY Cyg	1.09	0.72	CW	Cep	Eggen (1) assumes it may be CW	
V 336 Cyg	1.43	0.63	Cδ	CW	According to Eggen (1) it may be CW	
V 343 Cyg	1.30	0.63	Cδ	Cep	Eggen (1) assumes it may be CW	1
V 383 Cyg	1.35	0.67	Cδ	CW?		1
V 547 Cyg	1.42	0.69	Cδ	Cδ		1
V 714 Cyg	1.03	0.73	CW	CW		1
V 924 Cyg	1.16	0.60	Cδ	Cδ		1
V 1025 Cyg	1.42	0.62	Cδ	Cδ		1
BX Del	1.08	0.63	CW	Cep		1,2
AT Her	1.48	1.02	RV	Isb?	The gradients obtained by short series of UBV-magnitudes	8
SV Mon	1.52	0.51:	Cδ	Cδ		1
SZ Mon	0.90:	1.00:	SR	Cδ	Stobie (6) assumes it may be RV	6,7
VW Mon	1.17:	0.66:	Cδ	RRab		1
XX Mon	1.28	0.72	Cδ	Cδ		1
YY Mon	1.31	0.76	Cδ	Cδ		1
AC Mon	1.28	0.62	Cδ	Cδ		1
CS Mon	1.14	0.61	Cδ	Cep	Value of G_u such as for a CW but G_v is typical for Cδ	1
CU Mon	1.37	0.70	Cδ	Cep		7
EK Mon	1.25	0.68	Cδ	Cδ		1
FI Mon	1.35	0.67	Cδ	Cδ		1

(continuation)

TABLE

Star	GU	GV	Type	GCVS	Remarks	Source
FT Mon	1.17	0.70	Cδ	Cδ		1
V636 Sco	1.27	0.67	Cδ	Cep		6
AH Vel	1.13	0.68	CW	Cep		6
S Vul	1.67	0.63	Cδ	SRd		4

Kiev, September, 1970

I.G.KOLESNIK

The Main Astronomical Observatory
of the Ukrainian Academy of Sciences

REFERENCES

(1) O.J.Eggen, Ap.J, 156, 617 (1969).
(2) B.Basu, PASP, 81, 834 (1969)
(3) B.V.Kukarkin, P.N.Kholopov, Yu.N.Efremov, N.P.Kukarkina, N.E.Kurochkin, G.I.Medvedeva, N.B.Perova, V.P.Fedorovich M.S.Frolov, General Catalogue of Variable Stars, vol.I and II. Third Edition, Moscow, 1969.
(4) J.D.Fernie, AJ, 75, 244 (1970).
(5) W.Seggewiss, AJ, 75, 345 (1970).
(6) R.S.Stobie, Mon.Not.R.Astron.Soc., 148, 1(1970).
(7) R.I.Mitchell, B.Iriarte, D.Steinmetz, H.L.Johnson, Bol. Obs.Tonantzintla Tacubaya, 3, 153 (1964).
(8) B.Basu, PASP, 80, 616 (1968).
(9) E.S.Kheilo, Inf.Bull.Var. Stars, No.356 (1969).
(10) I.G.Kolesnik, E.S.Kheilo, Perem.Zvezdy, 17, 234 (1970).
(11) I.G.Kolesnik, Inf.Bull.Var.Stars, No.470 (1970).

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NUMBER 472

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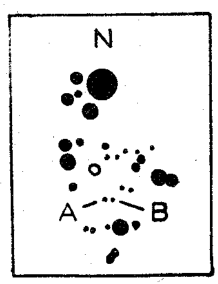
Budapest
1970 October 14

PREOUTBURST OBSERVATIONS OF NOVA SCUTI 1970

The nova that G.Alcock discovered on July 31, 1970 (1) was visible on 45 blue-light plates (103a-O, no filter) taken on five consecutive nights by A. Sandage with the 48-inch Palomar Schmidt between JD 2,435,279 and 2,435,283. These plates have been made available to M.Harwood for her continuing study of the variables in the Scutum Star Cloud.

From precise positions by H. Kosai (2) and T.Seki (3) the nova was identified; it is marked by an open circle on the finder chart (3'.5 by 2'.7). The brightest star is 8th magnitude SAO 142593. An independent identification of the nova was made on Sky Survey prints at Tokyo Observatory (2) and M. Huruhata (4) confirms that the same star was selected there.



A flyspanker was used for determining the magnitudes of comparison stars A(m_{pg}= 19.0) and B(m_{pg}= 19.5), by extrapolation of sequence Krieger C, which has been photoelectrically placed on the international system (5)

No convincing variation of Nova Scuti 1970 was found from eye estimates, the star never being brighter than A nor fainter than B. The average magnitude from all 45 estimates was 19.3.

For magnitudes cited in the IAU Circulars and unpublished AAVSO observations (6), it appears that maximum light occurred on or shortly before the date of discovery at $m_{vis} \sim 6.9$. On that date B-V was probably $+0^m.8$. Hence the blue magnitude would have been 7.7, indicating an increase of at least 11.6 magnitudes.

L.J.ROBINSON M.HARWOOD
Cambridge, Mass. U.S.A.

References

1. IAU *Circular* 2269
2. IAU *Circular* 2272
3. IAU *Circular* 2274
4. Private communication
5. M. Harwood, Leiden *Annals*, *21*, 387
6. Courtesy M.W. Mayall

COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 473

Konkoly Observatory
Budapest
1970 October 24

PHOTOELECTRIC OBSERVATIONS OF CQ Cep

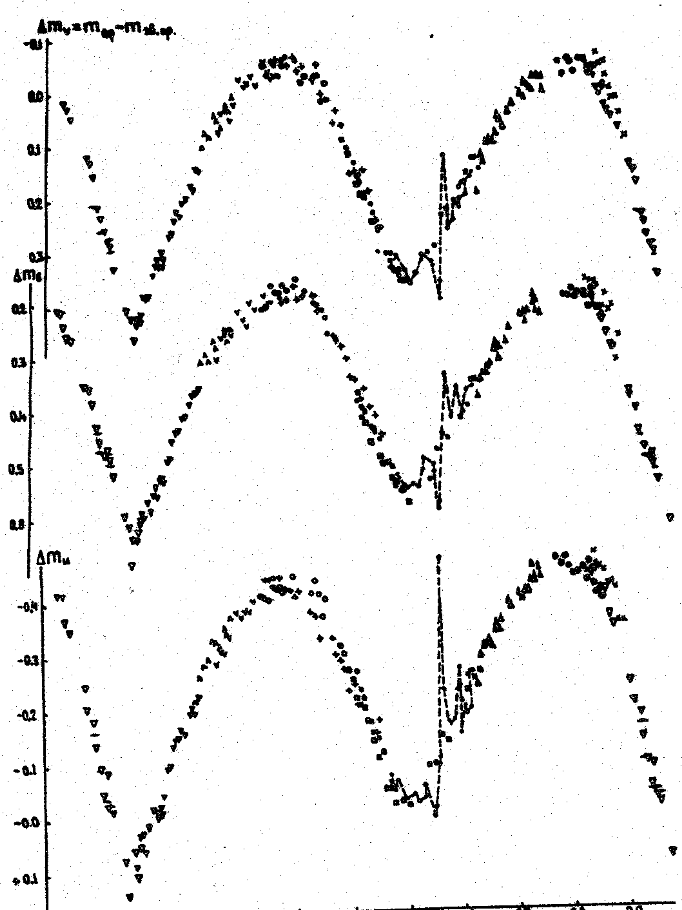
Three-colour photoelectric observations in a system close to U, B, V were obtained on the Wolf-Rayet eclipsing binary CQ Cep during 14 nights in February-May of 1969. The observations were made at the 45-cm reflector of the Ural University Observatory Kourovka, using HD 214259 and HD 214220 as comparison and check stars.

195, 194 and 204 observations were obtained in U,B, V, respectively. Each of these observations consists of two tracings for CQ Cep and two tracings for the comparison star.

The light-curves are plotted on the figure. Observations at different nights are denoted by different markings.

On 28-29th March we have observed some anomalous effect in the phase interval $0\overset{p}{.}53$-$0\overset{p}{.}60$ which lasted over 2 hours. A sharp decrease of the brightness of about $0\overset{m}{.}1$ was followed by a flash which showed the amplitudes $0\overset{m}{.}35$ in U, $0\overset{m}{.}13$ in B and $0\overset{m}{.}14$ in V.

A detailed account of the observations and their analysis will be given in a paper to be published in "Scientific Notices of the Ural University".



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NUMBER 474

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Budapest
1970 October 25

ANOTHER VARIABLE WITH CHANGING PERIOD

Magnitudes for one of my hitherto unpublished variable stars in Sagittarius, at $18^h33^m07^s$ - 21°14!2 (1900) were estimated by Miss Loretta J.Locicero on some 250 Harvard and 500 Nantucket plates. For the Harvard plates of the MF series (10-inch Metcalf, scale 167"/mm) for the years 1924-34, she found a reciprocal period of $2^{-d}467859$, and for the Nantucket plates (7.5-inch Cooke,scale 248"/mm) a slightly shorter value, 2.467825. Harvard plates of other series for the intermediate years 1942-51 are sparsely distributed and do not fit either of these periods well. In Figure 1, therefore, I have plotted the phases of ascending light, on the basis of the reciprocal period, 2.467825 and for magnitudes brighter than 13,7, against the Julian day from J.D.2424000 to beyond 2440000. This indicates that the period in changing progressively. All of the observations are then satisfactorily represented (Figure 2) by

$$\text{Phase} = 2.467825\ (\text{JD}) - n - 0.130 \cdot 10^{-8}(\text{JD} - 2438500)^2.$$

The final term in this expression is represented by the smooth curve through the points in Figure 1. In terms of the period itself we get

$$\text{Max} = \text{JD}\ 2438563.748 + 0^d\!.4052151\ n + 0.865 \cdot 10^{-10} n^2.$$

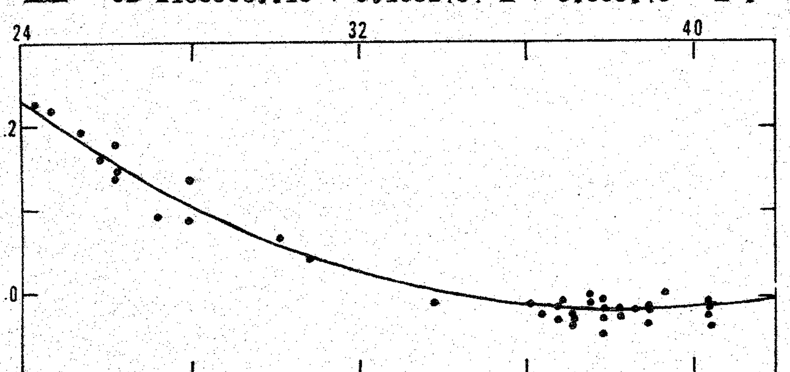

Figure 1

The period and change of period are given by

$$P = P_o \ (1 + 5.27 \cdot 10^{-10} n)$$

representing a progressive lengthening of the period by $1.85 \cdot 10^{-5}$ seconds per cycle.

The observations seemed to indicate a possible secular change in amplitude or magnitude at maximum. This can, however, be interpreted merely as systematic errors corresponding to the use of different instruments, different emulsions, and different effective exposures in a field where overlapping images are prevalent. The horizontal spread in the ascending branch of the light curve appears to be random and does not suggest a correction either to the basic period or the secular term.

The insert in Figure 2 is a finding chart showing a field of approximately 10' x 10'.

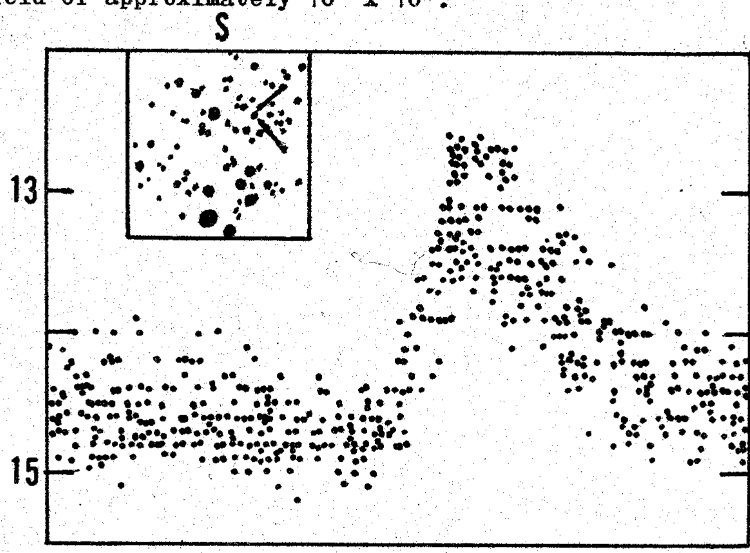

Figure 2

This is a part of the summer work at the Maria Mitchell Observatory supported by the U.S. National Science Foundation, for which we should like to express our appreciation.

8 October 1970

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NUMBER 475

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1970 October 26

PHOTOELECTRIC OBSERVATIONS OF NOVA SAGITTARII 1969.

Since its discovery by Welch (IBVS 389), Nova Sgr 1969 has been observed at the Auckland Observatory, N.Z., with the 50cm Zeiss Cassegrain reflector with Mark 1 photometer at the f/13.3 focus. The photometer consists of an EMI 9502 S.A.tube operated at 1600 volts H.T.with a digital readout and a ten second integration period.

The comparison star was HD 170704, for which the following values were found using HD 170279 and HD 170320 from Hogg's sequence (PASP, 75, 194, 1963):

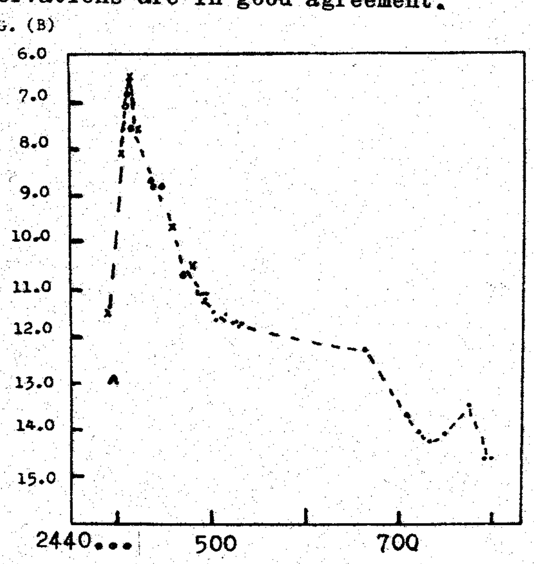
V = 8.52; B-V = +0.04; U-B = -0.11

OBSERVATIONS.

J.D.	V	B-V	U-B
2 440 485,90	11,24	-0,14	-0,59
,94	11,20	-0,14	-0,51
486,87	11,22	-0,11	-0,55
491,90	11,30	-0,18	-0,44
492,01	11,48	-0,18	-0,50
495,85	11,24	-0,11	-0,52
,86	11,34	-0,23	-0,50
,88	11,32	-0,11	-0,52
504,99	11,56	-0,08	-0,55
505,86	11,65	-0,03	-0,50
517,87	11,55	+0,02	-0,40
526,85	11,63	+0,07	-0,31
527,84	11,70	0,00	-0,40
531,88	11,81	-0,05	-0,30
533,85	11,78	-0,05	-0,29
666,10	11,76:	+0,56:	...
711,02	12,96:	+0,75:	+0,13:
722,00	13,42	+0,62	+0,53
734,00	13,29	+0,94	+0,38
750,17	13,29	+0,86	+0,05
776,97	13,32	+0,15	+0,12
799,09	14,02:	+0,63:	+0,06:
800,95	13,66	+0,98	+0,16

Observations are on the standard UBV system and the internal accuracy of these should be $\pm 0^m.02$, or better, with the exception of those indicated by a colon where weather or other factors intervened.

Candy (IBVS 408) published a photographic magnitude from a Perth plate. The Nova was also discovered on Bamberg plates taken at the Mount John University Observatory (IBVS 452). On the light curve herewith the photographic magnitudes from IBVS 389 and 408 are shown as crosses; those from IBVS 452 as open circles and B values from the Auckland observations as dots. Welch's observation on JD 2440413.93 must have been very close to the maximum. There is a difference between his observation on 2440391.96 and that at Mt. John on 2440395.02. Otherwise the two sets of photographic observations are in good agreement.



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NUMBER 476

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Budapest
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Veröffentlichungen der Remeis-Sternwarte Bamberg
Astronomisches Institut der Universität Erlangen-Nürnberg
Band VIII, Nr.91

PERIOD-CONTROL FOR ECLIPSING BINARIES BV 1161, 1162, 1209 and 1214

By the help of the Harvard plate material which was in a friendly manner at our disposal we were able to control the periods back to 1901. First this plate material (all minima estimated by D.FRIEDRICH, Bamberg, 1970) makes possible the derivation of the elements.

BV 1161 = CAP -56°8436($9^m_.0$) = HD 161 160(Ao)

Elements from IBVS 289, 1968, but with the half of the period given there:

Min = JD 242 8686.375 + $1^d_.554\ 965$. E

Minima	E	O - C	Minima	E	O - C
241 5117.823	-8726	+0.073	241 9589.733	-5850	-0.097
5198.671	-8674	+0.063	9695.537	-5782	-0.030
5226.533	-8656	-0.065	9897.706	-5652	-0.007
5646.536	-8486	+0.098	9925.785	-5634	+0.083
6296.507	-7968	+0.093	9978.655	-5600	+0.084
6302.664	-7964	+0.030	242 0034.577	-5564	+0,027
6563.768	-7796	-0.100	0037.613	-5562	-0.047
6697.570	-7710	-0.025	0295.814	-5396	+0.030
6933.844	-7558	-0.106	0348.623	-5362	-0.030
7039.568	-7490	-0.119	.680	-5362	+0.027
7297.847	-7324	+0.036	0373.622	-5346	+0.090
7325.760	-7306	-0.041	0429.537	-5310	+0.026
7353.833	-7288	+0.043	0609.808	-5194	-0.079
7378.714	-7272	+0.044	0651.844	-5167	-0.027
8034.812	-6850	-0.053	0662.737	-5160	-0.019
8115.646	-6798	-0.077	0690.701	-5142	-0.044
.713	-6798	-0.010	1007.835	-4938	-0.123
8404.871	-6612	-0.075	1135.485	-4856	+0.020
8451.707	-6582	+0.112	.533	-4856	+0.068
8824.790	-6342	+0.003	1368.734	-4706	+0.024
9180.805	-6113	-0.069	1396.656	-4688	+0.043
9558.763	-5870	+0.033	1421.627	-4672	+0.049

Minima	E	O – C	Minima	E	O – C
242 1424.589	–4670	–0.099	242 8378.428	– 198	–0.064
1449.538	–4654	–0.030	8456.245	– 148	+0.005
.586	–4654	+0.018	8742.321	+ 36	–0.033
1452.579	–4652	–0.099	8745.409	+ 38	–0.055
2133.646	–4214	–0.106	8770.239	54	–0.104
2525.550	–3962	–0.054	9140.361	292	–0.064
3237.638	–3504	–0.140	9168.307	310	–0.107
.680	–3504	–0.098	9818.353	728	–0.037
3576.716	–3286	–0.044	9821.390	730	–0.109
3918.784	–3066	–0.068	9874.294	764	–0.074
4024.576	–2998	–0.014			

A secondary minimum is suspected; Ampl. $0^{m}.80$.
No well-founded change in the period between 1900 and 1967.

<u>BV 1162</u> = CAP –64°3890($10^{m}.0$)

Elements from IBVS 289, 1968, but the period has been slightly corrected:

Min = JD 242 8332.225 + $5^{d}.730\,685$. E

Minima	E	O – C	Minima	E	O – C
241 5575.709	–2226	–0.011	242 3191.709	–897	–0.091
6022.561	–2148	–0.153	3237.680	–889	+0.034
6045.526	–2144	–0.110	3318.538	–875	+0.662
6297.652	–2100	–0.134	3535.741	–837	+0.099
7065.624	–1966	–0.074	4045.515	–748	–0.158
7718.727	–1852	–0.269	4074.517	–743	+0.191
8033.891	–1797	–0.293	4326.697	–699	+0.221
8102.776	–1785	–0.176	4704.628	–633	–0.063
8538.509	–1709	+0.025	8034.295	– 52	+0.066
8561.516	–1705	+0.109	8756.293	+ 74	–0.003
9569.782	–1529	–0.226	8819.310	+ 85	–0.023
9575.692	–1528	–0.046	9134.468	140	–0.053
242 0337.710	–1395	–0.209	9140.361	141	+0.110
0343.671	–1394	+0.021	9501.376	204	+0.091
0372.551	–1389	+0.247	9547.376	212	+0.246
0429.537	–1379	–0.073	9822.479	260	+0.276
1065.627	–1268	–0.089	9839.415	263	+0.020
2584.487	–1003	+0.139	243 0177.436	322	–0.069

A secondary minimum is suspected; Ampl. $0^{m}.55$.
No well-founded change in the period between 1901 and 1967.

BV 1209 = CAP $-69°1617(8^m.3)$ = HD 104 191(Ao)

Elements from IBVS 330, 1969, but the period has been slightly corrected:

Min = JD 243 4315.550 + $3^d.247$ 610 . E

	Minima	E	O – C		Minima	E	O – C
241	5547.618	-5779	+0.006	242	1331.585	-3998	-0.020
	6190.633	-5581	-0.005		1685.621	-3889	+0.026
	8093.736	-4995	-0.002		1724.577	-3877	+0.011
	8694.460	-4810	-0.086		8710.211	-1726	+0.036
	9509.675	-4559	-0.021		9382.482	-1519	+0.052
242	0295.631	-4317	+0.013		9421.372	-1507	-0.030

Ampl. $0^m.60$, without remarkable secondary minimum, EA.
No well-founded change in the period between 1901 and 1968.

BV 1214 = CAP $-50°8564(9^m.7)$ = CoD $-50°9816(10^m.)$

	Minima	E	O – C		Minima	E	O – C
241	5870.755	-770	+0.550	242	0754.495	-460	-0.845
	5885.629	-769	-0.335		0959.774	-447	-0.426
	5933.640	-766	+0.401		0960.701	-447	+0.501
	6264.669	-745	+0.501		0991.726	-445	+0.008
	6279.759	-744	-0.167		1006.763	-444	-0.713
	6563.768	-726	+0.189		1007.675	-444	+0.199
	6578.835	-725	-0.503		1370.709	-421	+0.782
	6633.664	-721.5	-0.828		1400.623	-419	-0.815
	6691.523	-718	+1.876		1716.711	-399	+0.103
	7035.624	-696	-0.710		1731.676	-398	-0.691
	7068.588	-694	+0.737		1732.663	-398	+0.296
	8123.575	-627	-0.095		2141.592	-372	-0.496
	8155.533	-625	+0.345		2142.600	-372	+0.512
	.602	-625	+0.414		2456.719	-352	-0.539
	8501.544	-603	-0.330		3221.598	-303.5	+0.053
	8533.511	-601	+0.119		3229.597	-303	+0.173
	8833.558	-582	+0.755		3269.516	-300.5	+0.695
	8911.533	-577	-0.063		3575.722	-300	-0.978
	9226.550	-557	-0.216		4678.694	-211	-0.512
	9242.535	-556	+0.011		5419.349	-164	-0.507
	9557.717	-536	+0.023		8019.225	+ 1	-0.783
	9605.580	-533	+0.610		.292	+ 1	-0.716
	9903.694	-514	-0.687		8035.230	2	-0.537
242	0313.572	-488	-0.530		8240.587	+ 15	-0.040
	0314.623	-488	-0.521		8366.356	23	-0.340
	0346.575	-486	+0.956		8397.225	25	-0.987
	0392.528	-483	-0.366		8429.238	27	-0.492
	0612.847	-469	-0.667		8602.584	38	-0.489
	0613.749	-469	+0.235		9501.245	95	-0.063
	0724.563	-462	+0.740		.344	95	+0.036
	0747.484	-460.5	+0.023				

The CAP and CoD numbers published in IBVS 330, 1969 are wrong; they belong to a neighbouring star.

Elements from IBVS 330, but the period has been slightly corrected:

Min = JD 242 8004.250 + $15^{d}.7585$. E

Ampl. $0^{m}.30$, with very deep secondary minimum, EA or EB
No well-founded change in the period between 1902 and 1968.

Remeis-Observatory Bamberg
1970 October 15

W. STROHMEIER

COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 477

Konkoly Observatory
Budapest
1970 October 26

Veröffentlichungen der Remeis-Sternwarte Bamberg
Astronomisches Institut der Universität Erlangen-Nürnberg
Band VIII, Nr.91

NEW BRIGHT SOUTHERN VARIABLE STARS

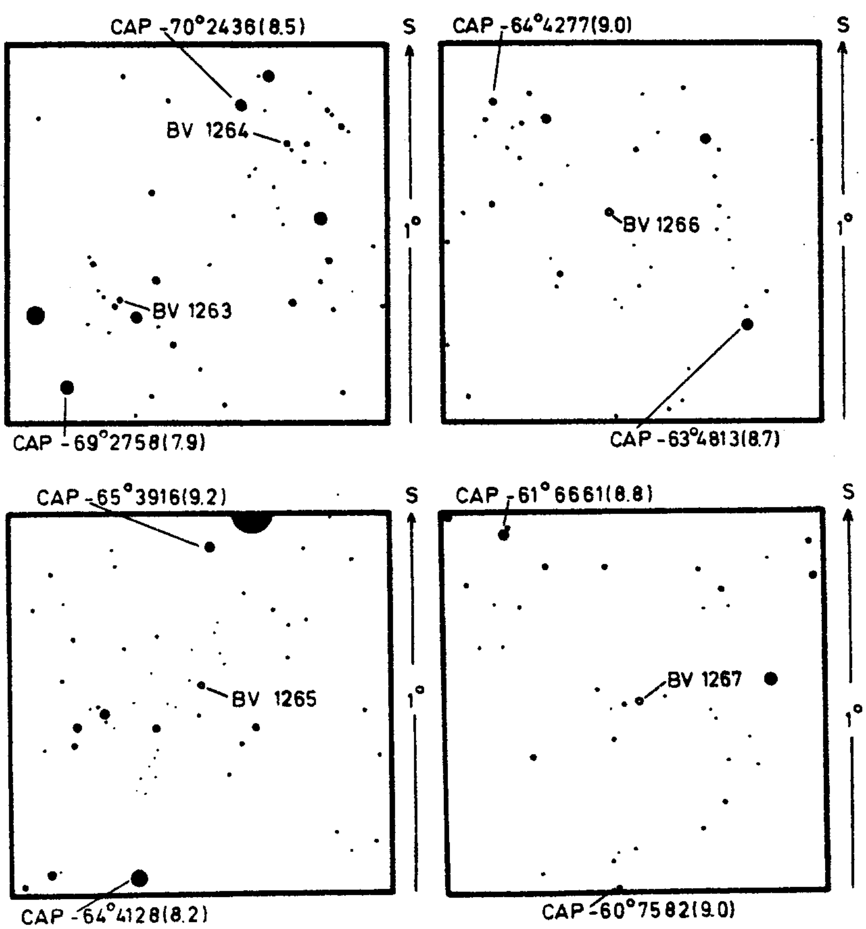
On sky patrol plates of the Southern Station of the Dr. Remeis-Sternwarte Bamberg and the University of Florida Gainesville at Mount John University Observatory, Lake Tekapo, New Zealand, further stars were found whose variability seems to be real as seen from the material available now.

			A_{pg}
BV1263 Aps	= CAP −69°2762 ($9^m_.5$)	= CoD −69°1690(10^m)	$1^m_.00$
BV1264 Aps	= CAP −70°2440 (9.5)	= CoD −70°1564(9.9)	1.40
BV1265 Pav	= CAP −65°3915 (10.2)		0.90
BV1266 Tuc	= CAP −64°4283 (9.0)	= CoD −64°1392(9.0) = HD 214 257(G5)	0.40
BV1267 Tuc	= CAP −61°6666 (8.7)	= CoD −61°6728(8.7)	0.80

On the following page you find the identification charts for the new variables.

Bamberg and the University of Florida,
August 1970

S. SHAW
J. SIEVERS



CAP -70°2436(8.5)
BV 1264
BV 1263
CAP -69°2758(7.9)
S
1°
CAP -64°4277(9.0)
BV 1266
CAP -63°4813(8.7)
S
1°
CAP -65°3916(9.2)
BV 1265
CAP -64°4128(8.2)
S
1°
CAP -61°6661(8.8)
BV 1267
CAP -60°7582(9.0)
S
1°

COMMISSION 27 OF THE I. A. U.
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NUMBER 478

Konkoly Observatory
Budapest
1970 October 27

POSSIBLE FLARE STAR NEAR M31

In a recent note Sharov and Alksnis (1970) have drawn attention to a possible nova (their No. 5) at a distance of 169' from the nucleus of M31. From a single observation on August 20 1969 they obtain B = 17.6 for this star. This observation is of particular interest because no other object associated with the Andromeda Nebula has ever been found at such a great distance from the nucleus of M31. Inspection of plates obtained with the 48-inch (126 cm) Schmidt telescope on Palomar Mountain shows a faint red star at the position of the object reported by Sharov and Alksnis. From a comparison with Arp's photoelectric sequence in M31 Field IV (Baade and Swope 1963) this star is found to have V = 19.2 and $B-V$ = 1.6. These data suggest the possibility that Sharov and Alksnis may have observed a flare of an M dwarf star on Aug.20 1969.

Inspection of this star on 43 Palomar Schmidt plates obtained between 1965 and 1970 shows no other major flares during a total exposure time of 1004 min. A single observation of marginal quality indicates that a small flare, during which the star brightened to B = 20.1 may have occurred on Dec.22 1968.

SIDNEY VAN DEN BERGH

David Dunlap Observatory
University of Toronto
Richmond Hill, Ontario, CANADA

References

Baade,W., and Swope,H.H. 1963, Astron. J. 68, 435.
Sharov,A.S., and Alksnis,A.K. 1970, Astron. Circ. USSR No.560.

COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 479

Konkoly Observatory
Budapest
1970 October 28

UV Cet

A continual photoelectric monitoring of the flare star UV Cet was done with the 91 cm reflector of the Okayama Station from 22 September to 5 October 1970.

During the 8.5 hours of monitoring in the magnitude system B, 9 flares were observed as shown in the following:

Date 1970	Time of Monitoring(UT)	Time max.(UT)	Flares $\Delta m(B)$	P	Duration	σ
Sept.						
26	$17^h29^m-19^h27^m$	$17^h57^m.3$	1.13^{mag}	0.5^{min}	1^{min}	0.07^{mag}
27	13 24 -15 19					
	17 12 -17 33	17 19.5	0.53	0.2	0.4	0.15
		17 21.7	0.66	0.2	0.2	0.15
Oct.						
1	18 28 -19 08	18 52.6	2.25	>9.0	>8	0.11
5	15 22 -19 00	15 44.6	0.68	0.1	0.1	0.15
		17 30.2	0.88	0.2	1.5	0.16
		18 00.5	0.70	0.7	3.5	0.19
		18 25.4	0.84	0.3	1.5	0.22
		18 50.6	0.93	1.0	4.0	0.15

$$\Delta m(B) = 2.5 \log (I_{o+f,max}/I_o)$$

$$P = \int (I_{o+f}-I_o)/I_o . dt; \quad \sigma(mag) = 2.5 \log (I_o+\sigma)/I_o$$

The values of $\Delta m(B)$, P and $\sigma(mag)$ are all referred to the total luminosity of L726-8 A+B. and not to L726-8B (UV Cet) only.

Tokyo Astronomical Observatory
19 October 1970

K.OSAWA and K.ICHIMURA

COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 480

Konkoly Observatory
Budapest
1970 October 30

57th NAME-LIST OF VARIABLE STARS

The present 57th name-list of variable stars has been composed in accordance with the previous 56th list. It contains all necessary identifications for 2216 new variable stars designated in 1970. In the square brackets the reference number is given for the work where (not always firstly) the information on discovery of the variable had been published. This reference number accompanies designation or number of the star given for it in the cited work. Name of the discoverer is mentioned only in the cases when it is not coincides with the name of the author of the cited work.

Reference numbers correspond to the numbers from literature list which is contained in the first volume of the 3rd edition of "General Catalogue of Variable Stars" (Nos 0001-5216), or from the supplementary list given below.

The serial numbers of flare variables in the Pleiades cluster are preceded by the symbol Pl Flare.

B.V.Kukarkin
P.N.Kholopov
N.B.Perova

Variable Star Commission of the Academy of Sciences
of the USSR and the Sternberg Astronomical Institute

Moscow, August, 1970.

