COMMISSION 27 OF THE I.A.U.

INFORMATION BULLETIN ON VARIABLE STARS

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1968 October - 1969 November

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5 November 1969

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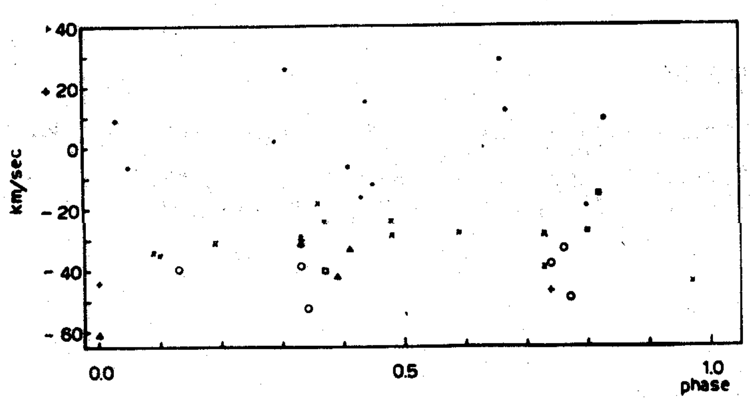
Konkoly Observatory
Budapest
1968 October 11

SPECTROGRAPHIC OBSERVATIONS OF THE VARIABLE STAR OMICRON ANDROMEDAE

In 1961 we have begun spectrographic observations (Pasinetti 1967, 1968) of Omicron Andromedae, considered by some AA. a photometric double star showing, sometimes, a shell spectrum.

We have measured the radial velocities of this star from fourty plates secured in the period 1961-1966 in which it has been a normal B-type star.



A velocity curve characteristic of the eclipsing variables does not result from our measures. The velocities deduced from the first Balmer lines (before H_8) range from -20 to -50 km/sec in the years later than 1961; this dispersion is probably real being greater than the mean square errors. Instead in 1961, the velocities are much higher owing to the presence of strong cores altering the velocities. In the figure our results for the first Balmer lines are plotted against the phases according to the data of Schmidt (1959); each symbol indicating a different year: . 1961, x 1962, Δ 1963, + 1964, □ 1965, o 1966.

The values of the other elements are sometimes much higher than those of hydrogen; the most velocities from Si are positive. However these results are rather uncertain as there are few measurable lines and they are very broadened.

PIERO GALEOTTI - LAURA E.PASINETTI
Osservatorio Astronomico di Merate

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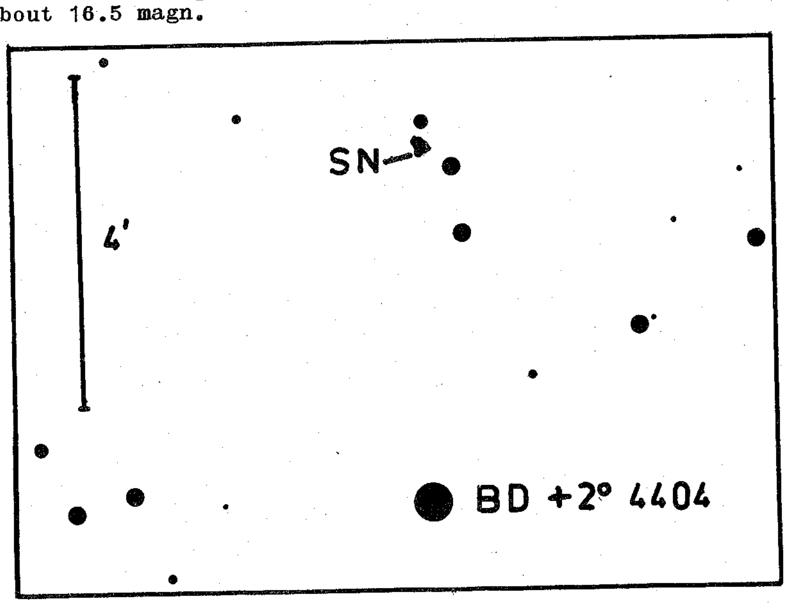
Konkoly Observatory
Budapest
1968 October 11

SUPERNOVA IN PEGASUS

On September 30,1968 I found a supernova on a plate obtained in the night September 28/29 with the 60/90/180 cm Schmidt telescope at the mountain station of the Konkoly Observatory.

The supernova is situated about 2" SE from the center of the anonymous galaxy at RA = $21^h 42^m.3$, D = +2°51' (1950). The identification chart shows the position of the supernova.

The brightness of the supernova was estimated of about 16.5 magn.



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Konkoly Observatory
Budapest
1968 October 15

BD +28°637

On the basis of the photometric material obtained in 1960-64 at the Schmidt camera in three colours of the UBV system (80 photos in each colour) we found that the star BD +28°637 is an irregular variable.

The extreme values of its brightness are as follows: 11.69-13.40, 11.30-12.41, 10.55-11.53 mg in U,B and V, respectively. The colour indices vary in wide range: (U-B) from +0.35 to +1.32, (B-V) from +0.51 to +1.65.

On the (U, U-B) diagram a short-wave emission excess appears with the increase of the brightness of the star.

On the Hertzsprung-Russel diagram the star is located within the T-band. The star BD +28°637 is probably a variable of the RW Aur type.

October 1, 1968.

L.N.MOSIDZE
Abastumani Astrophysical Observatory
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THE LIGHT-SURFACE OF TU Cas

TU Cas is a cepheid type variable with regular light curve variation. The periods were determined by Oosterhoff (1): $P = 2^{d}\!.1393$ and $P_B = 5^{d}\!.2306$.

The variable was observed at the Konkoly Observatory in three colours from 1960 untill 1963. Using a procedure proposed by J.Balázs and L.Detre (2) we constructed the so called light-surface of the variable. It proved to be similar to that of the RR Lyrae stars showing Blashko effect (e.g. AR Her) (3): on the light-surface of TU Cas a bulb appears and develops on the descending branch, whilst the brightness of the maximum decreases resulting in a double maximum at a definite phase of the P_B-period; later the old maximum is shrinking to a bulb on the ascending branch, finally disappearing, meanwhile the new one, increasing continuously, is shifted to the left and takes the place of the old maximum.

The phenomenon repeats itself in all the three colours and could be checked independently from the observations of Vasilanovskaja (4) as well.

E.ILLÉS
Konkoly Observatory
Budapest

Literature:

1 Oosterhoff,P.Th.: BAN XIII. No 479. (1967).
2 Balázs,J. - Detre,L.: Budapest Mitt.8 (1939).
3 Almár,I.: Budapest Mitt.51 (1961).
4 Vasilanovskaja,O.P.: Bjull.Stalinabad No 43-44 (1966).

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Konkoly Observatory
Budapest
1968 October 15

Veröffentlichungen der Remeis-Sternwarte Bamberg
Astronomisches Institut der Universität Erlangen-Nürnberg
Band VII, Nr. 78

PERIOD-CONTROL OF THE CEPHEIDS V737 CEN AND AX CIR

BV 417, meanwhile V737 Cen = CAP -61°4468($7^m_.1$) =
HD 128 037(G5); b = +1°6

Max = JD 242 8656.350 + $7^d_.065$ 85 . E

Maxima	E	O - C	Maxima	E	O - C
242 8656.362(S)	0	+0.012	243 8549.331	1400	+0.791
8663.458(S)	1	+0.042	8577.244	1404	+0.441
8685.285(S)	4	+0.672	8583.247	1405	-0.622
8712.262(S)	8	-0.615	8584.246	1405	+0.377
8713.272(S)	8	+0.395	8880.423	1447	-0.212
243 4365.577(S)	808	+0.020	8887.355	1448	-0.346
4507.524(S)	828	+0.650	.403	1448	-0.298
4570.300(S,+)	837	-0.166	8916.299	1452	+0.335
8195.312	1350	+0.060	.345	1452	+0.381
8202.290	1351	-0.023	8930.254	1454	+0.158
8223.253	1354	-0.258	.300	1454	+0.204
8230.217	1355	-0.360	9184.414	1490	-0.052
8471.538	1389	+0.722	9233.276	1497	-0.651
8498.451	1393	-0.628	.319	1497	-0.608
.495	1393	-0.584	9269.376	1502	+0.119
8499.443	1393	+0.364	9319.219	1509	+0.501
.488	1393	+0.409	9566.528	1544	+0.503
8520.386	1396	+0.091	9671.854(NZ)	1559	-0.156
.431	1396	+0.154	9678.833(NZ)	1560	-0.243
8548.286	1400	-0.254	.885(NZ)	1560	-0.191
.331	1400	-0.209	9679.823(NZ)	1560	+0.747
8549.286	1400	+0.746	.875(NZ)	1560	+0.799

(S) = Sonneberg, H.GESSNER
(NZ) = New Zeeland, I.PATERSON

Maxima	E	O – C	Maxima	E	O – C
242 1731.676++	-980	-0.141	241 8517.562	-1435	+0.707
1428.516++	1023	+0.531	8453.594	1444	+0.331
1421.534	1024	+0.614	8375.457	1455	-0.081
1046.542	1077	+0.112	8368.440	1456	-0.032
0990.634	1085	+0.731	8036.818	1503	+0.441
0756.485++	1118	-0.245	7774.568	1540	-0.373
0389.531	1170	+0.225	7711.620++	1549	+0.272
0332.559+	1178	-0.220	7704.581+	1550	+0.299
0325.624+	1179	-0.089	7018.628	1647	-0.267
241 9604.591	1281	-0.405	6636++	1701	-0.660
8884.547+	1383	+0.268	6361.528	1740	-0.243
8552.230++	1430	+0.046	6298.600	-1749	+0.422

All maxima before JD 242 1731 on plates of the Harvard Observatory (estimated by H.BAUERNFEIND, Bamberg).

No variability in the period in the time interval 1903-1967

BV 428, meanwhile AX Cir = CAP $-63°3436(6\overset{m}{.}8)$ =
HD 130 701/2(F5/A2); b = $-4\overset{\circ}{.}0$
Max = JD 242 8691.425 + $5\overset{d}{.}273\ 46$. E

Maxima	E	O – C	Maxima	E	O – C
242 8691.412++	0	-0.013	243 8580.245	1875	+1.083
8754.277	12	-0.429	8584.246+	1876	-0.190
8776.294+	16	+0.494	8589.251	1877	-0.458
9129.292	83	+0.170	8605.208	1880	-0.322
9135.516	84	+1.120	8879.403	1932	-0.347
9319.531+	119	+0.564	.449	1932	-0.301
9382.542	131	+0.294	8885.406	1933	+0.383
9419.361	138	+0.199	8906.308++	1937	+0.191
9809.416	212	+0.018	.355++	1937	+0.238
243 0158.437	278	+0.990	8911.340+	1938	-0.050
1677.415	566	+1.212	8916.345	1939	-0.319
8199.312+	1801	-0.161	8932.304+	1942	-0.180
8225.350	1808	-0.491	8933.261	1942	+0.777
8494.492++	1859	-0.295	.308	1942	+0.824
8499.488	1860	-0.573	9259.357++	2004	-0.082
8500.485	1860	+0.424	9269.331	2006	-0.655
8521.384++	1864	+0.230	.376	2006	-0.610
.429++	1864	+0.275	9270.353+	2006	+0.367
8548.331	1869	+0.809	9291.255+	2010	+0.175

Maxima	E	O - C
243 9291.299	2010	+0.219
9313.256	2014	+1.083
9318.226	2015	+0.779
9628.575+	2074	-0.006
9655.317++	2079	+0.369
9676.239++	2083	+0.197

\+ E.SCHÖFFEL und H.MAUDER,pe (Z.f.Astrophys., in print)

++ A.W.J.COUSINS and D.S.EVANS, pe (MNASSA 26, 84, 1967)

Maxima	E	O - C
242 8639.425	-10	+0.735
8344.346	66	+0.969
8227.484	88	+0.124
7295.259	265	+1.301
7214.320	280	-0.536
5475.235	610	+0.621
4704.550	756	-0.139
4314.593	830	+0.140
3961.578	897	+0.447
3918.692	905	-0.252
3533.722	978	-0.259
3228.576	1036	+0.456
3180.680	1045	+0.021
2458.714++	1182	+0.519
1731.676	1320	+1.218
1440.496	1375	+0.078
1430.499	1377	+0.629
1424.538	1378	-0.059
1367.664	1389	+1.075
1361.704	1390	+0.388
1050.548+	1449	+0.367
1049.546+	1449	-0.635
1007.675	1457	-0.319
0991.726	1460	-0.447
0338.576	1584	+0.312

Maxima	E	O - C
242 0033.513	-1642	+1.109
241 9589.639	1726	+0.206
9557.717	1732	-0.075
9531.728	1737	+0.304
8861.575	1864	-0.121
8824.678	1871	-0.103
8750.773	1885	-0.180
8498.545	1933	+0.718
8497.634+	1933	-0.193
8476.510	1937	-0.223
8450.607++	1942	+0.241
8440.765	1944	+0.946
8434.731+	1945	+0.186
8424.391	1947	+0.393
8160.519	1997	+0.194
8144.539++	2000	+0.034
8102.645	2008	+0.328
7748.622	2075	-0.374
7416.539+	2138	-0.229
7375.629	2146	+1.049
7238.869	2172	+1.399
7094.536	2199	-0.550
7069.577	2204	+0.858
6911.839	2234	+1.324
6636.679	2286	+0.384
6589.713+	2295	+0.879
6557.867	2301	+0.673
6309.550++	2348	+0.209
6298.600	2350	-0.194
6240.588+	2361	-0.198
5945.591	2417	+0.119
5940.506	2418	+0.307
5635.519	-2476	+1.181

hump in light-curve near phase 0.2; all maxima before JD 243 8199 on plates of the Harvard Observatory (estimated by H.BAUERNFEIND, Bamberg).

No variability in the period in the time interval 1901-1967

Remeis Observatory
Bamberg, 1968 Oct.15

W. STROHMEIER

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INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 305

Konkoly Observatory
Budapest
1968 October 29

PHOTOELECTRIC OBSERVATIONS OF YZ CMi

By the request of Working Group on UV Ceti type Stars a continuous photoelectric monitoring of YZ CMi was carried out at the Lick Observatory on Jan 23 and 24, 1968, U.T. The observations were obtained with the 24 inch reflector of the Lick Observatory and a blue filter of the UBV system. The variable was monitored in total for 11 hours. The star BD +3°1778 was used as a comparison star and observed 15-20 minutes. A few occasional three color measurements of both stars were also obtained. Here, only the data concerning flares of YZ CMi are presented. They are given in the Table. All the columns are self-explanatory. The occurrence of the third flare is uncertain. The star had a large western hour angle and, as a result, atmospheric fluctuations were relatively large. The flare had two narrow maxima poorly defined against the fluctuations.

Flares of YZ CMi observed at the Lick Observatory

Date (U.T.)	Time of Monitoring (U.T.)	Flares		
		Time of Maximum (U.T.)	Δb instr. (mag)	Duration (minutes)
Jan 23	$4^h11^m-7^h28^m$	6^h37^m	0.20	1
	$7^h40^m-8^h17^m$			
Jan.24	$3^h54^m-5^h48^m$			
	$6^h08^m-7^h42^m$			
	$7^h56^m-10^h27^m$	9^h26^m	0.23	1.5
	$10^h37^m-11^h52^m$	11^h40^m	0.2	1

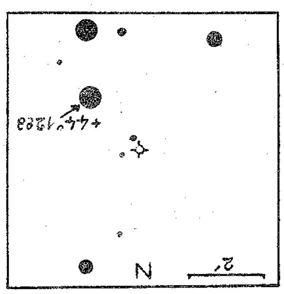
Warsaw University Observatory
Warsaw, Poland

K.STEPIEŃ

AF AURIGAE

Le Catalogue Général d'Etoiles Variables (1958) donne, pour cette variable semi-régulière très rouge (spectre N) découverte par Espin, les magnitudes photographiques max. et min. 11,3-11,8 (1).

J'ai étudié cette étoile sur 105 plaques de la Station de Mainterne dont 99 ont été obtenues entre les dates JJ 2437639 et 2438524. AF Aurigae fluctue généralement entre m_p 13,0 et 13,5 par comparaison avec les étoiles de la S.A.25 de Harvard (2). Les maximums que j'ai observés sont 12,3 (JJ 2438433) et 12,4 (JJ 2438465). Cette variable est invisible sur deux plaques (JJ 2437639 et 2437960) montrant une étoile de m_p 14,11 de la S.A.25 de Harvard. Sur une plaque (JJ 2436607) montrant deux étoiles de m_p 14,20 et 14,40 de la même S.A.25, AF Aurigáe est estimée 14,5 environ. Sur la planche 0-645 du "Sky Survey" de l'Observatoire du Mt. Palomar, la magnitude photographique est évaluée 13,5 environ.



19 Octobre 1968

ROGER WEBER

Station Astrophotographique
de Mainterne
(Eure-et-Loir)
France

(1) Selon Gaposchkin (H.A.118, n°16,123, 1952): "minimum is about 11,80".
(2) AF Aurigae est stiuée à 43' à l'Est de l'étoile centrale de la S.A.25.

COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 306

Konkoly Observatory
Budapest
1968 October 30

NOVA VULPECULAE

A series of photo-electric observations in B and V has been made from April to September 1968 with a photometer attached to the 50 cm reflector of ITA Observatory.

Several stars were used for comparison; the V magnitudes were taken from various sources and then adjusted to fit the observed magnitude differences. Differential atmospheric extinction was always taken into account, although the corrections were generally small. These adjusted values, shown in table 1, were actually used to derive the V magnitudes of the nova. SAO 87734 and 87733 were observed on all nights, the others only ocasionally. Thus, the relative values of the present V observations are quite accurate, but they may be systematically too high or too low by as much as 0.1^m due to the uncertainty in the adopted magnitudes for the comparison stars.

The color-indices B-V were obtained directly, not via comparison stars. Very serious difficulties were encountered in correcting for atmospheric extinction, since most observations were made at high zenith distances and under bad weather conditions. The B-V values may be in error by as much as 0.1^m.

All magnitudes and color indices were transformed from the instrumental into the standard UBV system. Since the instrumental system is well matched, only small corrections had to be applied and it is believed, that no significant error was introduced in this step.

Table 2 gives the final results.

Table 1:
Adopted values for the V magnitudes of the comparison stars.

Star (SAO number)	V	Star (SAO number)	V
87734	7.55	87633	5.43
87733	6.85	87883	4.53
87785	6.44	87840	5.52
87766	6.92		

Table 2:
Observed V magnitudes and color indices.

JD	V	B-V	JD	V	B-V
2439900+			2440000+		
75.726	5.84	0.57	5.708	7.67	0.50
79.698	5.78	0.54	11.670	7.84	0.43
96.680	7.25	0.51	35.649	8.61	0.24
97.677	7.27	0.52	37.660	8.67	0.24
			106.635	10.15	0.00

The ITA Astronomical Observatory
São José dos Campos, SP, Brazil

G.R. QUAST

RED VARIABLE IN LUPUS

This star, $\alpha = 15^h03^m.0$, $\delta = -41°17'$, was announced in IAU Circ. no.2090. Two photo-electric observations in B and V were made:

JD	V	B-V
2440083.413	8.31	2.17
2440106.414	8.76	2.38

Together with the variable, also the stars below were observed:

Star	V	B-V
$\alpha = 15^h03^m.1$; $\delta = -41°21'$	9.83	1.66
SAO 225473	8.28	1.21
SAO 225481	8.22	0.97
SAO 225422 (=HD 133220)	6.68	1.64

Only later it was found that SAO 225422 is also variable, as indicated in Royal Observatory Bulletin Nr 121; it was observed on JD 2440106.414. All the V magnitudes listed above may be systematically in error by as much as 0.2^m, since no reliable values could be found in catalogs; but the magnitude differences should be correct to within 0.04^m.

The ITA Astronomical Observatory
São José dos Campos, SP, Brasil

G.R. QUAST

COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 307

Konkoly Observatory
Budapest
1968 November 2

OBSERVATIONS OF FLARE STARS

a) YZ Canis Minoris, b) AD Leo, c) BD +13°2618 Virginis

A few unpublished results from 1966-67 of flare star monitoring and mean colour and magnitude photometry are presented. The material was obtained at the Boyden Observatory with the 16-inch Harvard Nishimura and 60-inch reflectors using equipment previously described (Refs.1 and 2).

In February 1967 photoelectric monitoring of YZ CMi was undertaken by E.Schöffel (Bamberg) as part of the joint optical-radio programme.Results were communicated privately to the radio astronomers at that time. One major flare of more than 2 magnitudes (blue) was well observed at the 16-inch during 23 hours monitoring over 5 nights, and two suspected flares were recorded. The material has been re-examined for small flares occuring during stable sky conditions, and the 3-sigma rule applied together with an arbitrary 'minimum duration' test to aid in the weighting of the observations. Flares accepted on the basis of the 3-sigma rule were judged as possible or doubtful depending on whether the duration was greater or less than 2 minutes. Standard deviations were derived from several 2-minute samples near the flares,where the data points were averages over 12-second tracings. The time constant (half final-deflection) for the tracings was 0.9 second. For the 16-inch continuous-monitoring observations of YZ CMi ($B = 12^m.88$), a typical detection threshhold for blue flares is at apparent magnitude 15.4 (for flare alone). An excellent discussion of the detection problem applied to the statistics of flare activity is given by W.Kunkel (Ref.3). Schöffel's hours of coverage and some details of flares are summarized in Tables 1 and 2, and light curves shown in the Figure.

Table 1

Monitoring of YZ CMi
Coverage U.T.

1967 Feb.	2	(2109-2258)
	3	1859-2132, 2136-50, 2152-2255, 2257-2304, (2304-2400).
	4	(0000-55), 0057-0158, 1849-0104.
	6	1854-2009, 2014-21.
	13	1814-2000, 2003-06, 2009-2400.
	14	0000-35, 0045-0100.

Total Coverage 22^h45^m (parenthesis indicate poor sky conditions)

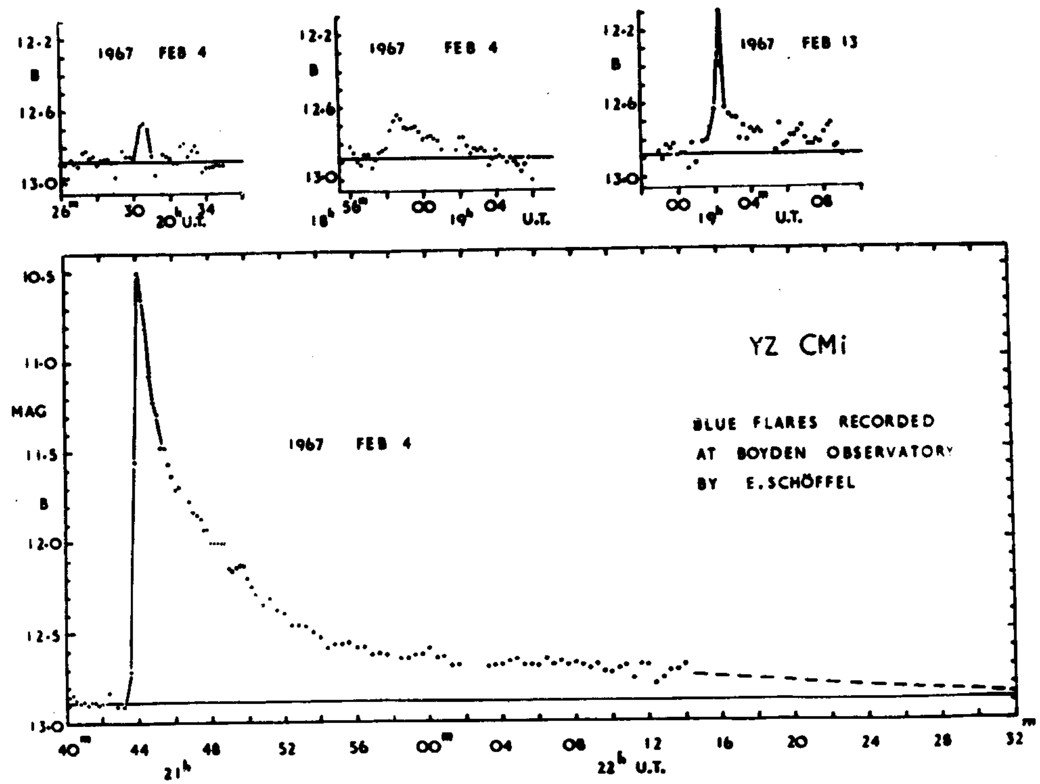

1967 FEB 4
1967 FEB 4
1967 FEB 13
B
U.T.
YZ CMi
BLUE FLARES RECORDED
AT BOYDEN OBSERVATORY
BY E.SCHÖFFEL
1967 FEB 4
MAG
B
21h
22h U.T.