GN And = 28And [5500, 5501] = HR 114 =
= BD+28°75 (5.9) = HD 2628 (F0) =
= ADS 409 A = GC 583 (5.26) =
= Zi 25 = КЗП 100032.
GO And = HR 234 [4170, 5624] = BD
+ 44°176 (6.8) = HD 4778 (A0) =
= GC 999 (6.12) = КЗП 5873.
GP And = BV 122 [4563] = КЗП 5879.
Strohmeier.
FS Aps = S 8876 [3776].
FT Aps = S 8878 [3776].
FU Aps = S 8943 [3776].
FV Aps = HV 8899 [4454] = 106.1932 =
= P 1100 = КЗП 2719.
FW Aps = HV 8953 [4454] = 107.1932 =
= P 1119 = КЗП 2809.
FX Aps = S 5613 [4001] = BV 963 [5234] =
= КЗП 7504.
9413 FY Aps = BV 1119 [5502].
EK Aqr = $23^h34^m04^s - 09°42'.7$ [5503].
EL Aqr = BD−8°6189 (9.2) = 261.1932
[5148, 5504] = P2413 = КЗП 5790
[4054].
V1181 Aql = S 4355 [0085] = КЗП 4369.
V1182 Aql = BD + 9°3928 (8.5) = HD
175514 (B0) [5505] = СПЗ 1572.
V1183 Aql = S 4375 [0085] = КЗП 4455.
V1184 Aql = S 4378 [0085] = КЗП 4478.
V1185 Aql = S 9040 [3776].
V1186 Aql = S 9041 [3776].
V1187 Aql = S 9042 [3776].
V1188 Aql = S 9398 [3910].
V1189 Aql = S 10521 [5506].
V1190 Aql = СПЗ 1617 [5507].
V1191 Aql = СПЗ 1618 [5507].
V1192 Aql = S 9403 [3910].
V1193 Aql = S 10525 [5506].
V1194 Aql = СПЗ 1620 [5507].
V1195 Aql = S 9404 [3910].
V1196 Aql = S 10527 [5506].
V1197 Aql = S 9405 [3910].
V1198 Aql = S 10529 [5506].
V1199 Aql = S 10530 [5506].
V1200 Aql = S 4387 [0085] = КЗП 4578.
V1201 Aql = S 9407 [3910].
V1202 Aql = S 10534 [5506].
V1203 Aql = S 10536 [5506].
V1204 Aql = S 10539 [5506]. Following
component of a close pair.
V1205 Aql = S 4390 [0085] = КЗП 4607.
V1206 Aql = S 10542 [5506].
V1207 Aql = S 10544 [5506].
V1208 Aql = 28 Aql = HR 7331 [5500] =
= BD + 12°3879 (5.5) = HD
181333 (F0) = GC 26654 (5.42).
V1209 Aql = S 10546 [5506].
V1210 Aql = S 9413 [3910].
V1211 Aql = S 10548 [5506].
V1212 Aql = S 10549 [5506].
V1213 Aql = Ross 308 [2604] = P1779 =
= КЗП 4629.
V1214 Aql = S 10551 [5506].
V1215 Aql = S 9415 [3910].
V1216 Aql = S 10553 [5506].
V1217 Aql = СПЗ 1621 [5507].
V1218 Aql = S 9416 [3910].
V1219 Aql = СПЗ 1622 [5507].
V1220 Aql = S 10555 [5506].
V1221 Aql = S 10556 [5506].
V1222 Aql = S 9419 [3910].
V1223 Aql = S 9420 [3910]. Near V361 Aql.
V1224 Aql = S 10560 [5506].
V1225 Aql = S 9421 [3910].
V1226 Aql = S 9422 [3910].
V1227 Aql = S 10562 [5506].
V1228 Aql = S 10561 [5506].

V1229 Aql = Nova Aql 1970 [5508]. *Honda.*
V1230 Aql = S 10565 [5506].
V1231 Aql = C 156 [4465] = S 9425 [3910] = = КЗП 3159.
V1232 Aql = S 9427 [3910].
V1233 Aql = S 10574 [5506].
V1234 Aql = S 10541 [5506].
V1235 Aql = S 10577 [5506].
V1236 Aql = S 4406 [0085] = B 67 [4465] = = КЗП 4681.
V1237 Aql = S 9935 [3903].
V1238 Aql = S 10580 [5506].
V1239 Aql = S 10581 [5506].
V1240 Aql = S 10582 [5506].
V1241 Aql = B 5 [4465] = S 9430 [3910] = = КЗП 8176.
V1242 Aql = S 9431 [3910].
V1243 Aql = S 9433 [3910].
V1244 Aql = S 10584 [5506].
V1245 Aql = S 9435 [3910].
V1246 Aql = СПЗ 1624 [5507].
V1247 Aql = S 9437 [3910].
V1248 Aql = S 4412 [0085] = КЗП 4701.
V1249 Aql = S 10586 [5506].
V1250 Aql = S 9438 [3910].
V1251 Aql = S 9936 [3903].
V1252 Aql = S 9439 [3910].
V1253 Aql = S 10591 [5506].
V1254 Aql = S 10593 [5506].
V1255 Aql = S 9937 [3903].
V1256 Aql = S 9441 [3910].
V1257 Aql = S 10595 [5506].
V1258 Aql = S 10599 [5506].
V1259 Aql = S 9445 [3910].
V1260 Aql = S 9444 [3910].
V1261 Aql = BD + 6°4199 (8.9) = HD 184542 (K2) = DO 5919 (M4) = = S 9446 [3910].
V1262 Aql = СПЗ 1625 [5507].
V1263 Aql = S 9447 [3910]. Near V383 Aql.
V1264 Aql = S 9448 [3910]. Near V990 Aql.
V1265 Aql = S 9449 [3910].
V1266 Aql = S 9450 [3910].
V1267 Aql = S 9451 [3910].
V1268 Aql = S 10602 [5506].
V1269 Aql = S 10601 [5506]. Preceding component of a close pair.
V1270 Aql = S 10603 [5506].
V1271 Aql = S 10605 [5506].
V1272 Aql = S 10606 [5506].
V1273 Aql = S 10608 [5506].
V1274 Aql = S 9452 [3910].
V1275 Aql = S 10610 [5506].
V1276 Aql = S 10611 [5506].
V1277 Aql = S 10613 [5506].
V1278 Aql = S 10614 [5506].
V1279 Aql = BD + 2°3961 (9.2) = HD 185806 (Mb) = DO 6034 (M5) = = S 9938 [3903].
V1280 Aql = S 9461 [3910].
V1281 Aql = S 9939 [3903].
V1282 Aql = S 9464 [3910].
V1283 Aql = S 9465 [3910].
V1284 Aql = S 10027 [3903].
V609 Ara = HV 8940 = 448.1935 [4194] = = P 4115 = КЗП 2787.
V610 Ara = CoD − 57°6594 (8.6) = CPD − 57°8150 (8.8) = HD 151697 (F0) = = S 5931 [4001] = BV 1259 = = КЗП 7496.
V611 Ara = S 5949 [4001] = КЗП 7510.
V612 Ara = S 6071 [4001] = КЗП 7581.
V613 Ara = S8778 [3776]. South-following component of a close pair; np-component is HV 7986 = КЗП 3734.
TZ Ari = G3 − 33 [5509].
UU Ari = 26 Ari = HR 729 [5500] = BD + 19°365 (6.4) = HD 15550 (F0) = = GC 3003 (6.14).

UV Ari = 38 Ari = HR 812 [5510, 5511] = BD+11°377 (5.2) = HD 17093 (A3) = GC 3308 (5.16).
UW Ari = 53 Ari [5512] = HR 938 = BD + 17°493 (6.7) = HD 19374 (B3) = GC 3728 (6.09) = Zi 176 = K3П 100259.
LY Aur = BD+35°1137 (6.6) [5513] = HD 35921 (B5) = GC 6767 (6.71) = ADS 4072 A.
LZ Aur = S 9184 [3910]. Near HH Aur.
MM Aur = S 9185 [3910].
MN Aur = Wr 182 [5514].
MO Aur = S 10188 [5515].
MP Aur = S 10189 [5515].
MQ Aur = S 9188 [3910].
MR Aur = S 10190 [5515].
MS Aur = S 9189 [3910].
MT Aur = S 10193 [5515].
MU Aur = S 10194 [5515].
MV Aur = S 10195 [5515].
MW Aur = Wr 190 [5516].
MX Aur = S 9596 [3905].
BV Boo = S 8501 [4341].
BW Boo = BD +36°2509 (6.5) [5517] = HD 128661 (A0) = GC 19708 (6.97).
X Cae = HR 1653 [4456, 5518] = CoD −35°2090 (6.5) = CPD −35°587 (6.7) = HD 32846 (F0) = GC 6214 (6.26) = Zi 348 = K3П 100444.
AS Cnc = Wr 105 [4336] = K3П 6632.
AT Cnc = GR 151 [5519].
AU Cnc = No.1 (Praesepe) [3924].
AV Cnc = No.2 (Praesepe) [3924].
AW Cnc = No.8 (Praesepe) [5520]. *Haro, Chavira.*
AX Cnc = No.3 (Praesepe) [3924].
AY Cnc = No.1 [5521].
AZ Cnc = No.4 (Praesepe) [3924].
BB Cnc = No.9 (Praesepe) [5520]. *Haro, Chavira.*
BC Cnc = No.10 (Praesepe) [5520]. *Haro, Chavira.*
BD Cnc = No.2 [5521].
BE Cnc = No.5 (Praesepe) [3924].
BF Cnc = S 10229 [5515].
BG Cnc = No.6 (Praesepe) [3924].
BH Cnc = No.7 (Praesepe) [3924]. Close binary.
BI Cnc = 49 Cnc [4170] = HR 3465 = BD + 10°1864 (6.0) = HD 74521 (A0p) = GC 12029 (5.58) = K3П 6657.
BK Cnc = No.11 (Praesepe) [5520]. *Haro, Chavira.*
FG CMa = S 10231 [5515].
FH CMa = CoD −30°3329 (9.4) = S 4869 [0085] = K3П 797.
FI CMa = S 10234 [5515].
FK CMa = S 10235 [5515].
FL CMa = S 10236 [5515].
FM CMa = BD −12°1777 (7.3) [5522] = HD 53756 (B5).
FN CMa = HR 2678 = BD −11°1790 (5.8) [5522] = HD 53974 (B3) = GC 9389 (5.28).
FO CMa = S 10239 [5515].
FP CMa = S 10240 [5515].
AV CMi = S 10225 [5515].
AW CMi = S 10226 [5515].
AX CMi = S 10227 [5515].
AY CMi = S 10228 [5515].
QQ Car = CPD −57°1705 (10.1) = BV 688 [4665].

QR Car = CoD − 66°789 (9.5) = CPD − 66°1108 (9.0) = HD 309818 (A3) = S 6276 [4001] = BV 697 [4665] = КЗП 6752.

QS Car = CoD − 70°728 (9.2) = CPD − 70°1138 (9.0) = HD 91908 (G) = BV 719 [4655].

QT Car = BV 1063 [5523].

QU Car = CoD − 67°1010 (10.0) = CPD − 67°1645 (9.4) = HD 310376 (A)

31 [5524].

V445 Cas = Wr 172 [5525].

V446 Cas = BD + 61°128 (8.7) = HD 3223 (Ma) = DO 23550 (M6) = Wr 56 [4067] = КЗП 5862.

V447 Cas = Wr 176 [5526].

V448 Cas = S 9135 [3910].

V449 Cas = S 10448 [5527].

V450 Cas = 58 [5528] = S 10450 [5527].

V451 Cas = BD + 58°127 (8.8) = HD 4949 (Ma) = DO 23844 (M5) = Wr 173 [5525].

V452 Cas = S 10453 [5527].

V453 Cas = S 10458 [5527].

V454 Cas = S 10461 [5527].

V455 Cas = S 9138 [3910].

V456 Cas = S 8456 [4341].

V457 Cas = S 9141 [3910].

V458 Cas = S 10465 [5527].

V459 Cas = BV 5 [0174] = КЗП 5894. *Strohmeier.*

V460 Cas = S 10467 [5527].

V461 Cas = S 9492 [3905].

V462 Cas = S 10468 [5527].

V463 Cas = S 9143 [3910].

V464 Cas = S 10469 [5527].

V465 Cas = BD + 57°237 (7.0) = HD 7733 (Mb) = GC 1563 (6.75) = DO 24198 (M5) = BV 302 [4015] = Wr 163 [3980] = КЗП 5905.

V466 Cas = BD + 57°258 (8.8) = HD 236697 (M) = DO 24228 (M1) = Wr 53 [4067] = КЗП 5911.

V467 Cas = S 8457 [4341].

V468 Cas = S 10473 [5527].

V469 Cas = S 10474 [5527]

V470 Cas = S 8459 [4341].

V471 Cas = S 9145 [3910].

V472 Cas = S 8460 [4341].

V473 Cas = S 8461 [4341].

V474 Cas = S 10478 [5527].

V475 Cas = S 9149 [3910].

V476 Cas = S 9150 [3910].

V477 Cas = S 10480 [5527].

V478 Cas = S 10481 [5527].

V479 Cas = S 10482 [5527].

V480 Cas = S 9494 [3905].

V481 Cas = S 9495 [3905].

V482 Cas = BD + 60°541 (7.8) [5522] = HD 16429 (F0) = GC 3189 (7.8).

V483 Cas = S 9531 [3905].

V484 Cas = S 10110 [3903].

V485 Cas = 665.1936 [0122] = H 18 [5529] = P 5812 = КЗП 5826.

V746 Cen = CoD − 32°8937 (9.3) = CPD − 32°3303 (9.8) = BV 505 [4371]. Near V467 Cen.

V747 Cen = CoD − 44°8789 (9.7) = CPD − 44°6453 (9.2) = HD 118695 (A5) = S 4973 [0085] = BV 845 = КЗП 2049.

V748 Cen = CoD − 32°10517 (9.9) = S 5003 [0085] = КЗП 2229.

V749 Cen = S 7622 [4021] = КЗП 7160.

HR Cep = $00^h01^m58^s.8 + 66°39'17''$, 1900.0 [5529].

HS Cep = СПЗ 1601 [5530].
HT Cep = СПЗ 1602 [5530].
HU Cep = 1 [5531] = СПЗ 1698.
HV Cep = СПЗ 1603 [5530].
HW Cep = 2 [5531] = СПЗ 1699.
HX Cep = СПЗ 1604 [5530].
HY Cep = СПЗ 1605 [5530].
HZ Cep = S3 [3527] = 3 [5531] = СПЗ 1700 = = КЗП 103037.
II Cep = СПЗ 1606 [5530].
IK Cep = S 4571 [0085] = КЗП 5482.
IL Cep = BD +61°2361 (9.0) = HD 216629 (B) [5522].
IM Cep = S 4604 [0085] = КЗП 5687.
YY Cet = BD−18°349 (9.2) = BV 795 [5196].
BX Cha = HV 8357 [4453] = 150.1933 = = BV 1066 [5523] = P 732 = = КЗП 1730.
BY Cha = S 9022 [3776].
BI Cir = S 8877 [3776].
BK Cir = S 8879 [3776].
BL Cir = S 8889 [3776].
BM Cir = S 8891 [3776].
SU Col = CoD−34°2083 (9.9) = S 4844 [0085] = BV1196 [5532] = КЗП 505.
SV Col = BV 1194 [5532].
FM Com = HR 4684 [5533] = BD +26°2326 (6.6) = HD 107131 (A3) = = GC 16795 (6.39).
FN Com = S 8058 [4341].
FO Com = No. 4 (Coma) [5520]. *Haro, Chavira.*
FP Com = 1 [5534] = КЗП 6915.
FQ Com = $13^{h}00^{m}.3+31^{\circ}33'$; 1950.0 [5535] = 44 [3950].
FR Com = S 8071 [4341].
FS Com = 40 Com [5536, 1371, 4513] = = HR 4949 = BD+23°2538 (5.8) = = HD 113866 (Mb) = DO 14692 (M5) = = GC 17769 (5.90) = 33.1911 = = Zi 981 = КЗП 101356.
V654 CrA = S 8747 [3776].
V655 CrA = Nova CrA 1967 [5537].
RV Crt = BD−19°3231 (9.0) = CPD −19°4811 (9.2) = HD 98412 (F8) = = BV 442 [4670].
BG Cru = 35 Cru = HR 4768 = CoD −58°4603 (6.3) = CPD−58°4344 (7.1) = = HD 108968 (F8p) = GC 17065 (5.44) = = BV 476 [4362, 5538].
V1253 Cyg = S 9359 [3910].
V1254 Cyg = 96.1906 [4815] = Zi 1677 = = КЗП 4640.
V1255 Cyg = СПЗ 1520 [5539].
V1256 Cyg = VV 228 [5540].
V1257 Cyg = VV 211 [5541].
V1258 Cyg = VV 229 [5540].
V1259 Cyg = VV 230 [5540].
V1260 Cyg = СПЗ 1524 [5539].
V1261 Cyg = VV 231 [5540].
V1262 Cyg = VV 232 [5540].
V1263 Cyg = S 9677 [3905].
V1264 Cyg = BD+43°3290 (6.8) [4170] = = HD 184905 (A0p) = GC 27072 (6.58) = КЗП 8214.
V1265 Cyg = VV 212 [5541].
V1266 Cyg = VV 201 [5353].
V1267 Cyg = СПЗ 1528 [5539].
V1268 Cyg = VV 213 [5541].
V1269 Cyg = VV 214 [5541].
V1270 Cyg = VV 252 [5543].
V1271 Cyg = VV 215 [5541].
V1272 Cyg = VV 216 [5541].

V1273 Cyg = VV 253 [5543].
V1274 Cyg = VV 202 [5353].
V1275 Cyg = VV 203 [5353].
V1276 Cyg = HR 7501 [5500] = BD + 28°3447 (7.2) = HD 186357 (F0) = = GC 27291 (6.44).
V1277 Cyg = VV 204 [5353].
V1278 Cyg = VV 205 [5353].
V1279 Cyg = 29°284 [4732] = VV 217 [5541] = = КЗП 8265.
V1280 Cyg = VV 206 [5353].
V1281 Cyg = VV 254 [5543].
V1282 Cyg = VV 208 [5353].
V1283 Cyg = VV 218 [5541].
V1284 Cyg = VV 209 [5353].
V1285 Cyg = VV 255 [5543].
V1286 Cyg = 29°377 [4732] = VV 219 [5541] = КЗП 8282.
V1287 Cyg = VV 242 [5543].
V1288 Cyg = VV 235 [5542].
V1289 Cyg = VV 236 [5542].
V1290 Cyg = VV 220 [5541].
V1291 Cyg = VV 237 [5542].
V1292 Cyg = VV 243 [5543].
V1293 Cyg = VV 238 [5542].
V1294 Cyg = 9 [4429] = КЗП 8324.
V1295 Cyg = VV 244 [5543].
V1296 Cyg = VV 239 [5542].
V1297 Cyg = VV 245 [5543].
V1298 Cyg = VV 240 [5542].
V1299 Cyg = 33 [4429] = VV 246 [5543] = = КЗП 8384.
V1300 Cyg = 24 [4429] = VV 247 [5543] = = КЗП 8387.
V1301 Cyg = 26 [4429] = VV 249 [5543] = = КЗП 8396.
V1302 Cyg = VV 257 [5543].
V1303 Cyg = VV 250 [5543].
V1304 Cyg = VV 258 [5543].
V1305 Cyg = 515.1936 [4475] = P 5257 = = КЗП 5016.
V1306 Cyg = GR 131 [5544].
V1307 Cyg = GR 132 [5544].
V1308 Cyg = GR 133 [5544] = VV 259 [5543].
V1309 Cyg = GR 134 [5544].
V1310 Cyg = GR 135 [5544].
V1311 Cyg = GR 136 [5544].
V1312 Cyg = GR 137 [5544] = VV 260 [5543].
V1313 Cyg = GR 138 [5544].
V1314 Cyg = GR 139 [5544] = VV 261 [5543].
V1315 Cyg = GR 140 [5544] = VV 262 [5543].
V1316 Cyg = GR 141 [5544].
V1317 Cyg = GR 142 [5544].
V1318 Cyg = GR 143 [5544].
V1319 Cyg = GR 144 [5544].
V1320 Cyg = GR 145 [5544].
V1321 Cyg = GR 147 [5544].
V1322 Cyg = MWC 344 [5545] = BD + 38°4062 (9.4) = HD 229221 (B) = = СПЗ 1672. In the [5545] erroneously printed as MWC 334.
V1323 Cyg = GR 148 [5544].
V1324 Cyg = GR 149 [5544].
V1325 Cyg = GR 150 [5544].
V1326 Cyg = 33.1934 [5158] = P 5433 = = КЗП 5226.
V1327 Cyg = S 9078 [3776].
V1328 Cyg = S 9098 [3776].
V1329 Cyg = НВV 475 [5546].
V1330 Cyg = Nova Cyg 1970 [5547].
V1331 Cyg = LkHα 120 [5548] = СПЗ 1701.
V1332 Cyg = S 8383 [4341].
V1333 Cyg = S 9126 [3776].

V1334 Cyg = HR 8157 [5549] = BD + 37°4271 (6.2) = HD 203156 (F2) = GC 29847 (5.83) = = ADS 14859 (6.6, 6.6; p = 0".3). It is not known which of the components varies.

V1335 Cyg = BD + 45°3503 (9.4) [5550] = = DO 39465 (M0) = Zi 2005 = = КЗП 5402.

V1336 Cyg = S 8388 [4341].

V1337 Cyg = S 10090 [3903].

V1338 Cyg = Ross 122 [2782] = P 2298 = = КЗП 5440.

V1339 Cyg = HR 8298 = BD + 45°3637 (6.2) [5551] = HD 206632 (Mb) = DO 39966 (M6) = GC 30390 (6.47) = = Zi 2038 = КЗП 102121.

V1340 Cyg = S 8410 [4341].

V1341 Cyg = Blue object near Cyg X–2 [5552].

V1342 Cyg = S 9695 [3905].

HU Del = G 24–16 [5509].

HV Del = S 9687 [3905].

HW Del = S 8296 [4341].

HX Del = S 9688 [3905].

HY Del = S 8301 [4341].

HZ Del = S 9689 [3905].

II Del = S 9690 [3905].

IK Del = S 9691 [3905].

γ Dor = HR 1338 [4970] = CoD – 51°1066 (4.4) = CPD – 51°524 (5.0) = HD 27290 (F5) = = GC 5179 (4.36) = КЗП 6101.

CK Dra = S 7578 [5553] = КЗП 7211.

CL Dra = HR 5960 [5500] = BD + 55°1793 (5.1) = HD 143466 (A5) = = GC 21467 (4.96).

CM Dra = LP 101–15 [5554].

CN Dra = HR 7563 [5500] = BD + 68°1082 (5.4) = HD 187764 (F0) = = GC 27430 (6.35).

SV Equ = BD + 5°4655 (9.0) [5555] = HD 199465 (A0).

SW Equ = СПЗ 1428 [4354].

CS Eri = CoD – 43°798 (8.9) = CPD – 43°273 (8.3) = HD 16456 (A2) = = BV 606 [4350].

CT Eri = CoD – 33°1755 (9.0) = CPD – 33°506 (9.0) = BV 453 [4362].

LN Gem = S 9191 [3910].

LO Gem = S 10196 [5515].

LP Gem = S 10197 [5515].

LQ Gem = S 9192 [3910].

LR Gem = BD + 22°1243 (8.5) = HD 43078 (B0) [5522].

LS Gem = S 10503 [5527].

LT Gem = BD + 23°1286 (9.1) = HD 254699 (B5) [5522].

LU Gem = BD + 23°1300 (7.3) = HD 43818 (B0) [5522] = GC 8104 (7.03).

LV Gem = S 10204 [5515].

LW Gem = S 10205 [5515].

LX Gem = S 10207 [5515].

LY Gem = S 10208 [5515].

LZ Gem = S 10209 [5515].

MM Gem = S 10210 [5515].

MN Gem = S 10211 [5515].

MO Gem = S 10212 [5515].

MP Gem = S 7957 [4065] = КЗП 6502.

MQ Gem = S 10214 [5515].

MR Gem = S 9209 [3910].

MS Gem = S 10217 [5515].

MT Gem = S 10218 [5515].

MU Gem = S 10219 [5515].

MV Gem = S 10220 [5515].

MW Gem = S 10221 [5515].
MX Gem = S 10222 [5515].
MY Gem = S 10377 [5556].
MZ Gem = S 10223 [5515].
NN Gem = S 10224 [5515].
NO Gem = S 9212 [3910].
AR Gru = CoD $-38°$ 15133 (9.9) = S 5145 [0085] = BV 1223 [5557] = = КЗП 5575.
V586 Her = S 10292 [5515].
V587 Her = S 10378 [5558].
V588 Her = S 10388 [5558].
V589 Her = S 10296 [5515].
V590 Her = S 10277 [5515].
V591 Her = S 10392 [5558].
V592 Her = Nova Her 1968 = S 10376 [5559].
V593 Her = S 10300 [5515].
V594 Her = S 10302 [5515].
V595 Her = S 10301 [5515].
V596 Her = S 10280 [5515].
V597 Her = S 10281 [5515].
V598 Her = S 10304 [5515].
V599 Her = S 10402 [5558].
V600 Her = BD + 14° 3086 (6.8) = HD 149881 (B2) [2602, 5522] = = GC 22342 (6.59) = КЗП 7409.
V601 Her = S 10306 [5515].
V602 Her = S 10284 [5515].
V603 Her = S 10308 [5515].
V604 Her = S 10307 [5515].
V605 Her = S 10313 [5515].
V606 Her = S 10409 [5558].
V607 Her = S 10309 [5515].
V608 Her = S 10310 [5515].
V609 Her = S 10411 [5558].
V610 Her = S 10311 [5515].
V611 Her = S 10312 [5515].
V612 Her = S 10316 [5515].
V613 Her = S 10317 [5515].
V614 Her = S 10414 [5558].
V615 Her = S 10318 [5515].
V616 Her = S 10415 [5558].
V617 Her = S 10286 [5515].
V618 Her = S 10287 [5515].
V619 Her = S 10289 [5515].
V620 Her = 63 Her [5500] = HR 6391 (6.19) = = BD + 24° 3140 (6.2) = HD 155514 (A3) = GC 23191 (6.19).
V621 Her = S 10332 [5515].
V622 Her = S 9816 [3903].
V623 Her = S 9819 [3903].
V624 Her = HR 6611 [5560] = BD + 14° 3329 (6.0) = HD 161321 (A3p) = GC 24075 (6.13).
V625 Her = S 10342 [5515].
V626 Her = S 10350 [5515].
V627 Her = S 10416 [5515].
V628 Her = S 10417 [5558].
V629 Her = S 10419 [5558].
V630 Her = S 10420 [5558].
V631 Her = S 10422 [5558].
V632 Her = $18^h 17^m 33^s + 24° 32'$; 1950.0 [5561]. *Pfau, Dorschner, Friedemann.*
V633 Her = S 4325 [0085] = КЗП 4203.
SZ Hor = CPD $-56°$495 (10.6) = S 4812 [0085] = BV 991 [5562] = КЗП 275.
TT Hor = CoD $-46°$ 1038 (9.9) = CPD $-46°$322 (9.8) = S 4815 [0085] = = BV 993 [5562] = КЗП 307.
HT Hya = BD + 2° 2117 (9.5) = DO 2672 (var; M3) = S 9607 [3905] = = КЗП 101018.
AR Ind = S 6894 [4001] = КЗП 8523.
AS Ind = S 6897 [4001] = КЗП 8527.

AT Ind = S 6907 [4001] = КЗП 8547.
AU Ind = S 6914 [4001] = КЗП 8562.
HK Lac = BD + 46°3572 (6.5) [5563] = = HD 209813(K0) = GC30890(6.52).
HL Lac = S 10095 [3903].
CN Leo = Wolf 359 [2799] = КЗП 6806.
CO Leo = $11^h12^m.4$ +26°10'; [5564].
CP Leo = S 8016 [4341].
CQ Leo = S 8020 [4341].
CR Leo = S 8030 [4341].
CS Leo = S 8034 [4341].
CT Leo = S 8036 [4341].
CU Leo = S 8037 [4341].
CV Leo = BD + 21°2373 (8.7) = DO 14498 (K5) = S 8038 [4341].
RW LMi = Star 6 (CIT 6) [3586] = DO 14136 (M7).
FV Lib = СПЗ 1612 [5565].
GI Lup = HV 8663 [4194] = 393.1935 = = BV 864 [5566] = P 3872 = = КЗП 2254. Coordinates given in [5566] are wrong.
V386 Lyr = S 10426 [5558].
V387 Lyr = S 10428 [5558].
V388 Lyr = S 10430 [5558].
V389 Lyr = S 10432 [5558].
V390 Lyr = S 10433 [5558].
V391 Lyr = S 10436 [5558].
V392 Lyr = S 9312 [3910].
V393 Lyr = S 10438 [5558].
V394 Lyr = S 10439 [5558].
V395 Lyr = S 10445 [5558].
V396 Lyr = S 9346 [3910].
V397 Lyr = СПЗ 1510 [5539].
V398 Lyr = BD + 38°3445 (6.9) = HD 178770 (Mb) [5567] = DO 17453 (M6) = GC 26377 (7.55).
V399 Lyr = VV 234 [5542].
V400 Lyr = VV 223 [5540].
V401 Lyr = VV 224 [5540].
V402 Lyr = VV 233 [5542].
V403 Lyr = VV 225 [5540].
V404 Lyr = VV 226 [5540].
V405 Lyr = VV 227 [5540].
V538 Mon = S 10198 [5515].
V539 Mon = 1 [5568].
V540 Mon = СПЗ 1533 [5197].
V541 Mon = СПЗ 1535 [5197].
V542 Mon = СПЗ 1536 [5197].
V543 Mon = 2 [5568].
V544 Mon = 3 [5568].
V545 Mon = 4 [5568].
V546 Mon = 5 [5568].
V547 Mon = S [5568].
V548 Mon = 6 [5568] = S 10199 [5515].
V549 Mon = 7 [5568].
V550 Mon = 8 [5568]. Southern component of a close binary ($\rho = 6''$). Companion $17^m.3$.
V551 Mon = 9 [5568].
V552 Mon = 10 [5568].
V553 Mon = 11 [5568].
V554 Mon = 12 [5568].
V555 Mon = 13 [5568].
V556 Mon = 14 [5568].
V557 Mon = 15 [5568].
V558 Mon = S 10201 [5515].
V559 Mon = S 10206 [5515].
V560 Mon = 66.1936 [4475] = P 2903 = = КЗП 855.
V561 Mon = S 10203 [5515].
V562 Mon = S 10213 [5515].
V563 Mon = S 10215 [5515].
V564 Mon = S 10216 [5515].
V565 Mon = S 10245 [5515].
V566 Mon = 13.1934 [5158] = P 2960 = = КЗП 943.

V567 Mon = S 10246 [5515].
V568 Mon = S 10247 [5515].
V569 Mon = HR 2670 = BD − 10°1862 (7.0) = HD 53755 (B3) [5522] = GC 9371 (6.38).
V570 Mon = S 10248 [5515].
V571 Mon = 21 Mon = HR 2707 [5569] = BD−0°1634 (6.4) = HD 55057 (F0) = GC 9505 (5.40).
V572 Mon = S 10249 [5515].
V573 Mon = S 10252 [5515].
V574 Mon = S 10257 [5515].
V575 Mon = S 10265 [5515].
V576 Mon = S 10268 [5515].
DO Mus = BV 863 [5566].
DP Mus = S 8967 [3776].
DQ Mus = S 8972 [3776].
DR Mus = S 8973 [3776].
DS Mus = S 8985 [3776].
DT Mus = S 8991 [3776].
DU Mus = S 8993 [3776].
DV Mus = S 9002 [3776].
DW Mus = 1 [3934].
DX Mus = S 9015 [3776].
DY Mus = S 9016 [3776].
BH Oct = S 6929 [4001] = КЗП 7923.
BI Oct = S 6985 [4001] = КЗП 8195.
BK Oct = S 6991 [4001] = КЗП 8207.
BL Oct = S 7033 [4001] = КЗП 8348.
BM Oct = BV 977 [5234].
V1119 Oph = HV 10522 [5056] = КЗП 2577.
V1120 Oph = HV 10527 [5056] = КЗП 2590.
V1121 Oph = AS 209 [5548] = СПЗ 1702.
V1122 Oph = S 10320 [5515].
V1123 Oph = S 10321 [5515].
V1124 Oph = 1 [5570].
V1125 Oph = S 10322 [5515].
V1126 Oph = 2 [5570].
V1127 Oph = 3 [5570].
V1128 Oph = 4 [5570].
V1129 Oph = 5 [5570].
V1130 Oph = S 10323 [5515].
V1131 Oph = 8 [5570].
V1132 Oph = 7 [5570].
V1133 Oph = 6 [5570].
V1134 Oph = 10 [5570].
V1135 Oph = 9 [5570].
V1136 Oph = 11 [5570].
V1137 Oph = 12 [5570].
V1138 Oph = 14 [5570].
V1139 Oph = 13 [5570].
V1140 Oph = СПЗ 412 [4931] = 16 [5570] = P4163 = КЗП 2857.
V1141 Oph = 15 [5570].
V1142 Oph = 17 [5570].
V1143 Oph = 18 [5570].
V1144 Oph = 19 [5570].
V1145 Oph = 21 [5570].
V1146 Oph = 20 [5570].
V1147 Oph = 23 [5570].
V1148 Oph = 22 [5570].
V1149 Oph = СПЗ 413 [4931] = 24 [5570] = P4167 = КЗП 2863.
V1150 Oph = 25 [5570].
V1151 Oph = 26 [5570].
V1152 Oph = 27 [5570].
V1153 Oph = 29 [5570].
V1154 Oph = 30 [5570].
V1155 Oph = 28 [5570].
V1156 Oph = 31 [5570].
V1157 Oph = 32 [5570].
V1158 Oph = 33 [5570].
V1159 Oph = 34 [5570].
V1160 Oph = 35 [5570].
V1161 Oph = 36 [5570].
V1162 Oph = 37 [5570].