Table 2

Flares of YZ CMi

1967	U.T. of max.	Blue Ampl.	Duration ≥3 (mins)	σ	Rise Rate mag/sec	Remarks
Feb.4	$18^{h}58^{m}.6$	$0^{m}.24$	3	$\pm 0^{m}.035$	0.005	Possible
4	20 30.6	0.21	1	± 0.048	0.006	Doubtful
4	22 44.0	2.38	40	± 0.017	0.092	Definite
13	19 02.3	0.76	2 ?	± 0.044	0.022	Definite

The flare star, AD Leo, and the suspected flare star, BD +13°2618 (Ref.4), were fragmentarily monitored in 1966 by W.Pretorius (Boyden) and myself. No flares were detected. Coverage is given in Tables 3 and 4, but this material is heterogeneous in that several filters (standard U, B and V) were used for monitoring. Detection threshholds in blue were at $14^{m}.8$ and $14^{m}.6$, for the two stars, respectively.

Table 3

Monitoring of AD Leo
Coverage U.T.

1966	Jan.24	1954-2027.
	Feb.16	2144-53, 2155-56, 2202-32, 2236-2400.
	17	0000-15
	May 8	1933-38, 1941-43, 1958-2000, 2002-13, 2037-42, 2045-52.

Total Coverage $3^{h}24^{m}$

Table 4

Monitoring of BD +13°2618
Coverage U.T.

1966
Feb.17 0118-24, 0129-0235.

Total Coverage $1^{h}12^{m}$

The photometric data for the three stars in Table 5 is in the standard UBVR system of Johnson et al. (Ref.5). The 60-inch observations were made during the programme mentioned in Ref.2, and the standard errors for AD Leo and its companion at 1'.7 NE, in V, V-R, B-V and U-B are $\pm 0^{m}.01$, $\pm 0^{m}.2$, $\pm 0^{m}.3$ and $\pm 0^{m}.4$, respectively. The 16-inch observations of BD +13°2618 are less accurate, being made by comparison with AD Leo. Mean extinction coefficients were used at air masses of 1.35 and 1.55 for the two stars, respectively, and the small differential colour terms neglected. Except for the red band, results for AD Leo have been published previously by Johnson and Morgan (Ref. 6) and Engelkemeir (Ref.7). Agreement is satisfactory save in the V magnitude. We note that AD Leo is an unresolved astrometric binary (Ref.7), and that small variations in magnitude have been suspected by several workers.

Table 5,

Photometric Results

Star	J.D. -2439000	V	V-R	B-V	U-B	Instrument
AD Leo	$486^d.551$	$9^m.38$	$1^m.63$	1.52	1.03	60-inch
Comp.to AD	486.558	10.71	0.98	1.05	0.98	60-inch
BD+13°2618	173.429	9.56		1.54	1.20	16-inch

Armagh Observatory
October 25, 1968.

A.D.ANDREWS

REFERENCES

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COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 308

Konkoly Observatory
Budapest
1968 November 3

Veröffentlichungen der Remeis-Sternwarte Bamberg
Astronomisches Institut der Universität Erlangen-Nürnberg
Band VII, Nr. 79

ECLIPSING BINARY BV 894

Part A: PHOTOELECTRIC OBSERVATIONS

BV 894 (= HD197070=CPD -72°2115) was independently noted as variable in (UBV) observations made at Siding Spring in September 1968. Because of the possibility that it was an ultrashort period variable, observations were obtained on 5 nights. The star is apparently a contact binary with a period near onehalf day. The observations, and the Australian Eastern Standard Time (AEST), are listed in Table 1. The colors, which show little or no change during the cycle, are B-V = $+0\overset{m}{.}34$ and U-B = $+0\overset{m}{.}03$. The amplitude is near $0\overset{m}{.}5$.

Table 1.

Date 1968 Sept	AEST	V_E	Date 1968 Sept	AEST	V_E	Date 1968 Sept	AEST	V_E
20	21:25	$8\overset{m}{.}67$	21	21:15	$8\overset{m}{.}70$	23	19:19	$8\overset{m}{.}74$
	21:50	8.68		21:25	8.67		20:45	8.76
	22:15	8.71		21:54	8.59	24	19:21	8.55
	22:30	8.73		22:50	8.52		22:07	8.81
	23:12	8.86		23:42	8.51		22:15	8.83
	23:24	8.91	22	00:26	8.50		22:23	8.85
21	00:00	8.97		19:18	8.51	27	19:35	8.62
	00:20	8.93		21:07	8.61		21:24	8.61
	20:23	8.81		22:19	8.74		22:58	8.49

No further observations are planned.

1968 October 20

O.J.EGGEN

Mt Stromlo and Siding Spring Observatories
Canberra, Australia

Part B: PHOTOGRAPHIC OBSERVATIONS

With help of the photoelectric observations by O.J. EGGEN it was possible to obtain the elements of BV 894 from sky patrol plates:

$$\text{Min} = \text{JD } 243\ 8228.470 + 0\overset{d}{.}562\ 979 \cdot E$$

Minima	E	O - C
243 8204.542	-42.5	-0.001
8228.465+	0	-0.005
8263.395	62	+0.020
8267.336	69	+0.020
8295.222	118.5	+0.039
8314.276	152.5	-0.048
8316.278+	156	-0.017
8555.549+	581	-0.012
8641.402	733.5	-0.013
8649.311	747.5	+0.014
8992.401	1357	-0.032
8994.412+	1360,5	+0.009
9029.333	1422.5	+0.025
9374.375	2035.5	-0.039
9376.374+	2039	-0.010
9378.372+	2042.5	+0.017
9380.374(3/4)	2046	+0.049
9404.252	2088.5	-0.007
9654.198+	2532.5	-0.017
9656.198+	2535	+0.013
244 0120.058(E)	3360	-0.022
.083(E)	3360	+0.003
0120.933(E)	3361.5	+0.009
0122.888(E)	3365	-0.007
0124.005(E)	3367	-0.015
.010(E)	3367	-0.010
.016(E)	3367	-0.004

Remeis Observatory
Bamberg, 1968 October 29

W. STROHMEIER

COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 309

Konkoly Observatory
Budapest
1968 November 6

NOVA POSSIBLE KOHOUTEK

Nous avons retrouvé la Nova possible signalée par L.Kohoutek (Cir. U.A.I. no.2106) à la position indiquée par W.Dieckvoss. Elle était déja présente sur un cliché obtenu le 11 septembre 1968 avec la magnitude 12.

Le tableau suivant donne des magnitudes provisoires déduites de l'examen des photographies prises avec le télescope Schmidt de l'Observatoire de Meudon sur film Kodak IIaO avec un filtre, donnant approximativement la magnitude B dans le système UBV.

Date		T.U.	Magnitude	Date		T.U.	Magnitude
1967	Sept.	6,904	[16,0	1968	Juin	29,963	[15,8
1968	Avr.	18,123	[15,8	-	Juil.	3,934	[15,8
-	-	19,086	[15,8	-	Sept.	11,845	12,0
-	-	19,098	[15,8	-	-	12,814	12,2
-	-	20,100	[15,8	-	Oct.	16,891	13,3
-	-	26,050	[13,7*	-	-	20,811	13,1
-	-	26,063	[13,7*	-	-	21,775	13,3
-	Juin	22,949	[15,6**	-	-	29,751	13,4

* Ciel absorbant ** Cirrus

Les magnitudes ont été obtenues par comparaison avec celles des étoiles de l'amas galactique voisin NGC 6834 d'après A.A.Hoag et al. (Publ.U.S.Nav.Obs., Sec. Ser., Vol.17, Part.7, 1961).

On voit que notre série de clichés permet de situer le maximum d'éclat de cette étoile entre le 3 juillet et le 11 septembre 1968.

Le 30 Octobre 1968

Ch. BERTAUD, B.DUMORTIER
Observatoire de Meudon

COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 310

Konkoly Observatory
Budapest
1968 November 7

UV CETI

A continual photoelectric monitoring of the flare star UV Cet was done with the 91-cm reflector of the Okayama Station from 14 to 28 October 1968, by the request of the Working Group of UV Ceti stars. During the 38 hours of monitoring 27 flares were observed as shown in the following Table. Some more details will be published in the Tokyo Astronomical Bulletin.

Table 1.

Flares of UV Cet observed at Okayama, 14 to 28 October, 1968.

Date 1968 Oct.	Time of Monitoring	Flares: Time of max.	$\Delta m(B)$	Duration	Integrated intensity
14^d	12^h50^m - 18^h20^m	$14^h33^m.2$	1.11^{mag}	2.0^m	0.90^{mag}
		17 08.7	0.64	1.7	0.64
15	13 00 - 17 40	14 36.7	0.69	0.3	0.14
		15 14.5	0.54	0.3	0.06
		15 26.2	1.41	0.7	0.34
		16 16.0	3.6	3.5	8.1
17	15 12 - 15 34				
	15 36 - 15 46				
	15 59 - 18 22	16 44.7	1.43	0.9	1.05
18	12 02 - 12 15				
	12 21 - 12 30				
	12 32 - 13 34				
	13 45 - 17 12	14 50.7	1.05	} 6.5	} 2.3
		14 52.7	0.90		
19	11 28 - 18 22	14 20.9	0.91	2.9	0.20
		15 25.3	0.41	2.0	0.37
		16 30.9	0.57	0.3	0.09
		16 35.0	0.47	0.3	0.05
		17 01.2	0.51	0.6	0.06
		17 06.4	0.59	1.8	0.32
24	15 41 - 17 11	15 51.9	1.17	2.3	0.51
25	16 03 - 18 02				

(Continued

Date 1968 Oct.	Time of Monitoring	Flares Time of max.	$\Delta m(B)$	Duration	Integrat intensit
26^{d}	$11^{h}08^{m}$ - $17^{h}50^{m}$	$11^{h}16^{m}.0$	0.78^{mag}	2.0^{m}	0.59^{ma}
		13 04.3	0.60	0.3	0.10
		13 25.7	0.84	0.3	0.11
		13 53.4	0.69	3.4	0.69
		13 56.9	1.07	1.2	0.33
27	16 05 - 18 02	16 47.3	3.40	}12.0	}22.2
		16 50.1	3.14		
28	11 08 - 11 40				
	15 04 - 16 31	15 44.5	0.59	0.3	0.05
		16 14.1	0.54	2.7	0.75
	16 49 - 17 32	17 18.0	0.88	3.2	1.02
		17 25.3	0.84	2.7	0.57

Tokyo Astronomical Observatory
November 1, 1968.

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

COMMISSION 27 OF THE I. A. U.
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NUMBER 311

Konkoly Observatory
Budapest
1968 November 8

IDENTIFICATION LIST OF THE NEW VARIABLE STARS NOMINATED IN 1968

(an extract from the 56-th nominating list)

In accordance with the request of the urgent publication of the simple nominating list of new variable stars we give here the list of 1648 new variables designated in 1968.

Astronomical Council of the Academy of Sciences
in the U.S.S.R, Commission for Variable Stars

Moscow, 1968 October 17

B.V.KUKARKIN, P.N.KHOLOPOV,
Yu.N.EFREMOV, N.E.KUROCHKIN,
M.S.FROLOV, N.P.KUKARKINA,
G.I.MEDVEDEVA, N.B.PEROVA,
V.P.FEDOROVICH

Preliminary designation	α 1900.0	δ 1900.0	Name
β Cas	$00^h03^m54^s$	+58°35'.7	β Cas
S 10138	00 07 57	+55 21.0	V 408 Cas
S 10139	00 17 12	+56 53.0	V 409 Cas
S 10141	00 17 57	+61 12.0	V 410 Cas
S 10147	00 24 51	+55 33.0	V 411 Cas
BD +34°106	00 37 21	+34 59.1	FF And
BV 297	00 38 40	+44 31.5	FG And
S 9486	00 40 15	+54 47.0	V 412 Cas
S 9136	00 41 27	+54 36.0	V 413 Cas
S 9496	00 42 09	+37 18.0	FH And
S 9487	00 42 15	+53 01.0	V 414 Cas
S 9489	00 48 33	+58 49.0	V 415 Cas
S 9498	00 51 15	+36 43.0	FI And
S 9490	00 55 51	+56 43.0	V 416 Cas
S 9501	00 56 21	+30 17.0	VV Psc
S 9139	01 01 15	+53 06.0	V 417 Cas
S 9502	01 01 30	+36 58.0	FK And
S 9503	01 02 36	+36 22.0	FL And
S 9504	01 03 24	+36 04.0	FM And
S 9142	01 06 24	+61 39.0	V 418 Cas
S 9505	01 06 30	+34 43.0	FN And
S 9507	01 09 00	+32 08.0	VW Psc
S 9508	01 09 51	+37 06.0	FO And
S 9509	01 11 12	+34 32.0	FP And
S 3349	01 12 45	+56 22.0	V 419 Cas
S 9493	01 24 48	+58 15.0	V 420 Cas
S 9146	01 28 42	+53 07.0	OY Per
S 9147	01 31 24	+56 49.0	V 421 Cas
S 9148	01 33 51	+58 55.0	V 422 Cas
BV 7	01 35 35	+79 34.7	GW Cep
12. 1939	01 36 31	+64 19.1	V 423 Cas
S 9151	01 40 27	+56 17.0	V 424 Cas
S 9511	01 45 57	+38 24.0	FQ And
S 9522	01 46 27	+51 42.0	OZ Per
S 9513	01 53 15	+35 43.0	FR And
S 9514	01 55 12	+33 18.0	RY Tri
BV 638	01 55 28	−16 50.0	XZ Cet
218. 1943	02 03 00	+24 45.0	TY Ari
S 9517	02 03 27	+33 22.0	RZ Tri
S 9518	02 04 36	+31 32.0	SS Tri

Preliminary designation	α 1900.0	δ 1900.0	Name
Zi 115 a	$02^h10^m02^s$	+58°03!9	PP Per
S 9526	02 11 57	+54 49.0	PQ Per
Wr 28	02 14 36	+57 24.3	PR Per
S 9519	02 19 57	+37 08.0	FS And
S 9521	02 24 39	+37 47.0	FT And
BSD 22. 2027	02 33 00	+45 12.3	PS Per
S 9534	02 35 15	+35 18.0	ST Tri
S 9530	02 35 33	+56 17.0	PT Per
S 9727	02 35 57	+35 16.0	PU Per
S 9728	02 36 30	+37 42.0	PV Per
S 9154	02 38 57	+35 50.0	PW Per
S 9156	02 41 03	+35 30.0	PX Per
S 9160	02 43 42	+37 14.0	PY Per
S 9731	02 46 06	+36 14.0	PZ Per
8.1936	02 47 36	+51 25.1	QQ Per
S 9533	02 53 18	+55 49.0	QR Per
S 9166	02 58 36	+36 01.0	QS Per
13.1936	02 59 20	+46 53.8	QT Per
S 9168	02 59 24	+40 17.0	QU Per
S 9171	03 03 03	+37 59.0	QV Per
S 9174	03 06 12	+38 35.0	QW Per
S 9177	03 08 48	+39 10.0	QX Per
S 9178	03 09 03	+42 05.0	QY Per
S 9537	03 11 34	+37 12.3	QZ Per
18.1936	03 13 52	+45 57.7	V 335 Per
S 9180	03 16 21	+41 16.0	V 336 Per
СПЗ 548	03 24 50	+34 08.0	V 337 Per
–	03 34 42	+24 25.0	HZ Tau
S 9540	03 37 12	+31 42.0	V 338 Per
–	03 43 45	+24 00.8	II Tau
S 9541	03 43 57	+33 30.0	V 339 Per
GR 103	03 47 40	+34 44.0	V 340 Per
–	03 47 54	+11 06.0	IK Tau
S 9542	03 55 57	+32 37.0	V 341 Per
S 9543	04 01 06	+29 02.0	IL Tau
S 9549	04 02 33	+46 56.0	V 342 Per
GC 5020	04 04 44	+26 13.2	IM Tau
S 9550	04 15 27	+50 00.0	V 343 Per
S 9551	04 16 42	+44 27.0	V 344 Per
G 190	04 18 18	+14 44.0	IN Tau

Preliminary designation	α 1900.0	δ 1900.0	Name
G 195	$04^h18^m36^s$	+14°52!0	IO Tau
S 9734	04 19 06	+28 58.0	IP Tau
-	04 23 15	+35 00.3	V 345 Per
-	04 23 33	+35 02.7	V 346 Per
S 9555	04 23 51	+25 54.0	IQ Tau
-	04 24 07	+34 44.6	V 347 Per
S 9556	04 25 09	+20 27.0	IR Tau
СПЗ 1319	04 27 42	+25 54.0	IS Tau
СПЗ 1320	04 28 06	+25 59.0	IT Tau
СПЗ 1506	04 29 43	+28 18.5	IU Tau
СПЗ 1507	04 33 22	+28 13.1	IV Tau
S 9557	04 35 03	+24 38.0	IW Tau
S 9553	04 38 00	+49 35.0	V 348 Per
273.1934	04 47 11	+06 09.4	V 648 Ori
S 4841	04 47 25	-45 57.2	W Cae
HR 1706	05 08 53	+32 34.3	KW Aur
-	05 10 10	+33 58.6	KX Aur
-	05 10 39	+34 15.2	KY Aur
MHα 265-3	05 23 48	+11 47.1	V 649 Ori
S 9560	05 25 33	+09 41.0	V 650 Ori
S 9735	05 27 24	+05 20.0	V 651 Ori
S 9749	05 27 27	+46 29.0	KZ Aur
S 9752	05 28 48	+47 20.0	LL Aur
П 1496	05 29 37	-05 04.7	V 652 Ori
37.1906	05 30 13	-09 32.7	V 653 Ori
S 9575	05 30 45	+46 57.0	LM Aur
-	05 31 06	-06 06.0	V 654 Ori
КПЗ 6308	05 31 09	-05 13.3	V 655 Ori
П 2348	05 31 16	-05 50.3	V 656 Ori
КПЗ 6328	05 31 42	-05 08.5	V 657 Ori
F 13	05 31 47	-06 33.9	V 658 Ori
КПЗ 102483	05 32 06	-05 28.8	V 659 Ori
S 9183	05 32 24	+25 23.0	IX Tau
S 9745	05 32 45	+15 12.0	V 660 Ori
BV 799	05 33 57	-76 19.0	UX Men
43.1936	05 36 05	+27 53.8	IY Tau
S 9186	05 38 21	+28 14.0	IZ Tau
S 9569	05 39 48	+07 18.0	V 661 Ori
S 9741	05 40 12	+11 37.0	V 662 Ori
S 9570	05 41 48	+10 08.0	V 663 Ori

Preliminary designation	α 1900.0	δ 1900.0	Name
S 9571	$05^{h}42^{m}21^{s}$	+07°31'.0	V 664 Ori
S 9582	05 44 09	+44 13.0	LN Aur
BV 487	05 44 36	−45 16.6	SS Pic
S 9742	05 45 36	+12 10.0	V 665 Ori
S 9747	05 48 21	+17 53.0	V 666 Ori
S 9586	05 49 45	+48 22.0	LO Aur
S 9755	05 50 24	+41 37.0	LP Aur
S 9589	05 52 30	+47 58.0	LQ Aur
S 9190	05 53 51	+28 36.0	LR Aur
BV 609	05 54 16	−09 23.3	V 474 Mon
S 9590	06 00 39	+40 46.0	LS Aur
S 7927	06 03 18	+16 35.0	V 667 Ori
S 7928	06 05 51	+24 15.0	IW Gem
S 3965	06 06 00	+19 58.0	V 668 Ori
S 9593	06 06 09	+43 16.0	LT Aur
S 9594	06 06 18	+42 06.0	LU Aur
BV 458	06 07 54	−66 57.9	VZ Dor
S 9758	06 10 36	+48 02.0	LV Aur
S 9195	06 11 39	+19 24.0	V 669 Ori
S 9196	06 11 51	+19 45.0	V 670 Ori
S 9763	06 12 42	+21 05.0	V 671 Ori
BV 645	06 13 00	−61 26.4	ST Pic
S 9198	06 13 57	+24 22.0	IX Gem
S 9765	06 13 57	+19 25.0	V 672 Ori
S 7934	06 14 09	+19 47.0	V 673 Ori
S 9760	06 18 09	+44 10.0	LW Aur
BV 646	06 19 00	−54 30.1	PX Car
S 9601	06 20 27	+48 49.0	LX Aur
S 7938	06 22 57	+18 13.0	IY Gem
–	06 23 28	+09 32.7	V 475 Mon
S 9200	06 23 36	+17 04.0	IZ Gem
–	06 24 05	+09 50.8	V 476 Mon
–	06 24 08	+08 48.1	V 477 Mon
–	06 24 39	+09 45.6	V 478 Mon
S 9769	06 24 57	+18 38.0	KK Gem
S 9201	06 25 12	+16 04.0	KL Gem
–	06 25 14	+09 49.8	V 479 Mon
–	06 25 22	+09 44.8	V 480 Mon
СПЗ 1534	06 25 38	+10 30.1	V 481 Mon
–	06 25 40	+10 03.5	V 482 Mon

Preliminary designation	α 1900.0	δ 1900.0	Name
–	$06^h26^m03^s$	+10°06'.7	V 483 Mon
HBV 402	06 26 03	–02 04.7	V 484 Mon
HBV 437	06 26 35	+01 24.5	V 485 Mon
КЗП 6464	06 27 03	+10 20.0	V 486 Mon
–	06 27 04	+09 42.6	V 487 Mon
–	06 27 06	+10 19.8	V 488 Mon
–	06 27 16	+10 21.3	V 489 Mon
L_kH_α 216	06 27 21	+10 23.2	V 490 Mon
S 7944	06 28 33	+20 03.0	KM Gem
–	06 28 59	+11 09.5	V 491 Mon
HBV 438	06 29 22	+00 16.9	V 492 Mon
645.1936	06 29 38	+26 58.2	KN Gem
–	06 31 04	+09 28.2	V 493 Mon
HBV 439	06 31 43	–02 46.8	V 494 Mon
HBV 440	06 32 02	–02 44.4	V 495 Mon
HBV 441	06 32 29	+03 23.1	V 496 Mon
–	06 34 23	+07 23.3	V 497 Mon
HBV 442	06 34 32	+02 03.2	V 498 Mon
HBV 443	06 34 49	+03 46.6	V 499 Mon
СПЗ 1554	06 34 56	+09 43.5	V 500 Mon
HBV 444	06 35 37	–01 01.2	V 501 Mon
S 9772	06 35 57	+24 31.0	KO Gem
S 7952	06 36 30	+16 24.0	KP Gem
S 7953	06 38 06	+16 00.0	KQ Gem
S 7954	06 38 15	+19 24.0	KR Gem
HBV 445	06 38 24	–02 23.9	V 502 Mon
S 9203	06 39 15	+24 36.0	KS Gem
–	06 39 26	+09 56.4	V 503 Mon
S 9775	06 39 27	+19 12.0	KT Gem
HBV 446	06 39 45	–03 51.1	V 504 Mon
S 9206	06 40 00	+17 10.0	KU Gem
HBV 447	06 40 36	+02 36.2	V 505 Mon
S 3752	06 41 28	+15 49.7	KV Gem
HBV 448	06 41 38	–03 43.8	V 506 Mon
HBV 449	06 41 48	+01 26.0	V 507 Mon
HBV 403	06 41 53	+04 04.5	V 508 Mon
HBV 450	06 42 05	–00 55.7	V 509 Mon
HBV 451	06 42 14	+02 37.5	V 510 Mon
HBV 452	06 42 23	+02 01.8	V 511 Mon
149.1931	06 42 30	–04 38.0	V 512 Mon