V1163 Oph = 38 [5570].
V1164 Oph = 39 [5570].
V1165 Oph = 40 [5570].
V1166 Oph = 41 [5570].
V1167 Oph = 43 [5570].
V1168 Oph = 42 [5570].
V1169 Oph = 44 [5570].
V1170 Oph = HV 3913 [5571] = 46 [5570] = = P 1138 = КЗП 2873.
V1171 Oph = 45 [5570].
V1172 Oph = 47 [5570].
V1173 Oph = 48 [5570].
V1174 Oph = 50 [5570].
V1175 Oph = 51 [5570].
V1176 Oph = 49 [5570].
V1177 Oph = 56 [5570].
123 V1178 Oph = 57 [5570].
V1179 Oph = 52 [5570].
V1180 Oph = 54 [5570].
V1181 Oph = 55 [5570].
V1182 Oph = 53 [5570].
V1183 Oph = 58 [5570].
V1184 Oph = 60 [5570].
V1185 Oph = HV 8990 [4707] = 49.1937 = = 61 [5570] = P 4177 = = КЗП 2875.
V1186 Oph = 63 [5570].
V1187 Oph = 62 [5570].
V1188 Oph = 64 [5570].
V1189 Oph = 65 [5570].
V1190 Oph = 66 [5570].
V1191 Oph = 67 [5570].
V1192 Oph = 68 [5570].
V1193 Oph = HV 3915 [5571] = 69 [5570] = = P 1141 = КЗП 2882.
V1194 Oph = 70 [5570].
V1195 Oph = 71 [5570].
V1196 Oph = 72 [5570].
V1197 Oph = 73 [5570].
V1198 Oph = 74 [5570].
V1199 Oph = 75 [5570].
V1200 Oph = 76 [5570].
V1201 Oph = 78 [5570].
V1202 Oph = 77 [5570].
V1203 Oph = 80 [5570].
V1204 Oph = 83 [5570].
V1205 Oph = 81 [5570].
V1206 Oph = 79 [5570].
V1207 Oph = 82 [5570].
V1208 Oph = 85 [5570].
V1209 Oph = 87 [5570].
V1210 Oph = 84 [5570].
V1211 Oph = 86 [5570].
V1212 Oph = 88 [5570].
V1213 Oph = 89 [5570].
V1214 Oph = 90 [5570].
V1215 Oph = 92 [5570].
V1216 Oph = 91 [5570].
V1217 Oph = 93 [5570].
V1218 Oph = 94 [5570].
V1219 Oph = 95 [5570].
V1220 Oph = 97 [5570].
V1221 Oph = 100 [5570].
V1222 Oph = 96 [5570].
V1223 Oph = 101 [5570].
V1224 Oph = 98 [5570].
V1225 Oph = 99 [5570].
V1226 Oph = 104 [5570].
V1227 Oph = 102 [5570].
V1228 Oph = 103 [5570].
V1229 Oph = 105 [5570].
V1230 Oph = 107 [5570] Near КЗП 2891 = HV 3917.
V1231 Oph = 106 [5570].
V1232 Oph = 108 [5570].
V1233 Oph = 110 [5570].

V1234 Oph = 109 [5570].
V1235 Oph = 111 [5570].
V1236 Oph = 113 [5570].
V1237 Oph = 112 [5570].
V1238 Oph = 116 [5570].
V1239 Oph = 114 [5570].
V1240 Oph = 115 [5570].
V1241 Oph = 117 [5570].
V1242 Oph = 121 [5570].
V1243 Oph = 118 [5570].
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V1822 Oph = 722 [5570].
V1823 Oph = 721 [5570].
V1824 Oph = 717 [5570].
V1825 Oph = 723 [5570].
V1826 Oph = 719 [5570].
V1827 Oph = 720 [5570].
V1828 Oph = 718 [5570].
V1829 Oph = 726 [5570].
V1830 Oph = 725 [5570].
V1831 Oph = 727 [5570].
V1832 Oph = 729 [5570].
V1833 Oph = 730 [5570].
V1834 Oph = 731 [5570].
V1835 Oph = 728 [5570].
V1836 Oph = 734 [5570].Near КЗП 3077.
V1837 Oph = 733 [5570].
V1838 Oph = 735 [5570].
V1839 Oph = 732 [5570].
V1840 Oph = 736 [5570].
V1841 Oph = 737 [5570].
V1842 Oph = 739 [5570].
V1843 Oph = 738 [5570].
V1844 Oph = 740 [5570].
V1845 Oph = 741 [5570].
V1846 Oph = 742 [5570].
V1847 Oph = 743 [5570].
V1848 Oph = 745 [5570].
V1849 Oph = 746 [5570].
V1850 Oph = 744 [5570].
V1851 Oph = 747 [5570].
V1852 Oph = 748 [5570].
V1853 Oph = 750 [5570].
V1854 Oph = 768.1933 [5155] = P 1231 =
= КЗП 3082.
V1855 Oph = 749 [5570].
V1856 Oph = 752 [5570].
V1857 Oph = 754 [5570].
V1858 Oph = 751 [5570].
V1859 Oph = 753 [5570].
V1860 Oph = 755 [5570].
V1861 Oph = 756 [5570].
V1862 Oph = 758 [5570].
V1863 Oph = 761 [5570].
V1864 Oph = 757 [5570].
V1865 Oph = 760 [5570].
V1866 Oph = 762 [5570].
V1867 Oph = 759 [5570].
V1868 Oph = 763 [5570].
V1869 Oph = 765 [5570].
V1870 Oph = 766 [5570].
V1871 Oph = 768 [5570].
V1872 Oph = 769 [5570].
V1873 Oph = 770 [5570].
V1874 Oph = 767 [5570].
V1875 Oph = HV 3954 [5571] = 772
[5570] = P 1233 = КЗП 3095.
V1876 Oph = 776 [5570].
V1877 Oph = 771 [5570].
V1878 Oph = 778 [5570].
V1879 Oph = 779 [5570].
V1880 Oph = 774 [5570].
V1881 Oph = 777 [5570].
V1882 Oph = 775 [5570].
V1883 Oph = 780 [5570].
V1884 Oph = 783 [5570].

V1885 Oph = 781 [5570].
V1886 Oph = 787 [5570].
V1887 Oph = 782 [5570].
V1888 Oph = 784 [5570].
V1889 Oph = 785 [5570].
V1890 Oph = 788 [5570].
V1891 Oph = 789 [5570].
V1892 Oph = 791 [5570].
V1893 Oph = 792 [5570].
V1894 Oph = 793 [5570].
V1895 Oph = 794 [5570].
V1896 Oph = 796 [5570].
V1897 Oph = 795 [5570].
V1898 Oph = Ross 365 [1873] = 797 [5570] = P 1236 = КЗП 3103.
V1899 Oph = 798 [5570].
V1900 Oph = 801 [5570].
V1901 Oph = 803 [5570].
V1902 Oph = 800 [5570].
V1903 Oph = 799 [5570].
V1904 Oph = 802 [5570].
V1905 Oph = 806 [5570].
V1906 Oph = 807 [5570].
V1907 Oph = 804 [5570].
V1908 Oph = 805 [5570].
V1909 Oph = 808 [5570].
V1910 Oph = 809 [5570].
V1911 Oph = 810 [5570].
V1912 Oph = 811 [5570].
V1913 Oph = 814 [5570] Not far from КЗП 3108.
V1914 Oph = 812 [5570].
V1915 Oph = 813 [5570].
V1916 Oph = 817 [5570].
V1917 Oph = 816 [5570].
V1918 Oph = 818 [5570].
V1919 Oph = 821 [5570].
V1920 Oph = 819 [5570].
V1921 Oph = 820 [5570].
V1922 Oph = 822 [5570].
V1923 Oph = 823 [5570].
V1924 Oph = 824 [5570].
V1925 Oph = 825 [5570].
V1926 Oph = 829 [5570].
V1927 Oph = HV 3957 [5571] = 826 [5570] = P 1238 = КЗП 3112.
V1928 Oph = 828 [5570].
V1929 Oph = 827 [5570].
V1930 Oph = 830 [5570].
V1931 Oph = 832 [5570].
V1932 Oph = 831 [5570].
V1933 Oph = 834 [5570].
V1934 Oph = 833 [5570].
V1935 Oph = 836 [5570].
V1936 Oph = 835 [5570].
V1937 Oph = 839 [5570].
V1938 Oph = 837 [5570].
V1939 Oph = 841 [5570].
V1940 Oph = 838 [5570].
V1941 Oph = 840 [5570].
V1942 Oph = 842 [5570].
V1943 Oph = 843 [5570].
V1944 Oph = 845 [5570].
V1945 Oph = 849 [5570].
V1946 Oph = 844 [5570].
V1947 Oph = 847 [5570].
V1948 Oph = 850 [5570].
V1949 Oph = 848 [5570].
V1950 Oph = СПЗ 446 [4931] = 851 [5570] = P 4287 = КЗП 3121.
V1951 Oph = 852 [5570].
V1952 Oph = 854 [5570].
V1953 Oph = 853 [5570].
V1954 Oph = HV 9050 [4579] = 738.1936 = = 856 [5570] = P 4289 = = КЗП 3122.
V1955 Oph = 855 [5570].
V1956 Oph = 858 [5570].

V1957 Oph = 857 [5570].
V1958 Oph = 860 [5570].
V1959 Oph = 861 [5570].
V1960 Oph = 859 [5570].
V1961 Oph = 862 [5570].
V1962 Oph = 863 [5570].
V1963 Oph = 864 [5570].
V1964 Oph = 865 [5570].
V1965 Oph = 866 [5570].
V1966 Oph = 867 [5570].
V1967 Oph = 868 [5570].
V1968 Oph = 871 [5570].
V1969 Oph = 870 [5570].
V1970 Oph = 873 [5570].
V1971 Oph = 869 [5570].
V1972 Oph = 872 [5570].
V1973 Oph = 874 [5570].
V1974 Oph = 876 [5570].
V1975 Oph = 875 [5570].
V1976 Oph = 879 [5570].
V1977 Oph = 877 [5570].
V1978 Oph = 878 [5570].
V1979 Oph = 881 [5570].
V1980 Oph = 883 [5570].
V1981 Oph = 880 [5570].
V1982 Oph = 882 [5570].
V1983 Oph = 886 [5570].
V1984 Oph = 887 [5570].
V1985 Oph = 884 [5570].
V1986 Oph = 885 [5570].
V1987 Oph = 888 [5570].
V1988 Oph = 889 [5570].
V1989 Oph = 890 [5570].
V1990 Oph = 891 [5570].
V1991 Oph = 893 [5570].
V1992 Oph = 892 [5570].
V1993 Oph = 897 [5570].
V1994 Oph = 895 [5570].
V1995 Oph = 894 [5570].
V1996 Oph = 896 [5570].
V1997 Oph = 900 [5570].
V1998 Oph = СПЗ 448 [4931] = 899 = [5570] = P 4296 = КЗП 3143.
V1999 Oph = 898 [5570].
V2000 Oph = 901 [5570].
V2001 Oph = 902 [5570].
V2002 Oph = 903 [5570].
V2003 Oph = 904 [5570].
V2004 Oph = 905 [5570].
V2005 Oph = 906 [5570].
V2006 Oph = 908 [5570].
V2007 Oph = 911 [5570].
V2008 Oph = 907 [5570].
V2009 Oph = 909 [5570].
V2010 Oph = 910 [5570].
V2011 Oph = 912 [5570].
V2012 Oph = 914 [5570].
V2013 Oph = 913 [5570].
V2014 Oph = 915 [5570].
V2015 Oph = 917 [5570].
V2016 Oph = 918 [5570].
V2017 Oph = 921 [5570].
V2018 Oph = СПЗ 449 [4931] = 919 [5570] = P 4302 = КЗП 3149.
V2019 Oph = 920 [5570].
V2020 Oph = 922 [5570].
V2021 Oph = 923 [5570].
V2022 Oph = 924 [5570].
V2023 Oph = S 10339 [5515].
V2024 Oph = Nova Oph 1967 [5572].
V2025 Oph = S 10341 [5515].
V2026 Oph = S 10343 [5515].
V2027 Oph = S 10345 [5515].
V2028 Oph = S 10346 [5515].
V2029 Oph = S 9846 [3903].
V2030 Oph = S 10353 [5515].
V2031 Oph = S 10354 [5515].
V2032 Oph = S 9268 [3910].

V2033 Oph = S 10355 [5515].
V2034 Oph = S 9281 [3910].
V2035 Oph = S 10359 [5515].
V2036 Oph = S 10360 [5515].
V2037 Oph = S 10361 [5515].
V2038 Oph = S 10362 [5515].
V2039 Oph = S 9894 [3903].
V2040 Oph = S 4309 [0085] = КЗП 4124.
V2041 Oph = S 4315 [0085] = КЗП 4163.
V2042 Oph = S 4321 [0085] = КЗП 4192.
V2043 Oph = S 9919 [3903].
V2044 Oph = S 9924 [3903].
V674 Ori = S 10165 [5515].
V675 Ori = S 8005 [4065] = КЗП 6166.
V676 Ori = Flare 122 [5520]. *Haro, Chavira.*
V677 Ori = Flare 180 [5573].
V678 Ori = Flare 181 [5573].
V679 Ori = Flare 1 [3924].
V680 Ori = Flare 182 [5573].
V681 Ori = Flare 183 [5573].
V682 Ori = Flare 123 [5520]. *Haro, Chavira.*
V683 Ori = Flare 184 [5573].
V684 Ori = Flare 2 [3924].
V685 Ori = Flare 3 [3924].
V686 Ori = Flare 124 [5520]. *Haro, Chavira.*
V687 Ori = Flare 125 [5520]. *Haro, Chavira.*
V688 Ori = Flare 4 [3924].
V689 Ori = Flare 126 [5520]. *Haro, Chavira.*
V690 Ori = B3 [4073] = КЗП 6180 = Flare 5.
V691 Ori = Flare 127 [5520]. *Haro, Chavira.*
V692 Ori = Flare 128 [5520]. *Haro, Chavira.*
V693 Ori = Flare 185 [5573].
V694 Ori = Flare 129 [5520]. *Haro, Chavira.* Close to HO Ori.
V695 Ori = 1 [5574]. Close to UY Ori.
V696 Ori = 2 [5574].
V697 Ori = Flare 186 [5573].
V698 Ori = Flare 187 [5573].
V699 Ori = Flare 188 [5573].
V700 Ori = Flare 7 [3924]. Not far from HP Ori.
V701 Ori = Flare 8 [3924].
V702 Ori = Flare 189 [5573].
V703 Ori = Flare 9 [3924].
V704 Ori = Flare 190 [5573].
V705 Ori = П 987 = Flare 130 [5520]. *Haro, Chavira.*
V706 Ori = Flare 11 [3924].
V707 Ori = Flare 192 [5573].
V708 Ori = 3 [5574].
V709 Ori = Flare 131 [5520]. *Haro, Chavira.* Close to V466 Ori.
V710 Ori = Flare 132 [5520] = 4 [5574]. *Haro, Chavira.*
V711 Ori = Flare 133 [5520]. *Haro, Chavira.*
V712 Ori = П 1109 = Flare 193 [5573].
V713 Ori = Flare 13 [3924].
V714 Ori = Flare 15 [3924].
V715 Ori = П 1167 = Flare 194 [5573] = КЗП 100521.
V716 Ori = Flare 17 [3924].
V717 Ori = Flare 195 [5573].
V718 Ori = Flare 196 [5573].
V719 Ori = 108 [4923] = Flare 197 [5573] = П 1190 = КЗП 6195.
V720 Ori = П 1191 = Flare 134 [5520]. *Haro, Chavira.*
V721 Ori = D 1[4073] = Flare 18 [3924] = КЗП 6196.

V722 Ori = Flare I 35 [5520]. *Haro, Chavira.*
V723 Ori = Flare 19 [3924].
V724 Ori = П 1215 = Flare 198 [5573].
V725 Ori = Flare 199 [5573]. Near КЗП 6199.
V726 Ori = Flare 21 [3924].
V727 Ori = Flare 137 [5520]. *Haro, Chavira.*
V728 Ori = Flare 138 [5520] *Haro, Chavira.*
V729 Ori = П 1254 = 101 [4923] = Flare 201 [5573] = КЗП 6200.
V730 Ori = П 1255 = Flare 202 [5573].
V731 Ori = 48 [4923] = Flare 200 [5573] = = КЗП 6202.
V732 Ori = П 1274 = Flare 139 [5520]. *Haro, Chavira.*
V733 Ori = Flare 205 [5573].
V734 Ori = Flare 24 [3924].
V735 Ori = П 1305 = Brun 163 [4939] = = Flare 204 [5573] = КЗП 100529.
V736 Ori = Flare 140 [5520]. *Haro, Chavira.*
V737 Ori = 5 [5574].
V738 Ori = Flare 178 [5575].
V739 Ori = Flare 179 [5575].
V740 Ori = Flare 27 [3924].
V741 Ori = Flare 26 [3924].
V742 Ori = Flare 207 [5573].
V743 Ori = S 10175 [5515].
V744 Ori = П 1410 = Flare 141 [5520]. *Haro, Chavira.*
V745 Ori = Flare 28 [3924].
V746 Ori = П 1428 = Flare 209 [5573]. Near WZ Ori.
V747 Ori = Flare 29 [3924].
V748 Ori = Flare 30 [3924].
V749 Ori = П 1463 = Flare 31 [5520].
V750 Ori = П 1485 = Var. n. 1 [2857]. = = КЗП 6215 = Flare 34.
V751 Ori = П 1486 = Flare 210 [5573].
V752 Ori = Flare 33 [3924].
V753 Ori = Flare 142 [5520]. *Haro, Chavira.*
V754 Ori = П 1500 = Flare 211 [5573].
V755 Ori = П 1502 = Flare 143 [5520]. *Haro, Chavira.*
V756 Ori = Flare 212 [5573].
V757 Ori = F1 [4073] = Flare 35 = КЗП 6219.
V758 Ori = Flare 145 [5520]. *Haro, Chavira.*
V759 Ori = П 1524 = 142 [4923] = 4 [5576] = КЗП 6220.
V760 Ori = Flare 36 [3924].
V761 Ori = Flare 37 [3924].
V762 Ori = П 1548 = Zo–Se 242 [2847] = = Flare 213 [5573] = P 222 = = КЗП 100549.
V763 Ori = Flare 149 [5520]. *Haro, Chavira.*
V764 Ori = П 1571 = Flare 147 [5520].
V765 Ori = Flare 215 [5573].
V766 Ori = 222 [4923] = Flare 148 [5520] = КЗП 6227. *Haro, Chavira.*
V767 Ori = Flare 38 [3924].
V768 Ori = П 1584 = Flare 40 [3924].
V769 Ori = S 10177 [5515].
V770 Ori = Flare 41 [3924].
V771 Ori = П 1609 = Flare 219 [5573].
V772 Ori = 1 [5576]. Near V475 Ori.
V773 Ori = П 1611 = 12 [4923] = Flare 216 [5573] = КЗП 6232.

V774 Ori = П 1616 = 178 [4923] = Flare 218 [5573] = K3П 6234.
V775 Ori = Flare 150 [5520] *Haro, Chavira.*
V776 Ori = П 1643 = Var. n. 8 [4084] = Flare 43 = K3П 6236.
V777 Ori = Flare 220 [5573].
V778 Ori = Flare 44 [3924].
V779 Ori = Flare 52 [3924].
V780 Ori = П 1656 = Flare 50 [3924].
V781 Ori = Flare 48 [3924].
V782 Ori = Flare 46 [3924].
V783 Ori = Flare 53 [3924].
V784 Ori = Flare 221 [5573]. Near BX Ori.
V785 Ori = Flare 222 [5573].
V786 Ori = П 1714 = 2 [5576].
V787 Ori = П 1715 = Brun 485[a] [4926] = K3П 100566 = Flare 152 [5520]. *Haro, Chavira.*
V788 Ori = П 1741 = Flare 153 [5520]. *Haro, Chavira.*
V789 Ori = Flare 154 [5520]. *Haro, Chavira.*
V790 Ori = П 1790 = Flare 224 [5573]. Close to MQ Ori.
V791 Ori = П 1857 = Flare 155 [5520]. *Haro, Chavira.*
V792 Ori = Flare 156 [5520]. *Haro, Chavira.*
V793 Ori = П 1930 = 183 [4923] = Flare 226 [5573] = K3П 6259.
V794 Ori = F2 [4073] = 2 [3937] = K3П 6262.
V795 Ori = Flare 56 [3924].
V796 Ori = 25 [3937].
V797 Ori = П 2063 = Flare 227 [5573].
V798 Ori = 26 [3937].
V799 Ori = F 4 [4073] = K3П 6279.
V800 Ori = Flare 60 [3924].
V801 Ori = 158 [5520]. *Haro, Chavira.*
V802 Ori = 27 [3937] = Flare 61. Coordinates given in [3937] are wrong.
V803 Ori = П 2112 = Flare 159 [5520]. *Rosino.*
V804 Ori = Flare 59 [3924].
V805 Ori = Flare 229 [5573].
V806 Ori = Flare 228 [5573].
V807 Ori = Flare 160 [5520]. *Haro, Chavira.*
V808 Ori = E36 [4073] = Flare 65 [3924] = K3П 6294.
V809 Ori = S 10168 [5515].
V810 Ori = 28 [3937]. Coordinates given in [3937] are wrong.
V811 Ori = 29 [3937]. Coordinates given in [3937] are wrong.
V812 Ori = П 2228 = Flare 69 [3924].
V813 Ori = Flare 73 [3924].
V814 Ori = П 2236 = 30 [3937]. Coordinates given in [3937] are wrong.
V815 Ori = П 2252 = 3 [5576].
V816 Ori = Flare 75 [3924]. Near OU Ori.
V817 Ori = Flare 161 [5520]. *Haro, Chavira.*
V818 Ori = 7 [5574]. Near V393 Ori.
V819 Ori = 31 [3937]. Near AV Ori. Coordinates given in [3937] are wrong.
V820 Ori = D16 [4073] = Flare 81 = K3П 6310.
V821 Ori = Flare 84 [3924]. *Haro.*
V822 Ori = Flare 83 [3924] = 8 [5574].
V823 Ori = F9 [4073] = K3П 6314.
V824 Ori = 102 [4923] = K3П 6318 = Flare 162 [5520]. *Haro, Chavira.*
V825 Ori = 9 [5574]. Near BB Ori.

V826 Ori = Flare 87[3924]. *Haro.*
V827 Ori = П 2363 = Flare 89 [3924]. *Haro.*
V828 Ori = Flare 163 [5520]. *Haro, Chavira.*
V829 Ori = Flare 232 [5573].
V830 Ori = Flare 233 [5573].
V831 Ori = Flare 91 [3924].
V832 Ori = 213 [4923] = 32 [3937] = = K3П 6323. Coordinates given in [3937] are wrong.
V833 Ori = Flare 92 [3924, 5520].
V834 Ori = Flare 164 [5520]. *Haro, Chavira.*
V835 Ori = П 2394 = Flare 234 [5573].
V836 Ori = Flare 94 [3924].
V837 Ori = Flare 96 [3924].
V838 Ori = 33 [3937]. Coordinates given in [3937] are wrong.
V839 Ori = Flare 93 [3924].
V840 Ori = Flare 95 [3924].
V841 Ori = Flare 235 [5573].
V842 Ori = Flare 236 [5573].
V843 Ori = Flare 98 [3924].
V844 Ori = Flare 165 [5520]. *Rosino.*
V845 Ori = Flare 166 [5520]. *Haro, Chavira.*
V846 Ori = F14 [4073] = K3П 6331.
V847 Ori = Flare 237 [5573].
V848 Ori = 10 [5574].
V849 Ori = Flare 167 [5520]. *Haro, Chavira.*
V850 Ori = Flare 100 [3924].
V851 Ori = Flare 168 [5520]. *Haro, Chavira.*
V852 Ori = П 2449 = 80 [4923] = Flare 101 [3924] = K3П 6333.
V853 Ori = П 2450 = Flare 169 [5520]. *Haro, Chavira.*
V854 Ori = П 2455 = Flare 102 [3924].
V855 Ori = Flare 103 [3924].
V856 Ori = Sosp. Var. 5 [3937] = Flare 238 [5573].
V857 Ori = Flare 106 [3924]. Close to BE Ori.
V858 Ori = 11 [5574].
V859 Ori = Flare 170 [5520]. *Haro, Chavira.*
V860 Ori = Flare 107 [3924]. Near V381 Ori.
V861 Ori = Flare 109 [3924].
V862 Ori = Flare 239 [5573].
V863 Ori = Flare 240 [5573].
V864 Ori = F15 [4073] = K3П 6341 = = Flare 108.
V865 Ori = П 2502 = Flare 241 [5573].
V866 Ori = Flare 242 [5573].
V867 Ori = Flare 110 [3924].
V868 Ori = 1 [5577].
V869 Ori = F16 [4073] = 16 [3937] = = K3П 6344.
V870 Ori = П 2532 = Flare 244 [5573].
V871 Ori = Flare 243 [5573].
V872 Ori = Flare 245 [5573].
V873 Ori = Flare 112 [3924].
V874 Ori = Flare 246 [5573].
V875 Ori = 2 [5577].
V876 Ori = П 2588 = S9 [4073] = Sosp. Var. 6 [3937] = K3П 6349.
V877 Ori = Flare 114 [3924].
V878 Ori = 250 [4923] = 3 [5577] = = K3П 6355. Near V593 Oph.
V879 Ori = F22 [4073] = K3П 6356.
V880 Ori = Flare 116 [3924].
V881 Ori = F23 [4073] = 23 [3937] = = K3П 6357.

V882 Ori = П 2663 = Flare 247 [5573].
V883 Ori = 4 [5577] = Haro 13a.
V884 Ori = 5 [5577].
V885 Ori = Flare 248 [5573].
V886 Ori = Flare 117 [3924].
V887 Ori = S 10169 [5515].
V888 Ori = 13 [5574].
V889 Ori = Flare 171 [5520]. *Haro, Chavira.*
V890 Ori = Flare 172 [5520]. *Haro, Chavira.*
V891 Ori = Flare 118 [3924].
V892 Ori = 6 [5577]. The southern component of a close binary (ρ = 3").
V893 Ori = Flare 119 [3924].
V894 Ori = 15 [5574].
V895 Ori = Flare 249 [5573].
V896 Ori = Flare 173 [5520]. *Haro, Chavira.*
V897 Ori = Flare 250 [5573].
V898 Ori = 7 [5577].
V899 Ori = Flare 251 [5573].
V900 Ori = Flare 120 [3924].
V901 Ori = BD−1°1005 (8.4) = HD 37776 (B5) [2602, 5522] = = КЗП 6381.
V902 Ori = 8 [5577].
V903 Ori = S 10170 [5515].
V904 Ori = Flare 174 [5520]. *Haro, Chavira.*
V905 Ori = Flare 175 [5520]. *Haro, Chavira.*
V906 Ori = Flare 252 [5573].
V907 Ori = Flare 253 [5573].
V908 Ori = Flare 254 [5573].
V909 Ori = Flare 176 [5520]. *Haro, Chavira.*
V910 Ori = S 10171 [5515].
V911 Ori = S 10172 [5515].
V912 Ori = S 10173 [5515].
V913 Ori = S 10185 [5515].
V914 Ori = S 10186 [5515].
V915 Ori = S 10187 [5515].
V916 Ori = BD+13°1120 (8.8) [5522] = = HD 252214 (B1) = GC 7792 (8.7).
V917 Ori = BD+13°1123 (9.0) [5522] = = HD 252248 (B3).
ψ Ori [5578, 4971, 1438] = 30 Ori = = HR 1811 = BD+2°962 (5.3) = = HD 35715 (B2) [5522] = GC = 6713 (4.66) = ADS 4039 A = = Zi 377 = КЗП 100487.
LL Pav = S 6932 [4001] = КЗП 7981.
LM Pav = S 6958 [4001] = КЗП 8135.
LN Pav = S 6965 [4001] = КЗП 8141.
LO Pav = S 6967 [4001] = КЗП 8148.
LP Pav = S 6968 [4001] = КЗП 8149.
LQ Pav = S 6970 [4001] = КЗП 8155.
LR Pav = S 6980 [4001] = КЗП 8173.
LS Pav = S 6984 [4001] = КЗП 8188.
LT Pav = CPD−71°2462 (10.4) = S7007 [4001] = КЗП 8253.
LU Pav = S 6824 [4001] = КЗП 8274.
LV Pav = S 6825 [4001] = КЗП 8289.
LW Pav = S 6828 [4001] = КЗП 8304.
LX Pav = S 6835 [4001] = КЗП 8323.
LY Pav = S 7026 [4001] = КЗП 8328.
LZ Pav = S 7030 [4001] = КЗП 8339.
MM Pav = S 6844 [4001] = КЗП 8340.
MN Pav = S 7032 [4001] = КЗП 8346.
MO Pav = S 7034 [4001] = КЗП 8368.
MP Pav = S 7036 [4001] = КЗП 8382.
MQ Pav = S 6848 [4001] = КЗП 8389.
MR Pav = S 7062 [4001] = КЗП 8495.

MS Pav = S 7071 [4001] = КЗП 8519.
MT Pav = S 7076 [4001] = КЗП 8525.
MU Pav = S 6901 [4001] = КЗП 8533.
MV Pav = S 5114 [0085] = КЗП 5235.
MW Pav = CoD−72°1636 (8.5) = CPD −72° 2551 (8.2) = HD 197070 (A5) = = GC 28880 (9.41) = BV 894 [5579, 5580].
GW Peg = СПЗ 1432 [4354].
GX Peg = HR 8584 [5500] = BD + 28° 4389 (6.7) = HD213534 (A5) = = GC 31473 (6.32).
V349 Per = S 8462 [4341].
V350 Per = S 9152 [3910].
V351 Per = BD+56°432 (8.0) = HD 13051 (B0) [5522].
V352 Per = BD + 55°543 (9.0) = HD 13494 (B8) [5522].
V353 Per = BD + 53°480 (8.9) = HD 13544 (B) [5522].
V354 Per = BD+ 55°554 (7.9) = HD 13745 (B2) [5522].
V355 Per = BD + 57°527 (8.8) = HD 13758 (B8) [5522].
V356 Per = BD + 56°473 (8.7) [5581, 5522] = КЗП 5971.
V357 Per = BD + 56°475 (7.7) [5522] = = HD 13866 (B2p) = GC 2724 (7.7).
V358 Per = BD + 56°478 (8.8) [5522] = = HD 13890 (B8).
V359 Per = BD + 56°545 (8.5) [5522] = = HD 14250 (B5).
V360 Per = BD + 56°589 (9.1) [5522].
V361 Per = BD + 55°605 (9.3) = HD 14605 (Oe5) = Wr 175 [5525].
V362 Per = BD + 57°589 (8.7) = HD 15752 (B0) [5522].
V363 Per = S 9529 [3905].
V364 Per = S 10505 [5506].
V365 Per = S 10506 [5506].
V366 Per = S 10507 [5506].
V367 Per = S 10508 [5506].
V368 Per = S 10510 [5506].
V369 Per = Wr 145 [5582].
V370 Per = S 10512 [5506].
V371 Per = BD+41°563 (9.5) = Wr 150 [5582].
V372 Per = S 10153 [5515].
V373 Per = S 10155 [5515].
V374 Per = BD + 41°645 (9.4) = DO 26905 (M6) = Wr 151 [5582].
V375 Per = СПЗ 921 [0940] = КЗП 302.
V376 Per = HR 1170 [5500] = BD + 43°818 (6.2) = HD 23728 (F0) = = GC 4572 (5.86).
V377 Per = S 10159 [5515].
V378 Per = GR 111 [3967].
V379 Per = S 10161 [5515].
V380 Per = BD + 37°866 (7.0) [4034] = = HD25354(A0p) = GC4847 (7.87). The data given for this star in [4170] are in reality for the star HD 25411 [5583].
V381 Per = S 10163 [5515].
AD Phe = CoD−40°288 (9.5) = CPD −40° 117 (9.9) = S 7148 [4001] = = BV 1260 [5235] = КЗП 5906.
AE Phe = CoD−50° 410 (7.9) = CPD −50° 204 (8.4) = HD 9528 (G0) = = GC 1874 (7.92) = BV 483 [4371].
ρ Phe [5584] = HR 242 [4456, 5518] = CoD − 51°209 (5.6) = CPD−51°132 (6.0) = = HD 4919 (F5) [4457] = GC 1019 (5.22) = Zi 45 = = КЗП 100071.

SU Pic = CoD−45°1909 (9.6) = CPD −45°599 (9.0) = HD 273665 (A0) = = S 4847 [0085] = BV 455 [4362] = = КЗП 545.
VX Psc = 97 Psc = HR 432 [5500] = = BD+17°210 (6.3) = HD 9100 (A2) = = GC 1807 (5.96).
VY Psc = 3 Ari = HR 515 [5500] = BD +16°196 (6.5) = HD 10845 (F0) = = GC 2156 (6.46) = Zi 91 = = КЗП 100135.
VZ Psc = BD+4°5012 (9.4) = Giclas 29-37 [5585].
MO Pup = S 4071 [0085] = КЗП 1066.
MP Pup = BD−12°2001 (9.1) = S10254 [5515].
MQ Pup = CoD−37°3645 (8.8) = CPD −37°1313 (8.4) = HD 60099 (B9) = = BV 805 [5196].
MR Pup = S 10261 [5515].
MS Pup = S 10262 [5515].
MT Pup = S 10269 [5515].
MU Pup = S 10270 [5515].
MV Pup = S 10271 [5515].
TZ Pyx = CoD−31°6412 (9.5) = CPD −31°2519 (9.7) = BV 823 [5201].
GS Sge = S 10367 [5515].
GT Sge = S 10368 [5515].
GU Sge = S 10369 [5515].
GV Sge = S 9969 [3903].
GW Sge = S 10373 [5515].
V2415 Sgr = Nova Sgr 1951? [5586] = = КЗП 7726.
V2416 Sgr = $17^h54^m06^s$ −21°40ʹ.9 ; 1950.0 [5587] = Velghe 61.
V2417 Sgr = 1 [5589].
V2418 Sgr = 2 [5589].
V2419 Sgr = 3 [5589].
V2420 Sgr = 4 [5589].
V2421 Sgr = 5 [5589].
V2422 Sgr = 8 [5589].
V2423 Sgr = 9 [5589].
V2424 Sgr = 10 [5589].
V2425 Sgr = 11 [5589].
V2426 Sgr = 12 [5589].
V2427 Sgr = 13 [5589].
V2428 Sgr = 14 [5589].
V2429 Sgr = 15 [5589].
V2430 Sgr = 16 [5589].
V2431 Sgr = 19 [5589].
V2432 Sgr = 20 [5589].
V2433 Sgr = 21 [5589].
V2434 Sgr = 22 [5589].
V2435 Sgr = 23 [5589].
V2436 Sgr = 24 [5589].
V2437 Sgr = 25 [5589].
V2438 Sgr = 26 [5589].
V2439 Sgr = 28 [5589].
V2440 Sgr = 29 [5589].
V2441 Sgr = 30 [5589].
V2442 Sgr = 31 [5589].
V2443 Sgr = 32 [5589].
V2444 Sgr = 33 [5589].
V2445 Sgr = 34 [5589].
V2446 Sgr = 35 [5589].
V2447 Sgr = 36 [5589].
V2448 Sgr = 37 [5589].
V2449 Sgr = 38 [5589].
V2450 Sgr = 39 [5589].
V2451 Sgr = 40 [5589].
V2452 Sgr = 41 [5589].
V2453 Sgr = 42 [5589].
V2454 Sgr = 43 [5589].
V2455 Sgr = 44 [5589].
V2456 Sgr = 45 [5589].
V2457 Sgr = 46 [5589].

V2458 Sgr = 47 [5589].
V2459 Sgr = 48 [5589].
V2460 Sgr = 49 [5589].
V2461 Sgr = 50 [5589].
V2462 Sgr = 51 [5589].
V2463 Sgr = 52 [5589].
V2464 Sgr = 53 [5589].
V2465 Sgr = 54 [5589].
V2466 Sgr = 55 [5589].
V2467 Sgr = 56 [5589].
V2468 Sgr = 57 [5589].
V2469 Sgr = 58 [5589].
V2470 Sgr = 59 [5589].
V2471 Sgr = 60 [5589].
V2472 Sgr = 61 [5589].
V2473 Sgr = 62 [5589].
V2474 Sgr = 63 [5589].
V2475 Sgr = 65 [5589].
V2476 Sgr = 66 [5589].
V2477 Sgr = 67 [5589].
V2478 Sgr = 68 [5589].
V2479 Sgr = 70 [5589].
V2480 Sgr = 71 [5589].
V2481 Sgr = 72 [5589].
V2482 Sgr = 73 [5589].
V2483 Sgr = 74 [5589].
V2484 Sgr = 75 [5589].
V2485 Sgr = 76 [5589].
V2486 Sgr = 77 [5589].
V2487 Sgr = 78 [5589].
V2488 Sgr = 79 [5589].
V2489 Sgr = 80 [5589].
V2490 Sgr = 81 [5589].
V2491 Sgr = 82 [5589].
V2492 Sgr = 83 [5589].
V2493 Sgr = 84 [5589].
V2494 Sgr = 85 [5589].
V2495 Sgr = 86 [5589].

V2496 Sgr = 87 [5589].
V2497 Sgr = 88 [5589].
V2498 Sgr = 89 [5589].
V2499 Sgr = 90 [5589].
V2500 Sgr = 91 [5589].
V2501 Sgr = 92 [5589].
V2502 Sgr = 93 [5589].
V2503 Sgr = 95 [5589].
V2504 Sgr = 96 [5589].
V2505 Sgr = 2 [5590].
V2506 Sgr = Nova Sgr 1946 No.2 [5591] =
= MHα 304–113. *Mayall.*
V2507 Sgr = 3 [5590].
V2508 Sgr = 5 [5590].
V2509 Sgr = CoD–35° 12429 (7.5) =
= CPD–35°7840 (7.6) = HD
167231 (A0) = BV 584 [4181].
V2510 Sgr = 9 [5590].
V2511 Sgr = 10 [5590].
V2512 Sgr = 12 [5590].
V2513 Sgr = 1 [5592].
V2514 Sgr = 13 [5590].
V2515 Sgr = 14 [5590].
V2516 Sgr = 15 [5590].
V2517 Sgr = 16 [5590].
V2518 Sgr = 17 [5590] = КЗП 3986 ?
V2519 Sgr = 18 [5590].
V2520 Sgr = 1 [5593].
V2521 Sgr = 19 [5590].
V2522 Sgr = 20 [5590].
V2523 Sgr = 21 [5590].
V2524 Sgr = 2 [5593].
V2525 Sgr = 1 [5594].
V2526 Sgr = 22 [5590].
V2527 Sgr = 2 [5592].
V2528 Sgr = 23 [5590].
V2529 Sgr = 24 [5590].
V2530 Sgr = 25 [5590].

V2531 Sgr = HV 9396 [4707] = 67.1937 = = P 4628 = КЗП 4025.
V2532 Sgr = 26 [5590].
V2533 Sgr = 27 [5590].
V2534 Sgr = 3 [5592].
V2535 Sgr = 29 [5590].
V2536 Sgr = 30 [5590].
V2537 Sgr = S 7658 [4195] = BV 553 [4381] = 31 [5590] = КЗП 7817.
V2538 Sgr = 32 [5590].
V2539 Sgr = 33 [5590].
V2540 Sgr = 34 [5590].
V2541 Sgr = 35 [5590].
V2542 Sgr = 4 [5592].
V2543 Sgr = 6 [5592].
V2544 Sgr = 7 [5592].
V2545 Sgr = 36 [5590].
V2546 Sgr = 9 [5592].
V2547 Sgr = 37 [5590].
V2548 Sgr = 3 [5593].
V2549 Sgr = 10 [5592].
V2550 Sgr = 38 [5590].
V2551 Sgr = 39 [5590].
V2552 Sgr = 1 [5595].
V2553 Sgr = 2 [5595].
V2554 Sgr = 40 [5590].
V2555 Sgr = 41 [5590].
V2556 Sgr = 42 [5590].
V2557 Sgr = 4 [5593].
V2558 Sgr = 5 [5593].
V2559 Sgr = 43 [5590].
V2560 Sgr = 44 [5590].
V2561 Sgr = 45 [5590].
V2562 Sgr = 6 [5593]. Northern component of a close pair. Companion of 16^m.
V2563 Sgr = 46 [5590].
V2564 Sgr = 47 [5590].
V2565 Sgr = 7 [5593].
V2566 Sgr = 48 [5590].
V2567 Sgr = 49 [5590].
V2568 Sgr = 50 [5590].
V2569 Sgr = 11 [5592].
V2570 Sgr = 3 [5595].
V2571 Sgr = 4 [5595].
V2572 Sgr = Nova Sgr 1969 [5596]. *Welch.*
V2573 Sgr = 5 [5595].
V2574 Sgr = 51 [5590].
V2575 Sgr = 52 [5590].
V2576 Sgr = 12 [5592].
V2577 Sgr = 53 [5590].
V2578 Sgr = 6 [5595].
V2579 Sgr = 54 [5590].
V2580 Sgr = 7 [5595].
V2581 Sgr = 55 [5590].
V2582 Sgr = 56 [5590].
V2583 Sgr = 57 [5590].
V2584 Sgr = $18^h26^m54^s$ – 25°15′.8; 1900.0 [5597] *Hoffleit.*
V2585 Sgr = 8 [5595].
V2586 Sgr = 8 [5593].
V2587 Sgr = 58 [5590].
V2588 Sgr = 9 [5595].
V2589 Sgr = 3 [5594].
V2590 Sgr = 60 [5590].
V2591 Sgr = 4 [5594].
V2592 Sgr = B [4409] = 10 [5595]. Near V2007 Sgr.
V2593 Sgr = 61 [5590].
V2594 Sgr = 62 [5590].
V2595 Sgr = CoD–30° 15907 = Innes 120 [4948] = 63 [5590] = Zi 1444 = КЗП 4227.
V2596 Sgr = 64 [5590].
V2597 Sgr = 65 [5590].
V2598 Sgr = 5 [5594].
V2599 Sgr = 66 [5590].

V2600 Sgr = 9 [5593].
V2601 Sgr = MHα 208–51 [5598].
V2602 Sgr = 67 [5590].
V2603 Sgr = 68 [5590].
V2604 Sgr = 69 [5590].
V2605 Sgr = 70 [5590].
V2606 Sgr = 11 [5595].
V2607 Sgr = 71 [5590].
V2608 Sgr = 10 [5593].
V2609 Sgr = Innes 54 [4947] = 72 [5590] = = Zi 1488 = КЗП 4303.
V2610 Sgr = 73 [5590].
V2611 Sgr = 74 [5590].
V2612 Sgr = 75 [5590].
V2613 Sgr = 76 [5590].
V2614 Sgr = 77 [5590].
V2615 Sgr = 78 [5590].
V2616 Sgr = 79 [5590].
V2617 Sgr = CoD–24°15680 (9.3) = CPD – 24°6855 (8.8) = HD 188297 (A0) = = BV 789 [5599].
V854 Sco = HV 10535 [5056] = КЗП 2614.
V368 Sct = Nova Sct 1970 [5601].
V369 Sct = BD–6°4932 (9.2) = HD 174553 (F8) [5600].
EZ Ser = СПЗ 1616 [5565].
FF Ser = S 9271 [3910].
FG Ser = S 10363 [5515].
FH Ser = Nova Ser 1970 [5602].
KK Tau = 16 [5603] = Pl Flare 133.
KL Tau = 26 [5603] = Pl Flare 141.
KM Tau = Pl Flare 101 [5604].
KN Tau = 22 [5603] = Pl Flare 138.
KO Tau = Pl Flare 116 [5605] = СПЗ 1706.
KP Tau = Pl Flare 1 [3924].
KQ Tau = Pl Flare 117 [5605] = СПЗ 1707.
KR Tau = Pl Flare 62 [5606].
KS Tau = Pl Flare 65 [5606].
KT Tau = Pl Flare 63 [5606].
KU Tau = Pl Flare 64 [5606].
KV Tau = Pl Flare 102 [5604].
KW Tau = Pl Flare 66 [5606].
KX Tau = Pl Flare 34 [5520]. *Haro, Chavira.*
KY Tau = Pl Flare 35 [5520]. *Haro, Chavira.*
KZ Tau = Pl Flare 129 [5605]. Konkoly observatory.
LL Tau = Pl Flare 128 [5605] = СПЗ 1718. Алма-Ата обс.
LM Tau = Pl Flare 36 [5520]. *Haro, Chavira.*
LN Tau = Pl Flare 67 [5606].
LO Tau = Pl Flare 3 [3924].
LP Tau = 7 [5521] = Pl Flare 38.
LQ Tau = 5 [5521] = Pl Flare 37.
LR Tau = Pl Flare 103 [5604].
LS Tau = Pl Flare 39 [5520] *Haro, Chavira.*
LT Tau = Pl Flare 147 [5607].
LU Tau = Pl Flare 40 [5520]. *Haro, Chavira.*
LV Tau = Pl Flare 118 [5605] = Pl Flare 148 [5607] = СПЗ 1708.
LW Tau = 17 [5603] = Pl Flare 134.
LX Tau = Pl Flare 4 [3924].
LY Tau = Ton 2 (Pleades) [5608] = Pl Flare 5 [3924].
LZ Tau = HII 134 = Pl Flare 68 [5606].
MM Tau = HII 146 = Pl Flare 149 [5607].
MN Tau = Pl Flare 6 [3924].
MO Tau = Pl Flare 41 [5520]. *Haro, Chavira.*
MP Tau = Pl Flare 119 [5605] = СПЗ 1709.
MQ Tau = Pl Flare 69 [5606].
MR Tau = HII 191 = Ton 3 (Pleiades) [5608] = Pl Flare 7 [3924].
MS Tau = HII 212 = Pl Flare 70 [5606].
MT Tau = HII 230 = Pl Flare 42 [5520]. *Haro, Chavira.*

MU Tau = Pl Flare 150 [5607].
MV Tau = Pl Flare 71 [5606].
MW Tau = Pl Flare 72 [5606].
MX Tau = H II 335 [5609] = Pl Flare 73 [5606].
MY Tau = H II 347 = Pl Flare 160 [5610].
MZ Tau = Pl Flare 10 [3924].
NN Tau = 19 [5603] = Pl Flare 136.
NO Tau = Pl Flare 9 [3924].
NP Tau = H II 357 [5609] = 10 [5521] = = Pl Flare 8 [3924] = 21 [5603].
NQ Tau = Pl Flare 104 [5604].
NR Tau = Pl Flare 75 [5606].
NS Tau = Pl Flare 74 [5606].
NT Tau = 23 [5603] = Pl Flare 139.
NU Tau = Pl Flare 43 [5520]. *Haro, Chavira.*
NV Tau = Pl Flare 12 [3924].
NW Tau = Pl Flare 11 [3924].
NX Tau = Pl Flare 161 [5610].
NY Tau = H II 500 = 9 [5521] = Pl Flare 44.
NZ Tau = Pl Flare 76 [5606].
OO Tau = Pl Flare 77 [5606].
OP Tau = Pl Flare 78 [5606].
OQ Tau = Pl Flare 79 [5606].
OR Tau = H II 590 = Pl Flare 45 [5520]. *Haro, Chavira.*
OS Tau = H II 624 = Pl Flare 113 [5605] = = СПЗ 1703.
OT Tau = H II 676 = Pl Flare 162 [5610].
OU Tau = H II 636 = Pl Flare 13 [3924].
OV Tau = S 10158 [5515].
OW Tau = H II 793 = Pl Flare 46 [5520]. *Haro, Chavira.*
OX Tau = H II 906 = Ton 4 (Pleiades) [5608] = Pl Flare 14.
OY Tau = H II 924 = 14 [5603] = Pl Flare 131.
OZ Tau = 2 [5521] = vM6 = Pl Flare 47.
PP Tau = H II 1061 = Pl Flare 48 [5520]. *Haro, Chavira.*
PQ Tau = H II 1069 = Pl Flare 80 [5606].
PR Tau = H II 1103 = Pl Flare 151 [5607].
PS Tau = Pl Flare 120 [5605] = СПЗ 1710.
PT Tau = H II 1173 = Pl Flare 81 [5606].
PU Tau = Pl Flare 49 [5520]. *Haro, Chavira.*
PV Tau = vM 16 [3924] = 13 [5521] = = 24 [5603] = Pl Flare 15.
PW Tau = 4 [5521] = Pl Flare 50.
PX Tau = Pl Flare 122 [5605] = СПЗ 1722.
PY Tau = Pl Flare 121 [5605] = Pl Flare 152 [5607] = СПЗ 1711.
PZ Tau = Pl Flare 163 [5610].
QQ Tau = H II 1286 = Pl Flare 16 [3924].
QR Tau = 31 [5603] = Pl Flare 146.
QS Tau = Pl Flare 153 [5607].
QT Tau = Pl Flare 82 [5606].
QU Tau = Pl Flare 18 [3924].
QV Tau = Pl Flare 105 [5604].
QW Tau = 15 [5603] = Pl Flare 132.
QX Tau = H II 1531 = Pl Flare 19 [3924].
QY Tau = H II 1547 = 25 [5603] = Pl Flare 140.
QZ Tau = Pl Flare 20 [3924].
V335 Tau = 30 [5603] = Pl Flare 145.
V336 Tau = Pl Flare 83 [5606].
V337 Tau = Pl Flare 164 [5610].
V338 Tau = H II 1653 = Ton 6 (Pleiades) [5608] = Pl Flare 21.
V339 Tau = Pl Flare 106 [5604].

V340 Tau = Pl Flare 154 [5607].
V341 Tau = Pl Flare 22 [3924].
V342 Tau = Pl Flare 155 [5607].
V343 Tau = H II 1785 = Pl Flare 84 [5606].
V344 Tau = Pl Flare 23 [3924].
V345 Tau = Pl Flare 85 [5606].
V346 Tau = H II 1827 = Pl Flare 51 [5520]. *Haro, Chavira.*
V347 Tau = Pl Flare 123 [5605] = СПЗ 1713.
V348 Tau = Pl Flare 24 [3924].
V349 Tau = vM 46 = Pl Flare 156 [5607].
V350 Tau = Pl Flare 86 [5606].
V351 Tau = Pl Flare 25 [3924].
V352 Tau = 1 [5521] = Pl Flare 52.
V353 Tau = Pl Flare 87 [5606].
V354 Tau = H II 2082 [2952] = КЗП 6056.
V355 Tau = H II 2144 = Pl Flare 157 [5607].
V356 Tau = Pl Flare 26 [3924].
V357 Tau = H II 2193 = Pl Flare 88 [5606].
V358 Tau = H II 2208 = Pl Flare 107 [5604].
V359 Tau = Pl Flare 89 [5606].
V360 Tau = 8 [5521] = Pl Flare 53.
V361 Tau = Pl Flare 90 [5606].
V362 Tau = Pl Flare 130 [5605]. Konkoly observatory.
V363 Tau = 3 [5521] = Pl Flare 54.
V364 Tau = Pl Flare 92 [5606].
V365 Tau = Pl Flare 91 [5606].
V366 Tau = Pl Flare 108 [5604].
V367 Tau = 29 [5603] = Pl Flare 144.
V368 Tau = Pl Flare 27 [3924].
V369 Tau = Pl Flare 28 [3924].
V370 Tau = H II 2588 = Pl Flare 165 [5610].
V371 Tau = H II 2601 = Pl Flare 56 [5520]. *Haro, Chavira.*
V372 Tau = H II 2602 = Pl Flare 93 [5604].
V373 Tau = Pl Flare 94 [5606].
V374 Tau = Pl Flare 158 [5607].
V375 Tau = H II 2879 = 6 [5521] = Pl Flare 57.
V376 Tau = H II 2908 = Pl Flare 166 [5610].
V377 Tau = Pl Flare 95 [5606].
V378 Tau = H II 2927 = Pl Flare 109 [5604].
V379 Tau = 18 [5603] = Pl Flare 135.
V380 Tau = Pl Flare 29 [3924].
V381 Tau = H II 3019 = Pl Flare 110 [5604].
V382 Tau = H II 3030 = Pl Flare 30 [3924].
V383 Tau = Ton 7 (Pleiades) [5608] = Pl Flare 31.
V384 Tau = H II 3104 = Pl Flare 111 [5604].
V385 Tau = Pl Flare 124 [5605] = СПЗ 1714.
V386 Tau = Pl Flare 96 [5606].
V387 Tau = Pl Flare 114 [5605] = СПЗ 1704.
V388 Tau = Pl Flare 125 [5605] = СПЗ 1715.
V389 Tau = Pl Flare 97 [5606].
V390 Tau = Pl Flare 58 [5520]. *Haro, Chavira.*
V391 Tau = Pl Flare 159 [5607].
V392 Tau = Pl Flare 115 [5605] = СПЗ 1705.
V393 Tau = Pl Flare 59 [5520]. *Rosino.*
V394 Tau = Pl Flare 126 [5605] = СПЗ 1716.
V395 Tau = Pl Flare 60 [5520]. *Haro, Chavira.*
V396 Tau = Pl Flare 98 [5606].
V397 Tau = Pl Flare 32 [3924].
V398 Tau = Pl Flare 112 [5604].
V399 Tau = Pl Flare 61 [5520]. *Haro, Chavira.*
V400 Tau = 27 [5603] = Pl Flare 142.
V401 Tau = Pl Flare 33 [3924].
V402 Tau = Pl Flare 127 [5605] = СПЗ 1717.

V403 Tau = Pl Flare 99 [5606].
V404 Tau = Pl Flare 100 [5606].
V405 Tau = 20 [5603] = Pl Flare 137.
V406 Tau = СПЗ 1573 [5611].
V407 Tau = СПЗ 1608 [5612].
V408 Tau = S 9554 [3905] = СПЗ 1575 [5613]. *Медведева.*
V409 Tau = СПЗ 1578 [5614].
V410 Tau = BD+28°637 (9.5) = HD 283518 (K5) = СПЗ 1577 [5615].
V411 Tau = $4^h16^m50^s$ + 27°13′24″; 1965.0 [5616].
V412 Tau = СПЗ 1607 [5617].
V413 Tau = СПЗ 1530 [5618].
V414 Tau = СПЗ 1609 [5612]. *Кукаркина.*
V415 Tau = СПЗ 1576 [5613]. *Медведева.*
V416 Tau = S 9182 [3910].
V417 Tau = S 10174 [5515].
V418 Tau = S 10176 [5515].
V419 Tau = S 10178 [5515].
V420 Tau = S 10181 [5515].
V421 Tau = S 10491 [5527].
V422 Tau = S 9187 [3910].
V423 Tau = S 10191 [5515].
V424 Tau = S 10192 [5515].
MU Tel = HV 10085 [4230] = КЗП 4400. *Boyd.*
MV Tel = S 6826 [4001] = КЗП 8299.
MW Tel = S 6845 [4001] = КЗП 8361.
MX Tel = S 6846 [4001] = КЗП 8369.
MY Tel = S 6847 [4001] = КЗП 8381.
MZ Tel = S 6855 [4001] = КЗП 8403.
NN Tel = S 6861 [4001] = КЗП 8428.
NO Tel = S 6874 [4001] = КЗП 8486.
NP Tel = S 6881 [4001] = КЗП 8502.
NQ Tel = S 6891 [4001] = КЗП 8514.
SU Tri = BD + 31°392 (9.1) [1570] = = КЗП 5977.
GU TrA = S 8902 [3776].
GV TrA = S 8917 [3776].
GW TrA = S 8920 [3776].
GX TrA = S 8924 [3776].
GY TrA = S 8941 [3776].
GZ TrA = S 8950 [3776].
HH TrA = S 8953 [3776].
BZ UMa = $8^h49^m.9$ + 58°00′; 1950.0 [5619] = СПЗ 1719.
CC UMa = DO 33480 (M0) = S 7735 [4065] = КЗП 6803.
CD UMa = СПЗ 1610 [5620].
DP Vir = S 9238 [3910].
DQ Vir = S 10272 [5515].
DR Vir = S 10273 [5515].
DS Vir = S 10274 [5515].
DT Vir = BD + 13°2618 = Wr 86 [4185] = КЗП 6977.
DU Vir = СПЗ 1611 [5565].
DV Vir = СПЗ 1574 [5621].
DW Vir = СПЗ 1614 [5565].
DX Vir = СПЗ 1615 [5565].
TX Vol = CPD − 65°967 (9.3) = = S 4903 [0085] = BV 1199 [5557] = КЗП 1329.
LT Vul = HR 7222 [5500]. = BD + 21°3648 (6.7) = HD 177392 (F2) = GC 26221 (6.50).
LU Vul = Nova Vul 1968 № 2 [5622].
LV Vul = Nova Vul 1968 № 1 [5623].
LW Vul = VV 256 [5543].
LX Vul = S 9073 [3776].

Supplementary Literature List

5234. *R. Knigge, H. Bauernfeind*, Bamb Ver 6, Nr 45, 1967.
5235. *W. Strohmeier, H. Bauernfeind*, IBVS No 360, 1969.
5353. *W. I. Miller*, Ric. Astr 7, No 14, 1968.
5500. *M. Breger*, AJ 74, 166, 1969.
5501. *S. Nishimura*, ASS 3, No 1, 77, 1969.
5502. *R. Knigge*, Bamb Ver 7, Nr 70, 1968.
5503. *A. A. Schoenmaker*, BAN 20, 222, 1969.
5504. *K. Stępień*, PASP **80**, 220, 1968.
5505. *Э. А. Витриченко*, АЦ № 448, 1967.
5506. *G. A. Richter*, MVS **5**, H. 5, 88, 1969.
5507. *В. П. Цесевич*, АЦ № 526, 1969.
5508. IAU Circ No 2233, 1970.
5509. *W. E. Kunkel*, IBVS No 294, 1968.
5510. *W. Fullerton*, AJ **72**, 797, 1967.
5511. *R. L. Millis*, PASP 79, 262, 1967.
5512. *K. R. Bondal*, Obs, 87, 220, 1967.
5513. *P. Mayer*, PASP **80**, 81, 1968.
5514. *R. Weber*, IBVS No 321, 1968.
5515. *C. Hoffmeister*, AN 290, H. 5/6, 277, 1968.
5516. *R. Weber*, BSAM No 22, 1969.
5517. *G. Jackisch*, IBVS No 314, 1968.
5518. *R. S. Stobie, Lagerweij*, IBSH No 14, 1969.
5519. *G. Romano, M. Perissinotto*, Padova Publ No 151, 1968.
5520. *G. Haro*, "Nebulae and Interstellar Matter", Chicago-London, 1968, p. 141.
5521. *L. Rosino*, Asiago Contr No 189, 1966.
5522. *G. Hill*, ApJ Suppl No 130, 1967.
5523. *R. Knigge*, Bamb Ver 7, Nr 59, 1967.
5524. *C. B. Stephenson, N. Sanduleak, R. E. Schild*, ApL **1**, 247, 1968.
5525. *R. Weber*, IBVS No 230, 1967.
5526. *R. Weber*, IBVS No 287, 1968.
5527. *G. A. Richter*, MVS **5**, H. **4**, 69, 1969.
5528. *М. В. Долидзе, Г. А. Пономарева*, АЖ **42**, 205, 1965.
5529. *D. J. Mac Connell*, ApJ Suppl No 147, 1968.
5530. *Л. В. Мирзоян, Э. С. Парсамян, Н. И. Каллоглян*, АЦ № 485, 1968.
5531. *Л. В. Мирзоян, Э. С. Парсамян, О. С. Чавушян*, Бюракан. сообщ. № 39, 3, 1968.
5532. *R. Avery, I. Sievers*, Bamb. Ver **7**, Nr. 76, 1968.
5533. *M. Breger, N. B. Sanwal*, ApL **1**, 103, 1968.
5534. *W. J. Luyten*, Minn Publ **3**, No. 10, 1961.
5535. *N. Sanduleak, P. Pesch*, IBVS No. 300, 1968.
5536. *G. Müller, Kempf*, Potsd Publ **17**, 146, 290, 1907.
5537. *N. Sanduleak*, IBVS No 368, 1969.
5538. *R. S. Stobie, J. B. Alexander*, Obs **90**, 66, 1970.
5539. *Н. Е. Курочкин*, ПЗ **16**, 460, 1968.
5540. *W. I. Miller*, Ric Astr **7**, No 16, 1969.
5541. *W. I. Miller*, Ric Astr. **7**, No 15, 1969.
5542. *W. I. Miller*, Ric Astr **7**, No 18, 1968.
5543. *W. I. Miller*, MS, 1970.
5544. *G. Romano*, IBVS No 229, 1967.
5545. *Я. Н. Чхиквадзе*, Сообщения АН Груз. ССР **57**, № 2, 321, 1970.
5546. *L. Kohoutek*, IBVS No 384, 1969.

5547. *Stienon*, IAU Circ No 2251, 1970.
5548. *Г. В. Зайцева*, ПЗ **16**, № 4, 435, 1968.
5549. *R. L. Millis*, Lowell Bull No 148, 1969.
5550. *T. E. Espi n*, AN **145**, 323, 1898.
5551. *T. E. Espin*, AN **124**, 179, 1890.
5552. *R. Giacconi, P. Gorenstein, H. Gursky, P. D. Usher, J. R. Waters, A. Sandage, P. Osmer, J. V Peach*, ApJ 148, L 129, 1967.
5553. *A. Wittmann*, MVS Nr 577, 1961.
5554. *O. J. Eggen, A. Sandage*, ApJ **148**, 911, 1967.
5555. *S. Catalano, M. Rodonò*, IBVS No. 175, 1966.
5556. *H. Gessner*, MVS **5**, H. 3, 38, 1969.
5557. *W. Strohmeier, I. Patterson*, IBVS No 330, 1969.
5558. *G. Richter*, MVS **5**, H. 3, 39, 1969.
5559. *G. A. Richter*, IBVS No 293, 1968.
5560. *R. Zissell*, IBVS No 378, 1969.
5561. IAU Circ No 2024, 1967.
5562. *W. Srtohmeier, H. Ott*, IBVS No 195, 1967.
5563. *C. Blanco, S. Catalano*, IBVS No 253, 1968.
5564. *К. Рудницкий*, ПЗ **16**, № 4, 482, 1968.
5565. *Р. М. Русев*, АЦ № 517, 1969.
5566. *W. Strohmeier, H. Bauernfeind, H. Ott*, Bamb Ver **6**, Nr. 36, 1966.
5567. *J. Smak*, AA **16**, 109, 1966.
5568. *P. Maffei*, Asiago Contr, No. 141, 1963.
5569. *O. J. Eggen*, IBVS No 250, 1968.
5570. *L. Plant*, BAN Suppl **2**, No. 6, 1968.
5571. *I. Woods*, HB No 834, 1926.
5572. *C. B. Stephenson*, IBVS No. 323, 1969.
5573. *G. Haro, E. Chavira*, TTB No. 32, 1969.
5574. *C. Roslund*, Ark Astr **5**, No. 22, 1969.
5575. *G. Haro, E. Parsamian*, TTB **5**, No 31, 45, 1969.
5576. *A. Blaghikh, P. Maffei*, Frascati Contr No 23, 1968.
5577. *P. Maffei*, Asiago Contr No. 140, 1963.
5578. *H. Shapley*, PAAS **3**, 17, 1918.
5579. *W. Strohmeier*, IBVS No 178, 1967.
5580. *O. J. Eggen*, IBVS No 308, 1968.
5581. *E. Lindemann*, Bull Acad Petersb, 1895, januar, S. 74.
5582. *R. Weber*, IBVS No 42, 1964.
5583. *H. A. Abt*, ApJ **140**, 1641, 1964.
5584. *R. T. A. Innes*, JBAA **6**, 488, 1896.
5585. *S. C. Wolff, G. Wallerstein*, PASP **77**, 370, 1965.
5586. *F. Zwicky*, HAC No. 1150, 1951.
5587. *F. Zwicky*, Morphological Asrtonomy, Springer, 1957, p. 241.
5589. *P. Th. Oosterhoff, J. Ponsen*, BAN Suppl **3**, No. 2, 79, 1968.
5590. *C. J. Kooreman*, BAN Suppl 3, No. 2, 41, 1968.
5591. *B. L. Welther*, AAVSO Abstr, October 1965, pp. 7, 9.
5592. *D. Hoffleit*, IBVS No 387, 1969.
5593. *D. Hoffleit*, IBVS No. 277, 1968.
5594. *D. Hoffleit*, IBVS No. 312, 1968.
5595. *D. Hoffleit*, AJ 72, 711, 1967.
5596. *F. M. Bateson*, IBVS No. 389, 1969.
5597. *J. Akyuz*, IBVS No. 395, 1969.
5598. *D. Hoffleit*, IBVS No. 254, 1968.
5599. *W. Strohmeier, H. Fischer, H. Ott*, IBVS No. 120, 1966.
5600. *D. S. Hall, A. D. Mallama*, IBVS No. 383, 1969.

5601. *G. E. D. Alcock*, Телеграмма 3/VIII, 1970.
5602. *Honda*, IAU Circ No. 2212, 1970.
5603. *L. Rosino, L. Pigatto*, Asiago Contr No. 231, 1969.
5604. *E. Parsamian, E. Chavira*, TTB No. 31, 35, 1969.
5605. *В. А. Амбарцумян, Л. В. Мирзоян, Э. С. Парсамян, О. С. Чавушян, Л. К. Ерастова*, АФ 6, 7, 1970.
5606. *G. Haro, E. Chavira*, TTB **5**, No. 31, 23, 1969.
5607. *G. Haro, E. Chavira*, TTB **5**, № 34, 181, 1970.
5608. *G. Haro*, IAU Symposium No. 20, 30, 1964.
5609. *B. Iriarte*, TTB **4**, No. 28, 79, 1967.
5610. *G. Haro, G. González*, TTB 5, No. 34, 191, 1970.
5611. *П. Б. Перова*, АЦ № 461, 1968.
5612. *Н. Б. Перова*, АЦ № 520, 1969.
5613. *А. Н. Седякина, Б. Бодри*, АЦ № 474, 1968.
5614. *Н. А. Горыня*, АЦ № 474, 1968.
5615. *Л. Н. Мосидзе*, АЦ № 474, 1968.
5616. *A. U. Landolt, ApJ* **153**, 151, 1968.
5617. *Г. И. Медведева*, АЦ № 493, 1968.
5618. *Т. Н. Куликова*, ПЗ **17**, № 1, 90, 1969.
5619. *Б. Е. Маркарян*, АФ **4**, № 1, 144, 1968.
5620. *Б. В. Кукаркин*, АЦ № 508, 1969.
5621. *Б. В. Кукаркин*, АЦ № 463, 1968.
5622. *L. Kohoutek*, IAU Circ. No. 2106, 1968.
5623. *G. E. D. Alcock*, IAU Circ No. 2066, 1968.
5624. *K. D. Rakos*, PASP **80**, 324, 1968.