Preliminary designation	α 1900.0	δ 1900.0	Name
КЗП868	06 42 36	+01 13.0	V 513 Mon
S 9205	06 44 09	+24 39.0	KW Gem
HBV 455	06 44 11	+00 03.2	V 514 Mon
HBV 456	06 44 18	-02 00.1	V 515 Mon
HBV 458	06 45 30	+01 58.9	V 516 Mon
HBV 457	06 45 45	+00 02.6	V 517 Mon
S 9207	06 46 00	+15 46.0	KX Gem
HBV 405	06 46 00	+00 44.6	V 518 Mon
HBV 459	06 46 21	+00 05.1	V 519 Mon
693.1933	06 46 49	+18 09.6	KY Gem
S 7978	06 47 03	-13 22.0	EX CMa
S 9208	06 47 12	+16 48.0	KZ Gem
КЗП 6523	06 49 13	-20 06.0	EY CMa
КЗП 6527	06 50 03	-23 48.1	EZ CMa
HBV 460	06 50 08	-01 21.3	V 520 Mon
HBV 461	06 50 46	-00 06.7	V 521 Mon
HBV 462	06 51 40	-02 36.1	V 522 Mon
HD 51725	06 53 20	-08 53.4	V 523 Mon
HBV 463	06 53 49	+02 21.1	V 524 Mon
HBV 464	06 54 10	+01 28.9	V 525 Mon
HBV 465	06 56 49	-00 59.3	V 526 Mon
HBV 466	06 57 03	-01 45.8	V 527 Mon
HBV 468	06 57 24	+02 08.7	V 528 Mon
HBV 467	06 57 49	+01 18.7	V 529 Mon
S 9210	06 57 51	+13 25.0	LL Gem
HBV 469	06 58 01	+03 23.7	V 530 Mon
HBV 470	06 58 02	+02 07.0	V 531 Mon
HBV 471	06 59 24	-00 12.1	V 532 Mon
S 9211	06 59 36	+10 44.0	LM Gem
HBV 472	07 01 27	+02 09.7	V 533 Mon
HBV 473	07 02 01	+02 02.0	V 534 Mon
HBV 406	07 05 38	+01 26.7	V 535 Mon
BV 610	07 06 39	-30 30.0	FF CMa
HBV 474	07 08 55	-02 44.3	V 536 Mon
14.1934	07 09 07	+08 58.5	AQ CMi
S 9603	07 14 06	-06 58.0	V 537 Mon
-	07 23 02	-27 27.0	KN Pup
-	07 25 44	-32 55.7	KO Pup
-	07 25 48	-34 06.0	KP Pup
PGC 1985	07 29 12	-14 18.5	KQ Pup

Preliminary designation	α 1900.0	δ 1900.0	Name
S 8571	$07^h30^m39^s$	−16°08ʹ.0	KR Pup
S 9213	07 32 03	+04 13.0	AR CMi
S 4885	07 33 58	−63 30.4	PY Car
–	07 34 05	−33 16.1	KS Pup
S 9215	07 38 57	+08 32.0	AS CMi
S 4086	07 40 47	−22 25.9	KT Pup
–	07 43 30	−30 19.6	KU Pup
S 9216	07 44 27	+02 12.0	AT CMi
BV 669	07 44 27	−48 17.3	KV Pup
S 3457	07 44 48	−14 51.0	KW Pup
S 9217	07 45 12	+06 26.0	AU CMi
S 4100	07 47 51	−26 07.5	KX Pup
S 4101	07 47 58	−26 29.5	KY Pup
BV 671	07 48 00	−17 08.0	KZ Pup
–	07 49 50	−30 11.8	LL Pup
–	07 50 47	−29 55.0	LM Pup
S 3787	07 50 52	−22 54.5	LN Pup
S 4089	07 51 06	−22 02.3	LO Pup
–	07 51 50	−31 06.8	LP Pup
–	07 52 19	−32 20.0	LQ Pup
HV 3883	07 52 57	−27 53.3	LR Pup
S 4107	07 54 57	−29 02.2	LS Pup
S 4109	07 55 24	−23 27.8	LT Pup
S 9220	07 57 15	−28 18.3	LU Pup
–	08 00 41	−34 58.2	LV Pup
S 4891	08 01 16	−26 21.0	LW Pup
BV 677	08 03 50	−16 10.1	LX Pup
S 3790	08 07 45	−22 58.9	LY Pup
S 8444	08 07 53	−23 26.0	LZ Pup
S 4115	08 10 38	−23 48.2	MM Pup
S 4116	08 11 03	−23 50.8	MN Pup
GC 11346	08 14 37	−09 51.2	HQ Hya
S 9604	08 29 39	+03 21.0	HR Hya
BV 495	08 38 28	−31 59.0	TX Pyx
BV 811	08 55 27	−27 25.6	TY Pyx
BV 90	08 57 03	+38 29.5	UV Lyn
BV 715	09 40 41	−06 16.8	RU Sex
BV 696	09 42 30	−43 42.4	FV Vel
GC 13540	09 43 51	+59 30.4	V UMa
BV 716	09 45 16	−37 52.1	XX Ant

Preliminary designation	α 1900.0	δ 1900.0	Name
S 4930	$10^h13^m48^s$	−36°18ʹ.3	XY Ant
S 4931	10 13 59	−32 46.5	XZ Ant
BV 701	10 19 49	−18 35.3	HS Hya
S 4936	10 34 06	−60 57.3	PZ Car
BV 36	10 39 51	+52 46.5	BH UMa
S 7729	10 41 09	+46 47.0	BI UMa
S 4939	10 41 14	−51 52.9	FW Vel
278.1930	10 41 38	−07 51.5	RV Sex
S 7732	10 44 30	+43 04.0	BK UMa
BV 722	11 01 07	−26 44.9	χ^2 Hya
S 7739	11 01 51	+41 48.0	BL UMa
S 7742	11 05 39	+46 58.0	BM UMa
205.1935	11 06 47	+19 02.8	BT Leo
S 7745	11 10 54	+41 45.0	BN UMa
S 7747	11 11 24	+42 34.0	BO UMa
S 7748	11 13 27	+47 34.0	BP UMa
S 7751	11 16 06	+44 51.2	BQ UMa
66.1934	11 17 57	+16 15.3	BU Leo
S 7752	11 18 42	+43 28.0	BR UMa
S 7753	11 20 15	+43 07.0	BS UMa
BV 725	11 22 38	−40 57.8	V 742 Cen
S 7754	11 22 42	+25 15.0	BV Leo
S 8958	11 23 04	−73 54.5	CU Mus
S 7757	11 25 27	+44 47.0	BT UMa
S 7758	11 25 39	+44 54.0	BU UMa
S 8019	11 26 57	+17 52.0	BW Leo
GR 120	11 32 07	+56 50.0	BV UMa
4.1935	11 32 47	+17 04.4	BX Leo
GR 121	11 34 15	+54 37.0	BW UMa
GR 122	11 34 22	+55 42.0	BX UMa
S 8026	11 35 33	+20 26.0	BY Leo
S 8484	11 36 51	+23 20.0	BZ Leo
S 9222	11 37 21	+18 05.0	CC Leo
S 7761	11 37 51	+19 34.0	CD Leo
S 7763	11 38 51	+23 54.0	CE Leo
S 8961	11 40 15	−70 09.4	CV Mus
S 8031	11 41 27	+16 47.0	CF Leo
S 8962	11 42 29	−69 22.6	CW Mus
BV 837	11 42 57	−68 25.7	CX Mus
S 7765	11 44 03	+22 10.0	CG Leo

Preliminary designation	α 1900.0	δ 1900.0	Name
S 7766	$11^h44^m15^s$	+24°44'.0	CH Leo
S 8035	11 44 33	+23 38.0	CI Leo
S 8965	11 45 52	−66 32.5	CY Mus
S 8040	11 49 57	+24 38.0	CK Leo
S 8041	11 50 00	+22 34.0	CL Leo
S 8042	11 51 18	+21 47.0	CM Leo
GR 123	11 52 47	+55 48.0	BY UMa
S 8970	11 54 46	−69 57.8	CZ Mus
S 7771	11 57 24	+18 11.0	BV Com
S 7772	11 59 12	+19 26.0	BW Com
S 8488	12 02 42	+22 15.0	BX Com
S 9223	12 03 06	+15 58.0	BY Com
–	12 03 08	+33 53.2	AA CVn
S 9224	12 04 48	+13 48.0	DD Vir
–	12 06 29	+32 09.3	BZ Com
–	12 06 35	+34 00.4	AB CVn
S 8489	12 06 42	+23 06.0	CC Com
–	12 07 30	+31 21.5	CD Com
S 8053	12 08 00	+21 33.0	CE Com
S 9227	12 08 12	+23 35.0	CF Com
–	12 08 25	+31 57.7	CG Com
S 8055	12 08 47	+22 52.0	CH Com
S 9780	12 08 48	+14 35.0	CI Com
S 8977	12 09 10	−67 59.2	DD Mus
S 8978	12 09 30	−68 12.1	DE Mus
–	12 09 48	+33 39.5	CK Com
–	12 10 09	+35 28.0	AC CVn
S 9781	12 10 48	+09 41.0	DE Vir
S 8980	12 11 60	−66 56.5	DF Mus
–	12 12 14	+31 32.0	CL Com
S 8982	12 12 52	−70 24.6	DG Mus
Ton 1498	12 12 54	+34 53.8	AD CVn
S 7775	12 14 24	+21 54.0	CM Com
GR 27	12 14 36	+17 05.0	CN Com
–	12 15 13	+32 45.2	CO Com
–	12 16 26	+34 07.0	AE CVn
–	12 16 34	+33 27.5	CP Com
–	12 17 14	+34 18.1	AF CVn
–	12 17 17	+34 22.4	AG CVn
–	12 17 18	+34 30.9	AH CVn

Preliminary designation	α 1900.0	δ 1900.0	Name
S 7778	$12^h17^m18^s$	+16°50′.0	CQ Com
S 9239	12 17 30	+11 50.0	DF Vir
S 7779	12 18 18	+16 42.0	CR Com
GC 16899	12 18 52	+43 05.8	AI CVn
S 9229	12 19 12	+18 24.0	CS Com
–	12 19 30	+24 38.1	CT Com
S 7782	12 19 39	+23 00.0	CU Com
–	12 20 12	+26 18.1	CV Com
S 9232	12 20 39	+22 39.0	CW Com
–	12 21 20	+34 41.7	AK CVn
–	12 22 42	+27 35.1	CX Com
S 7784	12 23 15	+25 30.0	CY Com
S 7785	12 23 39	+25 39.0	CZ Com
S 8060	12 23 45	+22 17.0	DD Com
S 9233	12 24 03	+19 15.0	DE Com
S 8492	12 24 09	+20 36.0	DF Com
–	12 24 46	+32 39.0	AL CVn
S 8062	12 25 09	+21 33.0	DG Com
S 9234	12 26 33	+22 03.0	DH Com
S 7788	12 28 21	+24 20.0	DI Com
S 7790	12 28 51	+22 44.0	DK Com
СПЗ 567	12 29 19	+16 41.5	DL Com
HZ 29	12 29 57	+38 12.0	AM CVn
S 7791	12 30 39	+17 06.0	DM Com
S 9235	12 30 45	+18 03.0	DN Com
S 7793	12 33 33	+19 05.0	DO Com
S 7794	12 34 21	+21 19.0	DP Com
S 9785	12 34 45	+12 03.0	DG Vir
S 9784	12 34 48	+06 37.0	DH Vir
S 9236	12 35 15	+18 19.0	DQ Com
S 7796	12 35 51	+22 51.0	DR Com
–	12 37 28	+26 24.8	DS Com
–	12 37 46	+28 46.3	DT Com
S 8997	12 38 22	−71 21.1	DH Mus
–	12 38 24	+30 14.1	DU Com
–	12 39 00	+28 34.2	DV Com
–	12 39 00	+29 45.2	DW Com
–	12 39 24	+30 34.0	DX Com
S 8493	12 39 45	+17 54.0	DY Com
S 9787	12 40 09	+09 18.0	DI Vir

Preliminary designation	α 1900.0	δ 1900.0	Name
S 9237	$12^h41^m21^s$	+19°01.'0	DZ Com
–	12 42 13	+26 43.2	EE Com
–	12 43 34	+25 56.2	EF Com
–	12 43 39	+30 20.3	EG Com
S 7797	12 43 39	+18 45.0	EH Com
S 9001	12 43 56	−69 16.7	DI Mus
S 9003	12 45 45	−68 16.0	DK Mus
S 9004	12 45 51	−68 32.6	DL Mus
–	12 45 52	+30 44.5	EI Com
–	12 46 29	+27 46.5	EK Com
СПЗ 380	12 46 35	+24 40.1	EL Com
–	12 46 48	+31 03.7	EM Com
–	12 49 17	+25 59.7	EN Com
СПЗ 1251	12 52 32	+29 25.7	EO Com
–	12 53 01	+28 49.8	EP Com
S 7801	12 53 57	+18 33.0	EQ Com
BV 765	12 54 12	−79 11.2	BV Cha
–	12 54 17	+29 50.1	ER Com
–	12 54 17	+27 08.3	ES Com
–	12 54 43	+32 34.5	AN CVn
–	12 55 17	+30 01.9	ET Com
S 7802	12 58 54	+20 15.0	EU Com
–	13 01 29	+30 09.1	EV Com
S 9011	13 01 55	−67 53.4	DM Mus
–	13 08 19	+31 33.2	EW Com
СПЗ 1256	13 08 21	+30 56.5	EX Com
–	13 09 13	+31 36.7	EY Com
GC 17960	13 11 17	−00 51.7	DK Vir
КЗП 101370	13 13 03	+41 05.9	AO CVn
–	13 13 24	+28 29.3	EZ Com
S 7803	13 13 57	+23 03.0	FF Com
S 8073	13 15 39	+22 58.0	FG Com
S 9019	13 15 45	−74 02.2	DN Mus
S 8076	13 19 36	+16 32.0	FH Com
S 8077	13 20 42	+17 19.0	FI Com
HD 116994	13 22 14	−50 46.3	V 743 Cen
HD 117555	13 26 04	+24 44.2	FK Com
S 7806	13 30 09	+20 23.0	FL Com
BV 477	13 20 58	−77 52.2	BW Cha
BV 514	13 33 47	−49 26.5	V 744 Cen

Preliminary designation	α 1900.0	δ 1900.0	Name
S 7807	$13^h34^m27^s$	+18°42!0	BQ Boo
S 8089	13 35 48	+16 37.0	BR Boo
S 8500	13 36 54	+24 05.0	BS Boo
S 7808	13 38 30	+24 25.0	BT Boo
BV 443	13 47 11	-18 13.0	DL Vir
S 8506	13 57 06	+22 59.0	BU Boo
BV 445	14 02 32	-10 40.9	DM Vir
BV 446	14 06 00	-10 00.0	DN Vir
Zi 1052	14 09 54	+52 15.4	X^2 Boo
BV 740	14 19 41	-61 36.5	V 745 Cen
BV 741	14 25 36	-53 14.9	FZ Lup
S 8881	14 27 01	-68 12.2	AY Cir
S 8882	14 29 00	-71 22.0	FF Aps
S 8883	14 30 11	-65 48.3	AZ Cir
КЗП 2171	14 33 32	-04 53.5	DO Vir
BV 744	14 35 33	-57 52.8	BB Cir
S 8893	14 42 11	-70 04.6	BC Cir
BV 510	14 43 48	-55 30.2	BD Cir
S 8896	14 46 18	-65 09.1	BE Cir
BV 44	14 49 16	+60 28.8	BT Dra
BV 526	14 54 08	-64 33.6	BF Cir
BV 568	14 55 44	-65 41.5	BG Cir
BV 277	14 55 56	+57 09.0	BU Dra
S 8905	14 56 42	-71 49.9	FG Aps
S 8906	14 57 26	-65 19.2	FZ TrA
S 8915	15 09 23	-63 39.2	BH Cir
ADS 9537 A	15 09 53	+62 13.0	BV Dra
ADS 9537 B	15 09 53	+62 13.3	BW Dra
S 8916	15 10 08	-66 46.5	GG TrA
BV 449	15 11 18	-12 40.2	ES Lib
BV 448	15 12 23	-40 25.5	GG Lup
S 8919	15 13 07	-66 22.3	GH TrA
BV 752	15 17 17	-52 29.8	GH Lup
BV 138	15 18 07	+27 14.1	TV CrB
S 8925	15 21 04	-72 19.2	FH Aps
S 8927	15 22 09	-72 52.8	FI Aps
КЗП 101506	15 23 42	+29 27.0	β CrB
S 8930	15 26 42	-71 51.0	FK Aps
S 8934	15 31 58	-68 06.9	GI TrA
S 8937	15 32 05	-64 32.3	GK TrA

Preliminary designation	α 1900.0	δ 1900.0	Name
S 8935	$15^h32^m13^s$	$-70°47'.9$	FL Aps
S 8938	15 34 26	-65 08.0	GL TrA
S 8939	15 34 56	-64 21.5	GM TrA
S 5018	15 39 37	-66 25.8	GN TrA
S 8946	15 40 15	-72 07.7	FM Aps
S 8947	15 40 39	-72 04.0	FN Aps
S 8948	15 42 43	-66 13.1	GO TrA
59.1914	15 44 56	-24 33.8	V 765 Sco
60.1914	15 45 40	-23 40.2	V 766 Sco
-	15 47 32	-14 43.1	ET Lib
-	15 48 40	-10 32.7	EU Lib
-	15 49 26	-13 44.5	EV Lib
-	15 49 58	-10 18.5	EW Lib
HV 10763	15 50 10	-12 30.1	EX Lib
-	15 50 17	-13 49.8	EY Lib
S 8955	15 50 49	-69 18.4	GP TrA
-	15 51 01	-13 32.2	EZ Lib
-	15 51 13	-14 19.9	FF Lib
-	15 51 22	-14 11.0	FG Lib
-	15 51 49	-10 40.1	FH Lib
-	15 52 06	-14 26.8	FI Lib
-	15 52 52	-09 49.2	FK Lib
-	15 53 10	-11 02.7	FL Lib
-	15 53 17	-10 13.3	FM Lib
-	15 54 02	-13 35.9	FN Lib
-	15 54 09	-12 55.8	FO Lib
-	15 54 33	-14 04.0	FP Lib
-	15 54 39	-09 10.4	FQ Lib
-	15 54 40	-14 04.7	FR Lib
-	15 54 51	-12 04.0	FS Lib
-	15 55 18	-12 50.2	FT Lib
-	15 55 35	-09 09.7	FU Lib
-	15 57 52	-10 13.6	V 767 Sco
-	15 57 52	-13 02.9	V 768 Sco
-	15 57 55	-11 29.8	V 769 Sco
40.1914	15 58 11	-12 50.3	V 770 Sco
41.1914	15 58 18	-12 54.3	V 771 Sco
-	15 58 21	-12 11.3	V 772 Sco
-	15 58 28	-14 22.5	V 773 Sco
-	15 58 36	-09 58.3	V 774 Sco

Preliminary designation	α 1900.0	δ 1900.0	Name
-	$15^h58^m43^s$	-09°21!4	V 775 Sco
-	15 59 01	-14 16.4	V 776 Sco
-	15 59 23	-11 35.4	V 777 Sco
-	16 00 07	-12 19.6	V 778 Sco
-	16 00 47	-14 18.4	V 779 Sco
-	16 01 03	-09 34.3	V 780 Sco
КЗП 2560	16 01 19	-11 15.7	V 781 Sco
-	16 01 20	-12 06.7	V 782 Sco
КЗП 2573	16 03 04	-11 50.6	V 783 Sco
-	16 03 11	-14 23.3	V 784 Sco
-	16 03 19	-14 32.3	V 785 Sco
-	16 03 19	-14 40.3	V 786 Sco
HV 10524	16 03 31	-09 08.9	V 787 Sco
HV 10525	16 03 40	-06 36.5	V 1015 Oph
HV 10526	16 03 56	-08 31.1	V 788 Sco
-	16 04 07	-12 02.2	V 789 Sco
47.1914	16 04 10	-14 21.4	V 790 Sco
-	16 04 39	-12 57.4	V 791 Sco
BV 228	16 05 00	+63 01.8	BX Dra
-	16 05 01	-09 29.7	V 792 Sco
-	16 05 10	-10 00.6	V 793 Sco
-	16 05 36	-09 35.0	V 794 Sco
-	16 05 45	-13 40.2	V 795 Sco
КЗП 2602	16 05 56	+78 14.3	RX UMi
-	16 06 08	-14 14.7	V 796 Sco
-	16 06 11	-15 44.8	V 797 Sco
-	16 06 13	-12 43.4	V 798 Sco
-	16 06 53	-14 26.6	V 799 Sco
-	16 06 59	-13 59.8	V 800 Sco
-	16 07 21	-11 54.3	V 801 Sco
-	16 07 44	-13 16.2	V 802 Sco
-	16 07 59	-14 08.0	V 803 Sco
-	16 08 11	-11 52.1	V 804 Sco
-	16 08 38	-13 18.5	V 805 Sco
S 9243	16 09 09	+22 54.0	V 537 Her
-	16 09 14	-10 27.7	V 806 Sco
-	16 09 42	-11 08.6	V 807 Sco
-	16 09 58	-09 25.4	V 808 Sco
S 9244	16 10 00	+24 10.0	V 538 Her
-	16 10 12	-12 32.2	V 809 Sco

Preliminary designation	α 1900.0	δ 1900.0	Name
–	$16^h10^m18^s$	−11°16!1	V 810 Sco
–	16 10 19	−13 19.1	V 811 Sco
–	16 10 20	−14 28.1	V 812 Sco
–	16 10 37	−12 01.1	V 813 Sco
–	16 10 45	−12 32.2	V 814 Sco
–	16 11 00	−13 40.9	V 815 Sco
–	16 11 06	−12 04.7	V 816 Sco
–	16 11 20	−05 06.5	V 1016 Oph
S 5022	16 11 45	−65 37.1	GQ TrA
–	16 12 22	−01 39.4	EH Ser
–	16 12 24	−04 33.4	V 1017 Oph
–	16 12 26	−03 08.7	EI Ser
–	16 12 39	−12 41.7	V 817 Sco
–	16 12 40	−05 42.1	V 1018 Oph
S 9247	16 13 24	+19 00.0	V 539 Her
–	16 13 39	−05 45.2	V 1019 Oph
–	16 13 44	−03 54.1	V 1020 Oph
–	16 13 46	−01 37.6	EK Ser
Sco X-1	16 14 14	−15 23.9	V 818 Sco
–	16 15 19	−00 59.0	EL Ser
S 9248	16 15 30	+23 30.0	V 540 Her
–	16 15 40	−01 58.2	EM Ser
HV 10557	16 15 44	−04 01.7	V 1021 Oph
HV 10559	16 16 05	−03 49.0	V 1022 Oph
КЗП 2654	16 16 30	−01 16.9	EN Ser
КЗП 2655	16 16 30	−02 53.6	EO Ser
HV 10566	16 16 32	−03 51.7	V 1023 Oph
–	16 17 26	−68 54.2	GR TrA
–	16 17 27	−01 44.2	V 1024 Oph
HV 10567	16 17 35	−04 02.8	V 1025 Oph
–	16 17 38	−03 39.4	V 1026 Oph
–	16 18 08	−00 57.0	V 1027 Oph
HV 10571	16 18 48	−05 51.6	V 1028 Oph
S 9249	16 19 36	+19 04.0	V 541 Her
–	16 19 46	−01 06.2	V 1029 Oph
–	16 19 58	−03 22.3	V 1030 Oph
–	16 20 29	−01 20.1	V 1031 Oph
–	16 20 54	−03 39.8	V 1032 Oph
–	16 21 24	−03 13.8	V 1033 Oph
HV 10596	16 22 50	−02 49.8	V 1034 Oph

Preliminary designation	α 1900.0	δ 1900.0	Name
–	$16^h22^m51^s$	−03°25!0	V 1035 Oph
–	16 23 02	−02 22.2	V 1036 Oph
S 9253	16 25 36	+19 16.0	V 542 Her
–	16 25 46	−05 49.2	V 1037 Oph
HV 10618	16 27 08	−04 40.8	V 1038 Oph
–	16 28.00	−03 18.0	V 1039 Oph
–	16 28 18	−02 37.4	V 1040 Oph
HV 10625	16 28 30	−01 49.1	V 1041 Oph
HV 10627	16 28 39	−01 20.2	V 1042 Oph
HV 10628	16 28 44	−04 25.1	V 1043 Oph
–	16 28 45	−01 08.1	V 1044 Oph
–	16 28 46	−02 33.6	V 1045 Oph
–	16 29 16	−03 22.7	V 1046 Oph
–	16 29 44	−04 27.2	V 1047 Oph
–	16 29 50	−03 09.6	V 1048 Oph
–	16 30 12	−70 03.1	GS TrA
–	16 30 29	−04 32.9	V 1049 Oph
–	16 31 10	−01 34.7	V 1050 Oph
S 9255	16 31 21	+20 07.0	V 543 Her
–	16 31 28	−03 11.0	V 1051 Oph
HV 10636	16 31 54	−05 07.5	V 1052 Oph
–	16 32 52	−67 21.6	GT TrA
S 9789	16 33 15	+08 49.0	V 544 Her
S 9256	16 34 39	+25 04.0	V 545 Her
S 9614	16 36 42	+12 39.0	V 546 Her
S 9791	16 38 39	+08 03.0	V 547 Her
S 9792	16 39 15	+08 19.0	V 548 Her
S 9793	16 39 24	+12 24.0	V 549 Her
S 9622	16 49 45	+05 52.0	V 1053 Oph
–	16 49 50	−71 31.2	FO Aps
–	16 50 04	−71 56.5	FP Aps
Wolf 630	16 50 10	−08 08.9	V 1054 Oph
–	16 50 59	−71 35.4	FQ Aps
КЗП 2865	16 52 24	−09 23.1	V 1055 Oph
S 9623	16 54 45	+06 31.0	V 1056 Oph
S 9795	16 56 21	+11 12.0	V 1057 Oph
S 9625	16 56 27	+07 32.0	V 1058 Oph
S 9628	17 02 57	+08 11.0	V 1059 Oph
S 9629	17 07 27	+07 50.0	V 1060 Oph
–	17 07 48	−68 21.3	FR Aps