New abbreviations

ApL	Astrophysical Letters
ASS	Astrophysics and Space Science.

COMMISSION 27 OF THE I. A. U.

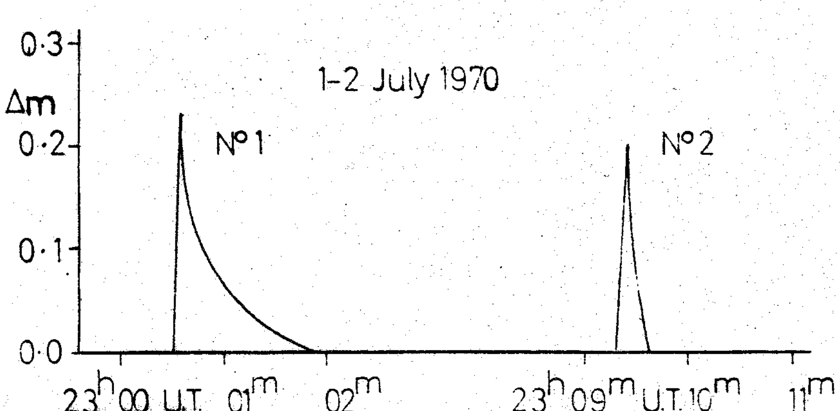
INFORMATION BULLETIN ON VARIABLE STARS

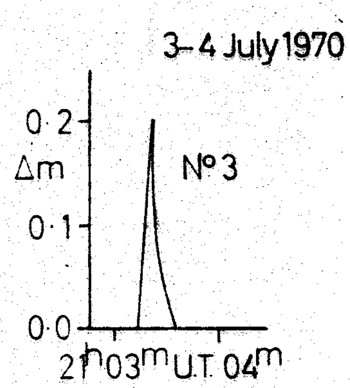
NUMBER 481

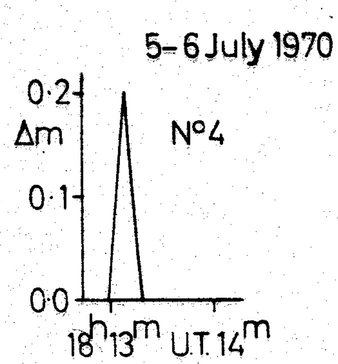
Konkoly Observatory
Budapest
1970 October 31

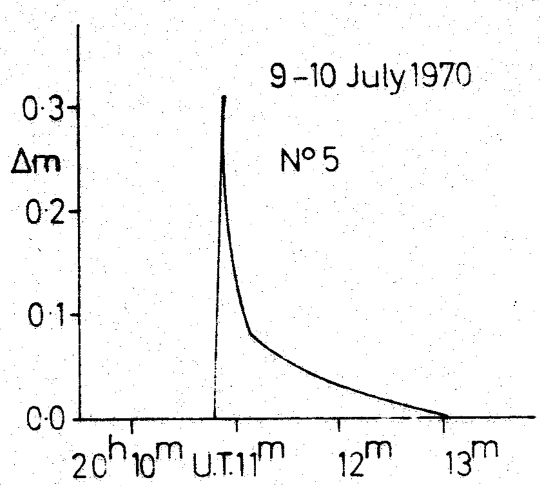
RECENT OBSERVATIONS ON THE FLARE STAR V1216 SAGITTARII

Date 1970	U.T.	Total hours per night	Flare No.	U.T. of flare	Duration minutes	Δm
June						
28	$18^h17^m-21^h19^m$	3^h02^m				
29	17 20 -22 26	5 06				
30	17 52 -23 40	5 48				
July						
1	17 26 -22 20,					
	22 32 -23 29	5 51	1	$23^h00.5$	1.40	0.23
			2	23 09.3	0.30	0.20
3	17 06 -21 19		3	21 03.2	0.35	0.20
	21 29 -22 14	4 58				
5	17 02 -21 38		4	18 13.0	0.30	0.20
	21 55 -22 03	4 44				
6	18 34 -20 38					
	20 55 -22 03	3 12				
7	19 00 -21 56	2 56				
8	18 31 -19 47	1 16				
9	17 14 -22 15	5 01	5	20 10.8	2.25	0.31
	Total	41^h54^m				









1970 October 19

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COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 482

Konkoly Observatory
Budapest
1970 November 2

UBV OBSERVATIONS OF THREE CEPHEIDS

During October-November, 1965, UBV observations were made at the Kitt Peak National Observatory of three Cepheid variables: SW Tauri, SZ Tauri, and SU Cassiopeiae. Differential magnitudes and colors and heliocentric phases are presented in Tables I-III. The elements used in computing the phases are given in Table IV.

Table IV — Elements

Star	Period	Inverse Period	Epoch
SW Tau	$1^d.5836468$	$0^{d-1}.63145393$	2419730.3536
SZ Tau	3.148987	0.3175624	2423619.57
SU Cas	1.949319	0.5129997	2430404.134

Comparison and check stars used to obtain the differential magnitudes and colors for each star are listed in Table V. The m.s.e. for each comparison star is computed from the nightly differences from the mean of all nights. The m.s.e. noted below each check star is the standard error of the mean of the differential observations.

Although the light curves and analyses will be published later, two features deserve special mention: 1) The light curves of SW Tauri show a double hump at maximum light; and 2) The light curves of SZ Tauri can be represented by simple since curves and show none of the scatter which O'Connell (Riverview Publ. I, 28, 1936) conjuctured to be present in the light curves of Cepheids with periods around 3^d.

E. F. MILONE
Gettysburg College

Table I -- SW Tauri Observations

Julian Date, Time	Cycle·Phase	DV	D(B-V)	D(U-B)
2439036.9574	12191.2324	0.573	0.044	0.532
9662	12191.2380	0.594	0.027	0.507
2439037.9958	12191.8883	1.245	0.280	0.519
2439038.9754	12192.5070	0.999	0.252	0.590
9841	12192.5123	0.992	0.274	0.594
9903	12192.5164	1.018	0.242	0.580
9968	12192.5204	1.003	0.275	0.594
2439041.9418	12194.3802	0.895	0.183	0.535
9453	12194.3823	0.899	0.185	0.526
9513	12194.3862	0.895	0.213	0.477
9550	12194.3885	0.896	0.199	0.514
9610	12194.3923	0.892	0.192	0.534
9642	12194.3944	0.913	0.183	0.550
9699	12194.3979	0.903	0.203	0.506
9737	12194.4004	0.930	0.177	0.502
9818	12194.4055	0.903	0.202	0.522
2439042.9752	12195.0327	0.564	-0.031	0.465
9837	12195.0382	0.560	-0.014	0.460
9900	12195.0421	0.567	-0.018	0.455
2439044.8628	12196.2247	0.572	0.035	0.443
8656	12196.2266	0.588	0.032	0.490
8707	12196.2299	0.567	0.027	0.477
8735	12196.2316	0.571	0.049	0.551
8787	12196.2350	0.578	0.044	0.439
8816	12196.2368	0.580	0.054	0.479
8867	12196.2399	0.588	0.052	0.492
8889	12196.2412	0.582	0.063	0.533
2439052.9761	12201.3484	0.834	0.190	0.474
9786	12201.3500	0.858	0.183	0.473
9837	12201.3531	0.875	0.152	0.521
9861	12201.3547	0.859	0.171	0.515
2439058.9696	12205.1331	0.520	-0.015	0.470
9733	12205.1354	0.512	-0.009	0.473
9891	12205.1454	0.504	-0.024	0.498
2439060.9206	12206.3652	0.874	0.192	0.546
9276	12206.3696	0.899	0.161	0.542
9694	12206.3960	0.935	0.149	0.547
9732	12206.3984	0.902	0.186	0.554
9805	12206.4031	0.931	0.162	0.555
2439061.7905	12206.9147	1.098	0.195	0.452
7959	12206.9180	1.108	0.151	0.442
2439062.8438	12207.5797	1.078	0.305	0.570
8488	12207.5828	1.088	0.300	0.598
8619	12207.5911	1.088	0.314	0.575
9626	12207.6545	1.203	0.302	0.645
9676	12207.6578	1.198	0.322	0.629

Julian Date, Time	Cycle.Phase	DV	D(B-V)	D(U-B)
2439063.8067	12208.1877	0.525	-0.014	0.483
8125	12208.1914	0.514	0.007	0.486
8653	12208.2247	0.550	0.038	0.505
8679	12208.2262	0.553	0.034	0.524
8713	12208.2284	0.560	0.031	0.523
8736	12208.2300	0.585	0.013	0.489
9690	12208.2900	0.696	0.119	0.506
9746	12208.2936	0.719	0.107	0.524
2439064.8744	12208.8621	1.239	0.281	0.533
8797	12208.8654	1.259	0.259	0.531
8855	12208.8691	1.263	0.272	0.528
9537	12208.9121	1.114	0.216	0.475
9565	12208.9138	1.098	0.208	0.492
9622	12208.9175	1.072	0.200	0.476
9652	12208.9193	1.074	0.183	0.491
2439065.8701	12209.4907	0.976	0.230	0.564
8729	12209.4926	0.963	0.242	0.556
8997	12209.5095	1.010	0.239	0.619
9120	12209.5172	1.010	0.253	0.608
9150	12209.5190	1.013	0.250	0.623
9652	12209.5508	1.051	0.269	0.602
9710	12209.5546	1.056	0.258	0.600
9757	12209.5575	1.063	0.251	0.594
2439066.7575	12210.0510	0.516	0.047	0.426
7646	12210.0555	0.560	0.010	0.475
8993	12210.1406	0.517	-0.013	0.474
9056	12210.1447	0.520	-0.014	0.474
9738	12210.1876	0.533	-0.003	0.475
9768	12210.1897	0.544	-0.012	0.482
2439068.8205	12211.3538	0.851	0.180	0.550
8237	12211.3560	0.852	0.190	0.567
8807	12211.3918	0.910	0.185	0.539
8837	12211.3937	0.898	0.200	0.539
8906	12211.3979	0.905	0.192	0.569
9233	12211.4187	0.930	0.209	0.530
9303	12211.4231	0.922	0.221	0.557
9480	12211.4342	0.922	0.217	-----
9525	12211.4371	0.913	0.233	-----
2439069.8150	12211.9818	0.638	0.003	0.459
8184	12211.9840	0.607	0.025	0.459
8237	12211.9872	0.632	-0.025	0.474
9184	12212.0470	0.581	-0.022	0.441
9208	12212.0486	0.567	0.003	0.472
9423	12212.0621	0.587	-0.019	0.464
9483	12212.0660	0.549	0.008	0.466
9538	12212.0693	0.545	0.007	0.491
9794	12212.0856	0.560	-0.002	0.458
9822	12212.0874	0.571	-0.020	0.471
70.0097	12212.1047	0.530	-0.002	0.460

Julian Date.Time	Cycle.Phase	DV	D(B-V)	D(U-B)
2439064.7693	4442.9049	-0.108	0.555	0.368
7736	4442.9071	-0.103	0.556	0.361
8244	4442.9332	-0.139	0.550	0.348
8265	4442.9343	-0.142	0.551	0.348
8362	4442.9393	-0.149	0.540	0.363
9077	4442.9760	-0.194	0.533	0.358
9124	4442.9783	-0.194	0.532	0.360
9173	4442.9808	-0.192	0.520	0.362
9220	4442.9833	-0.198	0.523	0.359
9934	4443.0199	-0.207	0.516	0.363
9959	4443.0212	-0.219	0.519	0.348
5.0012	4443.0239	-0.234	0.527	0.350
2439065.6454	4443.3543	0.070	0.637	0.415
6476	4443.3555	0.074	0.646	0.403
7024	4443.3836	0.097	0.662	0.390
7048	4443.3848	0.093	0.668	0.396
7097	4443.3873	0.105	0.655	0.392
7120	4443.3885	0.102	0.659	0.393
7170	4443.3911	0.106	0.651	0.399
7201	4443.3927	0.105	0.659	0.399
7455	4443.4056	0.102	0.674	0.400
7472	4443.4066	0.110	0.670	0.404
7525	4443.4093	0.114	0.665	0.398
8145	4443.4411	0.137	0.665	0.403
8173	4443.4426	0.140	0.662	0.404
8218	4443.4448	0.143	0.665	0.395
8300	4443.4490	0.137	0.685	0.389
8322	4443.4502	0.138	0.675	0.399
8805	4443.4750	0.162	0.679	0.398
8823	4443.4758	0.169	0.660	0.399
9234	4443.4969	0.163	0.680	0.409
9280	4443.4993	0.160	0.689	0.399
9324	4443.5016	0.163	0.685	0.405
2439066.6712	4443.8806	-0.077	0.571	0.355
6778	4443.8840	-0.085	0.562	0.372
8590	4443.9770	-0.167	0.536	0.367
8653	4443.9802	-0.170	0.541	0.356
8675	4443.9813	-0.166	0.535	0.361
8719	4443.9835	-0.172	0.537	0.366
9542	4444.0258	-0.179	0.527	0.359
9601	4444.0288	-0.175	0.526	0.365
9653	4444.0314	-0.178	0.532	0.364
2439068.8403	4444.9934	-0.192	0.520	0.363
8455	4444.9960	-0.189	0.513	0.366
9622	4445.0558	-0.188	0.536	0.355
9681	4445.0589	-0.188	0.540	0.350
9742	4445.0620	-0.182	0.535	0.347
2439069.7784	4445.4746	0.148	0.673	0.403
7811	4445.4760	0.149	0.674	0.408
8882	4445.5309	0.165	0.677	0.430

Julian Date.Time	Cycle.Phase	DV	D(B-V)	D(U-B)
2439069.8977	4445.5358	0.169	0.674	0.422
9286	4445.5516	0.173	0.696	0.406
9305	4445.5526	0.167	0.702	0.407
9345	4445.5547	0.169	0.702	0.400
9969	4445.5867	0.183	0.699	0.402
9991	4445.5878	0.190	0.687	0.417
2439071.8580	4446.5415	0.183	0.684	0.407
8626	4446.5438	0.184	0.685	0.415
8875	4446.5566	0.187	0.681	0.409
8900	4446.5579	0.185	0.684	0.417
8946	4446.5602	0.193	0.691	0.399
2439072.8440	4447.0472	-0.200	0.522	0.369
8461	4447.0484	-0.206	0.521	0.374
2439073.7333	4447.5035	0.166	0.686	0.404
7357	4447.5047	0.168	0.691	0.398
8512	4447.5640	0.194	0.690	0.411
8833	4447.5804	0.189	0.705	0.403
8854	4447.5815	0.192	0.694	0.405
9538	4447.6166	0.214	0.683	0.399
9756	4447.6278	0.199	0.691	0.411
9781	4447.6291	0.195	0.696	0.410
9985	4447.6396	0.198	0.692	0.405

Table III -- SU Cassiopeiae Observations

Julian Date.Time	Cycle.Phase	DV	D(B-V)	D(U-B)
2439036.9020	4428.6084	0.193	0.695	0.360
9166	4428.6158	0.204	0.690	0.392
2439037.9429	4429.1424	-0.113	0.551	0.374
9489	4429.1454	-0.107	0.552	0.375
9540	4429.1480	-0.111	0.560	0.369
2439038.9229	4429.6451	0.203	0.677	0.404
9300	4429.6488	0.211	0.673	0.394
9352	4429.6515	0.210	0.670	0.402
9415	4429.6547	0.208	0.682	0.395
2439039.9300	4430.1618	-0.132	0.547	0.346
9364	4430.1651	-0.123	0.553	0.365
9407	4430.1673	-0.131	0.531	0.379
9507	4430.1724	-0.127	0.569	0.343
9550	4430.1746	-0.124	0.558	0.360
9602	4430.1773	-0.119	0.555	0.364
2439040.8873	4430.6529	0.195	0.706	0.387
8932	4430.6559	0.203	0.669	0.390
8990	4430.6589	0.204	0.651	0.412
9063	4430.6627	0.193	0.681	0.390
9107	4430.6649	0.187	0.679	0.395
9216	4430.6705	0.188	0.674	0.395
2439041.9140	4431.1796	-0.099	0.559	0.379
9164	4431.1808	-0.106	0.567	0.368
9219	4431.1837	-0.099	0.570	0.368
9248	4431.1852	-0.104	0.571	0.366
2439042.8971	4431.6840	0.214	0.672	0.423
9042	4431.6876	0.206	0.681	0.409
9104	4431.6909	0.211	0.665	0.402
9162	4431.6938	0.203	0.690	0.383
9222	4431.6968	0.204	0.676	0.404
9288	4431.7002	0.208	0.657	0.402
2439044.8272	4432.6742	0.188	0.669	0.404
8331	4432.6772	0.188	0.675	0.406
9106	4432.7170	0.173	0.662	0.388
9133	4432.7183	0.162	0.671	0.399
2439045.7817	4433.1639	-0.116	0.575	0.365
7859	4433.1660	-0.112	0.565	0.378
2439046.6961	4433.6329	0.208	0.692	0.381
6985	4433.6341	0.212	0.682	0.386
7036	4433.6367	0.200	0.689	0.401
2439047.9086	4434.2550	-0.023	0.588	0.386
9163	4434.2590	-0.021	0.587	0.397
9237	4434.2627	-0.010	0.592	0.386
9307	4434.2664	0.002	0.597	0.377
9376	4434.2698	-0.003	0.596	0.396
9454	4434.2739	-0.	0.594	0.387
9866	4434.2950	0.018	0.609	-----
9911	4434.2973	0.020	0.618	-----
9977	4434.3007	0.019	0.615	0.393

Julian Date.Time	Cycle.Phase	DV	D(B-V)	D(U-B)
2439052.9261	4436.8290	0.027	0.598	0.365
9284	4436.8302	0.018	0.602	0.374
9322	4436.8322	0.026	0.591	0.376
9342	4436.8332	0.028	0.585	0.367
9382	4436.8352	0.016	0.592	0.363
9403	4436.8363	0.016	0.584	0.363
9950	4436.8644	-0.033	0.565	0.371
9976	4436.8657	-0.034	0.565	0.381
2439058.9466	4439.9177	-0.126	0.526	0.334
9511	4439.9200	-0.137	0.525	0.339
9556	4439.9224	-0.143	0.538	0.319
2439060.8864	4440.9128	-0.115	0.548	0.327
8890	4440.9142	-0.128	0.551	0.336
8984	4440.9190	-0.124	0.545	0.336
9024	4440.9211	-0.133	0.547	0.343
9531	4440.9471	-0.147	0.533	0.330
9563	4440.9487	-0.162	0.544	0.328
2439061.6838	4441.3220	0.024	0.630	0.386
6887	4441.3245	0.029	0.629	0.389
6927	4441.3265	0.028	0.633	0.402
7369	4441.3492	0.052	0.647	0.393
7421	4441.3519	0.049	0.650	0.399
8183	4441.3910	0.087	0.665	0.394
8224	4441.3931	0.087	0.661	0.391
2439062.7198	4441.8535	-0.051	0.588	0.362
7242	4441.8557	-0.046	0.575	0.361
7282	4441.8578	-0.057	0.586	0.366
8740	4441.9326	-0.154	0.535	0.356
8776	4441.9344	-0.148	0.536	0.355
8817	4441.9365	-0.157	0.532	0.369
9096	4441.9508	-0.173	0.536	0.359
9135	4441.9528	-0.171	0.535	0.364
9171	4441.9547	-0.166	0.533	0.360
9427	4441.9678	-0.179	0.530	0.365
9478	4441.9704	-0.181	0.527	0.362
9521	4441.9727	-0.183	0.536	0.361
9810	4441.9875	-0.183	0.518	0.364
9851	4441.9896	-0.185	0.520	0.359
2439063.7540	4442.3840	0.077	0.647	0.396
7576	4442.3859	0.083	0.646	0.390
8831	4442.4503	0.118	0.675	0.399
8865	4442.4520	0.117	0.680	0.394
8943	4442.4560	0.121	0.670	0.396
9422	4442.4806	0.135	0.680	0.400
9470	4442.4831	0.132	0.674	0.408
9851	4442.5026	0.143	0.687	0.414
9904	4442.5054	0.139	0.688	0.413

Julian Date.Time	Cycle.Phase	DV	D(B-V)	D(U-B)
2439064.8577	4904.8441	0.018	0.036	0.130
8933	4904.8554	0.003	0.047	0.142
8987	4904.8571	0.011	0.039	0.134
9297	4904.8669	0.021	0.031	0.139
9322	4904.8677	0.013	0.039	0.136
9371	4904.8693	0.011	0.042	0.131
9397	4904.8701	0.018	0.036	0.130
9437	4904.8714	0.017	0.040	0.131
9454	4904.8719	0.015	0.033	0.139
9788	4904.8826	0.018	0.031	0.142
9809	4904.8832	0.017	0.032	0.142
9849	4904.8845	0.013	0.036	0.128
2439065.8418	4905.1567	0.172	0.134	0.187
8462	4905.1581	0.173	0.126	0.192
8484	4905.1588	0.174	0.129	0.187
8525	4905.1600	0.178	0.126	0.188
8548	4905.1608	0.174	0.132	0.181
8882	4905.1713	0.189	0.138	0.194
8920	4905.1726	0.191	0.130	0.207
9451	4905.1895	0.213	0.155	0.210
9468	4905.1900	0.210	0.153	0.210
9509	4905.1913	0.219	0.155	0.209
9556	4905.1928	0.228	0.154	0.211
9947	4905.2052	0.244	0.164	0.217
9967	4905.2058	0.243	0.157	0.222
2439066.7743	4905.4528	0.335	0.198	0.237
7804	4905.4547	0.338	0.207	0.222
7861	4905.4565	0.341	0.195	0.231
8808	4905.4866	0.339	0.177	0.223
8860	4905.4882	0.332	0.186	0.226
9436	4905.5065	0.329	0.174	0.206
9458	4905.5073	0.323	0.180	0.205
9857	4905.5199	0.320	0.168	0.203
9879	4905.5206	0.308	0.175	0.212
9926	4905.5221	0.314	0.173	0.210
9946	4905.5227	0.318	0.167	0.203
2439068.7997	4906.0959	0.129	0.113	0.168
8026	4906.0969	0.134	0.107	0.174
8076	4906.0984	0.136	0.116	0.176
8099	4906.0992	0.136	0.106	0.187
8667	4906.1172	0.171	0.108	0.185
8699	4906.1182	0.162	0.113	0.187
9021	4906.1285	0.159	0.135	0.191
9075	4906.1302	0.170	0.123	0.190
9125	4906.1318	0.164	0.134	0.182
9835	4906.1543	0.195	0.137	0.201
9895	4906.1563	0.205	0.129	0.215
9944	4906.1578	0.192	0.151	0.197

Julian Date.Time	Cycle.Phase	DV	D(B-V)	D(U-B)
2439069.7677	4906.4034	0.356	0.197	0.253
7701	4906.4042	0.357	0.205	0.239
8335	4906.4243	0.359	0.194	0.247
8361	4906.4251	0.356	0.194	0.249
9054	4906.4471	0.354	0.193	0.231
9080	4906.4479	0.355	0.193	0.241
9111	4906.4489	0.355	0.191	0.235
9629	4906.4654	0.345	0.203	0.228
9653	4906.4661	0.352	0.193	0.224
2439071.7562	4907.0349	0.087	0.097	-----
2439071.9164	4907.0857	0.125	0.106	0.181
9212	4907.0873	0.129	0.111	0.187
2439072.0126	4907.1163	0.160	0.116	0.187
0144	4907.1169	0.155	0.119	0.176
0194	4907.1185	0.151	0.133	0.181
6944	4907.3328	0.338	0.210	0.215
6979	4907.3340	0.338	0.209	0.215
7312	4907.3445	0.346	0.204	0.236
7354	4907.3459	0.339	0.206	0.236
7823	4907.3608	0.352	0.202	0.244
7847	4907.3615	0.351	0.205	0.239
8605	4907.3856	0.353	0.197	0.239
8654	4907.3871	0.353	0.195	0.235
8671	4907.3877	0.355	0.194	0.243
8854	4907.3935	0.352	0.208	0.231
8882	4907.3943	0.358	0.204	0.233
9400	4907.4108	0.353	0.204	-----
2439073.7034	4907.6533	0.189	0.093	0.156
7066	4907.6543	0.173	0.105	0.140
8356	4907.6953	0.133	0.077	0.144
8383	4907.6961	0.140	0.070	0.144
8733	4907.7072	0.118	0.065	0.144
8754	4907.7079	0.116	0.064	0.146
9130	4907.7198	0.099	0.071	0.129
9152	4907.7205	0.099	0.070	0.127
9208	4907.7223	0.099	0.068	0.136
9235	4907.7231	0.098	0.071	0.132
9626	4907.7356	0.086	0.055	0.141
9652	4907.7365	0.092	0.047	0.139
4.0174	4907.7530	0.077	0.048	0.129
4.0198	4907.7538	0.079	0.038	0.153

Julian Date, Time	Cycle.Phase	DV	D(B-V)	D(U-B)
2439071.8430	12213.2623	0.613	0.083	0.513
8482	12213.2657	0.645	0.072	0.497
8707	12213.2799	0.688	0.097	0.499
8760	12213.2831	0.700	0.113	0.482
8793	12213.2853	0.718	0.094	0.494
2439072.7100	12213.8101	1.248	0.304	-----
7132	12213.8120	1.178	0.354	-----
7187	12213.8154	1.227	0.257	-----
7208	12213.8168	1.288	0.227	-----
7458	12213.8325	1.261	0.215	-----
7479	12213.8340	1.240	0.260	-----
7948	12213.8635	1.254	0.245	-----
7968	12213.8647	1.247	0.254	-----
8019	12213.8680	1.231	0.311	-----
8038	12213.8693	1.181	0.388	-----
9104	12213.9364	0.966	0.147	-----
9125	12213.9379	0.933	0.183	-----
9311	12213.9496	0.849	0.100	-----
9333	12213.9509	0.828	0.100	-----
2439073.8645	12214.5391	1.041	0.242	0.622
8951	12214.5583	1.024	0.290	0.607
8979	12214.5601	1.070	0.275	0.576
9044	12214.5642	1.116	0.261	0.557
9312	12214.5812	1.066	0.301	0.706
9337	12214.5828	1.112	0.288	0.585
9397	12214.5864	1.057	0.329	0.607
9430	12214.5886	1.108	0.298	0.643
9860	12214.6157	1.159	0.319	0.640
9888	12214.6176	1.144	0.300	0.626
4.0067	12214.6288	1.156	0.335	0.504
4.0092	12214.6304	1.161	0.283	-----

Table II -- SZ Tauri Observations

Julian Date.Time	Cycle.Phase	DV	D(B-V)	D(U-B)
2439038.9597	4896.6193	0.207	0.122	0.162
9647	4896.6209	0.212	0.104	0.158
2439040.9481	4897.2508	0.281	0.188	0.224
9530	4897.2524	0.275	0.193	0.221
2439042.0071	4897.5871	0.251	0.140	0.174
0147	4897.5895	0.245	0.128	0.188
0168	4897.5902	0.236	0.126	0.177
9993	4897.9022	0.014	0.030	0.147
2439043.0042	4897.9038	0.014	0.037	0.152
2439052.9571	4901.0646	0.097	0.095	0.178
9593	4901.0653	0.116	0.073	0.181
9632	4901.0666	0.097	0.092	0.181
9654	4901.0673	0.102	0.095	0.178
2439053.0055	4901.0800	0.115	0.109	0.166
0081	4901.0808	0.114	0.109	0.166
2439058.9143	4902.9565	0.021	0.055	0.148
9175	4902.9576	0.025	0.045	0.152
9257	4902.9602	0.035	0.047	0.158
9285	4902.9611	0.055	0.042	0.145
2439059.0000	4902.9838	0.046	0.047	0.142
0057	4902.9856	0.029	0.044	0.174
2439060.9412	4903.6002	0.235	0.124	0.165
9452	4903.6015	0.258	0.108	0.167
9992	4903.6187	0.206	0.100	0.167
2439061.0021	4903.6196	0.199	0.098	0.165
0067	4903.6211	0.195	0.102	0.167
8050	4903.8746	0.016	0.039	0.144
8091	4903.8759	0.019	0.036	0.141
2439062.7417	4904.1721	0.214	0.159	0.179
7471	4904.1738	0.212	0.157	0.198
7519	4904.1754	0.212	0.161	0.198
8888	4904.2188	0.250	0.170	0.228
8930	4904.2202	0.256	0.166	0.217
8967	4904.2213	0.261	0.163	0.222
9247	4904.2302	0.262	0.189	0.229
9283	4904.2313	0.266	0.180	0.227
9966	4904.2531	0.283	0.183	0.244
2439063.0008	4904.2544	0.279	0.192	0.224
9198	4904.5462	0.300	0.153	0.192
9238	4904.5475	0.300	0.149	0.199
9256	4904.5480	0.292	0.149	0.199
9339	4904.5507	0.291	0.156	0.201
9560	4904.5577	0.285	0.149	0.197
9604	4904.5591	0.282	0.153	0.187
2439064.0003	4904.5718	0.275	0.145	0.182
0049	4904.5732	0.279	0.139	0.194
8438	4904.8397	0.014	0.040	0.136
8482	4904.8411	0.011	0.040	0.136
8504	4904.8418	0.008	0.044	0.132
8553	4904.8433	0.012	0.031	0.140

Table V -- Comparison and Check Stars

Comparison (C) or Check (K) Star	V ± m.s.e.	(B-V) ± m.s.e.	(U-B) ± m.s.e.
		SW Tau	
BD + 4°683 (C)	8.845 ± .003	+0.497 ± .003	-0.028 ± .002
+ 2°692 (K)	6.945	+0.549	+0.067
m.s.e. of mean differences	± .002	± .002	± .003
		SZ Tau	
+19°742 (C)	6.365 ± .004	+0.742 ± .002	+0.399 ± .002
+19°740 (K)	7.262	+0.549	+0.128
m.s.e. of mean differences	± .002	± .002	± .002
		SU Cas	
+67°224 (C)	5.964 ± .0026	+0.116 ± .002	+0.118 ± .002
+67°215 (K)	6.651	+0.412	+0.207
m.s.e. of mean differences	± .002	± .003	± .004

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HD 72754 - A NEW Be VARIABLE STAR OF BETA LYRAE TYPE

The star HD 72754 (Bp; $8^h29^m.4$, $-49°16'$, 1900, with note "The line $H\beta$ is bright. The helium lines are faint") was found on Radcliffe slit spectra to have a remarkable early B type shell + stellar spectrum with variable velocity. A request for photometry was addressed to the Royal Observatory, Cape, and observations were secured over three successive seasons concurrently with Radcliffe spectroscopy.

The Cape observations (in U,B,V, with the 1.02m Elizabeth reflector) are listed in Table I, the first 11 by one of us (P.W.H.) which showed the star to be variable with small amplitude; the remainder were made by many observers on the Cape staff including J.B.A. who also organised the reductions.

The observations are plotted (V, B-V, U-B) in fig.1 against phase using the reciprocal period

$$P^{-1} = .029648 \text{ days}^{-1} \text{ or } P = 33.72 \text{ days}.$$

This period was determined from a least-squares solution for the radial velocity measures (by A.D.T.). The photometry had first suggested a period of order 17 days but the spectroscopy clearly demonstrated that there must be two minima in a period twice as great.

The numerous photometric observations now available confirm the difference between the two minima based on the longer period. The deeper of the minima in V occurs at about phase .16 when the spectra show that the visible star is in superior conjunction. Although the B-V colour remains remarkably constant through the cycle, U-B does not and has a greater variation during the secondary minimum of V (inferior conjunction).

The spectroscopic orbit will be published elsewhere. The spectra have not demonstrated the nature of the secondary star but a massive system is indicated and the complex phenomena are strikingly reminiscent of β Lyr and W Crucis. It is possible that the variations in V are entirely ellipsoidal in character; but the behaviour of U-B can be qualitatively understood if the U magnitude is dominated by H recombination beyond the Balmer limit in a gaseous stream which is partly obscured during both minima and more so with the bright star in front.

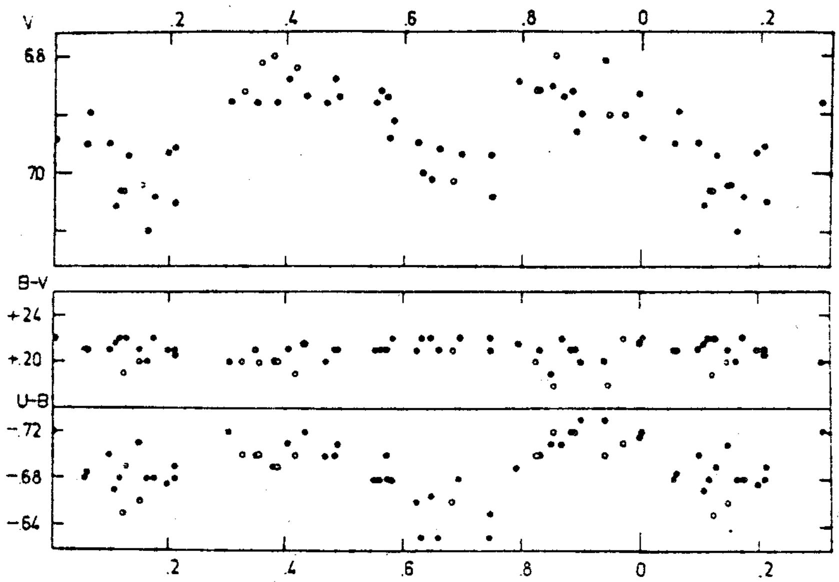

Fig. 1
Light and Colour-curve of HD 72754 (V, B-V, U-B).
Phases are computed from .029648 (JD - 2,400,000).
First season's observations shown with open circles.

The observed variations can be summarised as follows:

V = 6.84 to 7.06 (1), 6.99 (2)
B - V = +0.19
U - B = -0.73 to -0.67: (1), -0.65: (2).

The scatter about the mean curves must be mainly intrinsic in character, as is often found in massive close binaries.

It will be of interest to look for systematic variation in period such as has been found in βLyr as perhaps the most significant instance of rapid stellar evolution during a few decades.

Our thanks are due to Dr R.H. Stoy and Mr G.Harding for access to the Royal Observatory equipment for these observations during the three relevant seasons, and to the Cape staff for much assistance in making the observations. One of us (P.W.H.) is indebted to the Science Research Council for a travel grant.

Observations of HD 72754.

Heliocentric J.D.	V	B–V	U–B	Phase
243 9929.323	$6^{m}.86$	$+0^{m}.20$	$-0^{m}.70$	.825
9930.365	6.80	+0.22	–0.72	.855
9933.408	6.90:	+0.22	–0.70	.946
9934.285	6.90	+0.18	–0.71	.972
9939.346	7.03	+0.21	–0.65	.122
9940.342	7.02	+0.20	–0.66	.151
9946.280	6.86	+0.20	–0.70	.327
9947.305	6.81	+0.20	–0.70	.357
9948.281	6.80	+0.20	–0.69	.387
9949.299	6.82	+0.21	–0.70	.417
9958.264	7.01	+0.19	–0.66	.683
244 0181.585	6.88	+0.20	–0.72	.304
0187.587	6.84	+0.19	–0.70	.482
0190.574	6.87	+0.19	–0.70	.570
0196.567	7.04	+0.19	–0.63	.748
0200.588	6.87	+0.18	–0.71	.867
0210.586	7.10	+0.20	–0.68	.163
0221.525	6.87	+0.19	–0.71	.488
0224.425	6.94	+0.19	–0.68	.574
0228.516	6.97	+0.18	–0.68	.695
0235.426	6.90	+0.20	–0.73	.900
0252.432	6.84	+0.19	–0.71	.404
0257.430	6.88	+0.19	–0.68	.552
0258.435	6.91	+0.18	–0.68	.582
0267.451	6.85	+0.21	–0.71	.849
0270.481	6.81	+0.20	–0.73	.939
0274.419	6.95	+0.19	–0.68	.056
0278.403	7.04	+0.18	–0.68	.174
0284.339	6.88	+0.19	–0.70	.350
0285.371	6.88	+0.20	–0.69	.381
0288.321	6.88	+0.20	–0.70	.468
0291.417	6.86:	+0.19	–0.68	.560
0302.330	6.86	+0.19	–0.72	.883
0306.313	6.94	+0.18	–0.72	.002
0311.300	7.02	+0.19	–0.71	.149
0312.342	7.05	+0.19	–0.69	.180
0336.286	6.93	+0.19	–0.72	.890
0343.246	6.95	+0.19	–0.70	.097
0344.273	6.97	+0.18	–0.69	.127
0361.248	7.00	+0.18	–0.63	.630
0362.233	6.96	+0.19	–0.63	.659
0365.218	6.97	+0.18	–0.65	.748
0613.424	7.05	+0.18	–0.67	.107
0616.502	6.96	+0.19	–0.67	.198

Heliocentric J.D.	V	B-V	U-B	Phase
244 0624.425	$6^m_.87$	$+0^m_.18$	$-0^m_.72$	.433
0643.451	6.86	+0.18	-0.71	.997
0647.426	7.03	+0.18	-0.68	.115
0665.345	7.01	+0.18	-0.66	.646
0670.326	6.84	+0.18	-0.69	.794
0679.349	6.89	+0.19	-0.68	.061
0684.366	6.95	+0.19	-0.68	.210
0698.243	6.95	+0.19	-0.66	.622
0705.269	6.86	+0.19	-0.70	.830

1970 October

A.D. THACKERAY
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J.B. ALEXANDER
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P.W. HILL
(University Observatory, St Andrews).

COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 484

Konkoly Observatory
Budapest
1970 November 5

FLARES OF UV CETI

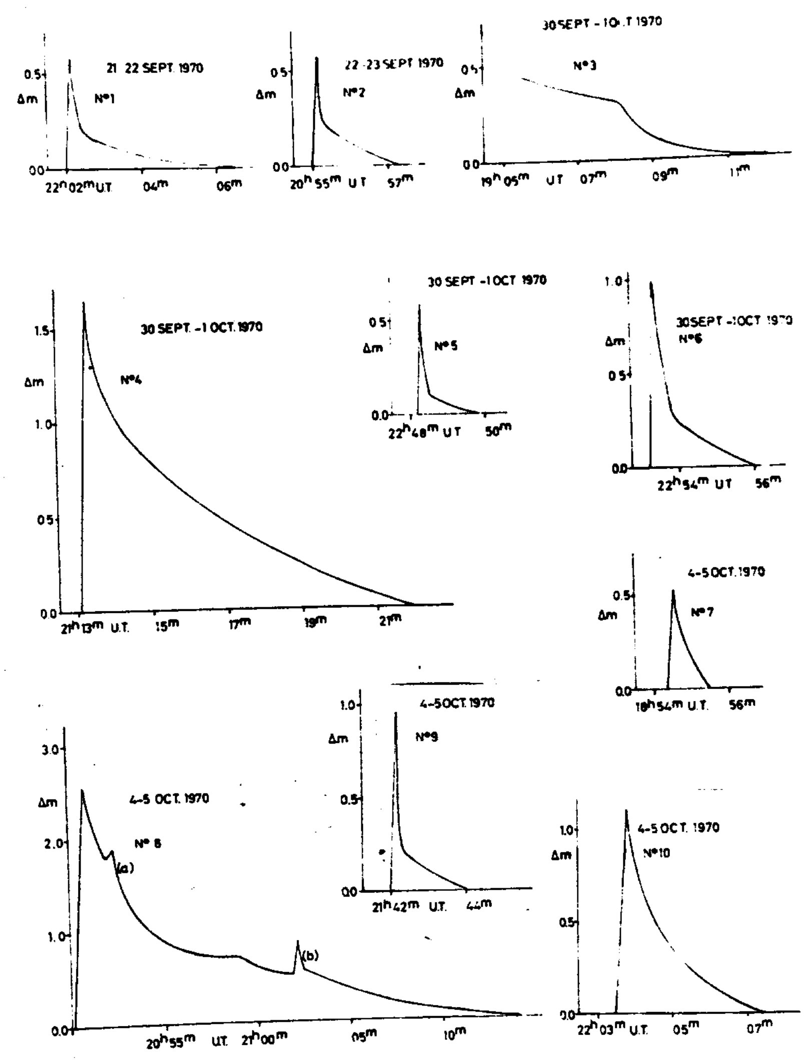
During the recent International Co-operative period from the 22nd September to the 9th October, 1970, the flare star UV Ceti was monitored at Boyden Observatory for a total time of 25^h19^m. The 40 cm aperture Nishimura telescope was used for this work, fitted with a Johnson B.Filter and a solid carbon-dioxide cooled E.M.I.type 6256 photomultiplier tube.

The table gives full details of the monitoring period. It will be seen that fifteen flares were recorded during the period, several of them being classed as major flares, especially Nos.4, 8 and possibly Nos.10 and 11.

Monitoring Table of UV Ceti

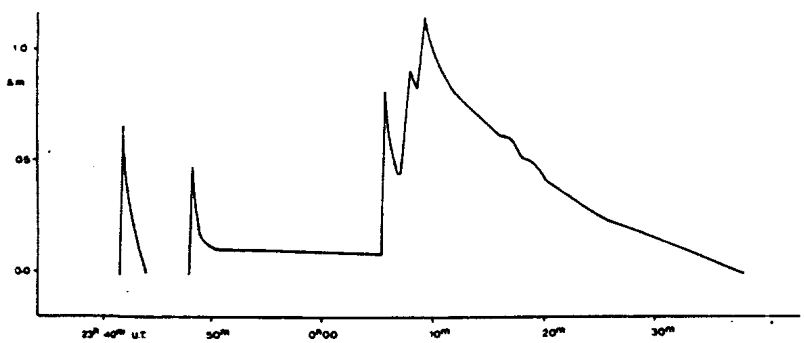
Date 1970	U.T.	Total hours per night	Flare No.	U.T. of flare	Duration	Δm
Sept. 20–21	20^h13^m–20^h40^m					
	20 58 –21 34	1^h03^m				
21–22	19 23 –22 41	3 18	1	$22^h02^m.0$	$5^m.0$	0.58
22–23	19 00 –22 30	3 30	2	20 55.0	2.2	0.57
23–24	20 52 –22 13	1 21				
30–Oct.1	18 23 –23 12	4 49	3	19 05.5	6.5	0.44
			4	21 13.1	8.9	1.53
			5	22 48.2	1.6	0.59
			6	22 53.3	2.7	0.99
Oct. 1–2	18 17 –22 45	4 28				
4–5	18 07 –22 55	4 48	7	18 54.4	1.2	0.53
			8	20 50.1	23.9	2.56
			8a	–	–	1.90
			8b	–	–	0.88
			9	21 42.0	2.0	0.96
			10	22 03.5	4.0	1.10
5–6	18 38 –20 40	2 02	11	18 50.6	3.7	1.03
			12	19 05.5	5.5	0.88
			12a			0.52
Total		25^h19^m				

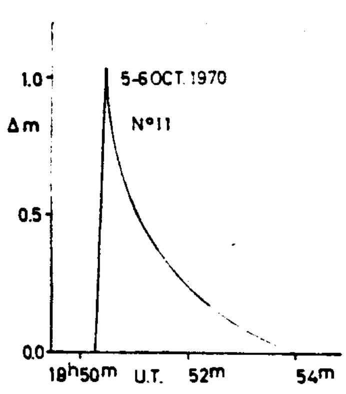
(Mean amplitude of flare activity 1.00)

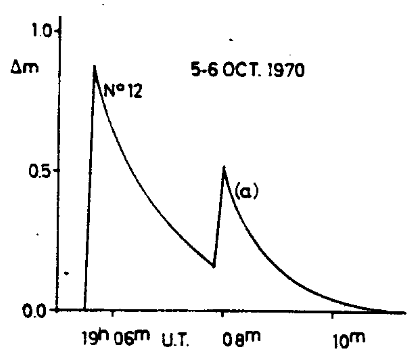

21 22 SEPT. 1970
N°1
22-23 SEPT 1970
N°2
30 SEPT - 1 OCT 1970
N°3
30 SEPT. -1 OCT. 1970
N°4
30 SEPT -1 OCT 1970
N°5
30 SEPT -1 OCT 1970
N°6
4-5 OCT. 1970
N°7
4-5 OCT. 1970
N°8
4-5 OCT. 1970
N°9
4-5 OCT. 1970
N°10
Δm
U.T.

MAJOR FLARE of UV Ceti

5-6 October 1967







Flare No.8 is particularly interesting in that it shows characteristics similar to those recorded during previous observations of UV Ceti by Eksteen. It was of an appreciable duration, of the order of 25^m. In this connection it is also of interest to compare the profile with that obtained during a major flare of UV Ceti during the 5th-6th October 1967 (previously not published).

	U.T. of flare	Duration	Δm
Flare of 5-6th October 1967.	$23^h40^m.9$	$1^m.1$	0.66
	23 44.0	25.0	0.48
			0.81
			0.90
			1.14

The level of activity during the monitored period was quite high; the mean amplitude being approximately $\Delta m = 1$.

It should be pointed out that with respect to flare No.3 the maximum is not shown as it was missed during recording of the background sky intensity - hence the values for duration and Δm should be taken with some reservation in this case.

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P.O. Box 339
BLOEMFONTEIN
Rep. of South Africa

Ref: J.P. Eksteen, 1968, MNASSA. Vol XXVII, page 145.

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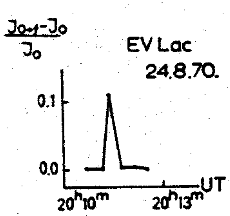
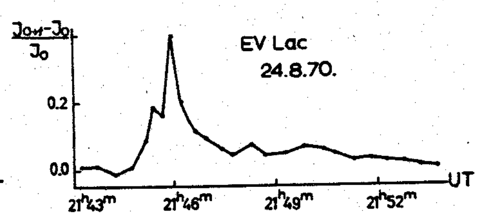
NUMBER 485

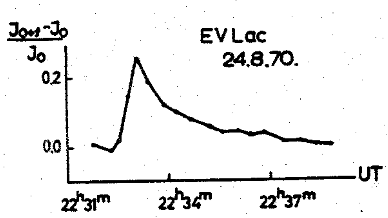
Konkoly Observatory
Budapest
1970 November 7

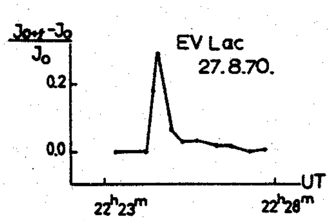
PHOTOELECTRIC OBSERVATIONS OF EV Lac DURING THE INTERNATIONAL CAMPAIGN 23 AUGUST-9 SEPTEMBER 1970

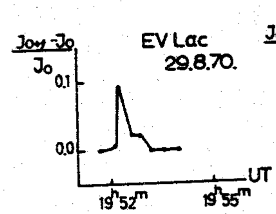
The results of photoelectric observations of the flare star EV Lac made at the Crimean Astrophysical Observatory during the International Campaign 23 August-9 September 1970 are given. The observations were made in the photometric system B using the 64-cm meniscus telescope. The time intervals covered with observations are given in Table I. Table II.contains the characteristics of the flares observed. The light curves are given on Figures.











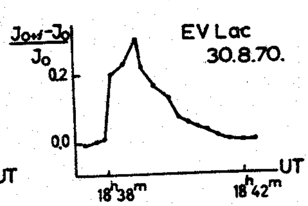
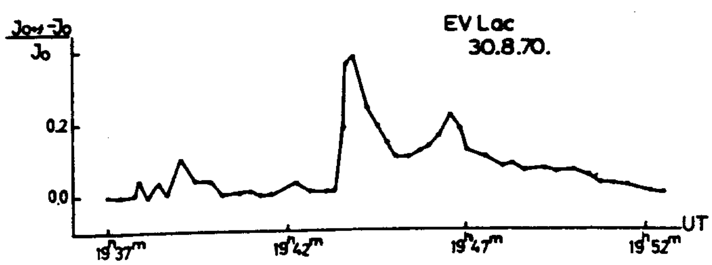
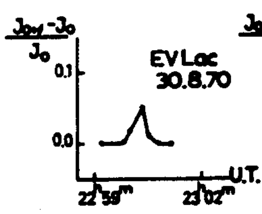
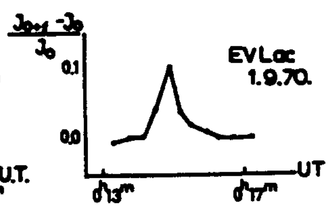


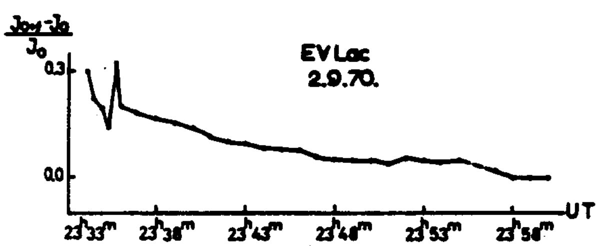
Table I

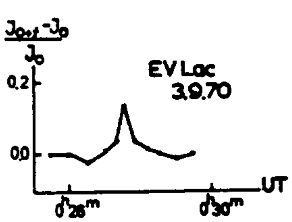
Date, 1970	Coverage (U.T.)
Aug.	
23.	19 51-20 44, 20 45-21 02
24.	18 20-18 29, 20 10-20 19, 20 20-20 23, 20 28-21 00, 21 01-21 33, 21 34-21 55, 22 01-22 41, 22 42-22 58, 23 01-23 06, 23 55-24 02
27	21 55-22 33, 22 37-22 53, 22 55-23 08, 23 10-23 56, 23 57-24 00
28	00 00-00 22, 00 23-00 50, 00 51-01 16, 01 17-01 30, 18 55-19 32, 19 33-20 03, 20 04-20 34, 20 35-21 05, 21 06-21 37, 21 38-22 16, 22 17-22 52, 22 53-23 23, 23 24-24 00
29	00 00-00 30, 00 31-01 03, 01 04-01 38, 18 16-18 49, 18 51-19 04, 19 06-19 28, 19 34-20 15, 20 19-20 39, 20 50-21 03, 21 16-21 22, 21 28-21 57, 22 03-23 30
30	18 05-18 14, 18 16-18 26, 18 27-19 56, 19 57-21 49, 21 55-22 20, 22 21-22 42, 22 43-24 00
31	00 00-00 16, 00 18-01 15, 18 03-18 13, 18 14-18 38, 18 39-18 47, 18 48-19 10, 19 13-21 39, 21 45-23 48, 23 54-24 00
Sept.	
1	00 00-00 17, 00 19-01 20, 19 39-19 52, 20 45-21 13, 21 14-21 27, 21 32-23 08
2	18 00-18 07, 19 00-19 23, 19 33-19 42, 19 47-20 06, 20 07-20 42, 20 46-21 53, 22 01-23 23, 23 33-24 00
3	00 02-01 30, 17 48-19 09, 19 15-19 33, 19 53-20 01, 20 07-20 30, 20 34-20 41, 21 40-22 39, 22 49-23 03
4	18 15-18 47, 18 48-19 30, 22 13-24 00
5	00 00-00 08, 00 09-01 30
8	17 30-17 44, 17 47-18 01, 18 04-18 29, 18 30-19 00, 19 04-19 26, 19 28-20 00, 20 02-20 29, 20 40-20 58, 21 03-21 32, 21 33-22 18, 22 22-24 00
9	00 00-01 30, 17 27-17 35, 17 36-17 56, 17 57-18 20, 18 31-18 44, 18 54-19 03, 19 05-19 33, 19 35-20 00, 20 02-20 51, 21 03-21 52


EV Lac
30.8.70.
0,2
0,0
UT
19h37m
19h42m
19h47m
19h52m


EV Lac
30.8.70
0,1
0,0
U.T.
22h59m
23h02m


EV Lac
1.9.70.
0,1
0,0
UT
0h13m
0h17m


EV Lac
2.9.70.
0,3
0,0
UT
23h33m
23h38m
23h43m
23h48m
23h53m
23h58m


EV Lac
3.9.70
0,2
0,0
UT
0h28m
0h30m

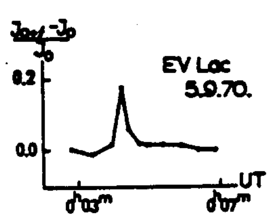
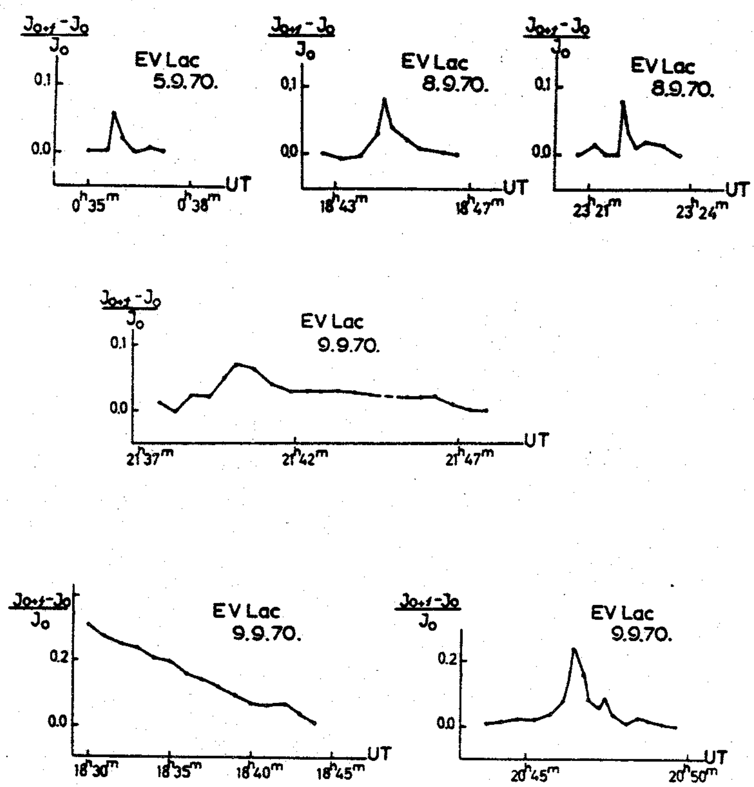

EV Lac
5.9.70.
0,2
0,0
UT
0h03m
0h07m

Table II

Date 1970		U.T. of flare maximum	Durations before and after max., minutes t_b	t_a	Δm_B	σ/I_o	P minutes	Air mass M(z)
Aug.	24	$20^h11^m.4$	0.2	0.4	0.12	0.02	0.03	1.09
	24	21 46.0	1.3	7	0.34	0.02	0.61	1.04
	24	22 33.1	0.7	5	0.22	0.02	0.44	1.00
	27	22 24.6	0.4	2.5	0.28	0.03	0.18	1.01
	29	19 52.3	0.2	0.8	0.09	0.02	0.02	1.08
	30	18 39.0	1.2	2.5	0.29	0.02	0.40	1.16
	30	19 43.8	0.5	8.2	0.36	0.03	1.06	1.06
	30	23 00.3	0.5	0.5	0.05	0.02	0.02	1.02
Sept.	1	00 14.9	0.7	1.3	0.10	0.02	0.09	1.10
	1	21 25.0	–	–	0.4:	–	–	1.00
	2	23 30	–	>25	>0.3	0.02	>24	1.05
	3	00 27.5	0.5	1.0	0.13	0.02	0.06	1.14
	5	00 04.2	0.5	1.2	0.19	0.02	0.07	1.12
	5	00 35.7	0.2	0.5	0.05	0.02	0.02	1.16
	8	18 44.5	0.6	1.5	0.13	0.02	0.05	1.04
	8	23 22.0	0.1	1.5	0.08	0.02	0.03	1.01
	9	18 25	–	>19	>0.3	0.03	>1.9	1.16
	9	20 46.5	1.0	2.5	0.23	0.03	0.25	1.13
	9	21 40.2	1.6	7	0.07	0.02	0.29	1.01



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COMMISSION 27 OF THE I. A. U.
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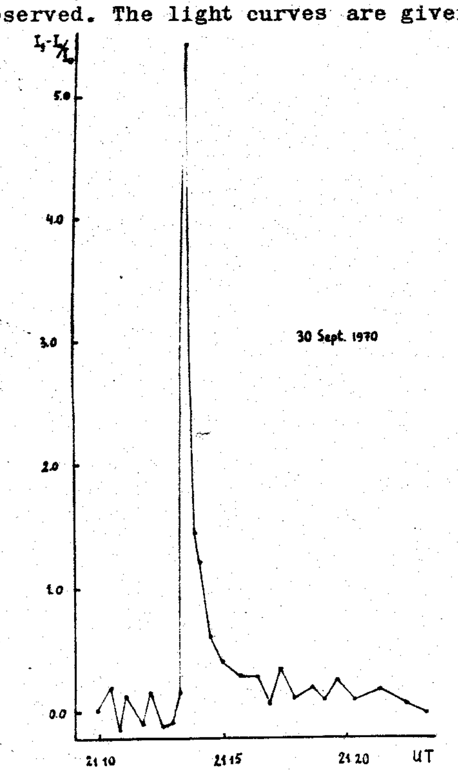
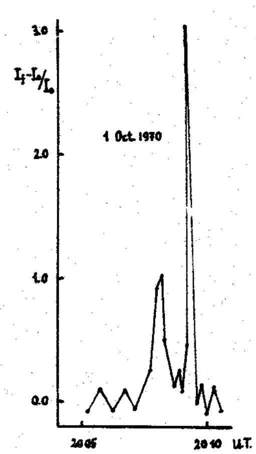
NUMBER 486

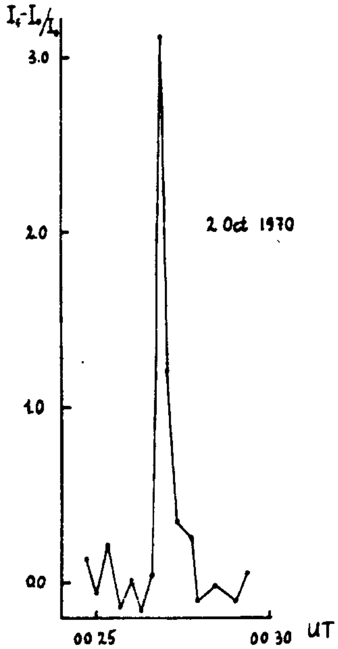
Konkoly Observatory
Budapest
1970 November 7

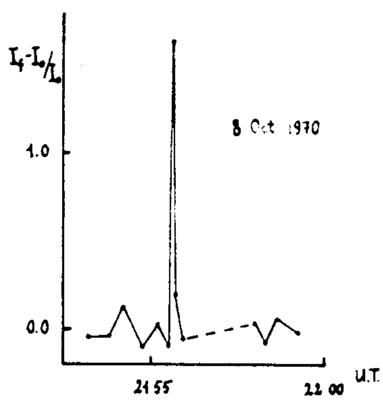
PHOTOELECTRIC OBSERVATIONS OF UV Cet DURING THE INTERNATIONAL CAMPAIGN 22 SEPTEMBER - 9 OCTOBER 1970

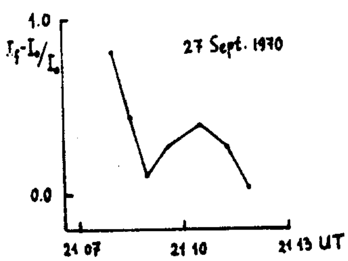
The results of photoelectric observations of the flare star UV Cet made at the Crimean Astrophysical Observatory during the International Campaign 22 September-9 October 1970 are given. The observations were made in the photometric system B using the 64-cm meniscus telescope. The time intervals covered with observations are given in Table I. Table II contains the characteristics of the flares observed. The light curves are given on Figures.

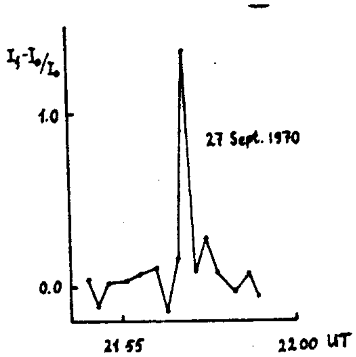





$I_f - I_o/I_o$
3.0
2.0
1.0
0.0
2 Oct 1970
00 25
00 30
UT


$I_f - I_o/I_o$
1.0
0.0
8 Oct 1970
21 55
22 00
U.T.


1.0
$I_f - I_o/I_o$
0.0
27 Sept. 1970
21 07
21 10
21 13 UT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1.0
0.0
27 Sept. 1970
21 55
22 00 UT

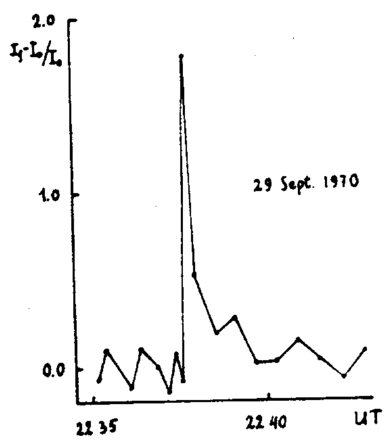
2.0
$I_f - I_o/I_o$
1.0
0.0
29 Sept. 1970
22 35
22 40
UT

Table I

Date, 1970	U.T. of coverage
Sept.	
27	19 54-19 59, 20 01-20 15, 20 20-20 24, 20 28-20 34, 20 36-20 47, 20 50-20 51, 20 53-21 06, 21 08-21 25, 21 27-21 33, 21 35-22 05, 22 06-23 01, 23 03-23 58, 24 02-24 25
29	19 34-20 45, 20 46-22 48, 22 50-23 10,(23 13-23 34, 23 40-23 51, 23 54-24 00)
30	(00 00-00 08, 00 10-00 16, 00 17-00 45, 00 49-00 54, 00 56-01 04),19 40-20 15, 20 17-21 32, 21 35-21 43, 21 45-22 12
Oct.	
1	19 27-20 14, 20 16-22 26, 22 28-22 43, 23 00-23 06, 23 16-24 00
2	00 00-00 01, 00 11-00 30, 00 34-00 42, 00 48-00 54
8	19 48-21 25, 21 27-23 18, 23 20-24 00
9	00 00-00 23, 00 31-00 35, 00 40-01 07, 01 10-01 11

Table II

Date 1970		U.T. of flare maximum	Durations before and after max., minutes		Δm_B	σ/I_o	P minutes
			t_b	t_a			
Sept.	27	$21^h08^m.0$*	–	–	0.64	0.08	>1.18
	27	21 56.8	0.2	1.2	0.93	0.10	0.48
	29	22 37.6	0.1	4.1	1.11	0.11	0.86
	30	21 13.4	0.2	10	2.02	0.13	4.40
Oct.	1	20 08.2	0.2	0.8	0.75	0.08	0.66
	1	20 09.1	0.1	0.6	1.51	0.08	0.91
	2	00 26.8	0.2	1.0	1.54	0.14	1.14
	8	21 55.6	0.1	0.5	1.05	0.09	0.33

*The beginning and maximum of this flare were missed.

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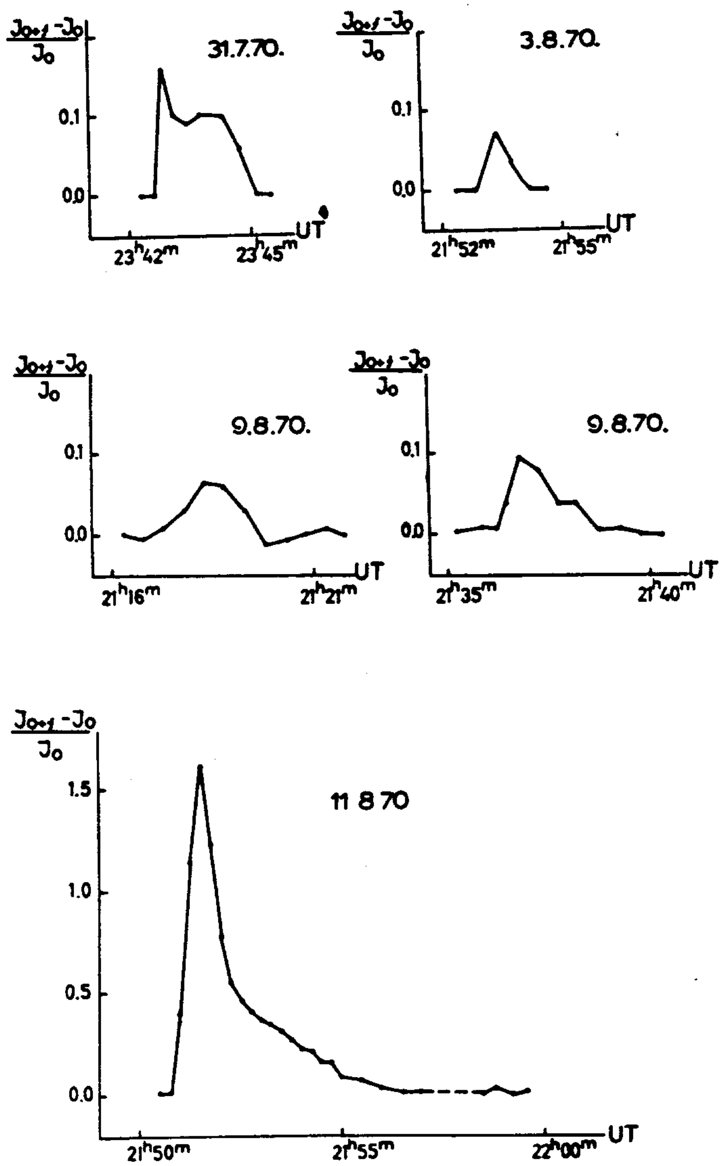
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 487

Konkoly Observatory
Budapest
1970 November 8

FLARES OF AC +8°142 - 393.

In the course of our programme of photoelectrical monitoring of a number of dM, dMe and UV Ceti type stars we observed the star AC +8°142 - 393, Gliese 735 (1), spectral type dM2e. Nothing about the flare activity of this star was known.

Our photoelectric observations were made in the system similar to B with the 64-cm meniscus telescope of the Crimean Astrophysical Observatory. The dates and UT of coverage are given in Table 1. Table 2 contains the following characteristics of flares; moment of maxima (UT); duration of flares before and after maximum, t_b and t_a (in minutes); amplitude of flare Δm_B in stellar magnitudes; the limiting amplitude of a flare Δm_{lim} which could be detected; integrated intensities P (in minutes); and the air masses M(z). The detailed description of the manner in which these characteristics should be obtained was given earlier (2). The light curves of flares inrelative intensities are given on the figures. The total coverage was 30^h06^m.