Preliminary designation	α 1900.0	δ 1900.0	Name
S 9630	17 09 48	+10 50.0	V 1061 Oph
S 9802	17 20 18	+16 46.0	V 550 Her
S 9804	17 23 09	+14 30.0	V 551 Her
S 8618	17 25 36	+12 57.0	V 1062 Oph
S 9806	17 25 42	+14 28.0	V 552 Her
S 9807	17 26 00	+10 22.0	V 1063 Oph
S 9808	17 27 33	+16 54.0	V 553 Her
S 8621	17 29 57	+09 48.0	V 1064 Oph
S 8631	17 30 47	-54 46.9	V 540 Ara
S 8632	17 31 24	-54 04.1	V 541 Ara
S 9812	17 31 24	+16 08.0	V 554 Her
S 8633	17 31 38	-52 50.6	V 542 Ara
S 8634	17 33 42	-52 17.6	V 543 Ara
S 8635	17 34 00	-52 39.5	V 544 Ara
S 8622	17 34 12	+10 25.0	V 1065 Oph
S 8639	17 34 51	-48 50.1	V 545 Ara
S 8623	17 35 06	+15 47.0	V 555 Her
S 8642	17 35 08	-50 24.7	V 546 Ara
S 9835	17 36 03	+00 43.0	V 1066 Oph
S 9259	17 36 18	+00 04.0	V 1067 Oph
S 9817	17 36 33	+12 28.0	V 1068 Oph
S 9260	17 36 36	+00 56.0	V 1069 Oph
S 8652	17 36 39	-47 03.4	V 547 Ara
S 8651	17 36 45	-51 56.7	V 548 Ara
S 8655	17 37 04	-50 04.8	V 549 Ara
S 8656	17 37 11	-47 15.9	V 550 Ara
S 8657	17 37 36	-50 01.6	V 551 Ara
S 8658	17 37 43	-53 34.3	V 552 Ara
S 9261	17 38 12	+01 04.0	V 1070 Oph
S 8661	17 38 43	-49 47.5	V 553 Ara
S 8662	17 38 50	-50 09.3	V 554 Ara
-	17 38 57	-43 25.3	V 819 Sco
S 9262	17 39 06	+07 10.0	V 1071 Oph
S 8669	17 39 37	-46 28.5	V 555 Ara
S 8670	17 39 44	-50 17.7	V 556 Ara
S 8672	17 39 47	-49 10.5	V 557 Ara
S 8627	17 40 15	+14 47.0	V 556 Her
S 8674	17 40 25	-50 09.0	V 558 Ara
-	17 40 31	-41 18.7	V 820 Sco
КЗП 3429	17 40 38	-38 55.8	V 821 Sco

Preliminary designation	α 1900.0	δ 1900.0	Name
S 8675	17h40m41s	−51°21!3	V 559 Ara
S 8676	17 40 43	−47 56.9	V 560 Ara
S 8678	17 40 55	−52 27.5	V 561 Ara
S 8679	17 41 06	−55 16.7	V 562 Ara
S 8680	17 41 15	−52 22.9	V 563 Ara
S 9823	17 41 15	+08 53.0	V 1072 Oph
S 9824	17 41 21	+15 09.0	V 557 Her
S 8683	17 41 38	−54 48.9	V 564 Ara
S 8684	17 41 51	−53 39.9	V 565 Ara
S 8628	17 41 51	+13 56.0	V 1073 Oph
S 8686	17 41 53	−46 48.1	V 566 Ara
−	17 41 56	−41 15.2	V 822 Sco
−	17 42 04	−41 45.0	V 823 Sco
S 8687	17 42 26	−53 46.4	V 567 Ara
−	17 43 04	−41 16.2	V 824 Sco
Nova 1964	17 43 18	−33 31.0	V 825 Sco
−	17 43 41	−41 55.2	V 826 Sco
S 8690	17 43 57	−46 03.9	V 568 Ara
S 9827	17 44 00	+14 39.0	V 558 Her
S 8692	17 44 04	−46 30.6	V 569 Ara
HV 11691	17 44 28	−39 06.2	V 827 Sco
S 8695	17 44 55	−55 07.7	V 570 Ara
S 8696	17 45 00	−52 29.8	V 571 Ara
S 8594	17 45 21	+28 19.0	V 559 Her
S 8699	17 45 25	−50 06.1	V 572 Ara
S 9829	17 45 27	+12 38.0	V 1074 Oph
S 8700	17 45 30	−50 21.3	V 573 Ara
S 8701	17 45 30	−45 12.7	V 828 Sco
HV 9134	17 45 39	−45 20.0	V 829 Sco
S 8630	17 45 45	+13 26.0	V 1075 Oph
S 8705	17 45 56	−49 14.5	V 574 Ara
S 8707	17 46 10	−49 09.3	V 575 Ara
S 8597	17 46 12	+26 00.0	V 560 Her
S 9840	17 46 12	+06 29.0	V 1076 Oph
S 8708	17 46 21	−53 01.3	V 576 Ara
−	17 46 23	−44 02.3	V 830 Sco
S 8710	17 46 29	−47 41.0	V 577 Ara
−	17 46 29	−42 56.6	V 831 Sco
S 8709	17 46 30	−50 00.2	V 578 Ara
S 8711	17 46 40	−51 21.6	V 579 Ara

Preliminary designation	α 1900.0	δ 1900.0	Name
S 8714	$17^h46^m45^s$	−46°56'.7	V 580 Ara
S 8713	17 46 48	−51 14.6	V 581 Ara
S 8716	17 47 07	−46 41.4	V 582 Ara
–	17 47 07	−37 25.0	V 832 Sco
–	17 47 12	−36 30.5	V 833 Sco
S 8717	17 47 21	−45 29.6	V 834 Sco
S 8720	17 47 33	−46 01.2	V 583 Ara
S 8598	17 47 33	+28 24.0	V 561 Her
S 9843	17 47 33	+06 58.0	V 1077 Oph
–	17 47 34	−43 11.8	V 835 Sco
S 8718	17 47 35	−52 46.2	V 584 Ara
–	17 47 48	−43 44.0	V 836 Sco
S 8722	17 47 53	−52 05.1	V 585 Ara
–	17 48 04	−38 26.0	V 837 Sco
–	17 48 21	−41 40.6	838 Sco
S 8725	17 48 31	−46 29.3	V 586 Ara
S 8727	17 48 32	−44 54.8	V 839 Sco
S 9263	17 48 33	+04 26.0	V 1078 Oph
–	17 48 35	−44 43.9	V 840 Sco
–	17 48 44	−45 20.1	V 841 Sco
S 9830	17 48 48	+16 20.0	V 562 Her
–	17 48 57	−43 45.5	V 842 Sco
S 9845	17 49 06	+03 23.0	V 1079 Oph
S 8729	17 49 12	−48 45.4	V 587 Ara
HD 321007	17 49 47	−36 42.2	V 843 Sco
HV 9154	17 49 48	−41 46.1	V 844 Sco
S 8732	17 50 02	−47 17.4	V 588 Ara
–	17 50 09	−39 09.4	V 845 Sco
S 8733	17 50 18	−55 04.2	V 589 Ara
–	17 50 18	−43 12.3	V 846 Sco
S 8735	17 50 22	−45 32.0	V 590 Ara
S 8736	17 50 25	−44 41.1	V 847 Sco
–	17 50 49	−36 57.8	V 848 Sco
849.1935	17 51 01	−42 23.1	V 849 Sco
–	17 51 15	−41 55.4	V 850 Sco
–	17 51 24	−42 14.4	V 851 Sco
–	17 51 26	−43 15.1	V 852 Sco
S 8738	17 51 28	−47 38.1	V 591 Ara
–	17 51 35	−41 28.7	V 853 Sco
–	17 51 54	−45 05.7	V 450 CrA

Preliminary designation	α 1900.0	δ 1900.0	Name
-	$17^h51^m59^s$	-42°21!7	V 451 CrA
S 9267	17 52 00	+06 27.0	V 1080 Oph
-	17 52 02	-44 40.5	V 452 CrA
S 8745	17 52 09	-45 13.9	V 453 CrA
CoD-39°12079	17 52 13	-39 37.9	V 454 CrA
-	17 52 16	-38 08.1	V 455 CrA
-	17 52 16	-40 08.0	V 456 CrA
-	17 52 37	-42 03.3	V 457 CrA
-	17 52 43	-45 10.3	V 458 CrA
-	17 53 09	-40 21.0	V 459 CrA
- -	17 53 16	-44 57.3	V 460 CrA
S 9273	17 53 21	+02 12.0	V 1081 Oph
S 8750	17 53 27	-48 55.6	V 592 Ara
-	17 53 36	-41 27.1	V 461 CrA
-	17 53 37	-41 15.5	V 462 CrA
-	17 53 40	-42 03.7	V 463 CrA
-	17 53 56	-41 16.9	V 464 CrA
-	17 54 03	-45 25.1	V 465 CrA
S 8601	17 54 15	+28 36.0	V 563 Her
S 8752	17 54 16	-44 46.5	V 466 CrA
S 8754	17 54 22	-45 58.6	V 593 Ara
S 8753	17 54 24	-48 43.9	V 594 Ara
-	17 54 26	-41 59.7	V 467 CrA
-	17 54 37	-42 35.9	V 468 CrA
S 8758	17 54 51	-47 12.5	V 595 Ara
S 9275	17 54 54	+00 35.0	V 1082 Oph
S 9305	17 55 00	+38 23.0	V 564 Her
-	17 55 12	-41 33.3	V 469 CrA
S 8759	17 55 14	-50 07.4	V 596 Ara
S 9276	17 55 21	+03 09.0	V 1083 Oph
-	17 55 30	-42 13.6	V 470 CrA
S 8760	17 55 36	-47 19.9	V 597 Ara
S 9850	17 55 48	+04 15.0	V 1084 Oph
-	17 55 53	-38 36.7	V 471 CrA
-	17 55 57	-40 44.8	V 472 CrA
S 9279	17 56 03	+03 48.0	V 1085 Oph
КЗП 7747	17 56 13	-23 02.9	V 2282 Sgr
КЗП 7749	17 56 19	-41 53.8	V 473 CrA
S 9851	17 56 21	-00 00.0	EP Ser
S 8766	17 56 25	-47 47.1	V 598 Ara

Preliminary designation	α 1900.0	δ 1900.0	Name
-	$17^h56^m28^s$	−40°44!1	V 474 CrA
-	17 56 38	−42 09.1	V 475 CrA
-	17 56 41	−37 20.2	V 476 CrA
-	17 56 51	−45 09.1	V 477 CrA
-	17 56 56	−45 28.5	V 478 CrA
-	17 57 03	−41 34.1	V 479 CrA
-	17 57 21	−39 45.8	V 480 CrA
-	17 57 29	−40 44.2	V 481 CrA
861.1935	17 57 30	−41 17.2	V 482 CrA
S 9284	17 57 33	+03 05.0	V 1086 Oph
S 8771	17 57 42	−47 59.2	V 599 Ara
S 8772	17 57 46	−47 40.0	V 600 Ara
HV 7498	17 57 51	−36 55.0	V 2283 Sgr
S 8773	17 58 02	−47 06.7	V 601 Ara
S 8774	17 58 03	−48 22.1	V 602 Ara
-	17 58 27	−42 17.2	V 483 CrA
866.1935	17 58 29	−41 07.9	V 484 CrA
-	17 58 29	−42 16.4	V 485 CrA
HV 7162	17 58 36	−36 50.6	V 2284 Sgr
S 9855	17 58 39	+03 06.0	V 1087 Oph
-	17 58 40	−42 13.5	V 486 CrA
-	17 59 20	−44 10.0	V 487 CrA
-	17 59 26	−42 54.1	V 488 CrA
-	17 59 32	−42 22.8	V 489 CrA
-	17 59 44	−39 39.5	V 490 CrA
S 9290	17 59 48	+01 31.0	V 1088 Oph
-	17 59 51	−42 03.5	V 491 CrA
S 9307	17 59 54	+34 42.0	V 565 Her
S 8780	17 59 57	−47 16.0	V 603 Ara
872.1935	17 59 57	−41 55.2	V 492 CrA
-	18 00 08	−41 32.6	V 493 CrA
S 8781	18 00 15	−45 48.8	V 604 Ara
S 8783	18 00 20	−45 31.5	V 605 Ara
S 8784	18 00 24	−48 20.3	V 606 Ara
HV 11815	18 00 28	−39 15.1	V 494 CrA
S 9860	18 00 33	−00 27.0	EQ Ser
875.1935	18 01 01	−40 56.7	V 495 CrA
-	18 01 03	−44 40.5	V 496 CrA
S 8787	18 01 07	−51 44.3	V 607 Ara
S 8789	18 01 32	−48 59.0	V 608 Ara

Preliminary designation	α 1900.0	δ 1900.0	Name
S 8790	$18^h01^m40^s$	−44°35!9	V 497 CrA
879.1935	18 01 54	−42 17.0	V 498 CrA
S 9862	18 01 54	+04 02.0	V 1089 Oph
S 9863	18 01 54	+07 55.0	V 1090 Oph
S 8791	18 01 56	−49 42.0	KM Tel
S 8792	18 02 05	−54 02.9	KN Tel
–	18 02 06	−40 59.0	V 499 CrA
S 9292	18 02 06	+01 34.0	V 1091 Oph
S 8795	18 02 27	−47 05.9	KO Tel
S 8793	18 02 27	−51 21.5	KP Tel
S 8797	18 02 42	−44 44.8	V 500 CrA
–	18 02 59	−40 08.7	V 501 CrA
–	18 03 03	−41 25.4	V 502 CrA
S 9294	18 03 09	+01 55.0	V 1092 Oph
S 8798	18 03 10	−48 59.9	KQ Tel
–	18 03 28	−37 44.6	V 503 CrA
S 8799	18 03 35	−53 01.7	KR Tel
S 9295	18 03 36	+00 10.0	V 1093 Oph
–	18 03 37	−40 04.8	V 504 CrA
S 9865	18 03 39	+00 09.0	V 1094 Oph
S 8802	18 03 47	−45 09.9	V 505 CrA
–	18 04 10	−38 52.0	V 506 CrA
S 8803	18 04 10	−45 18.1	V 507 CrA
S 8806	18 04 32	−52 33.6	KS Tel
–	18 04 38	−38 25.2	V 508 CrA
–	18 04 40	−31 50.2	V 2285 Sgr
–	18 04 41	−43 48.3	V 509 CrA
S 8810	18 04 44	−45 03.9	V 510 CrA
Wr 159	18 04 44	+41 42.0	V 566 Her
СПЗ 1498	18 04 54	+22 10.0	V 567 Her
–	18 05 16	−44 15.6	V 511 CrA
S 8812	18 05 19	−46 19.6	KT Tel
–	18 05 22	−42 28.6	V 512 CrA
S 9309	18 05 33	+32 22.0	V 568 Her
S 8814	18 05 38	−48 40.0	KU Tel
S 8604	18 05 57	+29 01.0	V 569 Her
–	18 06 14	−44 38.8	V 513 CrA
–	18 06 24	−43 34.5	V 514 CrA
S 9310	18 06 36	+35 25.0	V 570 Her
S 8818	18 06 37	−50 39.5	KV Tel

Preliminary designation	α 1900.0	δ 1900.0	Name
–	18 06 38	–42 56.0	V 515 CrA
–	18 06 38	–43 35.9	V 516 CrA
S 9868	18 06 39	+05 47.0	V 1095 Oph
–	18 06 40	–40 56.1	V 517 CrA
–	18 06 46	–42 35.0	V 518 CrA
S 8820	18 06 47	–46 55.8	KW Tel
–	18 06 55	–39 02.7	V 519 CrA
S 8821	18 07 06	–46 20.0	KX Tel
S 9311	18 07 09	+36 35.0	V 571 Her
–	18 07 16	–37 50.3	V 520 CrA
–	18 07 22	–36 29.5	V 2286 Sgr
S 5044	18 07 32	–44 29.3	V 521 CrA
–	18 07 36	–43 09.8	V 522 CrA
–	18 07 36	–43 19.7	V 523 CrA
S 8605	18 07 36	+25 53.0	V 572 Her
S 9320	18 07 45	+29 55.0	V 573 Her
–	18 07 51	–27 59.7	V 2287 Sgr
–	18 07 54	–27 48.1	V 2288 Sgr
–	18 07 57	–27 44.1	V 2289 Sgr
S 8823	18 07 58	–50 24.7	KY Tel
–	18 08 05	–41 42.5	V 524 CrA
–	18 08 08	–28 03.6	V 2290 Sgr
–	18 08 08	–28 07.6	V 2291 Sgr
–	18 08 09	–28 08.4	V 2292 Sgr
–	18 08 10	–27 51.6	V 2293 Sgr
–	18 08 11	–41 58.2	V 525 CrA
–	18 08 12	–28 03.5	V 2294 Sgr
–	18 08 15	–27 46.8	V 2295 Sgr
–	18 08 17	–27 44.9	V 2296 Sgr
–	18 08 22	–41 40.0	V 526 CrA
–	18 08 22	–27 45.5	V 2297 Sgr
–	18 08 22	–27 49.7	V 2298 Sgr
–	18 08 24	–28 04.0	V 2299 Sgr
S 8825	18 08 25	–47 15.7	KZ Tel
S 8824	18 08 26	–49 12.8	LL Tel
–	18 08 28	–28 00.1	V 2300 Sgr
–	18 08 29	–27 45.0	V 2301 Sgr
–	18 08 31	–27 45.1	V 2302 Sgr
–	18 08 33	–42 30.1	V 527 CrA
–	18 08 34	–27 49.3	V 2303 Sgr

Preliminary designation	α 1900.0	δ 1900.0	Name
-	$18^h08^m36^s$	−40°57!4	V 528 CrA
S 9871	18 08 36	+03 58.0	V 1096 Oph
-	18 08 39	−28 03.5	V 2304 Sgr
-	18 08 45	−28 02.5	V 2305 Sgr
-	18 08 46	−28 02.8	V 2306 Sgr
-	18 08 47	−27 46.6	V 2307 Sgr
-	18 08 50	−28 03.3	V 2308 Sgr
892.1935	18 08 54	−41 07.0	V 529 CrA
-	18 09 01	−27 58.9	V 2309 Sgr
-	18 09 03	−27 55.2	V 2310 Sgr
-	18 09 04	−27 52.1	V 2311 Sgr
-	18 09 06	−28 06.3	V 2312 Sgr
-	18 09 07	−27 48.7	V 2313 Sgr
-	18 09 08	−27 51.6	V 2314 Sgr
-	18 09 10	−38 41.5	V 530 CrA
-	18 09 10	−42 34.2	V 531 CrA
-	18 09 13	−42 12.2	V 532 CrA
-	18 09 13	−27 51.5	V 2315 Sgr
-	18 09 14	−27 47.4	V 2316 Sgr
-	18 09 14	−28 04.4	V 2317 Sgr
-	18 09 15	−38 25.5	V 533 CrA
-	18 09 15	−27 43.8	V 2318 Sgr
-	18 09 18	−27 59.2	V 2319 Sgr
-	18 09 21	−28 07.5	V 2320 Sgr
-	18 09 24	−28 01.6	V 2321 Sgr
-	18 09 34	−27 54.6	V 2322 Sgr
-	18 09 36	−27 59.0	V 2323 Sgr
-	18 09 38	−27 41.6	V 2324 Sgr
-	18 09 38	−27 54.3	V 2325 Sgr
-	18 09 38	−28 01.9	V 2326 Sgr
-	18 09 42	−28 05.1	V 2327 Sgr
-	18 09 47	−42 22.3	V 534 CrA
-	18 09 48	−39 04.6	V 535 CrA
S 8608	18 09 51	+28 28.0	V 574 Her
S 8829	18 09 56	−46 22.4	LM Tel
-	18 10 04	−27 53.4	V 2328 Sgr
-	18 10 05	−38 20.6	V 536 CrA
HV 11885	18 10 06	−39 08.7	V 537 CrA
-	18 10 07	−27 55.0	V 2329 Sgr
-	18 10 12	−27 42.3	V 2330 Sgr

Preliminary designation	α 1900.0	δ 1900.0	Name
S 8830	18ʰ10ᵐ17ˢ	-45°44!1	LN Tel
-	18 10 20	-43 54.3	V 538 CrA
-	18 10 24	-41 54.1	V 539 CrA
-	18 10 31	-41 22.7	V 540 CrA
S 8831	18 10 34	-46 19.1	LO Tel
S 8609	18 10 45	+29 43.0	V 575 Her
S 8832	18 10 51	-51 58.8	LP Tel
-	18 11 00	-24 00.0	V 2331 Sgr
S 8836	18 11 05	-46 59.4	LQ Tel
-	18 11 10	-37 31.0	V 541 CrA
-	18 11 11	-39 16.3	V 542 CrA
S 8837	18 11 18	-46 47.9	LR Tel
900.1935	18 11 24	-41 41.0	V 543 CrA
S 9874	18 11 24	+02 34.0	V 1097 Oph
902.1935	18 11 35	-44 53.5	V 544 CrA
-	18 11 37	-23 23.3	V 2332 Sgr
-	18 11 43	-38 57.6	V 545 CrA
S 9875	18 11 45	+05 03.0	V 1098 Oph
S 9303	18 11 54	+01 09.0	V 1099 Oph
-	18 11 58	-42 00.0	V 546 CrA
S 9885	18 12 21	+35 26.0	V 335 Lyr
S 9304	18 12 21	+02 22.0	V 1100 Oph
-	18 12 27	-13 52.9	ER Ser
-	18 12 39	-39 38.9	V 547 CrA
-	18 12 42	-13 28.7	ES Ser
-	18 12 43	-40 58.0	V 548 CrA
S 8841	18 12 44	-45 40.7	LS Tel
S 9876	18 12 48	+04 37.0	V 1101 Oph
-	18 12 50	-38 21.7	V 549 CrA
-	18 12 50	-44 01.2	V 550 CrA
S 9877	18 12 51	+05 29.0	V 1102 Oph
906.1935	18 12 58	-42 56.1	V 551 CrA
-	18 13 00	-39 23.0	V 552 CrA
-	18 13 04	-37 35.1	V 553 CrA
-	18 13 04	-43 35.4	V 554 CrA
S 8842	18 13 04	-50 56.0	LT Tel
-	18 13 07	-41 53.6	V 555 CrA
-	18 13 15	-13 28.2	ET Ser
-	18 13 18	-42 53.4	V 556 CrA
-	18 13 19	-38 53.8	V 557 CrA

Preliminary designation	α 1900.0	δ 1900.0	Name
907.1935	$18^h13^m21^s$	-41°15!4	V 558 CrA
-	18 13 29	-13 53.0	EU Ser
-	18 13 33	-14 01.1	EV Ser
-	18 13 35	-40 55.2	V 559 CrA
-	18 13 37	-23 19.0	V 2333 Sgr
S 8845	18 13 39	-46 35.5	LU Tel
-	18 13 48	-37 17.0	V 560 CrA
-	18 14 02	-38 35.2	V 561 CrA
-	18 14 11	-13 55.7	EW Ser
S 8847	18 14 12	-44 23.2	V 562 CrA
-	18 14 12	-14 06.0	EX Ser
-	18 14 13	-36 13.1	V 2334 Sgr
-	18 14 23	-36 48.1	V 2335 Sgr
-	18 14 32	-38 20.4	V 563 CrA
S 8610	18 14 39	+28 22.0	V 576 Her
9.1919	18 14 48	+22 04.9	V 577 Her
-	18 15 02	-39 55.9	V 564 CrA
S 8849	18 15 25	-48 23.5	LV Tel
S 8850	18 15 27	-44 49.0	V 565 CrA
-	18 15 29	-45 16.5	V 566 CrA
S 8851	18 15 32	-46 25.3	LW Tel
-	18 15 46	-36 35.4	V 2336 Sgr
S 8852	18 15 55	-47 02.2	LX Tel
-	18 16 05	-36 26.0	V 2337 Sgr
-	18 16 30	-39 56.7	V 567 CrA
-	18 16 36	-38 03.8	V 568 CrA
-	18 16 37	-38 28.3	V 569 CrA
-	18 16 38	-40 48.7	V 570 CrA
-	18 16 42	-37 10.2	V 571 CrA
-	18 16 44	-41 23.2	V 572 CrA
-	18 16 46	-37 10.5	V 573 CrA
-	18 16 56	-39 15.2	V 574 CrA
S 8855	18 16 59	-49 32.7	LY Tel
-	18 17 00	-42 50.4	V 575 CrA
-	18 17 11	-45 27.2	V 576 CrA
-	18 17 12	-44 00.0	V 577 CrA
-	18 17 16	-37 11.1	V 578 CrA
-	18 17 18	-38 59.5	V 579 CrA
-	18 17 21	-42 11.2	V 580 CrA
910.1935	18 17 21	-45 28.1	V 581 CrA

Preliminary designation	α 1900.0	δ 1900.0	Name
– –	$18^h17^m23^s$	−43°01'.1	V 582 CrA
–	18 17 28	−37 52.9	V 583 CrA
–	18 17 38	−25 29.0	V 2338 Sgr
S 9890	18 17 51	+11 09.0	V 1103 Oph
–	18 17 59	−40 08.9	V 584 CrA
–	18 18 03	−23 21.7	V 2339 Sgr
–	18 18 08	−37 46.0	V 585 CrA
S 7360	18 18 09	−40 57.5	V 586 CrA
S 7359	18 18 10	−45 47.6	LZ Tel
–	18 18 18	−22 54.0	V 2340 Sgr
–	18 18 25	−23 50.0	V 2341 Sgr
–	18 18 26	−24 56.2	V 2342 Sgr
–	18 18 29	−39 06.8	V 587 CrA
545.1935	18 18 30	−42 18.3	V 589 CrA
–	18 18 32	−41 02.1	V 588 CrA
–	18 18 37	−23 22.9	V 2343 Sgr
S 8857	18 18 41	−48 25.5	MM Tel
–	18 18 46	−41 13.7	V 590 CrA
–	18 18 49	−38 08.1	V 591 CrA
S 7361	18 19 01	−45 03.0	V 592 CrA
S 9892	18 19 09	+07 19.0	V 1104 Oph
–	18 19 10	−37 10.0	V 593 CrA
S 7364	18 19 17	−40 44.1	V 594 CrA
S 8859	18 19 24	−47 22.7	MN Tel
S 7365	18 19 30	−44 26.9	V 595 CrA
S 8860	18 19 35	−50 00.1	MO Tel
–	18 19 38	−38 03.3	V 596 CrA
–	18 19 45	−38 14.4	V 597 CrA
–	18 19 45	−40 13.7	V 598 CrA
–	18 20 00	−42 47.0	V 599 CrA
922.1935	18 20 01	−44 28.4	V 600 CrA
–	18 20 02	−37 54.0	V 602 CrA
–	18 20 04	−41 45.1	V 602 CrA
–	18 20 32	−40 08.0	V 603 CrA
–	18 20 41	−42 14.6	V 604 CrA
–	18 20 45	−23 28.9	V 2344 Sgr
–	18 20 45	−22 49.5	V 2345 Sgr
–	18 20 48	−39 17.8	V 605 CrA
–	18 20 48	−21 10.9	V 2346 Sgr
–	18 20 50	−40 26.3	V 606 CrA

Preliminary designation	α 1900.0	δ 1900.0	Name
–	$18^h21^m10^s$	−44°54'.4	V 607 CrA
S 7370	18 21 13	−42 18.3	V 608 CrA
–	18 21 16	−38 57.9	V 609 CrA
–	18 21 40	−39 15.6	V 610 CrA
–	18 21 57	−37 37.3	V 611 CrA
546.1935	18 22 03	−36 18.8	V 2347 Sgr
–	18 22 18	−38 09.3	V 612 CrA
–	18 22 26	−37 35.8	V 613 CrA
–	18 22 27	−23 16.6	V 2348 Sgr
S 8866	18 22 27	−49 06.2	MP Tel
S 7374	18 33 37	−39 56.0	V 614 CrA
BV 556	18 33 38	−16 45.8	V 2349 Sgr
–	18 33 45	−25 51.6	V 2350 Sgr
S 8867	18 22 46	−47 12.7	MQ Tel
–	18 22 47	−37 04.4	V 615 CrA
S 7376	18 22 51	−43 07.7	V 616 CrA
КЗП 7846	18 23 01	−31 32.0	V 2351 Sgr
–	18 23 04	−38 15.4	V 617 CrA
S 8870	18 23 08	−52 03.0	MR Tel
S 7377	18 23 09	−40 11.2	V 618 CrA
–	18 28 12	−22 06.3	V 2352 Sgr
–	18 23 18	−42 17.7	V 619 CrA
–	18 23 20	−24 27.9	V 2353 Sgr
S 8871	18 23 36	−48 55.2	MS Tel
–	18 23 54	−44 11.4	V 620 CrA
S 9895	18 24 00	+12 49.5	V 578 Her
S 9887	18 24 01	+32 58.6	V 336 Lyr
–	18 24 02	−24 56.3	V 2354 Sgr
–	18 24 03	−44 42.6	V 621 CrA
–	18 24 07	−12 22.6	V 366 Sct
–	18 24 14	−38 25.4	V 622 CrA
–	18 24 16	−37 45.8	V 623 CrA
–	18 24 21	−32 26.4	V 2355 Sgr
–	18 24 21	−36 55.7	V 2356 Sgr
–	18 24 26	−22 27.6	V 2357 Sgr
–	18 24 35	−45 15.4	V 624 CrA
–	18 24 38	−23 42.5	V 2358 Sgr
S 9896	18 24 39	+11 10.0	V 1105 Oph
–	18 24 48	−41 29.1	V 625 CrA
–	18 24 56	−32 30.0	V 2359 Sgr

Preliminary designation	α 1900.0	δ 1900.0	Name
–	$18^h25^m02^s$	−39°42!0	V 626 CrA
–	18 25 13	−32 16.8	V 2360 Sgr
–	18 25 15	−32 16.4	V 2361 Sgr
–	18 25 16	−44 36.0	V 627 CrA
–	18 25 32	−24 15.8	V 2362 Sgr
–	18 25 35	−41 30.2	V 628 CrA
S 9898	18 25 39	+07 45.0	V 1106 Oph
S 9899	18 25 54	+05 28.0	EY Ser
550.1935	18 26 11	−41 11.5	V 629 CrA
–	18 26 22	−42 44.0	V 630 CrA
–	18 26 31	−23 18.6	V 2363 Sgr
–	18 26 36	−39 13.3	V 631 CrA
S 7392	18 26 39	−41 18.7	V 632 CrA
S 9900	18 26 51	+07 48.0	V 1107 Oph
–	18 27 07	−38 05.2	V 633 CrA
–	18 27 13	−42 32.1	V 634 CrA
S 9902	18 27 24	+06 39.0	V 1108 Oph
–	18 27 52	−43 01.7	V 635 CrA
–	18 28 02	−24 29.9	V 2364 Sgr
–	18 28 04	−10 29.9	V 367 Sct
S 7397	18 28 23	−44 51.6	V 636 CrA
–	18 28 36	−22 00.6	V 2365 Sgr
–	18 28 41	−22 01.6	V 2366 Sgr
–	18 28 45	−23 57.6	V 2367 Sgr
–	18 28 48	−43 37.6	V 637 CrA
–	18 29 08	−21 24.7	V 2368 Sgr
–	18 29 24	−22 27.5	V 2369 Sgr
556.1935	18 29 59	−44 17.0	V 638 CrA
S 7401	18 30 07	−40 30.0	V 639 CrA
–	18 30 14	−20 48.6	V 2370 Sgr
S 9315	18 30 33	+40 50.0	V 337 Lyr
S 9905	18 30 36	+10 18.0	V 1109 Oph
S 9906	18 31 09	+07 21.0	V 1110 Oph
–	18 31 19	−39 06.4	V 640 CrA
561.1935	18 31 30	−36 57.2	V 2371 Sgr
HD 234677	18 31 35	+51 38.7	BY Dra
–	18 31 35	−22 17.6	V 2372 Sgr
–	18 31 53	−35 42.2	V 2373 Sgr
–	18 31 54	−27 46.2	V 2374 Sgr
–	18 32 00	−33 03.9	V 2375 Sgr

Preliminary designation	α 1900.0	δ 1900.0	Name
–	$18^h32^m06^s$	−39°14!8	V 641 CrA
–	18 32 14	−25 38.2	V 2376 Sgr
S 9911	18 32 36	+10 20.0	V 1111 Oph
S 9910	18 32 39	+08 35.0	V 1112 Oph
S 9912	18 32 57	+13 05.0	V 579 Her
–	18 33 12	−37 15.4	V 642 CrA
–	18 33 26	−33 33.1	V 2377 Sgr
S 9318	18 33 54	+35 50.0	V 338 Lyr
–	18 34 07	−18 44.2	V 2378 Sgr
–	18 34 22	−34 27.7	V 2379 Sgr
S 9915	18 34 27	+08 35.0	V 1113 Oph
–	18 35 04	−37 34.0	V 643 CrA
–	18 35 16	−25 49.2	V 2380 Sgr
S 9324	18 35 39	+41 28.0	V 339 Lyr
–	18 35 49	−36 05.2	V 2381 Sgr
–	18 35 53	−35 39.0	V 2382 Sgr
S 9916	18 36 03	+08 42.0	V 1114 Oph
S 9319	18 36 15	+32 43.0	V 340 Lyr
S 9917	18 36 15	+09 41.0	V 1115 Oph
–	18 36 56	−19 07.0	V 2383 Sgr
S 9918	18 37 21	+07 28.0	V 1116 Oph
S 9920	18 38 24	+07 01.0	V 1117 Oph
–	18 38 54	−37 58.5	V 644 CrA
–	18 39 26	−36 57.8	V 2384 Sgr
S 9889	18 39 27	+38 38.0	V 341 Lyr
–	18 39 36	−38 07.7	V 645 CrA
S 9923	18 39 36	+11 12.0	V 1118 Oph
–	18 39 52	−32 56.0	V 2385 Sgr
–	18 40 14	−32 11.2	V 2386 Sgr
S 9327	18 40 18	+39 41.0	V 342 Lyr
–	18 40 53	−40 46.2	V 646 CrA
S 9638	18 41 21	+41 36.0	V 343 Lyr
S 9329	18 41 30	+43 16.0	V 344 Lyr
–	18 41 31	−35 36.0	V 2387 Sgr
S 9332	18 42 00	+41 56.0	V 345 Lyr
578.1935	18 42 06	−40 31.0	V 647 CrA
–	18 42 18	−34 33.8	V 2388 Sgr
–	18 42 41	−36 05.6	V 2389 Sgr
S 9333	18 43 09	+44 15.0	V 346 Lyr
S 9334	18 43 57	+41 16.0	V 347 Lyr
935.1936	18 44 12	−27 04.0	V 2390 Sgr

Preliminary designation	α 1900.0	δ 1900.0	Name
S 9361	$18^h45^m09^s$	+53°51!0	BZ Dra
S 9640	18 45 24	+44 54.0	V 348 Lyr
–	18 46 01	–34 26.4	V 2391 Sgr
S 9335	18 46 12	+42 38.0	V 349 Lyr
S 9337	18 46 18	+46 04.0	V 350 Lyr
S 9936	18 46 18	+42 51.0	V 351 Lyr
–	18 46 54	–26 24.9	V 2392 Sgr
–	18 47 07	–29 39.8	V 2393 Sgr
S 9023	18 48 33	+15 26.0	V 580 Her
S 9929	18 48 36	+12 20.0	V 581 Her
S 9340	18 48 54	+42 03.0	V 352 Lyr
–	18 49 06	–34 20.3	V 2394 Sgr
S 9342	18 49 12	+45 10.0	V 353 Lyr
S 9642	18 49 39	+41 25.0	V 354 Lyr
S 9643	18 50 24	+43 00.0	V 355 Lyr
S 9664	18 50 39	+51 50.0	CC Dra
–	18 50 44	–41 21.5	V 648 CrA
–	18 51 07	–33 58.8	V 2395 Sgr
S 9028	18 51 21	+13 46.0	V 582 Her
S 9029	18 51 51	+14 47.0	V 583 Her
–	18 52 23	–34 51.6	V 2396 Sgr
–	18 52 30	–25 20.4	V 2397 Sgr
S 9363	18 52 33	+52 20.0	CD Dra
S 9030	18 52 36	+16 25.0	V 584 Her
S 9646	18 52 36	+39 20.0	V 356 Lyr
S 9032	18 52 51	+14 22.0	V 585 Her
–	18 53 27	–36 17.8	V 2398 Sgr
S 7452	18 54 49	–46 47.4	MT Tel
S 9345	18 54 54	+42 57.0	V 357 Lyr
–	18 54 54	–34 52.0	V 2399 Sgr
S 9036	18 55 45	+15 57.0	V 1103 Aql
Innes 87	18 56 03	–26 33.1	V 2400 Sgr
–	18 56 06	–24 49.7	V 2401 Sgr
S 9649	18 56 18	+42 16.0	V 358 Lyr
–	18 56 35	–40 48.7	V 649 CrA
949.1935	18 57 00	–41 25.0	V 650 CrA
–	18 57 30	–32 25.4	V 2402 Sgr
–	18 58 00	–41 23.5	V 651 CrA
–	18 58 21	–29 03.0	V 2403 Sgr
87.1905	18 58 29	+30 52.1	V 359 Lyr

Preliminary designation	α 1900.0	δ 1900.0	Name
S 9045	18^{h}59^{m}03^s	+14°35'.0	V 1104 Aql
S 9347	18 59 12	+46 19.0	V 360 Lyr
S 9349	18 59 39	+46 50.0	V 361 Lyr
S 9052	18 59 48	+16 28.0	V 1105 Aql
S 9051	18 59 51	+14 04.0	V 1106 Aql
Innes 137	18 59 51	-31 31.4	V 2404 Sgr
S 9053	19 00 09	+14 41.0	V 1107 Aql
-	19 00 40	-32 56.1	V 2405 Sgr
S 9056	19 00 54	+15 48.0	V 1108 Aql
S 9057	19 01 03	+14 04.0	V 1109 Aql
-	19 01 11	-28 18.8	V 2406 Sgr
S 4382	19 01 15	+03 10.0	V 1110 Aql
S 9058	19 01 45	+15 20.0	V 1111 Aql
S 9351	19 02 03	+43 54.0	V 362 Lyr
S 9399	19 02 36	-00 33.0	V 1112 Aql
-	19 03 58	-27 14.7	V 2407 Sgr
S 9400	19 04 12	-01 02.0	V 1113 Aql
S 9368	19 04 12	+55 41.0	CE Dra
S 9369	19 04 42	+53 13.0	CF Dra
S 9401	19 04 57	-01 36.0	V 1114 Aql
S 9370	19 05 21	+52 49.0	CG Dra
S 9653	19 05 36	+42 53.0	V 363 Lyr
СПЗ 1511	19 05 46	+29 56.3	V 364 Lyr
S 9402	19 06 03	+03 25.0	V 1115 Aql
S 9655	19 06 09	+45 05.0	V 365 Lyr
-	19 06 42	-40 47.9	V 652 CrA
S 9353	19 06 42	+46 00.0	V 366 Lyr
S 9656	19 06 57	+42 16.0	V 367 Lyr
Innes 98	19 07 15	-33 43.4	V 2408 Sgr
-	19 07 49	-24 20.1	V 2409 Sgr
-	19 07 50	-37 46.3	V 653 CrA
S 9354	19 08 00	+43 15.0	V 368 Lyr
СПЗ 1512	19 08 09	+32 02.0	V 369 Lyr
S 9667	19 08 15	+52 03.0	V 1102 Cyg
S 9668	19 08 51	+56 20.0	CH Dra
-	19 09 54	-27 56.5	V 2410 Sgr
S 9355	19 10 09	+42 03.0	V 370 Lyr
-	19 10 13	-32 55.3	V 2411 Sgr
-	19 10 31	-35 36.8	V 2412 Sgr
S 9406	19 10 39	-01 38.0	V 1116 Aql

Preliminary designation	α 1900.0	δ 1900.0	Name
S 9408	19h12m00s	+00°50!0	V 1117 Aql
S 9357	19 12 06	+45 59.0	V 1103 Cyg
S 9409	19 12 45	+02 16.0	V 1118 Aql
S 9410	19 12 48	+00 05.0	V 1119 Aql
HBV 407	19 12 56	+26 47.4	V 371 Lyr
S 9358	19 13 03	+41 45.0	V 372 Lyr
СПЗ 1513	19 13 24	+31 33.6	V 373 Lyr
-	19 13 42	-28 35.7	V 2413 Sgr
S 9411	19 14 03	+03 20.0	V 1120 Aql
S 9931	19 14 06	+00 37.0	V 1121 Aql
S 9412	19 14 39	+02 12.0	V 1122 Aql
S 9932	19 15 06	+06 43.0	V 1123 Aql
VV 191	19 15 30	+33 03.8	V 374 Lyr
S 9933	19 15 33	+02 17.0	V 1124 Aql
S 9377	19 15 33	+50 34.0	V 1104 Cyg
VV 181	19 16 10	+33 59.7	V 375 Lyr
СПЗ 1514	19 16 35	+31 29.2	V 376 Lyr
Innes 106	19 16 45	-30 34.4	V 2414 Sgr
93.1906	19 16 47	+29 21.3	V 1105 Cyg
S 9378	19 16 51	+53 15.0	V 1106 Cyg
S 9360	19 16 54	+46 54.0	V 1107 Cyg
95.1906	19 16 58	+26 49.7	IO Vul
S 9414	19 17 06	+07 11.0	V 1125 Aql
S 9379	19 17 06	+54 22.0	V 1108 Cyg
HBV 408	19 17 07	+33 21.3	V 377 Lyr
S 9380	19 17 15	+53 31.0	V 1109 Cyg
S 9417	19 18 00	+07 15.0	V 1126 Aql
HBV 409	19 18 01	+31 10.2	V 378 Lyr
97.1906	19 18 14	+29 55.9	V 1110 Cyg
HBV 410	19 18 37	+31 06.9	V 379 Lyr
99.1906	19 18 50	+26 46.5	IP Vul
S 9418	19 19 00	+01 31.0	V 1127 Aql
СПЗ 1517	19 19 15	+29 59.2	V 1111 Cyg
101.1906	19 19 26	+26 46.9	IQ Vul
HBV 411	19 19 33	+26 28.0	IR Vul
S 9423	19 19 45	+03 06.0	V 1128 Aql
S 4400	19 20 02	+05 43.2	V 1129 Aql
VV 192	19 20 09	+30 45.1	V 380 Lyr
VV 193	19 20 16	+27 40.4	V 1112 Cyg
S 9382	19 20 18	+52 32.0	V 1113 Cyg

Preliminary designation	α 1900.0	δ 1900.0	Name
103.1906	$19^h20^m37^s$	+28°14!3	V 1114 Cyg
VV 182	19 20 48	+31 23.7	V 381 Lyr
VV 194	19 20 56	+29 26.4	V 1115 Cyg
VV 195	19 21 00	+30 50.4	V 382 Lyr
СПЗ 1518	19 21 08	+30 13,7	V 383 Lyr
S 9383	19 21 24	+51 28.0	V 1116 Cyg
S 9426	19 21 27	-01 42.0	V 1130 Aql
VV 196	19 21 40	+31 02.4	V 384 Lyr
VV 197	19 21 51	+33 05.8	V 385 Lyr
HBV 413	19 21 58	+28 59.9	V 1117 Cyg
S 9385	19 22 10	+52 21.0	V 1118 Cyg
S 9428	19 22 33	+03 11.0	V 1131 Aql
S 9429	19 22 57	+04 00.0	V 1132 Aql
S 9386	19 23 21	+50 55.0	V 1119 Cyg
HBV 414	19 23 39	+26 07.6	IS Vul
S 9387	19 23 42	+56 30.0	CI Dra
VV 183	19 23 58	+34 41.5	V 1120 Cyg
S 9388	19 24 03	+53 41.0	V 1121 Cyg
105.1906	19 24 31	+26 54.7	IT Vul
СПЗ 1519	19 24 32	+30 41.9	V 1122 Cyg
S 9432	19 24 33	+04 21.0	V 1133 Aql
106.1906	19 25 37	+26 53.0	IU Vul
S 9436	19 25 54	+07 37.0	V 1134 Aql
S 9434	19 25 54	-00 34.0	V 1135 Aql
HBV 415	19 26 27	+27 32.9	IV Vul
S 9675	19 27 03	+49 05.0	V 1123 Cyg
HBV 416	19 27 44	+29 56.8	V 1124 Cyg
HBV 417	19 27 57	+31 39.3	V 1125 Cyg
S 9440	19 28 06	+06 14.0	V 1136 Aql
S 8114	19 28 1[illegible]	+13 32.0	V 1137 Aql
КЗЛ 4718	19 28 34	+29 21.3	V 1126 Cyg
S 9442	19 28 45	+02 45.0	V 1138 Aql
S 9443	19 28 51	+03 14.0	V 1139 Aql
S 9391	19 29 33	+51 05.0	V 1127 Cyg
HBV 418	19 29 36	+30 17.0	V 1128 Cyg
112.1906	19 29 50	+27 51.9	V 1129 Cyg
VV 163	19 30 38	+39 29.6	V 1130 Cyg
VV 184	19 30 44	+28 28.8	V 1131 Cyg
VV 164	19 30 58	+37 03.6	V 1132 Cyg
VV 165	19 31 05	+42 42.2	V 1133 Cyg

Preliminary designation	α 1900.0	δ 1900.0	Name
HBV 419	19 31 27	+26 25.7	IW Vul
VV 166	19 31 54	+35 51.8	V 1134 Cyg
S 9132	19 31 57	+02 22.0	V 1140 Aql
36.1905	19 32 08	+02 22.6	V 1141 Aql
S 9453	19 32 24	+07 24.0	V 1142 Aql
HBV 420	19 32 32	+29 40.5	V 1135 Cyg
S 9944	19 33 24	+13 36.0	V 1143 Aql
HBV 421	19 33 49	+28 37.1	V 1136 Cyg
S 9393	19 34 30	+50 49.0	V 1137 Cyg
S 9455	19 34 33	+04 31.0	V 1144 Aql
S 9456	19 34 45	+02 31.0	V 1145 Aql
HBV 422	19 34 49	+26 11.2	IX Vul
VV 198	19 35 11	+34 15.5	V 1138 Cyg
СПЗ 1529	19 35 26	+30 43.8	V 1139 Cyg
S 9458	19 35 30	+05 03.0	V 1146 Aql
S 9457	19 35 36	-00 26.0	V 1147 Aql
VV 199	19 35 44	+27 51.4	V 1140 Cyg
HBV 423	19 36 02	+25 48.0	VY Vul
СПЗ 872	19 36 06	+36 26.0	V 1141 Cyg
HBV 424	19 36 12	+33 41.7	V 1142 Cyg
S 9952	19 36 24	+18 31.0	FT Sge
GC 27206	19 36 27	+54 44.5	V 1143 Cyg
S 9945	19 37 00	+12 05.0	V 1148 Aql
S 4426	19 37 12	+55 17.4	V 1144 Cyg
S 9946	19 37 24	+13 59.0	V 1149 Aql
S 9459	19 37 24	+01 01.0	V 1150 Aql
S 9460	19 37 33	+03 52.0	V 1151 Aql
S 9462	19 38 12	-00 09.0	V 1152 Aql
S 9463	19 38 24	+00 59.0	V 1153 Aql
HBV 425	19 38 25	+28 00.3	V 1145 Cyg
S 9466	19 39 51	+04 19.0	V 1154 Aql
S 9940	19 39 54	+05 06.0	V 1155 Aql
S 9941	19 40 09	+02 18.0	V 1156 Aql
VV 200	19 40 09	+28 05.0	V 1146 Cyg
S 9947	19 41 18	+07 11.0	V 1157 Aql
S 9954	19 41 45	+16 39.0	FU Sge
HBV 426	19 42 01	+32 01.0	V 1147 Cyg
S 9396	19 42 06	+52 39.0	V 1148 Cyg
S 9955	19 42 09	+16 41.0	FV Sge
S 9994	19 42 33	-03 50.0	V 1158 Aql