Jo+1 - Jo / Jo
31.7.70.
0.1
0.0
UT
23h42m
23h45m
Jo+1 - Jo / Jo
3.8.70.
0.1
0.0
UT
21h52m
21h55m
Jo+1 - Jo / Jo
9.8.70.
0.1
0.0
UT
21h16m
21h21m
Jo+1 - Jo / Jo
9.8.70.
0.1
0.0
UT
21h35m
21h40m
Jo+1 - Jo / Jo
11 8 70
1.5
1.0
0.5
0.0
UT
21h50m
21h55m
22h00m

Table 1

Date, 1970	Coverage U.T.		
31 July	21^h35^m–21^h39^m;	21^h43^m–22^h05^m;	22^h07^m–22^h25^m;
	22 27 –22 57 ;	23 15 –23 36 ;	23 38 –24 00 ;
1 August	00 02 –00 25 ;		
3 August	21 47 –22 10 ;	22 11 –23 36;;	23 37 –23 57 ;
	23 59 –24 22 ;		
4 August	00 25 –00 37 ;	21 12 –21 22;;	21 23 –21 44 ;
	21 45 –22 09 ;	22 10 –22 32 ;	22 33 –23 46 ;
6 August	21 10 –21 45 ;	21 52 –23 35 ;	23 48 –23 56 ;
7 August	21 11 –22 06 ;	22 07 –23 05 ;	23 07 –23 40 ;
8 August	21 24 –22 20 ;	22 21 –22 32 ;	22 40 –23 40 ;
9 August	19 07 –19 25 ;	19 27 –20 09 ;	20 11 –20 33 ;
	20 34 –22 30 ;	22 35 –22 51 ;	22 52 –23 19 ;
	23 26 –23 35 ;		
10 August	20 15 –20 43 ;	20 46 –21 24 ;	21 25 –21 47 ;
	21 53 –22 13 ;	22 15 –22 28 ;	22 29 –22 50 ;
	22 55 –23 09 ;	23 10 –23 27 ;	
11 August	18 44 –19 08 ;	19 12 –19 36 ;	19 37 –20 02 ;
	20 04 –20 31 ;	20 32 –21 09 ;	21 11 –22 00 ;
	22 09 –22 29 ;	23 05 –23 20 ;	
13 August	19 32 –19 54 ;	19 55 –20 02 ;	20 04 –20 24 ;
	20 25 –20 36 ;	20 57 –21 18 ;	21 19 –21 46 ;
20 August	18 16 –18 21 ;	18 22 –18 44 ;	18 45 –19 06 ;
	19 07 –19 33 ;	19 35 –19 58 ;	20 00 –21 00 ;
	21 01 –21 23 ;		
22 August	18 25 –18 47 ;	19 59 –20 04 ;	20 06 –20 35 ;
	20 37 –21 09 ;	21 11 –21 35.	

Table 2.

Date and UT of flare maximum		t_b	t_a	Δm_B	Δm_{lim}	P	M(z)
31 July	$23^h42^m.8$	$0^m.2$	$2^m.4$	$0^m.15$	$0^m.05$	0.11	2.0
3 Aug.	21 53.3	0.5	0.9	0.07	0.02	0.05	1.4
9 Aug.	21 18.4	1.3	1.3	0.06	0.04	0.09	1.4
9 Aug.	21 36.7	0.5	2.0	0.10	0.04	0.13	1.4
11 Aug.	21 51.5	0.7	5.0	1.00	0.03	2.18	1.5

N.I. SHAKHOVSKAYA
Crimean Astrophisical Observatory

K.L. MASLENNIKOV
Leningrad State University

References

(1) W.Gliese, Veröffentlichungen des Astronomischen Rechen - Institut in Heidelberg

(2) A.D.Andrews, P.F.Chugainov, R.E.Gershberg, V.S.Oskanjan; IBVS No.326, 1969.

COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 488

Konkoly Observatory
Budapest
1970 November 11

PHOTOELECTRIC OBSERVATIONS OF EV Lac

Photoelectric monitoring of EV Lac was carried out at the Byurakan Observatory with the 50 cm reflector in the time interval 23 August - 9 September 1970, proposed by the "working group" (IBVS 416). The observations were made with a standard B filter.

From the experience achieved during a statistical investigation of flare data, we thought it more opportune to present our observational data in a form which seems to be more convenient from the point of view of further statistical and other investigations.

Denoting by

UT_{max} - the UT of the maximum

t_b - the duration of the light increase in minutes,

t_a - the duration of the light decrease in minutes,

X_S - the deflection - for a fixed sampling time interval - due to the normal radiation of the star,

$\bar{X}_s$ - the mean value of X_s (in the case of a flare this value is calculated from the X_s immediately preceding the flare),

σ - the standard deviation of X_s,

X_f - the deflection due to the radiation of the flare itself,

X_{fM} - the maximum deflection of the flare,

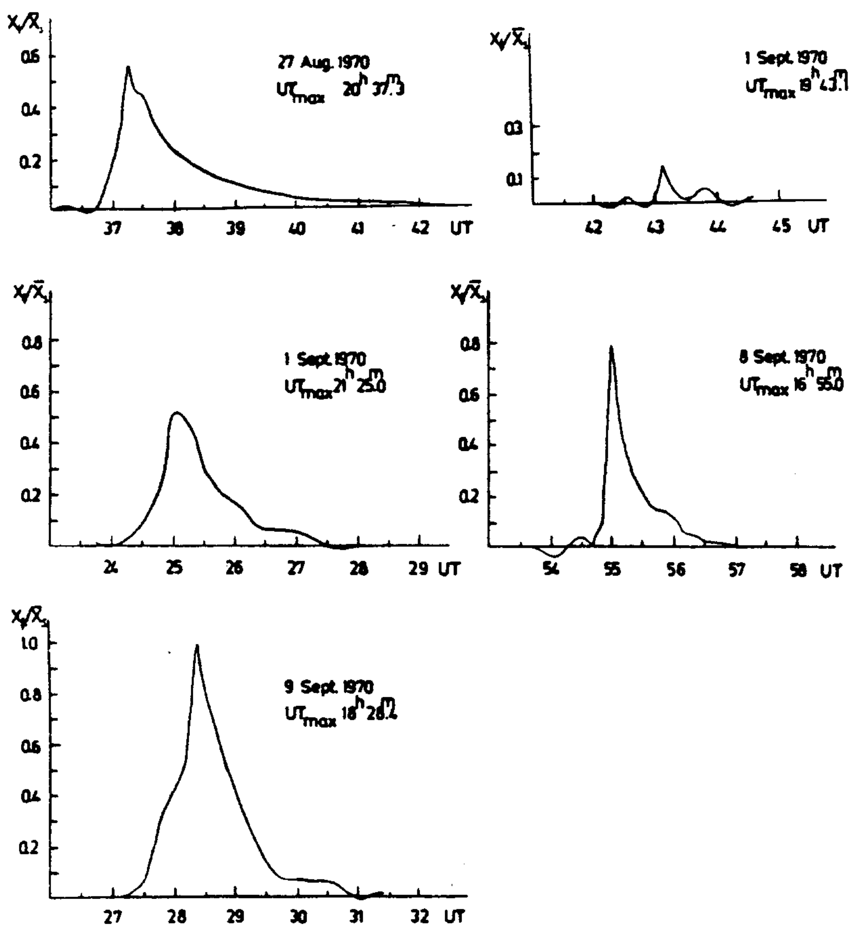
P - the value of $\int_{t_1}^{t_2}(X_f/\bar{X}_s)dt$ in minutes (t_1 and t_2 being the moments of the beginning and the end of the flare),

F(z) - the air mass at the moment of the flare,

we can present the observational data in the following form:

Table I

Data UT 1970	Coverage UT	UT_{max}	t_b	t_a	$\frac{X_{fM}}{\bar{\bar{X}}_s}$	$\frac{\sigma}{\bar{\bar{X}}_s}$	P	F(z)	Remarks
Aug.									
23	1731-2045								1
	2100-2220								
24	1800-2200								1
	2209-2309								2
25	1700-2200								1
	2208-2400								
26	0000-0008								1
27	1745-1855					0.026			
	1912-2130	$20^h37^m.3$	0.63	3.33	0.56	0.026	0.74	1.03	2
	2145-2200					0.026			4
28	1811-2133					0.021			2
	2135-2310					0.021			
31	1849-1915					0.019			2
	1920-2120					0.019			
	2125-2207					0.019			
Sept.									
1	1647-2110	19 43.1	0.21	0.29	0.15	0.028	0.03	1.04	3
	2116-2400	21 24.9	1.04	2.50	0.51	0.018	0.63	1.01	
2	0000-0033					0.018			
3	1826-1904					0.011			2
	1915-2019					0.011			
	2155-2230					0.011			
4	1630-1713					0.019			2
	1718-1726					0.019			
	1918-1954					0.019			
	2210-2310					0.019			
5	1633-2100					0.016			
	2105-2309					0.016			
6	0000-0120					0.019			2
7	1748-2050					0.019			
	2055-2308					0.019			
8	1623-2040	16 55.0	0.66	0.94	0.79	0.026	0.39	1.32	
	2055-2400					0.026			
9	0000-0100					0.020			
	1624-1820					0.020			
	1824-2040	18 28.4	1.12	2.23	0.99	0.020	0.97	1.09	
	2049-2400					0.020			
10	0000-0100					0.020			


27 Aug. 1970
UTmax 20h 37m.3
1 Sept. 1970
UTmax 19h 43m.1
1 Sept. 1970
UTmax 21h 25m.0
8 Sept. 1970
UTmax 16h 55m.0
9 Sept. 1970
UTmax 18h 28m.4
UT

Remarks

1. - The instability of the measuring device did not allow the detection of flares with $X_{fM}/\bar{X}_s < 0.45$
2. - Cloudy.
3. - Possible flare.
4. - The connection between Δm and $X_f/\bar{X}_s$ is given by $\Delta m = 2.5 \log (X_f/\bar{X}_s+1)$

Total coverage 4296 minutes.

The light curves of observed flares are presented in the figures. The ordinate is given in the units of $X_f/\bar{X}_s$

V.S. OSKANIAN
Byurakan Observatory
USSR

Correction to IBVS No.176:

Star name	Printed	Correctly
RW CMa	28201.83+5.72941 E	27021.68+5.72906 E
RW Cas	37168.23	37158.23
UX Per	4.97247 E	4.56581 E

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NUMBER 489

Konkoly Observatory
Budapest
1970 November 19

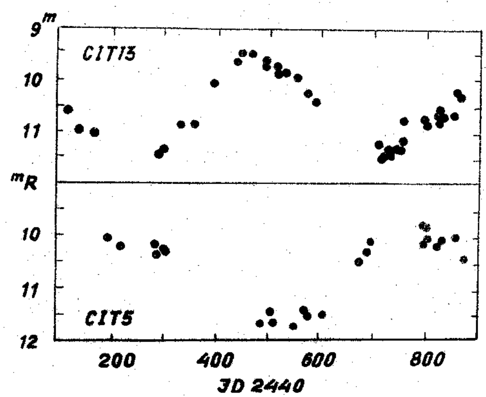
ON THE VARIABILITY OF THE CARBON STARS CIT 5 AND CIT 13

Among the 14 extremely cool stars found at the California Institute of Technology (1) at least three are carbon stars and possibly variables (2,3). P.Pesch (3) has shown that two of them, CIT 5 and CIT 13, had been identified as N-type stars at the Dearborn observatory and listed as Nos 259 and 228 respectively (4,5), Do 228 having been noted as variable (4). The last one has No 5438 in the Catalogue of Suspected Variable Stars (6).

In order to find out the type of variability of the two stars they have been observed since autumn 1968 photographically with a Schmidt camera mainly in m_R (magnitudes similar to R of W.Becker) as well as in V (and in B, when possible). By now, some conclusions can be made.

<u>CIT 5</u> = Do 259 = IRC +50096 (7) had two flat maxima, $m_R = 10^m.1$, and one minimum, $m_R = 11^m.7$. The range of changes in V was from $11^m.8$ to $14^m.1$. In B the star was fainter than the plate limit (18^m-19^m) even at maximum light, thus $B-V > 6^m$. The cycle of light variations was about 550^d. The star probably belongs to the variables of Mira Ceti type. If so, it is a carbon star of this type of variability possessing the longest period known.

<u>CIT 13</u> = Do 228 = CSVS 5438 (6) = IRC + 40485 had two minima, $m_R \sim 11^m.5$, $V \sim 13^m.5$, and one maximum, $m_R = 9^m.5$ at J.D. 2440457. Its colour indices at J.D. 2440586 were $B-V \sim 5^m$, $V-m_R = 1^m.7$. The cycle of variations of CIT 13 is about 470^d. Such a period of variability contradicts neither the few observations of K-magnitudes published in (1,2,7) nor the early two observations given in (4). The star evi-



dently is of Mira Ceti type. The light of CIT 13 is now increasing, somewhat slower, however, than in the previous cycle, and will reach its maximum in December 1970.

The results of observations for both stars in magnitudes m_R are given in the Figure.

Radioastrophysical Observatory
Latvian Academy of Sciences
October 22, 1970

Z. ALKSNE
A. ALKSNIS

References

1. B.T.Ulrich, G.Neugebauer, D.McCammon, R.B.Leighton, E.E.Hughes, E.Becklin, 1966, Ap.J. 146, 238
2. W.Z.Wisniewski, R.F.Wing, H.Spinrad and H.L.Johnson,1967, Ap.J. 148, L 29
3. P.Pesch, 1967, Ap.J. 149, L 65
4. O.J. Lee, T.J.Bartlett, 1945, Ann.Dearborn Obs., 5, P.3
5. O.J. Lee, G.D.Gore, T.J.Bartlett, 1946, Ann. Dearborn Obs., 5, P. 7.
6. B.V. Kukarkin, P.P.Parenago, Yu.I.Efremov, P.N.Kholopov, 1951, Catalogue of Suspected Variable Stars, Moscow.
7. G.Neugebauer, R.B.Leighton, 1969, Two-Micron Sky Survey. A Preliminary Catalogue, NASA SP-3074, Washington.

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Konkoly Observatory
Budapest
1970 November 21

THE SECONDARY PERIOD OF THE RRab STAR SZ Hydrae

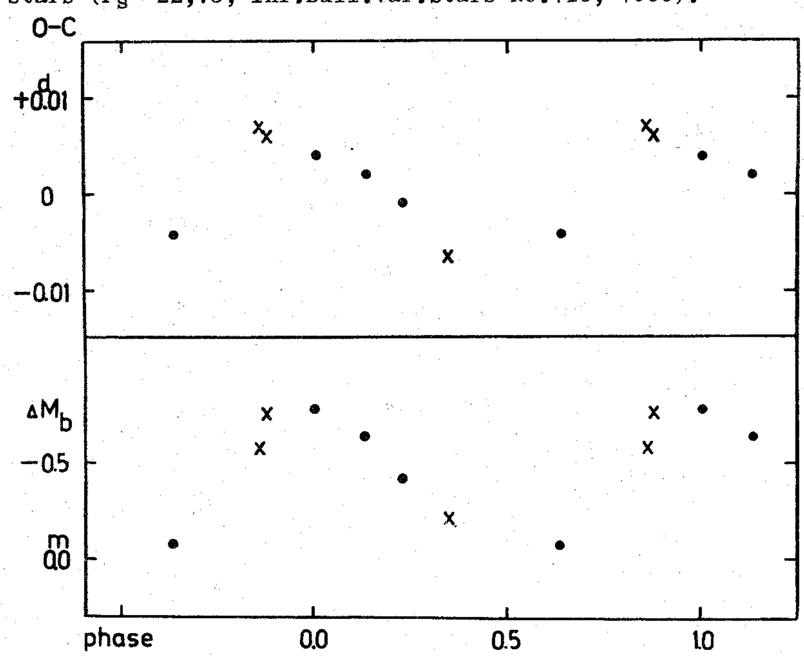
Inspired by a notice of L.J.Robinson (Per.Zv. V.16. No.1.,p.62, 1966) on a possible Blashko effect in the light variation of SZ Hya I initiated photoelectric observations of the star during my stay at the Catania Astrophysical Observatory on Aetna in spring 1970 in order to determine the length of its secondary period.

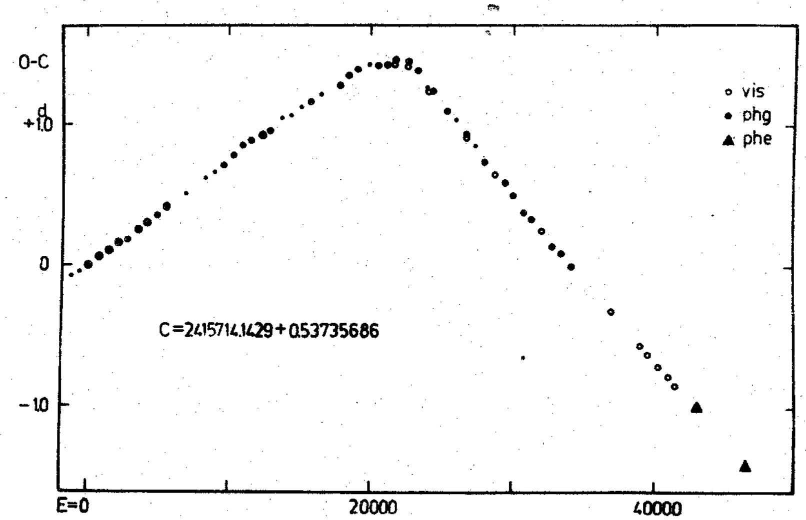
The observations were carried out with the quasi-Cassegrain reflector of 61 cm aperture and 600 cm focal length, equipped with an EMI 6256 photomultiplier tube.

Although only four maxima could be obtained, their favourable distribution in phase enabled the determination of the secondary period. The result is:

$$P_s = 25^{d}\!.8$$

Only Z CVn has a shorter secondary period among the RRab stars ($P_s = 22^{d}\!.75$, Inf.Bull.Var.Stars No.146, 1966).





The table contains the observed maxima in two colours $(\Delta)M_y$, $(\Delta)M_b$ and their O-C values computed with the following elements:

$$\text{Max.hel.} = 2440679{,}412 + 0^{d}\!.53724022E \qquad (1)$$

Three photoelectric maxima obtained by Arizona observers (Fitch, Wisnewski and H.L.Johnson: Comm. Lunar and Plan. Lab. Numb.71, pp 20-21, 1966) are included in the table.

J.D. max.	O-C	$(\Delta)M_y$	$(\Delta)M_b$
	Arizona observations:		
2438773,828	$+0^{d}.007$	$10^{m}.55$	$10^{m}.50$
810,884	−0.007	11,14	11,04
901,692	+0.008	10,75	10,68
	Catania observations:		
2440679,416	+0.004	−0,350	−0.780
685,321	−0.001	−0.050	−0.420
708,425	+0.002	−0.240	−0.640
721,313	−0.004	+0.240	−0.080

In figure 1 the values of ΔM_b and O-C are plotted against the phase of the secondary period computed by the formula:

$$\text{Max. amp.} = 2440705 + 25\overset{d}{.}8 \ N \qquad (2)$$

The Arizona observations indicate the same secondary period. The Arizona magnitudes M_b were adjusted to the Catania magnitudes by shifting them by $-11\overset{m}{.}26$.

Combining their observations with my Catania results, an improved value of $25\overset{d}{.}74$ can be derived for P_s, but the number of elapsed epochs between the two series of observations may be yet in error by ± 1.

Fig.2 shows the O-C diagram for the fundamental period. Points denote the photographic epochs given by Robinson, the circles are visual epochs from Per. Zvj. (see above), the triangles are the epochs obtained at Arizona and Catania, respectively.

I am very grateful to Prof. Godoli for a grant enabling me to carry out observations in the Catania Observatory, and to Drs. C.Blanco, S.Catalano and M.Rodono for helping me in the observations.

S. KANYÓ

Konkoly Observatory
Budapest

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Konkoly Observatory
Budapest
1970 November 28

VARIABLE STAR COLLOQUIUM IN BAMBERG
31 AUGUST – 3 SEPTEMBER 1971

An IAU Colloquium on "New Directions and New Frontiers in Variable Star Research" will be held in Bamberg, G.F.R., on 31 August - 3 September 1971, at the invitation of the Remeis Sternwarte, Astronomisches Institut der Universität Erlangen-Nürnberg. The Colloquium is co-sponsored by IAU Commissions 27 (Variable Stars) and 42 (Photometric Double Stars). The Scientific Organizing Committee appointed by the two Commissions consists of: L.Detre, O.J.Eggen, M.W.Feast, T.Herczeg, K.Kwee, W.Strohmeier, F.B.Wood, and G.H.Herbig (Chairman).

The Provisional program is as follows:

I. New Phenomena in Very Cool Variables
   A. Polarization
   B. Microwave Emission

II. Flare Stars: Recent Campaigns, New Insights

III. Rapid and Ultrarapid Variables (including X-ray sources)

IV. Duplicity and its Consequences Among the Intrinsic Variable Stars
   A. Variable Stars in General
   B. Eruptive Variables in Particular

V. Variable Star Observations from Outside the Earth's Atmosphere

Each Section will begin with an invited introductory lecture, to be followed by approximately 2 hours of shorter contributions on the same theme. Those wishing to present papers should write directly to Dr.Herbig (Lick Observatory, University of California, Santa Cruz, California 95060, USA), before July 1 1971 if possible, regarding a place on the program. A small grant from the IAU is available for assisting with the travel expenses of a limited number of participants. These grants will be awarded about May 1971; application forms can be obtained either from Prof. Strohmeier in Bamberg or from Dr.Herbig.

G.H. HERBIG

Lick Observatory

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NUMBER 492

Konkoly Observatory
Budapest
1970 November 29

FLARE STAR OBSERVATIONS DURING SATELLITE X-RAY EXPERIMENTS

In IBVS No.466 the A.S. and E. group announced that the SAS-A spacecraft would be directed to survey flare stars during 1971. We have proposed that the following observing periods be utilised:

YZ CMi	25-31 January 1971
YZ CMi	19-25 February 1971
AD Leo	18-24 March 1971

Subject to the launch date of 12 December 1970, Dr. E. Kellogg, the Project Scientist for SAS-A project, has agreed that two days will be spent monitoring YZ CMi within the dates suggested in January. The exact dates will be announced 30 days in advance. Observations during the later periods will depend on the initial results and other commitments.

We propose to activate the optical flare star program of the Smithsonian Astrophysical Observatory using twelve Baker-Nunn cameras on these dates (Solomon 1966). We appeal to optical and radio astronomers to supplement this coverage. We draw the attention of potential observers to the recent prediction of x-ray emission from flare stars (Grindlay 1970); the intensity predicted is well within the range of the SAS-A spacecraft.

November 19, 1970

T.C.WEEKES

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Amado, Arizona 85640

References

Grindlay,J.E., Astrophysical Journal, 162, 187, 1970.
Solomon,L., Smithsonian Special Report, No.210, 1966

Note:
Should the dates mentioned be in conflict with the program of cooperative observations for 1971 to be named by Commission 27 we request immediate notification so that these proposed dates can be modified.

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Konkoly Observatory
Budapest
1970 December 7

NEW FLARES IN PLEIADES

In course of a common program between the Byurakan Astrophysical Observatory and the Konkoly Observatory on searching flares in Pleiades three new flares were noted. The observations were made on Kodak 0a-0 emulsion with the 60/90/180 cm Schmidt-type telescope of the Konkoly Observatory in the period 8-10 Oct. 1970 in 11 hours of effective observational time.

Additionally a flare of the star H II 1094 was found during the reexamination of the plates taken in 1969 with the Schmidt telescope of the Konkoly Observatory.

Table 1 and 2 summarize the data of the stars (position, brightness in minimum, amplitude and date of flare) and the photographically measured magnitudes during the flares respectively.

It is to mention that flare no.2 was independently observed by dr. E. Parsamian using a 1,5° objective-prism (1800 A/mm at H_γ) attached to the 40" Schmidt-type telescope of the Byurakan Observatory.

L.G. BALÁZS
Konkoly Observatory

R.A.VARDANIAN
Byurakan Astrophysical Observatory

Table 1.

Star	α 1950	δ 1950	$m_{pg\ min}$	Ampl.	Date
			Flare data		
1 HII 1094	$3^h43^m37^s.6$	$+23°48'.47$	$14^m.6$	$1^m.4$	10.11.1969
2	3 38 45.5	24 57.16	18.3	5.1	8.10.1970
3	3 37 15.6	23 00.01	17.8	2.7	9.10.1970
4 HII 1061	3 43 32.5	23 57.52	15.1	2.7	9.10.1970

Table 2.

Star	U.T.	m_{pg}	Star	U.T.	m_{pg}
1	$21^h.28^m.00^s$	$14^m.1$	2	$22^h.53^m.30^s$	$16^m.5$
	21.33.50	13.2		22.58.00	16.7
	21.38.10	14.2	3	03.22.00	17.8
	21.42.20	14.5		03.26.20	15.7
	21.46.30	14.6		03.30.40	15.1
2	21.50.00	>18.3		03.35.00	16.5
	21.55.00	13.2	4	22.44.30	15.1
	21.59.49	13.5		22.48.45	12.5
	22.04.15	14.7		22.53.00	12.4
	22.08.45	15.0		22.57.15	12.9
	22.13.15	15.1		23.08.30	14.5
	22.17.45	15.2		23.13.00	14.7
	22.22.15	15.2		23.21.15	14.8
	22.25.45	15.2		23.25.30	14.8
	22.31.15	15.3		23.29.45	14.9
	22.40.00	15.5		23.32.00	15.0
	22.44.30	16.1		23.36.15	15.2
	22.49.00	16.1			

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Konkoly Observatory
Budapest
1970 December 8

NOVA SAGITTARII 1970 = SVS 1728.

The nova was found on a 8° objective-prism plate taken 1970 July 29 by R.Bartaja and T.Vashakidse at Abastumani with the 70-cm reflector. The approximate coordinates as measured on the BD-Atlas are $\alpha = 18^h27^m.3 \pm 0^m.1$, $\delta = -18°48' \pm 1'$. (1855) The spectral region covered is $\lambda\lambda$3700-5000 at a dispersion of about 160 A/mm at H_γ. The magnitude of the nova on this plate is near m_{pg} 13^m. The appearence of the spectrum is as follows: bright lines $H\beta$, H_γ, H_δ; N_1 is fainter than $H\beta$, the intensity of λ4363 is approximately equal to that of H_γ, a faint broad λ4640 is present. The spectrum seems to have been obtained at the beginning of the nebular stage, so that the star was probably about 5 magnitudes down from the maximum light. The nova is invisible on the spectral plates taken in 1968 with the same limiting photographic magnitude.

Sternberg Astronomical Institute
Moscow, 30 Nov. 1970

V. ARHIPOVA,
O. DOKUCHAEVA

COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 495

Konkoly Observatory
Budapest
1970 December 9

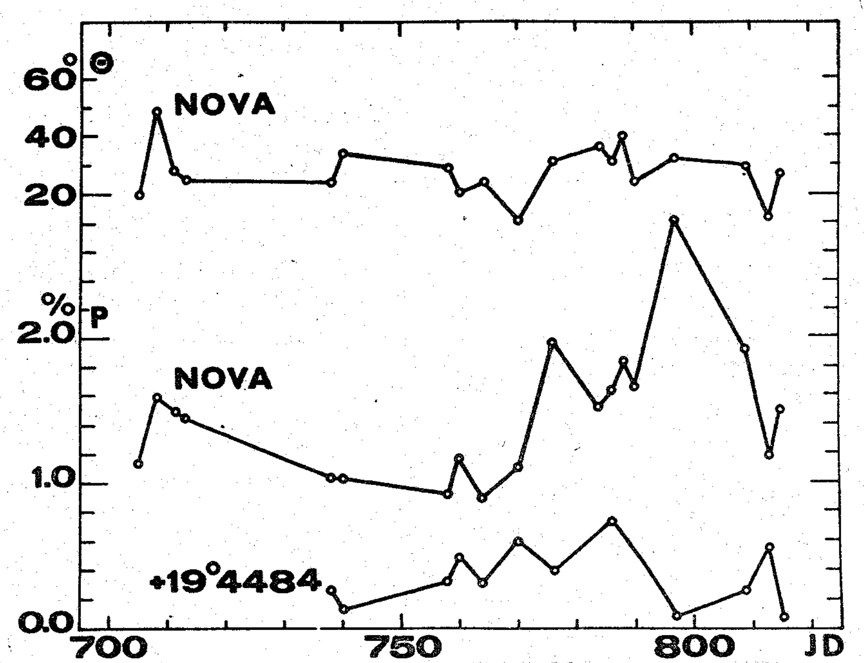
THE OPTICAL POLARIZATION OF NOVA Del 1967

From Aug.2, 1967 to Nov.20, 1967 the optical polarization of Nova Delphini 1967 has been observed. The observations have been carried out with the Zeiss refractor 65/1055 cm of Belgrade Astronomical Observatory. The photoelectric polarimeter (Oskanjan et al.,1969) without filters and slightly modified has been used.

The observed degree of polarization in percents, P, and the position angle of the plane of vibration, θ, of the Nova are shown in Table I and in Figure 1. The lowest curve in the same Figure represents the amount of polarization of the comparison star BD +19°4484. All individual measurements have been obtained by one-minute integration of the observed polarimetric signal.

Table I

Date		JD 24397	p%	θ°
1967				
VIII.	2	705.500	1.13	20
	5	708.504	1.60	49
	8	711.560	1.49	28
	10	713.438	1.45	25
IX.	4	738.307	1.04	24
	6	740.299	1.03	34
	24	758.357	0.92	29
	26	760.378	1.17	20
	30	764.356	0.89	24
X.	6	770.256	1.10	10
	12	776.322	1.97	31
	20	784.281	1.51	36
	22	786.396	1.63	31
	24	788.340	1.85	40
	26	790.319	1.66	24
XI.	2	797.219	2.81	32
	14	809.252	1.93	29
	18	813.219	1.18	11
	20	815.250	1.50	27



The r.m.s. error of a single measurement in the case of the comparison star amounts to ± 0.34 %. Taking into account the brightness difference between Nova and the 6th magnitude comparison star, we can ascribe the same value as an upper limit of the error to the observations of the Nova. On the other hand, the r.m.s. error of one-minute single measurements of the position angle of the plane of vibration of a 1 % polarized 6th magnitude standard star amounts to $\pm 13°$. A similar scatter about the mean value of $\Theta_m = 28°$ in the case of the Nova can also be noticed.

The degree of polarization of the Nova from Aug.2 to Oct.6, was lower than 1.5 %, and from Oct.6 to Nov.14, was higher than 1.5 % with an increase to 2.8 % on Nov.2. It was noticed that seven from nine values of P higher than the average appeared simultaneously with the Θ values higher than the average. However, the correlation coefficient amounting to +0.42 does not confirm any linear correlation between P and Θ. Nevertheless the observed time variation of polarization is in accordance with H.D.Morrison and W.Liller's (1968) measurements and seems to be real.

The observed plane of vibration of the electrical vector is parallel to the galactic equator what could suggest the interstellar origin of the observed polarization, or at least, a considerable interstellar component in it. But Hutchings' (1969) statement that the Nova is closer than 400 pc agrees well with Zellner's (1969) conclusion, based on the observed untypical wavelength dependence of P, that the Nova's polarization can not be of interstellar origin. Furthermore, according to the rather scarce polarimetric observation of the field stars (available data only for HD 196035 and HD 196775, Hall 1958) the interstellar contribution to the observed polarization is probably not higher than $P_M = 0.4$ % in the direction $\theta = 7°$.

As more definite conclusion on the interstellar polarization is impossible without some more data on the closer field stars and a more certain estimation of the distance of Nova, at this stage one should take the observed polarization as mainly intrinsic.

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References

Hall J.S.,1958, Publ. of the U.S.Naval Obs., second series, 17 VI
Hutchings J.B., 1969, Mass loss from Stars, Ed.M.Hack, (Proc. of the Second Trieste Coll. on Astroph.)
Morrison N.D. and Liller W., 1968, A.J. vol.73, No 5, p.II,
Oskanjan V., Kubicela A. i Arsenijevic J.,1969, Bull. Astr. Obs. Beograd, 27,1.
Zellner B., 1969, Mass Loss from Stars, Ed.M.Hack, (Proc. of the Second Trieste Coll. on Astroph.)

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INFORMATION BULLETIN ON VARIABLE STARS
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Konkoly Observatory
Budapest
1970 December 12

RESULTS OF THE STUDY OF 3806 VARIABLES IN AND ABOUT THE MAGELLANIC CLOUDS

(presented at IAU, Brighton)

1. Three thousand and five hundred and seventy one stars were announced by the Harvard College Observatory in the time interval from 1889 until 1953. Two hundred and thirty five new variables I found during my work with Mrs. Gaposhkin on the Clouds from the year 1960 while making more than two million observations on some 4000 plates. We found that 483 announced variables are probably not bona fide variables and they were discarded.

2. The distribution of the variables in and about both LMC and SMC finally accepted by Mrs. Gaposhkin and myself in reference to eleven classes of variability in light was published in 1970. (See No. 420, Inform. Bull. Comm. 27 of IAU).

3. Employing an accurate formula for 85 eclipsings in both Clouds I determined many individual moduli. The mean moduli for the Clouds are

   18.38 ± 0.02 for LMC and 19.15 ± 0.03 for SMC

   The corresponding distances and diameters, the latter, of course, as seen on the Harvard Bruce plates are: 47.4kps and 6.9kps; 67.79kps and 5.8kps.

4. With these moduli I derived the Absolute Period-Luminosity Relation for 2244 Cepheids equally divided between two Clouds. For the SMC: $M = -2^m_.12 - 2^m_.24 \log P$. For those of the LMC the relation is very much alike; for the W Virginis stars it runs parallel $2^m_.40$ below. For the Long Periodics it is less explicit yet still definite. These relations are explicitly for the maximal brightness of the lightcurve and not for any other brightness which I find from the point of view of application are inferior to that adopted here. This P-L relation I'd call the "First Cosmic Law" or Miss Leavitt law.