Preliminary designation	α 1900.0	δ 1900.0	Name
S 9397	$19^h42^m33^s$	+54°24'.0	V 1149 Cyg
VV 167	19 42 53	+43 02.9	V 1150 Cyg
HBV 427	19 43 11	+27 05.1	IZ Vul
HBV 428	19 43 19	+28 13.9	KK Vul
HBV 429	19 43 52	+29 36.7	V 1151 Cyg
S 9997	19 44 21	+02 16.0	V 1159 Aql
VV 185	19 44 21	+36 11.0	V 1152 Cyg
VV 168	19 44 30	+34 37.1	V 1153 Cyg
S 9998	19 44 57	+02 55.0	V 1160 Aql
BV 394	19 44 58	+42 52.3	V 1154 Cyg
VV 169	19 45 08	+42 18.5	V 1155 Cyg
S 9950	19 46 36	+07 15.0	V 1161 Aql
HBV 430	19 46 36	+29 06.0	V 1156 Cyg
BV 381	19 46 49	-11 37.6	V 1162 Aql
S 9958	19 47 12	+17 50.0	FW Sge
HBV 431	19 47 14	+31 04.9	V 1157 Cyg
HBV 432	19 47 35	+30 51.3	V 1158 Cyg
VV 173	19 48 17	+38 45.2	V 1252 Cyg
S 10005	19 48 27	-03 14.0	V 1163 Aql
VV 174	19 48 36	+38 59.0	V 1159 Cyg
VV 175	19 49 03	+35 28.7	V 1160 Cyg
S 9960	19 49 09	+22 19.0	KL Vul
S 10006	19 49 21	-01 58.0	V 1164 Aql
S 9961	19 49 53	+18 31.0	FX Sge
S 9963	19 50 03	+20 58.0	KM Vul
СПЗ 1560	19 50 11	+12 30.2	V 1165 Aql
S 10007	19 50 51	+02 18.0	V 1166 Aql
VV 170	19 50 59	+42 41.6	V 1161 Cyg
VV 176	19 51 06	+36 31.4	V 1162 Cyg
VV 177	19 51 16	+36 36.5	V 1163 Cyg
HBV 433	19 51 29	+27 26.5	KN Vul
S 9966	19 51 33	+16 11.0	FY Sge
VV 186	19 51 38	+42 21.5	V 1164 Cyg
S 10008	19 52 18	+00 13.0	V 1167 Aql
VV 187	19 52 32	+39 43.0	V 1165 Cyg
VV 188	19 52 54	+39 34.7	V 1166 Cyg
S 9967	19 52 54	+20 01.0	FZ Sge
S 7846	19 52 57	+56 24.0	V 1167 Cyg
S 7845	19 52 57	+52 34.0	V 1168 Cyg
VV 178	19 52 57	-39 42.6	V 1169 Cyg
S 10031	19 53 00	+30 29.0	V 1170 Cyg

Preliminary designation	α 1900.0	δ 1900.0	Name
S 10032	$19^h53^m18^s$	+28°49!0	KO Vul
374.1933	19 53 56	+11 32.3	V 1168 Aql
HBV 434	19 54 08	+33 36.8	V 1171 Cyg
HBV 435	19 54 21	+32 56.3	V 1172 Cyg
S 10009	19 54 57	-02 29.0	V 1169 Aql
S 9968	19 55 30	+20 06.0	GG Sge
S 10011	19 56 09	+03 15.0	V 1170 Aql
S 10012	19 56 21	+04 06.0	V 1171 Aql
S 10013	19 57 25	-00 49.7	V 1172 Aql
VV 189	19 57 30	+35 56.3	V 1173 Cyg
S 9972	19 58 33	+21 16.0	GH Sge
S 10014	19 58 36	+01 56.0	V 1173 Aql
S 9973	19 59 48	+20 30.0	GI Sge
S 10015	19 59 51	-04 43.0	V 1174 Aql
S 10035	20 00 00	+30 58.0	V 1174 Cyg
S 10018	20 00 45	+02 00.0	V 1175 Aql
S 9974	20 01 03	+16 32.0	GK Sge
S 9975	20 02 42	+18 40.0	GL Sge
S 7860	20 02 45	+59 37.0	GX Cep
S 10020	20 02 51	+02 44.0	V 1176 Aql
S 9976	20 03 18	+19 05.0	GM Sge
S 7864	20 04 06	+60 23.0	GY Cep
S 7863	20 04 15	+57 42.0	V 1175 Cyg
S 7862	20 04 18	+52 14.0	V 1176 Cyg
VV 171	20 05 36	+38 06.2	V 1177 Cyg
Wr 169	20 05 43	+19 59.0	GN Sge
S 7868	20 06 21	+53 22.0	V 1178 Cyg
S 10023	20 06 33	-03 39.0	V 1177 Aql
S 7870	20 06 33	+57 30.0	V 1179 Cyg
Wr 166	20 06 51	+21 52.0	KP Vul
S 7873	20 07 30	+51 47.0	V 1180 Cyg
S 9983	20 07 39	+22 07.0	KQ Vul
S 9984	20 07 51	+21 46.0	KR Vul
S 7874	20 07 54	+54 22.0	V 1181 Cyg
S 7875	20 08 30	+54 36.0	V 1182 Cyg
VV 190	20 09 40	+37 26.6	V 1183 Cyg
S 7878	20 10 03	+53 59.0	V 1184 Cyg
S 10043	20 10 21	+33 28.0	V 1185 Cyg
Wr 43	20 11 01	+18 22.0	GO Sge
S 7880	20 11 15	+56 03.0	V 1186 Cyg

Preliminary designation	1900.0	δ 1900.0	Name
S 9985	$20^{h}11^{m}30^{s}$	+20°50'.0	GP Sge
S 9986	20 12 33	+16 03.0	GQ Sge
S 9988	20 12 57	+24 02.0	KS Vul
S 10026	20 13 00	-01 10.0	V 1178 Aql
LS III 41-11	20 13 14	+41 39.2	V 1187 Cyg
S 7886	20 13 15	+51 50.0	V 1188 Cyg
S 7885	20 13 15	+51 38.0	V 1189 Cyg
Hels.pgpl.852N279	20 13 22	+41 39.1	V 1191 Cyg
S 10044	20 13 24	+26 15.0	KT Vul
S 7888	20 13 45	+53 52.0	V 1190 Cyg
S 10029	20 14 15	-01 39.0	V 1179 Aql
BV 398	20 15 14	+15 32.5	GY Del
S 9989	20 15 15	+23 14.0	KU Vul
S 10045	20 16 00	+25 25.0	KV Vul
S 9682	20 16 03	+18 03.0	GR Sge
КЗП 5136	20 16 14	+75 50.4	GZ Cep
S 7893	20 16 51	+60 17.0	HH Cep
S 10046	20 16 51	+27 41.0	KW Vul
S 9683	20 17 33	+10 16.0	GZ Del
S 7894	20 18 00	+55 53.0	V 1192 Cyg
S 10047	20 18 48	+27 06.0	KX Vul
S 7895	20 19 06	+59 16.0	V 1193 Cyg
S 10030	20 19 18	+01 52.0	V 1180 Aql
S 10049	20 20 27	+29 24.0	V 1194 Cyg
S 9685	20 20 57	+17 36.0	HH Del
S 10061	20 21 21	+17 37.0	HI Del
S 7897	20 21 27	+54 52.0	V 1195 Cyg
S 7898	20 22 06	+54 10.0	V 1196 Cyg
S 10051	20 22 27	+28 25.0	KY Vul
S 9133	20 23 06	+61 16.0	HI Cep
S 10063	20 24 42	+12 51.0	HK Del
S 10064	20 24 51	+17 50.0	HL Del
S 10052	20 26 03	+28 55.0	KZ Vul
S 9059	20 27 24	+25 21.0	LL Vul
S 9686	20 27 33	+18 24.0	HM Del
S 7907	20 28 24	+56 26.0	V 1197 Cyg
S 10065	20 28 51	+10 39.0	HN Del
S 7910	20 29 36	+52 00.0	V 1198 Cyg
S 9062	20 30 27	+22 51.0	LM Vul
S 9063	20 30 39	+22 33.0	LN Vul

Preliminary designation	1900.0	δ 1900.0	Name
S 9065	20 31 09	+24 27.0	LO Vul
S 7913	20 31 27	+52 39.0	V 1199 Cyg
S 7915	20 31 39	+57 21.0	V 1200 Cyg
S 10066	20 32 15	+12 42.0	HO Del
S 9069	20 34 45	+23 42.0	LP Vul
S 9070	20 34 57	+23 57.0	LQ Vul
S 10073	20 35 39	+44 44.0	V 1201 Cyg
СПЗ 652	20 36 08	+07 15.3	HP Del
S 7919	20 36 21	+53 10.0	V 1202 Cyg
S 9074	20 36 39	+24 35.0	LR Vul
S 10067	20 36 57	+18 38.0	HQ Del
S 7920	20 37 03	+56 29.0	HK Cep
Nova Del 1967	20 37 48	+18 48.1	HR Del
S 9079	20 38 12	+32 30.0	V 1203 Cyg
S 9077	20 40 18	+22 49.0	LS Vul
S 10074	20 40 48	+46 26.0	V 1204 Cyg
S 9082	20 41 00	+34 27.0	V 1205 Cyg
S 9083	20 41 18	+34 13.0	V 1206 Cyg
S 9084	20 41 54	+34 16.0	V 1207 Cyg
S 9086	20 42 18	+32 26.0	V 1208 Cyg
S 9087	20 42 48	+33 00.0	V 1209 Cyg
S 9088	20 42 54	+32 38.0	V 1210 Cyg
S 9089	20 43 12	+34 43.0	V 1211 Cyg
S 9091	20 44 54	+34 34.0	V 1212 Cyg
S 9092	20 45 06	+34 09.0	V 1213 Cyg
S 9093	20 45 24	+34 34.0	V 1214 Cyg
S 9094	20 45 30	+34 20.0	V 1215 Cyg
S 9096	20 46 00	+35 06.0	V 1216 Cyg
S 9097	20 46 30	+34 13.0	V 1217 Cyg
S 9102	20 48 30	+34 32.0	V 1218 Cyg
S 10072	20 48 48	+16 47.0	HS Del
S 5120	20 48 57	-70 48.4	KZ Pav
S 9692	20 50 06	+16 50.0	HT Del
S 10077	20 50 27	+41 12.0	V 1219 Cyg
S 10079	20 56 48	+47 24.0	V 1220 Cyg
S 10080	20 57 12	+39 08.0	V 1221 Cyg
S 9470	20 59 12	+40 01.0	V 1222 Cyg
S 9471	21 00 54	+40 49.0	V 1223 Cyg
S 10082	21 01 06	+44 34.0	V 1224 Cyg
S 4533	21 02 46	+45 53.7	V 1225 Cyg

Preliminary designation	1900.0	δ 1900.0	Name
S 9107	$21^h03^m27^s$	+37°59'.0	V 1226 Cyg
S 10084	21 04 42	+45 24.0	V 1227 Cyg
173.1935	21 05 05	+38 53.2	V 1228 Cyg
S 9111	21 05 33	+37 48.0	V 1229 Cyg
S 9112	21 06 00	+36 30.0	V 1230 Cyg
S 10085	21 06 18	+45 51.0	V 1231 Cyg
S 10086	21 07 51	+43 48.0	V 1232 Cyg
S 9116	21 07 57	+37 52.0	V 1233 Cyg
S 10088	21 09 00	+40 57.0	V 1234 Cyg
S 9118	21 10 24	+37 36.0	V 1235 Cyg
S 9120	21 12 27	+38 41.0	V 1236 Cyg
S 9122	21 13 30	+37 09.0	V 1237 Cyg
S 9125	21 14 54	+36 29.0	V 1238 Cyg
S 9130	21 15 42	+37 56.0	V 1239 Cyg
S 9131	21 18 36	+37 13.0	V 1240 Cyg
GR 97	21 19 07	+67 34.0	HL Cep
GR 112	21 19 56	+46 26.0	V 1241 Cyg
S 10091	21 20 57	+44 34.0	V 1242 Cyg
GR 98	21 21 59	+67 00.0	HM Cep
S 10092	21 22 03	+45 08.0	V 1243 Cyg
S 10093	21 22 45	+44 57.0	V 1244 Cyg
GR 115	21 23 06	+45 35.0	V 1245 Cyg
166.1940	21 23 35	+43 03.8	V 1246 Cyg
252.1932	21 24 03	-07 25.5	EI Aqr
GR 116	21 26 13	+47 48.0	V 1247 Cyg
GR 117	21 32 30	+42 59.0	V 1248 Cyg
GR 118	21 33 43	+43 58.0	V 1249 Cyg
GR 119	21 34 45	+42 56.0	V 1250 Cyg
Wr 160	21 37 12	+48 12.0	V 1251 Cyg
S 8578	22 02 33	+42 53.0	GN Lac
S 9696	22 07 12	+47 07.0	GO Lac
S 8580	22 08 15	+45 01.0	GP Lac
HR 8494	22 11 24	+56 32.7	ε Cep
S 9697	22 14 12	+54 15.0	GQ Lac
S 8581	22 15 45	+45 48.0	GR Lac
S 9698	22 21 33	+56 45.0	HN Cep
S 9699	22 22 27	+52 44.0	GS Lac
S 8585	22 26 24	+45 19.0	GT Lac
S 8587	22 30 06	+44 34.0	GU Lac
S 9703	22 30 48	+62 06.0	HO Cep

Preliminary designation	1900.0	δ 1900.0	Name
S 10094	22 37 27	+56 10.0	GV Lac
S 9706	22 41 39	+52 42.0	GW Lac
КЗП 5612	22 42 15	+56 19.5	GX Lac
S 9708	22 43 56	+54 46.0	GY Lac
Bidelman 63	22 47 11	+31 13.9	GT Peg
100.1931	22 47 36	+33 42.5	GU Peg
S 10100	22 52 24	+53 16.0	GZ Lac
S 10102	22 52 30	+54 30.0	HH Lac
S 10101	22 52 30	+53 15.0	HI Lac
S 9475	22 54 45	+52 14.0	FU And
S 9704	22 56 00	+65 11.0	HP Cep
S 9712	22 59 15	+52 44.0	V 425 Cas
S 9713	22 59 21	+51 58.0	FV And
S 10107	23 01 30	+56 24.0	V 426 Cas
СПЗ 1509	23 02 06	+57 10.2	V 427 Cas
S 9714	23 02 21	+55 50.0	V 428 Cas
S 9715	23 05 30	+51 10.0	FW And
S 8573	23 08 36	+60 54.0	HQ Cep
S 9477	23 08 39	+49 28.0	FX And
S 9716	23 11 12	+54 03.0	V 429 Cas
S 10108	23 11 18	+55 42.0	V 430 Cas
S 10109	23 14 39	+53 55.0	V 431 Cas
СПЗ 1468	23 16 54	+62 08.0	V 432 Cas
S 10112	23 18 42	+49 43.0	FY And
S 8574	23 20 48	+60 47.0	V 433 Cas
S 10113	23 21 00	+52 35.0	FZ And
КЗП 8857	23 23 43	−30 19.9	VY Scl
S 10115	23 24 18	+54 47.0	V 434 Cas
S 10121	23 26 39	+58 50.0	V 435 Cas
BD+57°2758	23 28 07	+57 21.2	V 436 Cas
S 9722	23 29 06	+54 46.0	V 437 Cas
сп3 1505	23 31 21	+61 29.0	V 438 Cas
СПЗ 1452	23 32 27	+46 33.3	GG And
S 9724	23 32 57	+49 43.0	GH And
S 9482	23 33 15	+52 14.0	V 439 Cas
S 10117	23 33 21	+50 50.0	V 440 Cas
S 9725	23 34 48	+47 59.0	GI And
S 10124	23 35 18	+62 49.0	V 441 Cas
S 9484	23 35 27	+53 25.0	V 442 Cas
S 10119	23 36 51	+50 58.0	V 443 Cas

Preliminary designation	1900.0	δ 1900.0	Name
Ton S 120	$23^h44^m54^s$	−26°56!0	VZ Scl
S 10132	23 49 00	+56 22.0	V 444 Cas
Wr 170	23 49 04	+45 02.0	GK And
Wr 171	23 49 55	+44 50.0	GL And
S 4790	23 55 00	+34 48.0	GM And
S 9134	23 55 30	+26 08.0	GV Peg

COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 312

Konkoly Observatory
Budapest
1968 November 12

PERIODS FOR EIGHT VARIABLE STARS IN SAGITTARIUS

Periods have been determined at the Maria Mitchell Observatory from Harvard and Nantucket plates for the following variable stars:

Var.	R.A. 1900	Dec.	Max	Min	Type	JD	Period
1	$18^h13^m55^s$	$-22°15'.4$	13.8	16.0	EA	32702.406	$3^d.16299$
2	18 42	-24 58.9	15.6	16.6	RR	25474.346	0.56600
3	28 25	-23 06.1	14.5	15.7	RV	23238	137.5
4	28 59	-21 38.7	14.9	[15.9	M	27250	255
5	30 33	-22 52.0	14.8	16.1	M	26120	272
MN Sgr	33 55	-28 07.3	13.5	16.0	M	27221	283
NO Sgr	40 53	-19 42.7	13.0	[15.5	M	36050	296
NR Sgr	41 27	-24 03.5	12.5	[15.5	SR	25900	183

Notes:

Var.1. 15 minima. An approximate period had been determined by Mary Ashman in 1967 and improved by Jean Jackman in 1968.

Var.2. 185 observations. Bailey Var. No.8 in M 28. An approximate period determined in 1964 by Joyce Pascoe has been revised in 1968 by Linda Deery. Period increasing 2×10^{-10} d. per epoch.

Var.3. 48 epochs.

Var.4. 55 epochs.

Var.5. 35 epochs.

MN Sgr. 55 epochs. Period derived by Karen Alper.

NO Sgr. 29 epochs.

NR Sgr. Originally classified as irregular.

This work has been carried out under a grant from the U.S. National Science Foundations.

DORRIT HOFFLEIT

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

COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 313

Konkoly Observatory
Budapest
1968 November 14

UBV OBSERVATIONS OF NOVA DELPHINI

Nova Delphini was observed by the writer on 15 nights between July 1967 and September 1968 with a refrigerated 1P21 photomultiplier on the 60 cm Zeiss reflector of the Vatican Observatory, using a Knick DC amplifier and a Brown recorder. Several Johnson-Morgan Standard Stars were observed each night; α Delphini was used as a check star. The observations were reduced with an IBM 1620 computer, using the programme prepared by F.C.Bertiau (Ricerche Astronomiche, Vol.6, No.20, 1963).

In the table are listed the heliocentric J.D., and the V, B-V and U-B observations of the Nova. Observations of lower weight are indicated by a colon.

J.D.hel. 2,400,000+	V	B-V	U-B	J.D.hel. 2,400,000+	V	B-V	U-B
39686.3632	$5^m.64$	$+0^m.27$	$-0^m.70$	40060.3472	$6^m.54$	$+0^m.18$	$-0^m.98$
.3652	5.69	.27	-0.73	.3491	6.54	.18	-1.00
704.4048	5.49	.24	-0.60	066.3428	3.63	.28	-0.92
707.3262	5.50	.24	-0.63	.3435	6.64	.26	-0.94
.3280	5.50	.25	-0.62	068.3632	6.83	.32	-0.93
709.3256	5.51	.27	-0.52	.3648	6.83	.33	-0.93
.3286	5.49	.26	-0.54	088.3382	6.83	.38	-0.82
711.3420	5.47	.26	-0.53	.3399	6.83	.39	-0.83
.3437	5.47	.25	-0.53	089.3356	6.84	.39	-0.83
792.2817	4.81:	.27:	-0.27:	.3372	6.84	.39	-0.82
.3358	4.81:	.25:	-0.30:	124.3122	6.89	.40	-0.75
.3374	4.83:	.24:	-0.31:	.3138	6.88	.41	-0.74
818.3035	4.80	.29	-0.37	125.3078	6.89	.44	-0.69
.3052	4.81	.29	-0.38	.3094	6.89	.45	-0.71
819.2543	4.88	.29	-0.36				
.2559	4.87	.28	-0.36				

Specola Vaticana
Castel Gandolfo
7 November 1968

D.J.K. O'CONNELL

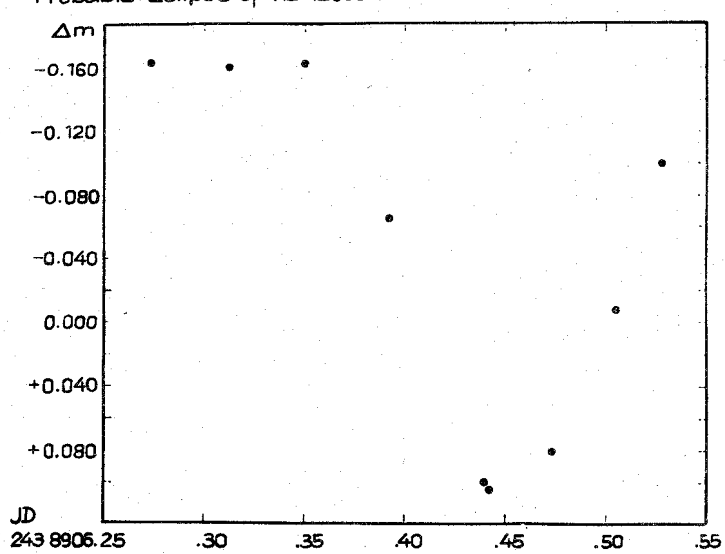
COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 314

Konkoly Observatory
Budapest
1968 November 16

HD 128661, PROBABLY AN ECLIPSING VARIABLE

In the course of a test on the variability of small amplitude for more than 200 A-type stars with a 25 cm mirror at Kottamia Observatory (UAR) in 1965 the star HD 128661 = BD +36°2509 was found to be probably an eclipsing variable. The eclipse began at about JD 2438906,367. The end could not be observed, the zenith distance being too large. The minimum occurred at about JD 2438906,455. The amplitude might be at least 0.28 mag.; the duration of the eclipse was about $4^h 20^m$. HD 129653 and HD 125642 were used as comparison stars. The mean error of one measuring is less than $\pm 0\overset{m}{.}01$. In the following night, JD 2438907,259 - JD 2438907,490, HD 128661 showed no variations of light.

Probable Eclipse of HD 128661



Comparison of HD 128661 with HD 129653

JD 2438906,....	Δ m
,2736	$-0^{m}.162$
,3128	-0.159
,3493	-0.162
,3927	-0.065
,4392	+0.098
,4413	+0.104
,4735	+0.080
,5045	-0.007
,5274	-0.098

German Academy of Sciences
Institut fur Sternphysik
Sternwarte Sonneberg

G. JACKISCH

COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 315

Konkoly Observatory
Budapest
1968 November 20

FLARES OF UV CETI, 1967

Continuous U-band photoelectric photometry of flare activity of UV Ceti was obtained late in 1967 with the 16-inch and 36-inch reflectors of the Cerro Tololo Inter-american Observatory as part of the co-operative monitoring program by the working group on flare stars of I.A.U. Comcission 27. The observations consist of 256 flares observed in 78.4 hours of monitoring.

The data here presented depart from the common format in two respects. First, monitoring was done in the U-band to take advantage of the more favorable detection of flare events afforded by this band (Kunkel, 1967). Flare light was reduced to U-magnitudes by an equation of the form

$$U = u - k_u \cdot X + \text{const.}$$

where u is the raw magnitude, k_u is an ultraviolet extinction coefficient (equal, on the average, to $k_u = 0.58$), and X is the airmass. For each night the constant and the extinction coefficient were determined from standard stars. Residuals from a best fit were 0.05 magnitudes, r.m.s., or better. Errors in estimating statistical parameters will generally exceed this amount until the number of recorded flare events exceeds several hundred, thus justifying the present procedure for all but the most extravagant observing programs. The exclusion of a color term was maintained because the value of the term is not a simple function of color, and is further completely unknown for flare light. This problem is likely to be more severe in the B-band where line emission will occasionally account for a major fraction of the recorded signal. Calibration was achieved by comparing flare light to a nearby star of moderately early type, thus avoiding complications associated with the red-leak of the instrumental system, as well as any reference to quiescent photospheric light, which is known to be variable in many instances (Roques 1958, Petit 1955, Oskanian 1964, Bateson and Kohler 1968).