5. My Topography of the LMC brought forth 34 bright regions or "Ridges", not senselessly called associations, in contrast to the surrounding regions embracing the whole Cloud of lesser density of stars. Many interesting and may be significant interreliationships between these Ridges, Coils and Variables are indicated.

6. The two-dimensional distribution of all 3323 Variables leaves little doubt that the "TILT" of both Clouds scarcely can hold the ground. At least not in its conventional sense.

7. Out of many hundreds of Miniclusters (the small and the smallest clusters of stars hitherto practically unknown and not attended though perhaps they form a fundamental background of the Clouds), I found partly serendipitiously partly with intention that at least twenty of them have variables of all sort making them, at least temporarily, a new kind of stellar formations, a new sort of denizens.

8. Turning to account the formulae for the Cepheids, RR Lyrae and Eclipsings I was able to place 119 Variables of both Clouds, hitherto a puzzle as a "Surplus" in their proper and accurate perspective. They all with a few exceptions are located between the Clouds and the Milky Way forming "silver cords" suggesting or recommending the stellarly physical connection between these starry families MW, LMC, SMC probably reminiscent of NGC6027.

9. If No.8 is correct however imperfectly and deficiently presented then the "strange" findings of Miss Cannon years ago and the very recent ones of Fehrenbach and Duflot in reference to "Foreground stars" are no more strange but "natural".

10. Two thousand five hundred and forty seven periods of Variables were determined in this work independent of the old work at the HCO with an exception of using the announcement and identification. Three fifths of the periods are quite new, the rest redetermined to a higher accuracy.

11. In historical sense our work constitutes a finalizing of a probably most expensive astronomical project at the HCO and certainly the longest project for it began in the very beginning of modern astronomy and lasted 81 years, one month and seven days counting the end the date of my signature of this article. The project is undoubtedly also the greatest ever emprized by a single observatory.

December 1, 1970

SIRGAY GAPOSHKIN

Harvard College Observatory

COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
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Konkoly Observatory
Budapest
1970 December 14

COOPERATIVE OBSERVATIONS OF EV Lac

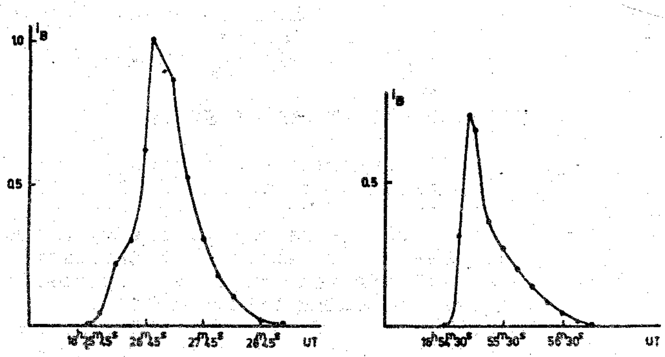
The programme of cooperative observations of flare stars for the year 1970 was published in IBVS 416. According to this programme a series of observations was carried out with the 16" telescope of the Byurakan Observatory in the time ~~interval~~ 23 August - 9 September 1970. The observations were effectuated with a photoelectric polarimeter having a fast rotating polaroid (1).

The photomultiplier used was a multicalyФЭУ -79 having a spectral sensitivity range from 3000 to 8300 A. with a maximum at 4000-4400 A.

The observational data are given in the Table below.

Observations of EV Lac

Date of observation	Coverage UT	m	Moment of maximum	Duration of flare	Colour range
23.VIII-70	$17^h50^m-18^h30^m$	-	-	-	blue
	18 35 -21 00	- -	-	-	yellow
24.VIII	17 30 -21 00	-	-	-	"
25.VIII	17 10 -23 10	-	-	-	"
	23 33 -00 00	-	-	-	"
26.VIII	18 10 -23 35	-	-	-	"
28.VIII	18 00 -23 10	-	-	-	blue
31.VIII	19 43 -22 10	-	-	-	"
2.IX	17 00 -19 35	-	-	-	"
	20 30 -00 10	-	-	-	"
	00 15 -00 45	-	-	-	"
3.IX	18 35 -22 27	-	-	-	"
5.IX	17 00 -23 12	-	-	-	"
6.IX	16 53 -20 30	-	-	-	"
	21 20 -23 00	-	-	-	"
	23 29 -01 10	-	-	-	"
7.IX	17 35 -23 00	-	-	-	"
8.IX	16 40 -01 00	$0^m.6$	$16^h54^m24^s$	2^m30^s	"
9.IX	17 05 -23 30	0.75	18 26 50	3 15	"



The star EV Lac has been observed on the whole during 65^h11^m. During this time interval two flares with amplitudes $\Delta m = 0^m.6$ and $\Delta m = 0^m.75$ have been registered, both in the blue colour. This magnitudes have been corrected for the influence of the optical companion (2).

The light curves are presented in the Figure. The excess flux of the flare expressed in the units of the normal foux of the star, $i = (n_{fl}/n_{nor}-1)$, was taken versus UT.

K.A. GRIGORIAN
M.A. ERITSIAN

1 M.A.Eritsian, A Photoelectric Polarimeter with a Fast Rotating Polarization Modulator (in press).

2 P.F.Chugainov, Izv. Crimean Astrophysical Observatory (in Russian) 26, 171-179, 1961.

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NUMBER 498

Konkoly Observatory
Budapest
1970 December 18

PHOTOELECTRIC OBSERVATIONS OF AD Leo DURING THE 1970 MARCH 1-15 INTERNATIONAL PATROL

The observations of AD Leo carried out during the above mentioned period, according to the observing schedule prepared by the I.A.U.Working Group on Flare Stars (Andrews and Chugainov, 1970), are presented. Within the 15.5 hours of patrol in b light (Table 2) four flares were observed. A Cassegrain reflector of 91 cm aperture and a quasi-Cassegrain reflector of 61 cm aperture referred to in Table 2 as 91 and 61 fed similar photometers equipped with EMI 6256 photomultipliers and the Schott filter combinations: BG 12/1 + GG 13/2 (b), GG 14/2 (v).

Table 1. Observed flares

No	Date 1970	t_{max}	d_b	d_a	$m_{lim}-m_o$	$(m_f-m_o)_{max}$	P	Remarks
1	Mar 7	$02^h40.2^{min}$	0.5^{min}	1.5^{min}	$+4.95^m$	$+2.61^m$	0.06	1
2	Mar 8	02 27.3	0.1	0.7	+5.34	+2.30	0.04	3 *
3	Mar 9	00 22.1	0.3	0.2	+5.36	+1.80	0.04	2 *
4	Mar 9	02 29.6	0.1	8.4	+5.07	+1.34	0.79	2

t_{max} = U.T. of maximum intensity
d_b = rise-time, d_a = decay-time,
$m_{lim}-m_o = -2.5 \log (3\sigma/I_o)$
were σ and I_o indicate the standard deviation of the random noise fluctuations and the mean intensity of the quiet star near the observed flare, respectively.
$(m_f-m_o)_{max} = -2.5\log\left[(I_{o+f}-I_o)/I_o\right]_{max}$, where I_{o+f} is the intensity deflection due to the variable star (I_o) plus that of flare (I_f) at maximum; $P=\int_{t_b}^{t_e}\left[(I_{o+f}-I_o)/I_o\right] dt$ integrated intensity (in minutes).

Remarks: sky condition, 0 very clear, 2 clear with some thin layers, 3 extended thin stratus, * uncertain.

Table 2.

Date	Tel.	F	Coverage U.T. Coverage U.T.	TC	$m_{lim}-m_o$
1970 March					
07	91	b	01^h21^{min}-0340	139^{min}	$+4.95^m$
07	61	b	2233-2248,2250-2306,2311-2315, 2328-2354,2357-2400.		
08			0000-0007,0019-0048,0100-0127, 0138-0220,0224-0236,0244-0251, 0254-0336.	230	+5.44
08	91	b	1857-1909,1920-2126,2219-2310, 2345-2400.		
09			0000-0042,0044-0107,0110-0120, 0124-0133,0213-0216,0222-0232, 0234-0257,0305-0328.	347	+4.89
08	91	v	2147-2148,2152-2154.		
09			0208-0209.	004	
09	91	b	1918-2007,2014-2018,2020-2022.	055	+4.91
10	91	b	1843-1910,2027-2031,2048-2050, 2052-2055,2056-2059,2101-2111.	049	+4.84
10	91	v	1943-1944,1946-1949.	004	
12	91	b	1844-1846,1854-1904.	012	+4.97
14	91	b	1906-2000.	054	+4.92
15	91	b	1908-1951,2000-2001.	044	+4.95

Tel. = cm aperture telescope; F = Schott filters; u = UG1 (1 mm), b = BG12 (1 mm) + GG13 (2 mm), v = GG14 (2 mm); TC = total coverage per night; $m_{lim}-m_o = -2.5 \log (3\sigma/\bar{I}_o)$, where σ represents the standard deviation of the random noise fluctuation for a night, and $\bar{I}_o$ represents the mean intensity of the quiet star during the same night.

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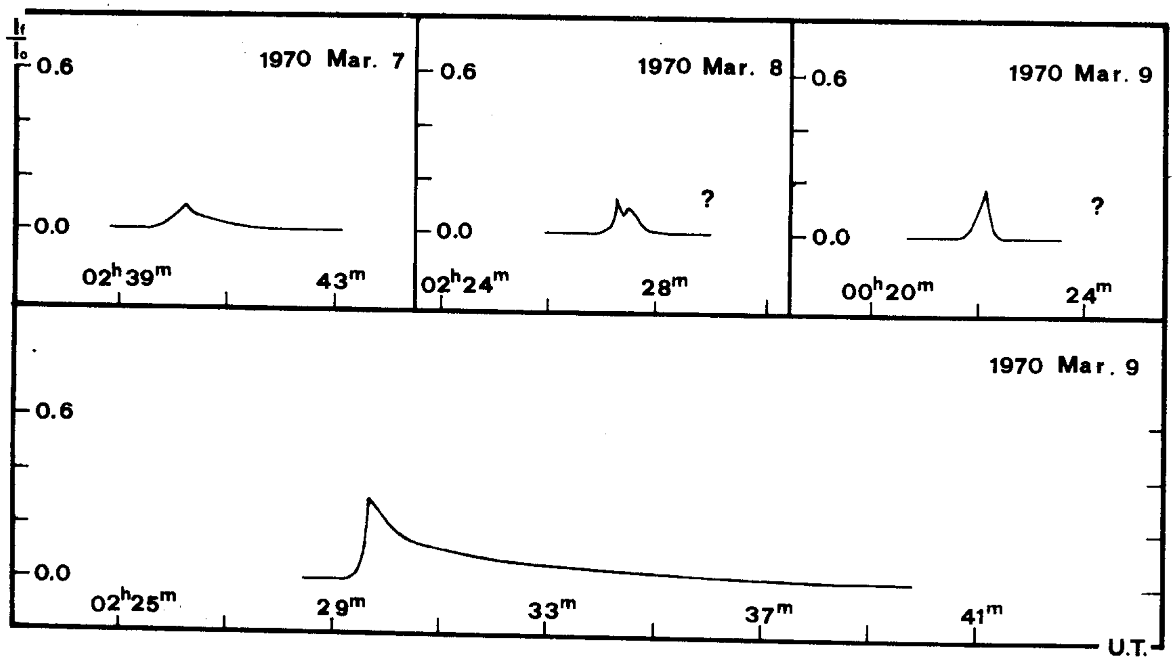
Reference

Andrews, A.D., Chugainov P.F. 1970. Comm. 27. IAU, Inf.Bull. var.Stars No.416



Flares of AD Leo

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NUMBER 499

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Budapest
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SOME PROBABLY REAL AND SOME PROBABLY SPURIOUS FLARES OF AD Leo

Photoelectric monitoring of AD Leo during the co-operative patrol period in March 1970 yealded six apparent flares, none of them dramatic. Three of these occurred at nearly identical hour angles suggesting that they are probably spurious.

Table I shows the distribution of actual monitoring time which totaled 15.91 hours. Differential measures were made each night with respect to the comparison star indicated in IBVS No. 326. These magnitude differences are listed at some sample times in Table II.

All photometry was done at Mt. Cuba Observatory using the same system as reported in IBVS No.363 except that an f/32 (rather than f/16) secondary mirror was used in the 61-cm diameter Cassegrain. This gave a less divergent beam through the Calcium K-line interference filter (70A wide).

Estimates of the signal to noise ratio I_0/σ (average nonflaring signal divided by standard deviation) in Table II are for the instrumental time constant which is between one and two seconds. Noise fluctuations as they appeared on the photometer chart have been faitfully reproduced in Figures 1 and 2 so as to avoid smoothing out possible fine structure within the flare curves. However, a spike to 3σ above quiescence would not be identified as a flare unless it remained at this elevated level for at least five or ten seconds. Therefore, the quantity tabulated as $m_{lim}-m_0 = 2.5 \log (I_0/3\sigma)$ is based on a time constant more realistically assumed to be five times longer than the instrumental time constant, making the standard deviation $1/\sqrt{5}$ times smaller in this equation.

Table II shows measurements of AD Leo at times that appeared to be representative of the quiescent star. AD Leo is seen to average 1.34 mag fainter than the comparison star with a range of ± 0.15 mag among the 18 measures. Thirteen noise estimates show the instrumental I_0/σ to vary from 4.4 to 8.1 with an average of 6.12, corresponding to $m_{lim}-m_0 = 1.65$.

In Table III the universal time is listed for the moment of peak intensity of each flare and suspected flare. The duration of elevated brightness before the peak and after the peak are indicated by t_b and t_a respectively. The change in magnitude of the flare star is denoted Δm and the

Table I. Coverage of AD Leo during March, 1970. Times are rounded to the nearest minute of UT

March	UT Coverage
1	3^h31^m-33^m, 3:37-54, 4:06-17, 4:20-29, 4:32-35, 4:37-46, 4:48-52, 4:54-57, 5:00-02, 5:18-20, 5:23-34, 5:40-50, 5:55-6:05, 6:07-19, 6:27-41, 6:44-56, 6:59-7:13, 7:19-31, 7:49-8:06, 8:11-25.
8	2:02-07, 2:11-22, 2:25-39, 2:43-52, 3:06-13, 3:19-29, 3:32-40, 3:44-47, 5:05-13, 5:16-29, 5:33-40, 5:43-51, 5:53-6:04, 6:06-15, 6:19-25, 7:37-43.
9	2:58-3:00, 3:30-34, 3:42-53.
10	2:14-23, 2:25-26, 2:29-42, 2:46-58, 3:02-16, 3:19-34, 3:40-53, 3:56-4:16, 4:35-49, 4:55-5:19, 5:26-42, 5:49-6:03, 6:09-29, 6:36-54, 6:59-7:26, 7:31-51, 7:54-8:06, 8:08-10, 8:14-27.
12	1:58-2:00, 2:03-11, 2:16-31, 2:35-48, 2:52-3:05, 3:11-28.
15	0:57-1:07, 1:09-20, 1:24-39, 1:41-56, 1:59-2:09, 2:11-26, 2:29-42, 2:44-57, 2:58-3:11, 3:12-23, 3:28-40, 3:42-54, 3:56-4:06, 6:24-31, 6:36-46, 6:48-7:02, 7:10-21, 7:23-31, 7:34-36, 7:42-53, 7:58-8:10, 8:12-25, 8:31-46, 8:48-55, 8:57-58.

difference in magnitude between the comparison star and the flare star at its peak is denoted $m_c - m_{o+f}$. The difference in magnitude between the light from the flare at its maximum and that from the quiescent star (I_o) is computed from the brightness of their combined light (I_{o+f}) at its peak using.

$$(m_f - m_o)_{max} = -2.5 \log \left(\frac{I_{o+f} - I_o}{I_o} \right)$$

Near each flare a limiting magnitude of flare detectability is estimated ($m_{lim} - m_o$) in the same manner as was done for Table II. The integrated intensity P is computed (by planimetry) as recommended in IBVS No.326.

Events 3 and 6 have initial peaks at identical siderealtimes (hour angle = $1^h57^m.7$ E) within the accuracy of reading the chart recordings (universal times as originally read from the chart to 0.1 min convert to sidereal times differing by only two seconds). The first peak of Event 4 is 2.2 min earlier but an equally high peak that

Table II. Magnitude differences (using the 3903-3973A filter) between the comparison star and AD Leo during moments of apparent quiescence and estimates of noise in the AD Leo signal.

1970 March	UT	$m_c - m_o$	UT	$\frac{I_o}{\sigma}$	$m_{lim} - m_o$
1	4:02	1.38	*4:12	6.92	1.78
	5:48	1.36	*7:02	6.15	1.65
	6:35	1.32	8:02	4.80	1.38
	8:02	1.48			
8	2:31	1.25	*2:36	5.54	1.54
	3:42	1.42	6:01	7.42	1.86
	5:28	1.19			
9	3:32	1.30	3:32	6.89	1.78
10	2:12	1.29	*2:39	8.14	1.96
	2:51	1.33	7:56	7.36	1.85
	4:42	1.37			
	5:15	1.38			
	7:14	1.40			
12	2:34	1.35	2:28	5.83	1.59
15	1:58	1.43	1:35	4.42	1.29
	4:05	1.35	*2:05	5.00	1.43
	6:38	1.22	6:28	6.28	1.68
	8:08	1.34	8:15	4.83	1.39

*Near a flare; $m_{lim} - m_o$ at this time used for Table III.

follows is at the coincident sidereal time. The only other date (both 1969 and 1970 seasons) on which monitoring of AD Leo was in progress at Mt. Cuba around this hour angle was 1970 March 12. On that date there is no evidence of brightening at the hour angle of the first peak of Event 4; however, a five minute interval to measure background sky and the comparison star was begun one minute later and, hence, one minute before the hour angle of the triply coincident peaks. Within this interval, a 1.9 min measure of the comparison star ($\sim 1\overset{'}{.}5$ distant at position angle $\sim 350°$) does not appear elevated nor does the 1.8 min measure of the sky at a distance of $\sim 0\overset{'}{.}9$ in position angle $\sim 315°$ from AD Leo. Although Event 4 may involve some intrinsic variation of AD Leo, the evidence is strong that stray light is entering the photometer at hour angle = $1^h 51\overset{m}{.}8$E when the telescope is aimed at AD Leo. At each of the only three times these conditions were met, a peak of $\Delta m = 0.32$ magnitude occurred within 0.1 min of that hour angle and an irregularly elevated signal was exhibited between hour angles 1:52E and 1:48E, as shown in Fig. 3.

Table III. Flares* of AD Leo

No	1970 March	UT	t_b	t_a	Δm	m_c-m_{o+f}	$m_{lim}-m_o$	$(m_f-m_o)_{max}$	P (min)	Air mass
1	1	$4^h48^m.8$	?	20^m?	0.62	1.95	1.78	0.29	3	1.06
2	1	$7^h08^m.7$	$0^m.22$	$1^m.6$	0.50	1.98	1.65	0.60	0.24	1.24
3*	8	$2^h27^m.3$	$0^m.30$	4^m?	0.32	1.59	1.54	1.14	0.47	1.17
4*	10	$2^h17^m.2$	$1^m.8$	16^m	0.32	1.63	1.96	1.15	2.0	1.17
5	10	$2^h52^m.6$	$0^m.80$	$22^m.5$	0.47	1.77	1.96	0.68	2.5	1.11
6*	15	$1^h59^m.8$	$0^m.13$	15^m	0.33	1.73	1.43	1.14	1.6	1.17

*N.B. The events designated with an asterisk in the first column all occurred at the same orientation of the telescope and are, therefore, suspected to be spurious.

Remarks (referred by No. in Table III):

(1) The beginning of the flare was missed because of centering problems; however, it is unlikely to have begun earlier than 4^h47^m. Also it is remotely possible that a principal peak could have occurred between $4^h48^m.1$ and $4^h48^m.5$ while the star was being recentered.

(2) Signal and noise portrayed in Fig.1. Light cloud cover.

(3) Noisy signal. At 0.7 min after the peak the signal dropped below I_o for 0.1 min as shown in Fig.3.

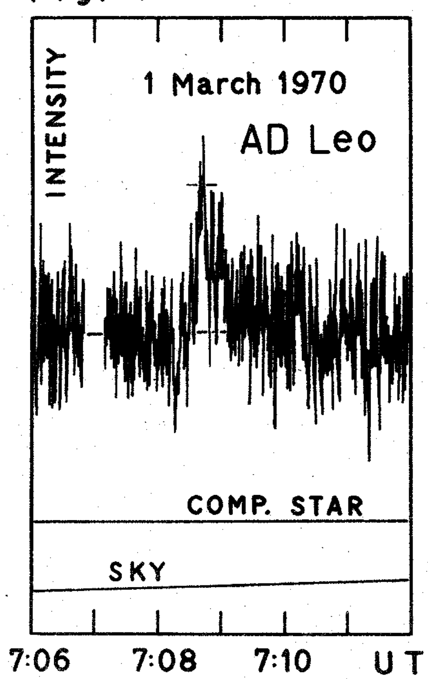
(4) This variable elevated signal occurred soon after monitoring began. Thus, the prior quiescent level is poorly established.

(5) Signal and noise portrayed in Fig.2. The most unambiguous flare in this Table. Signal continued at an elevated level of $m_c-m_{o+f} = 1.38$ from 3^h02^m to 3^h13^m, then dropped to 1.31 by 3^h15^m.

To create Figure 3, eye estimates of the mean intensity I_{o+f} were made within independent 0.2 min intervals successively along the photometer chart. The quiescent intensity I_o was interpolated linearly from regions that typically were several minutes long and just outside the figure.

Although several faint working lights are usually on at fixed locations in the dome, none is known to leak light into the photometer. The possibility that a discrete ray can, after several chance reflections at a particular setting of the telescope, find its way to the electrically and magnetically shielded photomultiplier must be investigated. Electrical noise associated with attitude of the telescope is not considered likely. It may be pertinent that

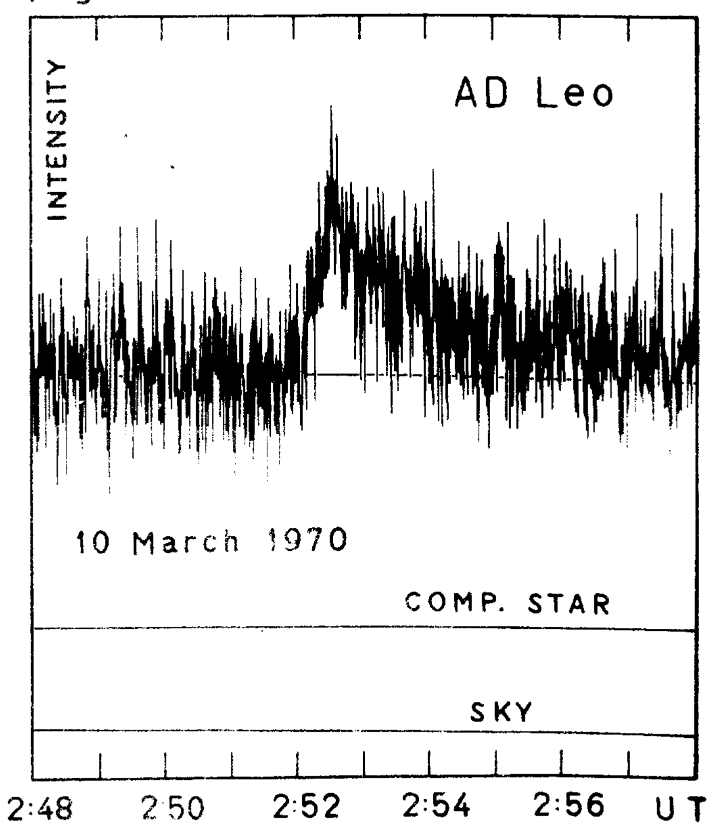
Fig. 1



the 1.8 mag star γ Leo is only 5' away. An attempt will be made to trace the effect during the coming observing season of AD Leo.

Andrews (1968) has pointed out that an analysis of over 100 flares recorded at several different observatories showed 17% of the flares to occur within 1 min of the same sidereal time as another flare. Events 3, 4, and 6 of Table III are the only coincidences so far found at Mt.Cuba Observatory. Of the ten flares of DO Cep observed in 1968 (IBVS No.329) no two were at the same sidereal time. Furthermore, for each sidereal time at which a flare occurred there were at least two other nights on which monitoring was in progress at that moment of sidereal time and no flare was seen. These statements are also true for AD Leo Events 1, 2, and 5 in Table III although No.2 happens to have occur-

Fig. 2



AD Leo
INTENSITY
10 March 1970
COMP. STAR
SKY
2:48
2:50
2:52
2:54
2:56
UT

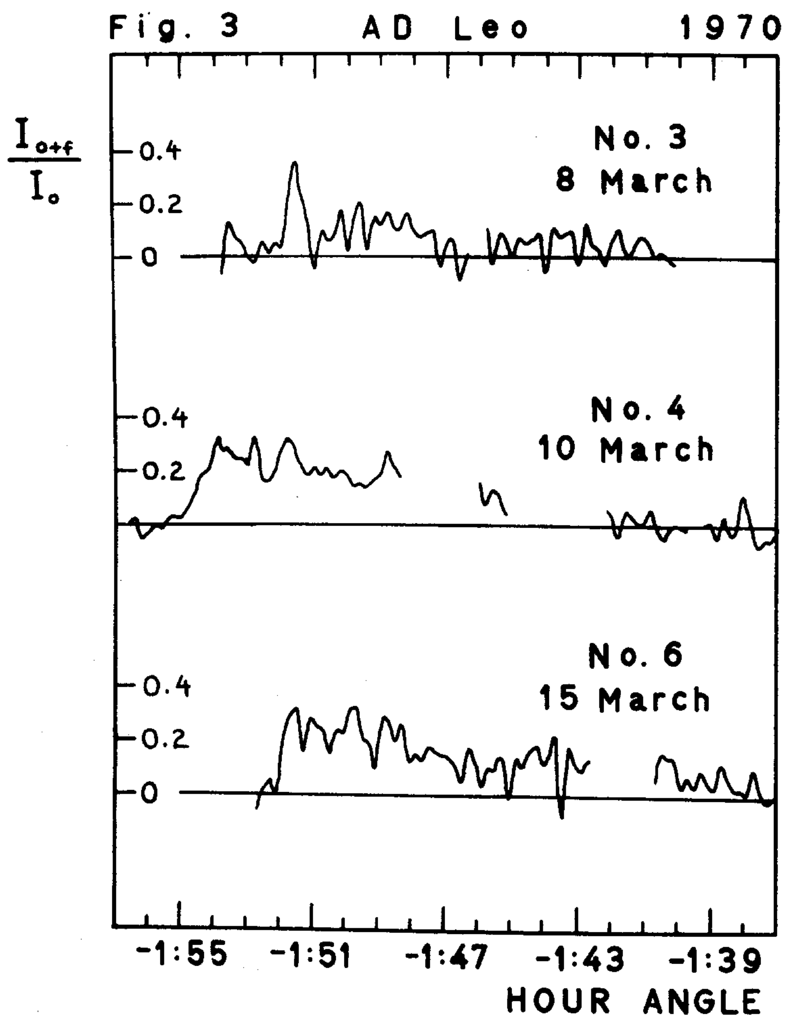


Fig. 3
AD Leo
1970
$\frac{I_{o+f}}{I_o}$
0.4
0.2
0
No. 3
8 March
0.4
0.2
No. 4
10 March
0.4
0.2
0
No. 6
15 March
-1:55
-1:51
-1:47
-1:43
-1:39
HOUR ANGLE

red at the same hour angle as one of the DO Cep flares (No.5).

Although all three of the apparently spurious flares (3, 4, 6) were noted to be "dubious" on a preliminary table, each, by itself, would have been reported as a possible flare with a notation of uncertainty. It was only the coincidence of three similar events at the same hour angle that commanded consideration of their probably nonstellar nature. Photoelectric observers of variable stars are advised to check the times of erratic brightenings for such coincidences.

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REFERENCES

Andrews, A.D., PASP 80, 99, 1968.

Andrews, A.D., P.F.Chugainov, R.E.Gershberg, and V.S.Oskanian, IBVS No.326, 1969.

Herr, R.B., IBVS.No.363, 1969.

Herr,R.B., and J.A.Breich, IBVS No.329, 1969.

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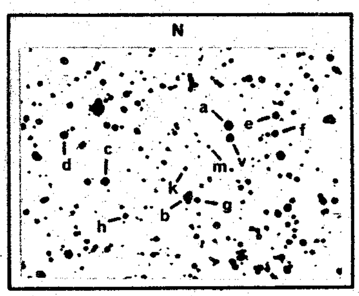
Budapest
1970 December 28

A NEW LARGE AMPLITUDE ECLIPSING STAR

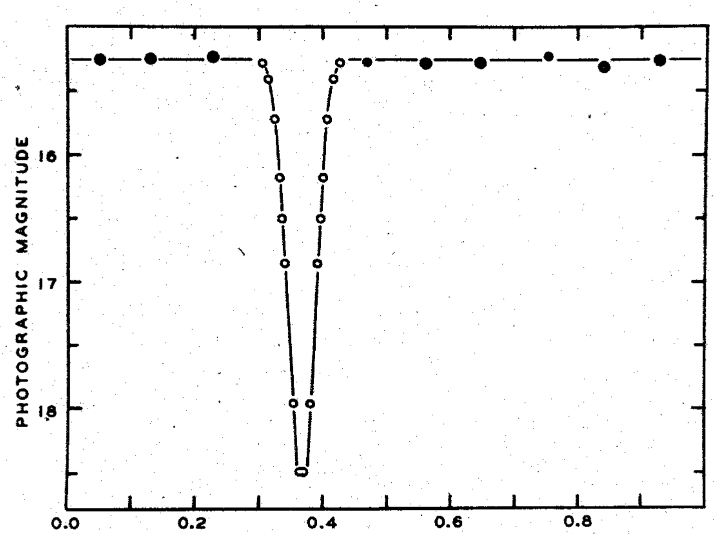
In 1966, while examining variables in the Scutum Star Cloud, V.M. Swain discovered this eclipsing binary at $18^h43^m11^s$, $-5^\circ49'.1$ (1900). It is identified as v in Fig.1, where the comparison stars are also marked: a = 14.87, b = 15.01, c = 15.60, d = 15.79, e = 16.52, f = 17.08, g = 17.74, h = 18.03, k = 18.30, m = 18.53.



Though of photographic magnitude 15.3 at maximum, this star faded below the limit of the 110 24-inch Bruce plates she inspected. In the autumn of 1966, Evered Kreimer obtained 13 useable negatives during two minima with a cold-emulsion camera and a 12.5-inch reflector, which he has described (1). Though the images of the variable were very weak at mid-minimum, they indicated a range of about three magnitudes and confirmed the period of 4.1 days.

Fortunately, this star was visible near mid-minimum on four of 50 plates taken by A.Sandage with the 48-inch Palomar Schmidt and made available to M.Harwood. From this latter material, the minimum magnitude of the eclipsing binary was determined to be 18.5, from the Kron Harwood (2) and the photometric standards for NGC 6712 given by Sandage and Smith (3).

Since 10-minute exposures were used by Kreimer and Sandage, little smearing of the light curve during primary eclipse should be present. However, the Bruce exposures were several times longer and were given half weight in forming the normal points of primary eclipse (ϕ = 0.3060 to ϕ = 0.4284 in Table I); it was also necessary to subtract 0.13 magnitude from these estimates to remove a systematic difference. The Kreimer results were not used at all to form the light curve, since his exposures were on panchromatic film instead of a blue-sensitive emulsion.



The points in Fig.2 denote the following: large dots, the average of more than five estimates; small dots, the average of five or fewer estimates; open circles, normal points from the reflected observations. These data are summarized in Table I, where n indicates the number of estimates and $\bar{\phi}$ the mean phase computed from $\phi = p^{-1}$ (JD - 2420000).

Table I.

$\bar{\phi}$	m	n	$\bar{\phi}$	m	n
.0513	15.25	24	.3542/.3802	17.96	3
.1307	15.24	9	.3645/.3699	18.49	3
.2594	15.23	13	.4701	15.27	5
.3060/.4284	15.28	5	.5615	15.28	22
.3165/.4179	15.41	2	.6473	15.28	18
.3261/.4083	15.72	5	.7554	15.22	4
.3328/.4016	16.18	3	.8419	15.30	24
.3376/.3968	16.51	5	.9276	15.26	8
.3412/.3932	16.86	5			

The eclipses last $0^p.144 = 14^h.2$ and are total with a duration of $0^p.016 = 1^h.6$. The mean light durve during primary eclipse was fitted to the individual observations to obtain the four normal times of minima in Table II. The first two

Table II.

JD Hel.	E	O–C
2 428 198.598	-636	$+0^d.001$
28 894.378	-487	-.003
35 284.072	+1065	+.001
39 401.140	+2065	+.001

are from Bruce plates, the third from 48-inch Schmidt plates, and the last from Kreimer's negatives. The following elements were derived:

JD min. hel. = 2430899.394 + $4^d.117068$ E.

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(1) John H.Mallas and Evered Kreimer, Sky and Telescope 33, 285, 1967.
(2) Margaret Harwood, Leiden Annals XXI, 387, 1962.
(3) Allan Sandage and Lewis L. Smith, ApJ 144, 886, 1966.