The second departure from common practice is to express flare duration as a time interval during which flare light is brighter than a specified fraction of peak light. This estimator is less likely to be biased than an estimator that depends on a search from a noisy record for the beginning and end of a change in light. Complete free-dom from bias cannot be assured even so, since the electrometer time constant of one second will affect estimates of peak light in the faster flares.

Tabulated for each night (columns 1,2, and 3) are the event U.T., airmass of the observation, and U-magnitude of peak light. Columns 4 and 5 list flare durations in minutes at 0.5 peak light and 0.1 peak light, respectively. A colon is used to denote uncertainty greater than 10 per cent, r.m.s., in the presence of low level signals, and the letter "c" indicates a complex time history, often with several peaks, so that meaningful measurement could not be made. Flare decay rates are offered at 1,2,and 3 magnitudes below peak light in columns 6,7, and 8, respectively. They are expressed as the $\log_{10}$ of the decay in magnitudes per minute; the r.m.s. error is about 0.1 unless a colon is used to indicate greater uncertainty. No estimates of flare rise characteristics are offered since the rise rate is at times strongly influenced by instrumental limitations of the one second pen movement. There is evidence that loss of extremely rapid events due to instrumental limitations is not negligible in these observations. A more complete discussion of this matter will appear in another paper.

Completeness of the record may be bounded by two lines: (1) the listing is at least 90 per cent complete for flares brighter than U = 14.5. (2) Flare parameters are not significantly biased by instrumental response characteristics for all events with durations at half peak light greater than 0.08 minutes. (Electrical noise "spikes" generally had durations at half power of 0.03 minutes.) The 53 events beginning with those of 1967 Sept.7 and ending with the eight event of 1967 Sept.26 were observed on a sampling scheme of successive 5 second integrations. Flare parameters for these events are likely to be biased unless the duration at half peak light is greater than 0.3 minutes. (Peak light will be underestimated, flare durations will be overestimated, and decay rate parameters may be slightly too negative.)

In perhaps 10 per cent of the cases event times are in error by more than 0.1 minutes. This is due to a slight variability in the frequency of the observatory power source, and was not recognized until after the observing season had ended.

A graphical summary of the observations is presented in figure 1, showing the flare rate in events per hour brighter than some magnitude U. The data fit an expression of the form

$$\text{Rate}(U) = \exp\left[1.04\ (U - 13.58)\right] \text{ events/hour}$$

Observatorio Interamericano
de Cerro Tololo, 1968 November 9 **WILLIAM E. KUNKEL**

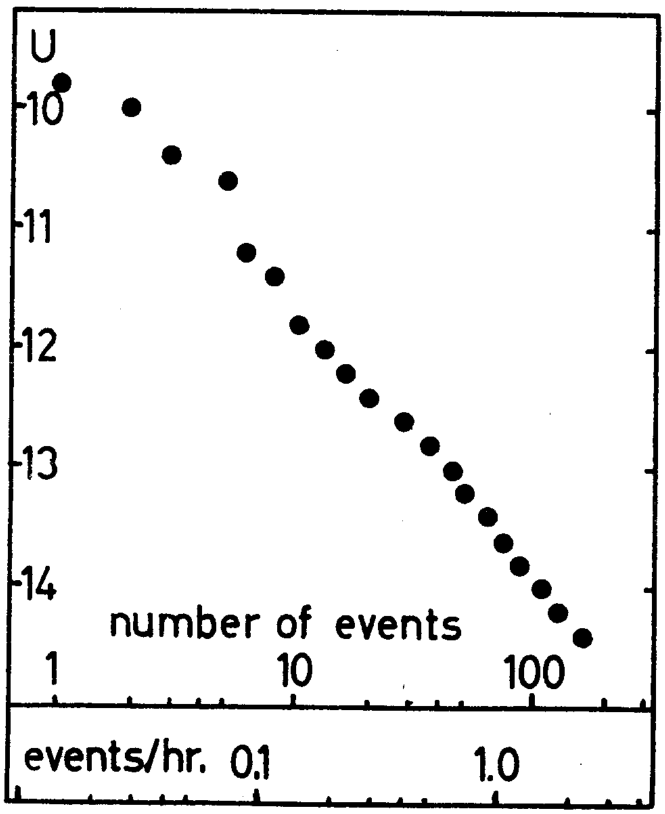


fig l. Flare Incidence of UV Cet

Flare Abstract

Event U.T.	Air-mass	U_{peak}	$T_{0.5}$	$T_{0.1}$	τ_1	τ_2	τ_3
1967 Sep 05, $05^h44^m.2$ - $9^h05^m.0$ U.T.			29 events;		$3^h.346$		
$05^h51^m.0$	1.09	15.76	0.48		-		
6 15.1	1.06	14.38	.50	2.8:	-.09	0.0	
6 01.4	1.07	15.87	.74		-		
6 18.5	1.05	14.71	.05		-		
6 24.9	1.05	13.84	.10	.55	1.02	+.43	+.03:
6 32.1	1.04	15.09	.8		+.46		
6 39.8	1.04	14.84	.62		-.21		
6 43.1	1.03	15.23	.63		-		
6 45.5	1.03	15.36	.7:		-		
6 54.8	1.03	15.9	.14		-		
7 10.4	1.02	16.5	.7:		-		
7 13.3	1.02	15.80	.28		-		
7 14.2	1.02	14.58	.23	2.5:	+.59	-.63:	
7 21.6	1.02	15.80	.28		-		
7 23.1	1.02	16.1	.26		-		
7 23.7	1.02	15.35	.20		-		
7 38.5	1.03	16.00	.26:		-		
8 9.7	1.05	15.29	.48		-.13		
8 15.6	1.05	13.81	.29	2.1	+.39	-.13:	
8 24.3	1.06	15.50	3.2		c		
8 29.6	1.07	15.38	.52		-		
8 32.5	1.07	15.57	.45		-		
8 46.3	1.09	15.41	.26		-		
8 47.6	1.09	13.01	.20	c	+.21	c	
8 48.0	1.09	13.44:	c	c	c	c	
8 48.9	1.09	13.06:	c	c	-.22c	-.43c	
8 53.8	1.10	14.02	.55	1.14	+.31		
8 56.6	1.11	15.05	.09		+.82		
9 1.1	1.11	15.75	.35		-		
1967 Sep 07, $4^h26^m.2$ - $9^h15^m.0$ U.T.			24 events		$4^h.813$		
$4^h54^m.4$	1.20	15.20	.23		+.25		
5 11.9	1.16	14.45	1.05	5.:	+.04		
5 31.5	1.11	13.72	.40	2.22	+.23		
5 35.5	1.11	13.33	.51	2.38	+.04	-.02	-.40:
5 47.0	1.09	15.17	.36		-		
6 3.2	1.06	14.46	.15	1.:	+.52	+.25	
6 29.0	1.04	14.39	.42	1.88	+.50	+.16	
6 15.7	1.05	16.19	.52		+.25		
6 35.6	1.04	15.49	.34		+.41		
6 36.6	1.04	15.82	.85		-.03		

Event U.T.	Air-mass	U_{peak}	$T_{0.5}$	$T_{0.1}$	τ_1	τ_2	τ_3
1967 Sep 07, continued							
$7^h\ 0^m.8$	1.02	14.97	1.54		-		
7 2.1	1.02	14.92	.88		-		
7 16.3	1.02	14.78	.35		-.52		
7 18.8	1.02	11.48	.44	3.25	+.16:	-0.08	-.36
7 44.3	1.03	15.18	8.5:		-		
7 56.4	1.04	16.07	.55		-		
8 18.6	1.06	14.76	2.25	5.7	-.22	-.51:	
8 37.3	1.09	15.12	.32		+.56:		
8 48.5	1.10	14.43	.22	1.85	-.01	+.06	
8 53.9	1.11	12.25	.4		+.52		
8 55.4	1.12	12.82	.65		c	c	} -.83
9 05.9	1.14	15.42	.22		c	c	}
9 09.1	1.15	15.97	.6:		-		
9 10.4	1.15	15.73	.6:		-		
1967 Sep 20, $6^h36^m.7$ – $8^h58^m.1$				10 events		$2^h.368$	
$6^h54^m.4$	1.03	13.95	.18:		+.62		
6 55.9	1.03	15.12	.76		-		
7 02.5	1.03	12.60	.63	2.25	+.27	+.09	-.43
7 13.9	1.04	13.02	.29:	2.:	+.5:	+.07	
7 31.7	1.06	15.31	.7		-		
7 34.6	1.06	15.46	.35		-		
7 56.3	1.09	15.20	1.2		~.0		
8 19.0	1.14	12.81	.75	3.0	-.09	-.19	-.29:
8 33.5	1.17	15.25	.4:		-		
8 41.3	1.19	14.85	2.1		-		
1967 Sep 21, $6^h28^m.2$ – $7^h23^m.2$				5 events		$0^h.917$	
$6^h42^m.0$	1.03	15.35	.82		-		
6 46.0	1.03	15.43	.95		-		
6 56.1	1.03	13.56	.49	1.4:	+.42	+.39	
7 16.7	1.05	12.53	.2:	1.25	+.17:	+.26	-.32
7 26.9:	1.06	*14.53			-		
1967 Sep 23, $4^h21^m.2$ – $9^h19^m.7$				16 events		$4^h.982$	
$4^h30^m.2$	1.18	15.41	.34	1.9	+.4:		
4 36.2	1.11	14.90	.14:	.55	+.9:		
4 41.9	1.10	15.56	1.15		-		
4 47.1	1.09	14.20	.19:		+.62		

* Brightest observed value; peak lost while checking sky

Event U.T.	Air-mass	U_{peak}	$T_{0.5}$	$T_{0.1}$	τ_1	τ_2	τ_3
1967 Sep 23, continued							
$4^h50^m.2$	1.09	*13.14			–		
5 17.3	1.05	15.23	2.3		–.32		
5 51.9	1.03	14.74	.54		+.16		
6 53.9	1.04	15.19	1.15		+.02:		
7 12.4	1.05	13.72	.84	8.:	–.02	–.65	
7 30.0	1.07	15.49	.52		–		
7 53.3	1.11	14.99	.92		–.02		
8 12.4	1.14	14.15	.25		.00		
8 18.2	1.16	14.53	8.4		–.85		
8 36.8	1.21	14.44	.19		+.62:		
8 48.6	1.25	14.75	.17:		+.62:		
9 10.2	1.33	15.25	.65		–		
1967 Sep 26, $4^h09^m.4$–$5^h30^m.5$ & $6^h17^m.0$–$8^h47^m.0$ 18 events $3^h.852$							
$4^h15^m.5$	1.13	15.32	.34		–		
4 19.9	1.12	16.05	1.04		–		
4 39.7	1.08	10.34	.16:	.57	+.63	+.53	+.05
4 55.1	1.06	16.44	1.5:		–		
5 01.0	1.06	15.09	.25		+.85		
5 02.6	1.05	15.69	1.4		–		
5 17.8	1.04	15.45	.3		–		
5 26.4	1.03	15.80	6.6		–		
6 24.4	1.03	12.27	.12	.7	+.78	+.10	–.95
6 32.5	1.03	16.08	.15		–		
6 39.3	1.03	15.70	.24		–		
6 40.9	1.04	13.39	.19	.6	+.76	+.59	+.25
6 44.6	1.04	14.46	.09	.42	+.93	+.55	
6 45.9	1.12	15.70			–		
6 48.3	1.12	15.37	.17		–		
6 48.8	1.12	15.21	.44		–		
6 56.2	1.14	15.97	1.6		–		
8 04.1	1.36	15.46	.2:		–		
1967 Oct 03, $3^h35^m.0$–$5^h08^m.3$ & $5^h19^m.1$–$9^h01^m.5$ 16 events $5^h.262$							
$3^h41^m.5$	1.14	14.96	.3		–		
3 51.3	1.12	13.36	.07	.24	+1.25	+.92	
3 55.9	1.11	12.82	.20	.8	+.71	+.46	+.24
4 15.8	1.07	14.13	.53	1.6	–		
4 26.4	1.06	11.10	.13	.37	+1.22	+1.11	–.23
4 29.0	1.06	10.62	.12	.31	1.17	1.06	+.38

* Brightest observed value; peak lost while checking sky.

Event U.T.	Air-mass	U_{peak}	$T_{0.5}$	$T_{0.1}$	τ_1	τ_2	τ_3
1967 Oct 03, continued							
$5^h22^m.1$	1.02	14.41	.13		–		
5 34.6	1.02	14.23	.05		–		
5 35.8	1.02	12.55	.12	2.0:	+1.08	–.19	
5 41.1	1.02	13.13	.46	1.14	+.58	+.30	
5 42.5	1.02	13.36	.09	.35	+.85		
5 52.4	1.03	14.13	.25c		–		
5 59.0	1.03	12.84	.08	.46	1.24	+.26	
7 42.1	1.17	12.65	.23	2.48	+.80	+.20	
7 43.5	1.17	14.33	.14		–		
7 46.3	1.18	14.38	.35		–		
1967 Oct 04, $1^h38^m.2$–$2^h43^m.8$ & $4^h51^m.6$–$6^h52^m.8$ 3 events $3^h.113$							
$2^h13^m.7$	1.45	14.98	.12		–		
4 56.3	1.03	14.43	1.35		–		
6 17.6	1.03	15.13	.95:		–		
1967 Oct 05, $1^h28^m.0$ – $9^h00^m.4$ 15 events $7^h.365$							
$1^h55^m.5$	1.70	13.36	.20	.92	.76	+.15	
2 27.4	1.61	14.03	.20		.64		
2 40.6	1.52	11.95	.11	.67	.76	+.60	+.22
4 04.2	1.12	13.65	.50	6.5:	–.13		
4 13.7	1.10	15.26	.27		–		
4 29.3	1.08	14.86	.14		–		
4 39.8	1.06	14.80	.74		–		
5 35.9	1.02	13.06	.09	.32	+.91	+.82	–.11
5 50.4	1.02	15.40	.13		–		
6 01.3	1.02	14.30	.06		–		
7 18.9	1.09	14.51	.92		–.04		
7 43.8	1.14	14.52	.16		+.17		
7 54.2	1.17	13.99	.19		+.94:		
8 02.4	1.19	14.71	.7:		–		
5 00.7	1.04	14.18	.13		+1.03	+.12	
1967 Oct 06, $1^h17^m.4$–$4^h11^m.0$ & $4^h28^m.5$–$9^h00^m.2$ 26 events $7^h.422$							
$1^h49^m.4$	1.55	13.00	.26	1.12	+.74	+.02	
1 58.2	1.49	13.97	.91		+.05		
2 10.5	1.42	12.78	.19c	.4	+.87	+.87	
2 23.8	1.35	14.67	1.4		–		

Event U.T.	Air-mass	U_{peak}	$T_{0.5}$	$T_{0.1}$	τ_1	τ_2	τ_3
1967 Oct 06, continued							
$2^h56^m.7$	1.22	14.74	.19		–		
3 01.1	1.21	14.95	1?		–		
3 24.1	1.15	15.58	.3		–		
3 25.8	1.15	15.14	.45		–		
3 36.9	1.12	13.82	.38 or	1.1c	0:?		
4 42.3	1.04	14.80	.10		–		
5 14.3	1.02	14.02	.06	.26	1.43	+.82:	
5 28.0	1.02	14.07	.12		1.06		
5 28.2	1.02	14.66	.08		–		
5 32.6	1.02	14.16	.14	1.5?	1.18	+.18:	
5 59.5	1.04	13.21	.32c	1.7	+.55	+.30	–.11:
6 36.8	1.07	14.49	.07		–		
6 40.6	1.08	15.43	.17		–		
6 41.9	1.08	13.43	.07		1.40		
6 43.0	1.08	11.46	.30	2.0c	.84	–.01	–.10
6 43.4	1.08	12.62	.09		1.18:		
6 46.8	1.09	13.02	.13	1.7:c	.62:c		
7 30.5	1.17	13.90	.26		–.23		
7 39.5	1.20	14.06	.27	1.7:	+.53		
7 42.1	1.21	14.06	.31	2.4	+.04		
8 15.1	1.33	14.83	.47		–		
8 56.5	1.55	13.35	.83	4.25	–.26	–.13	
1967 Oct 07, $1^h35^m.2$–$3^h32^m.1$ & $3^h49^m.5$–$9^h04^m.5$ 23 events $7^h.313$							
$1^h53^m.8$	1.50	14.27	.07		+.32		
2 28.9	1.31	14.03	.05	.47	1.53		
2 32.2	1.30	13.83	.11	1.4	1.22	+.05:	
2 41.2	1.26	13.11	.21	1.26	+.66	+.07	–.11:
3 08.2	1.18	14.24	.10		–		
3 44.8	1.10	14.45	.82		+.28		
3 47.0	1.10	14.48	.22		+.45		
4 19.4	1.06	13.36	.11	.74	+.79	+.20	
5 10.7	1.02	12.09	.13	.63	1.05	+.52	+.32
5 12.2	1.02	14.30	.38		c		
5 13.2	1.02	14.20	.12:		c		
6 6.8	1.04	14.41	.07		–		
6 47.2	1.09	14.28	.09		–		
7 10.7	1.13	14.44	.22		–		
7 13.4	1.14	13.65	.77	2.35	+.13	+.03	
7 22.2	1.16	14.72	.12		–		
7 47.5	1.23	14.04	.24	1.4	+.47	+.29	

Event U.T.	Air-mass	U_{peak}	$T_{0.5}$	$T_{0.1}$	τ_1	τ_2	τ_3
1967 Oct 07, continued							
$8^{h}10^{m}.0$	1.31	9.90	.24	1.2	+.73	+.25	−.03
8 17.7	1.35	13.56	2.15		−.59		
8 33.3	1.42	10.68	.48c	1.92	+.27	−.09	−.16
8 35.4	1.43	13.43	.06		1.31:		
8 41.7	1.46	14.44	.58:		–		
8 57.4	1.57	13.96	1.48:		−.23		
1967 Oct 08, $0^{h}57^{m}.8-4^{h}19^{m}.4$ & $4^{h}26^{m}.3-8^{h}53^{m}.2$				21 events	$7^{h}.808$		
$1^{h}01^{m}.2$	1.88	14.46	.65		–		
1 10.6	1.78	14.17	.11		–		
1 29.9	1.61	13.47	.11		1.05		
1 33.1	1.59	14.14	.21		–		
2 15.7	1.35	14.99	1.79		–		
2 41.2	1.24	13.13	.11	1.63	+.64	+.01	
2 43.5	1.24	14.12	.09		–		
4 03.2	1.07	14.50	.23		–		
4 08.5	1.06	12.91	.07	.55	1.25	+.53	+.19:
4 39.5	1.04	14.23	.40		c		
4 40.0	1.04	13.14	.07	.54:	+.89	+.90:	c
5 50.1	1.03	12.49	.13	1.18	+.83	+.07	+.04
6 01.8	1.04	14.46	.08		–		
6 58.8	1.11	14.57	.16		–		
7 01.5	1.12	12.76	.35c		+.4:c	c	
7 02.5	1.12	13.01	1.25c		−.09c	−.09	
7 14.5	1.14	15.35	.31:		–		
7 34.9	1.19	12.31	.16	.64	+1.06	+.42	−.06
8 26.1	1.40	14.21	.07				
8 31.5	1.43	14.84	.43:		–		
8 36.2	1.46	13.56	.05		1.00	+.43	
1967 Oct 09, $0^{h}59^{m}.7-3^{h}49^{m}.8$ & $3^{h}57^{m}.8-8^{h}59^{m}.7$				19 events	$7^{h}.867$		
$1^{h}33^{m}.7$	1.59	13.69	.46	2.9:	.12		
2 08.1	1.38	13.08	.34	9.4:	c		
3 31.3	1.11	13.95	.24		.60		
4 59.4	1.02	12.62	} .45	.76	.92	+.60	+.32
4 59.6	1.02	12.33	}				
5 16.3	1.02	11.86	.14	.51	1.07	+.80	+.35
5 19.5	1.02	12.97	.79	c	+.14:	c	
5 20.8	1.02	13.45	.9c	c	c		
6 08.3	1.05	13.73	.51c	3.8:	+.08c		
6 24.7	1.07	14.43	.31		+.42		

Event U.T.	Air-mass	U_{peak}	$T_{0.5}$	$T_{0.1}$	τ_1	τ_2	τ_3
1967 Oct 09, continued							
$6^h31^m.2$	1.07	14.04	.6:		+.11		
6 32.8	1.08	13.67	.26		+.66		
6 54.6	1.11	14.03	.23	.9:	+.62		
7 10.0	1.15	12.46	.06	.29	1.42	+.85	+.08
7 21.9	1.18	9.77	.3c	2.2	+.33:c	-.31	-.57
7 27.9	1.19	11.75	.13c	.52	+.89	+.56	
8 07.7	1.33	14.03	.17		–		
8 08.0	1.34	13.78	.22		+.41		
8 51.5	1.58	14.69	.28		–		
1967 Oct 10, $0^h32^m.0$- $1^h26^m.1$ & $4^h50^m.6$-$8^h55^m.2$ 14 events $4^h.978$							
$0^h43^m.5$	1.98	12.66	.34	1.6	+.22	-.08	
1 10.6	1.75	14.04	.15				
5 01.9	1.02	13.93	5.9	12.5:	-.82:	-.2:	
6 10.3	1.05	13.58	.18	.5:	1.17	1.05:	
6 21.1	1.07	14.50	.24		–		
6 21.4	1.07	14.45	.25		–		
6 32.0	1.08	14.01	.4		+.50		
6 33.4:	1.08	14.54	2:c		c		
6 49.5	1.11	14.30	.10		–		
6 51.5	1.11	14.36	.05		–		
6 56.8	1.13	13.97	3.0		-.57		
7 01.3	1.14	12.88	.16	c	+.11	0:	
7 07.9	1.14	14.48	.35		–		
8 41.7	1.24	14.15	.15		–		
1967 Oct 11, $1^h16^m.7$-$4^h04^m.3$ & $4^h20^m.1$-$8^h33^m.0$ 18 events $7^h.008$							
$1^h36^m.8$	1.51	13.84	.15		–		
2 20.5	1.29	13.58	.13		+1.02		
3 12.2	1.13	13.84	.10		+.70		
3 21.3	1.12	14.54	.23		–		
3 27.0	1.11	14.28	.05		–		
3 46.9	1.07	12.29	.08	.50	1.10	+.72	-.06
3 58.4	1.06	12.07	.17	1.3	c	+.09c	+.23
4 39.8	1.03	14.41	.09		–		
4 54.5	1.02	14.25	1.5		-.13		
5 42.3	1.04	14.33	.10		–		
6 03.4	1.05	12.52	.05	.15	1.34	1.18	.74
5 58.6	1.05	14.78	.36				
6 16.1	1.07	14.03	.78		-.30		

Event U.T.	Air-mass	U_{peak}	$T_{0.5}$	$T_{0.1}$	τ_1	τ_2	τ_3
1967 Oct 11, continued							
$6^h20^m.9$	1.07	14.42	.10		-		
6 30.8	1.09	13.51	1.23	4.4	-.14	-.22	
7 41.0	1.26	14.41	.14		-		
8 14.9	1.41	13.66	.31		+.71		
8 16.9	1.42	14.62	.25		-		

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Petit, M., 1955, J.Obs. 38, 354

Roques, P.E., 1958, P.A.S.P. 70, 310.

COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 316

Konkoly Observatory
Budapest
1968 November 27

THE ECLIPSING BINARY V78 IN OMEGA CENTAURI

According to the proper motion, magnitude, and apparent position (Woolley,1963) the eclipsing binary in the globular cluster ω Centauri satisfies the membership criteria as to be considered a member of the cluster. Therefore, it turns out to be a very interesting object since it is the brightest known eclipsing binary of extreme population II. Consequently, in collaboration with Fourcade and Laborde, we began observing this star with the 154 cm telescope at Bosque Alegre Observatory. By means of 380 photographic observations published by Martin (1938) plus

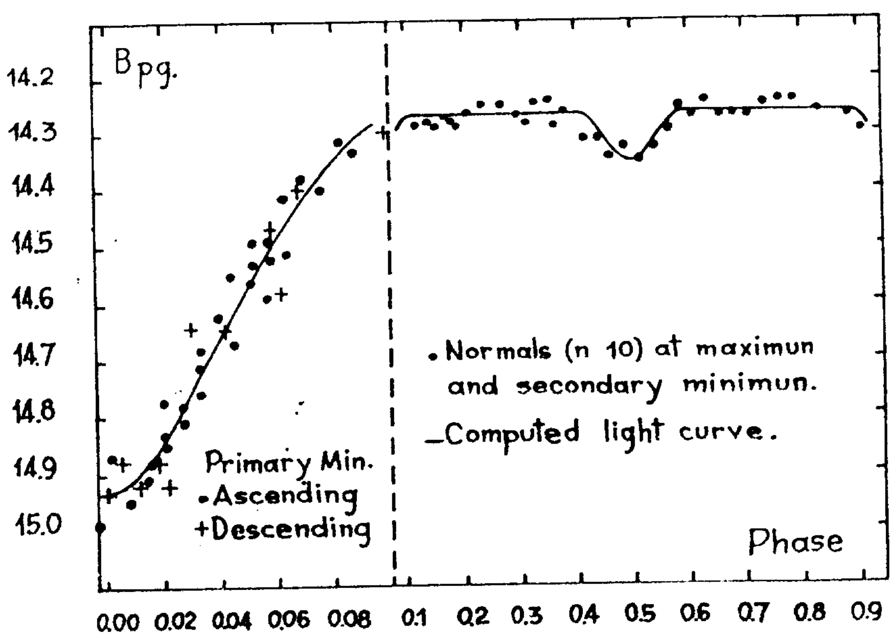

Fig. 1: Light curve of ωCen. V 78.

80 observations secured at Bosque Alegre and reduced to the same system, the following times of minima were obtained:

Minima		E	O - C
JD ⊙ 2426470.3099	±0.0067 m.e.	-3079	+0.009
2427895.4165	±0.0036	-1859	-0.001
2427943.3090	±0.0015	-1818	-0.002
2427970.1714	±0.0037	-1795	-0.007
2440055.6397	±0.0032	+8551	+0.001

A least squares solution gives the linear elements:

$$\text{Min} = \text{JD } 2430066.9693 + 1^{d}.16812879 \cdot E$$
$$\pm 0.0020 \quad \pm 0.00000047 \quad \text{p.e.}$$

The light curve shows a tipical EA with a shallow (1/2) secondary minimum (fig.1). A shape-dêpth relation and a nomographic solution give the following photometric orbital elements for a non-rectified preliminary solution:

$^{4}\alpha_0^{oc} = 0.60$ $\quad i = 72.25°$

$k = 0.80$ $\quad r_s = 0.2812$

$Ls = 0.7675$ $\quad r_g = 0.3515$

$Lg = 0.2325$ $\quad x = 0.4$ (assumed).

Cordoba Observatory
Laprida 854, Cordoba,
Argentina.
1968 November 18.

R.F. SISTERO

References

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Woolley,R.V.d.R., 1963, Roy.Obs.Ann., N°2.

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INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 317

Konkoly Observatory
Budapest
1968 December 3

PHOTOELECTRIC OBSERVATIONS OF UV Ceti

During the UV Ceti international patrol, planned for 1968 by Working Group on Flare Stars, we carried out continous photoelectric monitoring of this star with the 91 cm cassegrain telescope at our stellar station in Serra La Nave (Catania).

The same photometer was used as for the observations of YZ CMi (IBVS n° 274). From October 11 to October 28 we have made about $50^h.0$ of patrol in thirteen nights. The photoelectric coverage is given in Tab.I. The patrol times do not include the sky measurements.

For the time intervals enclosed under uncertain coverage, we can only exclude the happening of flares greater than $0^m.3$. This is due to the bad quality of the seeing.

The characteristics of 64 observed flares are reported in Tab.II. The times d and D are the rise time and the total duration of the flare, respectively.

The times d' and D' are both referred to that part of the flare for which we have:

$$I_{flare}/I_{min} \geq 20\ \% \quad I_{flare\ max}/I\ min$$

Some more details will be published in the "Memorie della Societa Astronomica Italiana".

CRISTALDI S., NARBONE M., RODONO M.
Osservatorio Astrofisico
Catania (Sicily)

Tab I
Photoelectric Coverage (October 1968)

N	Day	Coverage	Uncertain coverage	Number of observed flares	
				certain	uncertain
1	11	$1^h54^m.8$	$1^h00^m.2$	2	-
2	12	3 40.0	30.8	-	2
3	13	3 57.1	-	6	3
4	14	6 28.7	4.3	4	-
5	15	6 24.3	4.9	4	2
6	16	6 10.3	1.5	10	5
7	17	5 15.6	3.0	3	-
8	18	6 51.7	-	7	3
9	23	2 06.5	-	2	1
10	24	1 01.4	35.4	2	-
11	27	2 02.4	6.8	4	-
12	28	4 06.3	39.1	4	-
		49^h59^m1	$3^h06^m.0$	48	16

Tab II
Characteristics of the Observed Flares (October 1968)

No.	Day	d	D	d'	D'	I_{max}/I_{min}	Remarks
1	11	$0^m.50$	$1^m.60$	$0^m.28$	$0^m.80$	2.30	
2		0.40	10.00	0.28	2.50	1.79	
3	12	0.15	0.85	0.10	0.48	1.46	(1)
4		0.20	5.00	0.08	2.50	1.52	(1)
5	13	0.10	5.00	0.09	1.13	2.25	
6						2.27	
7		0.10	2.00	0.09	1.10	1.48	
8						2.31	
9		0.10	4.15	0.07	1.32	2.07	
10		0.05	1.20	0.04	0.75	1.38	(1)
11		0.05	3.70	0.04	0.30	1.64	(1)
12		0.05	0.50	0.04	0.40	1.48	(1)
13		0.05	1.70	0.04	0.28	3.06	
14	14	0.10	1.70	0.08	0.80	1.67	
15						1.69	(2)
16						1.71	(2)
17		0.10	1.50	0.08	0.43	1.77	
18	15					1.43	(2)
19						2.20	(2)
20						1.76	(2)
21		0.05	1.40	0.04	0.68	1.15	(1)
22		0.80	4.70	0.65	3.83	1.13	

Tab II (Cont.)

No.	Day	d	D	d'	D'	I_{max}/I_{min}	Remarks
23	15					1.63	(1) (2)
24	16	$0^m.05$	$0^m.60$	$0^m.04$	$0^m.58$	1.22	(1)
25						1.51	(2)
26						1.28	(2)
27		0.05	0.20	0.03	0.13	1.25	(1)
28		0.20	0.50	0.10	0.28	1.18	(1)
29		0.10	0.70	0.08	0.30	1.21	(1)
30						1.49	(2)
31		0.10	1.10	0.09	0.17	1.67	
32						1.29	(1) (2)
33		0.15	0.60	0.12	0.20	1.32	
34		0.05	0.70	0.04	0.50	1.58	
35						1.76	(2)
36						1.58	(2)
37		0.20	4.10	0.17	0.60	1.60	
38		0.15	2.10	0.08	0.35	1.75	
39	17	0.10	1.00	0.08	0.50	1.68	
40		0.00	0.40	0.00	0.22	1.51	
41		0.10	0.10	0.08	0.45	1.84	
42	18	0.20	3.20	0.13	0.72	1.43	
43		1.10	2.00	0.60	1.00	1.18	(1)
44		0.45	1.30	0.35	1.00	1.17	(1)
45						1.46	(1)
46						1.73	(2)
47						2.07	(2)
48						1.53	(2)
49		0.30	6.20	0.25	3.40	1.41	
50						1.59	(2)
51						4.47	(2)
52	23	0.20	1.50	0.07	0.62	1.63	
53		0.60	1.10	0.20	0.70	1.20	(1)
54		0.60	2.50	0.50	1.65	1.30	
55	24	0.05	1.80	0.05	0.11	2.02	
56		0.30	0.50	0.09	0.20	1.80	
57	27					1.51	(2)
58		0.05	1.35	0.05	0.50	1.49	
59		0.20	1.90	0.19	0.50	1.57	
60						1.44	(2)
61	28	0.15	0.40	0.14	0.22	2.10	
62						1.96	(2)
63						1.29	(2)
64		0.10	1.80	0.08	0.95	1.42	

Remarks: (1) uncertain; (2) complex structure.

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INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 318

Konkoly Observatory
Budapest
1968 December 19

THE PROGRAMME OF CO-OPERATIVE OBSERVATIONS OF FLARE STARS IN 1969

The "Working group on flare stars" suggests the following dates and names of stars to be observed in 1969:

11-25 January	YZ CMi
10-24 February	AD Leo
4-19 September	EV Lac
3-18 October	UV Cet

The observers are asked to publish their results in the I.B.V.S. as soon as possible. The summary of all the observations realized during each of the proposed series will be prepared by us and published in I.B.V.S. as well.

It should be noticed that the observations of flare stars made in time intervals not coinciding with those of the co-operative programme will have a greater statistical weight if the effective coverage time for each observed star is not smaller than 50 hours.

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Armagh Observatory

P.F.CHUGAINOV,
R.E.GERSHBERG
Crimean Observatory

V.S.OSKANIAN
Burakan Observatory

COMMISSION 27 OF THE I. A. U.
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Konkoly Observatory
Budapest
1968 December 19

NOTE ON GAMMA BOOTIS

In "The General Catalogue of Variable Stars" Kukarkin et al.(1) have classified Gamma Bootis as an unstudied variable and stated that its brightness variations can from time to time be represented with the period of $0^{d}.2903137$.

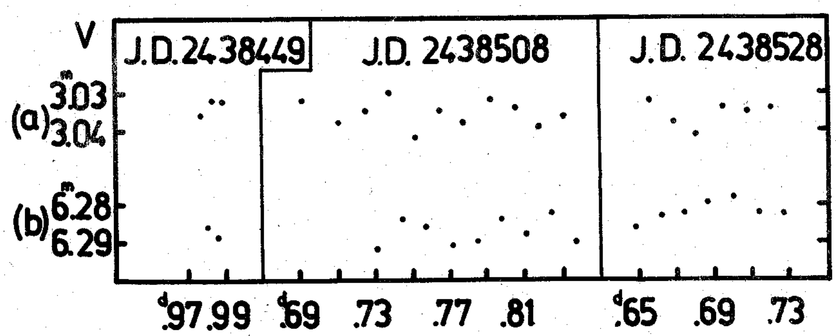

Fig.1.

The V magnitudes of (a) Gamma Bootis, and (b) HR 5402 plotted against Julian date

The star was observed by the present writer in the spring of 1964 with a photoelectric photometer attached to Lowell Observatory's 21-inch reflecting telescope. A 1P21 refrigerated photomultiplier tube and standard BV filters were used. The V magnitude and (B-V) colour index of the comparison star, HR 5441, were determined on two nights - they are equal to $6^{m}.390 \pm 0^{m}.005$ and $0^{m}.523 \pm 0^{m}.003$, respectively (mean errors estimated). The results of the differential observations of Gamma Bootis, as well as of the check star, HR 5402, reduced in the usual way, are shown in Figs.1 and 2. Each point was derived from two comparisons

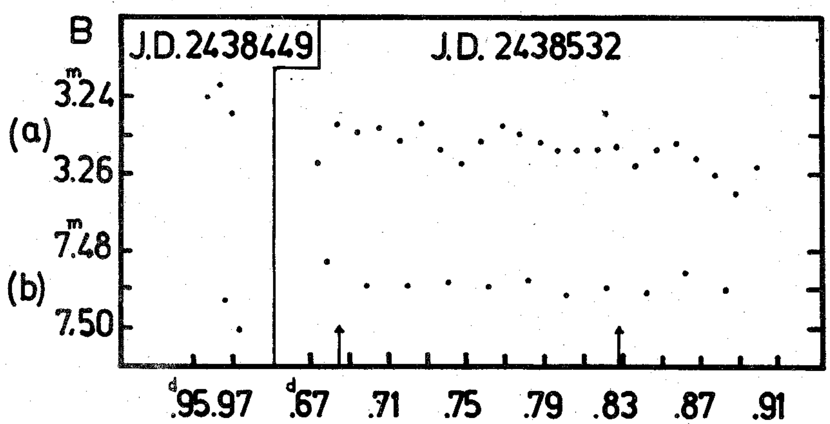

Fig. 2.

The B magnitudes of (a) Gamma Bootis, and (b) HR 5402 plotted against Julian date. The arrows indicate phases 0 and 0.5, computed according to elements (I)

"Gamma Boo - HR 5441" or "HR 5402 - HR 5441", in the case of the check star. The observations suggest that brightness of Gamma Bootis undergoes rapid fluctuations within about $0^m.01$.

Our result differs greatly from that derived by Magalashvili and Kumsishvili (2) from their photoelectric observations, carried out in the years 1960, 1961 and 1962 at Abastumani Observatory. They found the star's brightness to vary according to the elements

$$\text{Max.} = \text{J.D.}\,2437020^d.440 + 0^d.2903137\,E, \qquad \text{(I)}$$

the amplitudes of the mean light-curves being equal to $0^m.05$ and $0^m.11$ in the yellow and blue light, respectively. It is tempting to conclude that the large brightness variations present in 1960 to 1962 have virtually ceased in 1964. Such a conclusion may not be the correct one, however, for Magalashvili's and Kumsishvili's result is open to doubt: maxima of their mean light-curves were derived from the 1960 observations alone while the minima - from observations obtained in the years 1961 and 1962. It seems therefore, that Magalashvili's and Kumsishvili's observations indicate only that Gamma Bootis was by several hundreds of a magnitude brighter in 1960 than in the remaining two years, provided that Beta Bootis, the comparison star they used, was constant. Rapid fluctuations of brightness of Gamma Bootis are also suggested by Magalashvili's and Kumsishvili's observations.

According to our results the V magnitude of HR 5402 is equal to $6^{m}.285$ (see Fig.1). It should be mentioned that this value differs by $0^{m}.1$ from the one quoted in the Yale "Catalogue of Bright Stars" (3).

Wroclaw, Poland
December 3, 1968

MIKOLAJ JERZYKIEWICZ
Wroclaw University Observatory

References:

(1) Kukarkin,B.V., Parenago,P.P., Efremov,Yu.I., and Kholopov,P.N., "The General Catalogue of Variable Stars", second edition, Moscow 1968.

(2) Magalashvili,N.L., and Kumsishvili,J.J., Abastumani Astrophys.Obs.Bull. No.32, p.3, 1965.

(3) Hoffleit,Dorrit, "Catalogue of Bright Stars", Yale University Observatory, New Haven, Connecticut, 1964.

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NUMBER 320

Konkoly Observatory
Budapest
1968 December 19

VARIABILITE PROBABLE DES NAINES ROUGES

Lors de l'examen systématique de notre fichier des étoiles proches du Soleil ($\pi > 0''050$) nous avons remarqué un certain nombre d'étoiles pour lesquelles les observations font apparaître des discordances dans les estimations de la magnitude apparente, ce qui permet d'en soupçonner la variabilité. C'est notamment le cas des 11 étoiles suivantes; μ est la mouvement propre, en granduer, π la parallaxe, V et M(V) la magnitude, apparente et absolue, dans le systeme U-B-V; Δ est l'amplitude des differences observés, après réduction des observations à la même échelle.

	1950 AR	1950 Dec	V	μ	π (0"001)	Sp	M(V)	Δ
Ross 10	1h35m07s	+56°58',9	11,9	0"51	84±8	M4	11,5	1,1
Wolf 1530	1 42 19	+16 06,2	14,4	0,78	60±12	M4	13,3	1
-45°1184	3 31 17	-44 52,3	11,0	0,35	92±9	M5	10,8	>0,8
+21°652	4 26 02	+21 48,7	8,4	0,22	76±11	M1	7,8	1
-12°2918AB	9 28 53	-13 16,1	10,8	0,75	106±6	M4	11,0	2
Wolf 414 B	12 26 28	+ 8 42,3	12,0	0,70	66±7	M5	11,1	1,3
-45°7872	12 33 15	-45 32,9	11,5	0,71	93±12	M3	11,3	1,1
+48°2108B	13 17 36	+48 02,4	11,0	0,15	85±10	M2:	10,7	1,6
+45°2743A	18 33 50	+45 41,8	9,9	0,56	79±7	M2	9,4	1
Fur 53	20 43 18	+44 18,7	10,8	0,50	100±9	M3	10,8	1,1
LTT 8749	21 52 15	-47 35	12,1	0,50	83±11	m	11,7	2,1

Remarques

-12°2918: Couple très sérre,en mouvement rapide (P < 10 ans)
(Baize 1) Wolf 414 B: Ecartement 500" avec BD +9°2636
+48°2108: Couple orbital P=48,74 ans (Heintz 2)
+45°2743: le compagnon (mpg 14,1) est à 112"

Drancy le 9 Décembre 1968

MICHEL PETIT

(1) P.Baize JO 49.1.1966
(2) K.Heintz: München Veröff.5.19.255.1963

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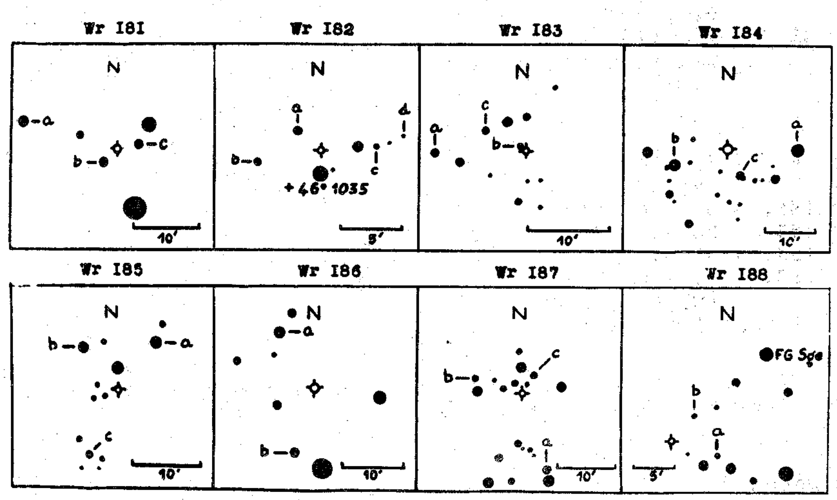
Konkoly Observatory
Budapest
1968 December 21

NOUVELLES ETOILES VARIABLES

	RA (1900,0)	D	max.	min.	type	nombre d'observ.
Wr 181	$00^h58^m40^s$	+61°11'	10,0	10,5	L	154
Wr 182	05 33 33	+46 05	11,9	13,5	E	107
Wr 183	05 45 21	+44 31	11,5	12,2	L	107
Wr 184	05 46 16	+40 42	10,1	10,7	L	107
Wr 185	05 51 48	+44 13	11,1	11,7	L	107
Wr 186	05 56 11	+42 12	9,9	10,5	L	107
Wr 187	06 20 22	+30 19	11,9	12,4	L	48
Wr 188	20 08 37	+19 53	12,9	13,4	L	131



Etoiles de comparaison

	a	b	c	d	
Wr 181	10,25	10,40	10,89	-	(magnitudes S.A.8 Bergedorf)
Wr 182	11,98	12,16	12,91	13,37	(magnitudes S.A.25 Bergedorf)
Wr 183	11,48	12,04	12,40	-	(- d° -)
Wr 184	10,3	10,6	10,8	-	(d'après S.A.25 Bergedorf)
Wr 185	10,9	11,2	11,7	-	(- d° -)
Wr 186	10,0	10,9	-	-	(- d° -)
Wr 187	11,88	12,25	12,40	-	(magnitudes S.A.50 Bergedorf)
Wr 188	12,9	13,4	-	-	(d'après la séquence photographique de G. Richter pour FG Sge (M.V.S.414, 1959).

Remarques

Wr 181. = BD +60°160 = n°1559 de la S.A.8 Bergedorf (mp 10,34. Sp g : K4)

Wr 182. = n°1298 de la S.A.25 Bergedorf (mp 11,92. Sp...). Les éléments provisoires tirés de cinq minimums sont:

$$\text{min.} = \text{JJ } 2438321{,}413 + 0^{j}55995$$

Wr 183. + BD +44°1302 = n°859 de la S.A. 25 Bergedorf (mp 11,79. Sp d K0)

Wr 184. = BD +40°1443. Etoile orangée.

Wr 185. = BD +44°1315. Etoile orangée.

Wr 186. = BD +42°1474. Etoile orangée.

Wr 187. = BD +30°1229. = n°1796 de la S.A.50 Bergedorf (mp 12,14. Sp M)

Wr 188. Etoile orangée.

Des détails seront publiés dans le Bulletin de la Station Astrophotographique de Mainterne.

13 Décembre 1968

ROGER WEBER.

Station Astrophotographique
de Mainterne

COMMISSION 27 OF THE I. A. U.
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NUMBER 322

Konkoly Observatory
Budapest
1968 December 27

PHOTOELECTRIC MINIMA OF ECLIPSING VARIABLES

In the table thirteen minima of eclipsing binaries are given, obtained photoelectrically at the Bucharest Astronomical Observatory. (O-C)-s were computed with the elements given in "Rocznic Astronomiczny, 1968" for the first nine minima and from the "Finding List for Observers of Eclipsing Variables, 1963", for the last four stars, respectively.

J.D.	E	O-C	n	Observer
44i Bootis				
2439945.4222	9633	+0.0155	21	H.Minti
TV Cassiopeiae				
2439389.4182	10632	+0.0065	120	H.Minti, G.Maris
2440203.2765	11081	+0.0032	40	A.Dumitrescu
Beta Persei				
2439462.4537	137	+0.0165	38	H.Minti, G.Maris
V836 Cygni				
2439769.2886	20235	-0.0053	20	H.Minti
782.2588	20255	-0.0034	33	H.Minti
RZ Cassiopeiae				
2439784.2876	18765	-0.0376	30	H.Minti
X Trianguli				
2439788.2722	2281	-0.0058	30	H.Minti
832.2465	2317	-0.0069	28	H.Minti
RX Herculis				
2440062.3672	4319	+0.0002	54	Al.Dumitrescu
AI Draconis				
2440070.4118	3063	+0.0003	51	Al.Dumitrescu
V477 Cygni				
24400138.4232	3107	-0.0764	35	H.Minti
WW Aurigae				
24400154.4692	2855	-0.0058	41	Al.Dumitrescu

December 18, 1968

C.POPOVICI
Bucarest Observatory,
Astrophysical Section

COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 323

Konkoly Observatory
Budapest
1969 January 9

NOVA IN OPHIUCHUS

On objective prism plates taken by N.Sanduleak at Cerro Tololo InterAmerican Observatory I have found a nova in the following position (1900.0):

α	δ
$17^h36^m.2 \pm 0^m.2$	$-24°56' \pm 3'$

The quoted uncertainties are estimated maximum values. The position is about 10' from V 553 Ophiuchi, a nova which reached maximum in 1940 (cf. Burwell and Swope, Pub.A.S.P. 53, 343, 1941).

The following magnitudes have been derived from the objective prism plates by calibrating image density against a magnitude sequence defined by NGC 6494:

	B	V
July 7, 1967	11,9	--
" 12, "	--	11.0

The redness of the spectrum in the 5000 - 6800 Å region is sufficient to explain the B(July 7) - V(July 12) magnitude difference as interstellar reddening, without appeal to photometric variation during that time period.

The Palomar prints are so crowded in the region of this star that is is not possible to identify the pre-outburst nova image on them, but the nova must have been fainter than V ~ 18 at minimum. The visual spectrum is a good match for a typical nova about 1½ magnitudes below, and following, maximum light, which therefore must have been near V = 9,5, presumably some time during the first half of 1967.

December 31, 1968

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Warner and Swasey Observatory

COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 324

Konkoly Observatory
Budapest
1969 January 13

PHOTOELECTRIC OBSERVATIONS OF NOVA VULPECULAE

The photoelectric observations of Nova Vulpeculae, discovered by Alcock on April 15, 1968, have been carried out from April 25 through September 21 at the 330-mm reflector in a system close to UBV. The filters used were: UG2, BG12+GG13 and GG11. The observations were reduced to the standard UBV system.

The Data of Observations

JD	V	B-V	U-B	n
2439972.463	5.34	+0.56	-0.36	5
73.432	5.33	+0.61	-0.39	4
74.440	5.54	+0.59	-0.42	5
75.410	5.64	+0.56	-0.41	4
76.404	5.64	+0.59	-0.42	4
78.425	5.71	+0.56	-0.45	5
79.406	5.57	+0.61	-0.43	2
2440002.353	7.28	+0.47	-0.42	4
03.379	7.35	+0.49	-0.47	3
32.438	8.25	+0.55	-0.42	2
33.400	8.13	+0.59	-0.23	3
34.410	8.24	+0.57	-0.34	3
56.370	8.63	+0.61	-0.10	3
59.401	8.75	+0.54	-0.04	3
60.420	8.76	+0.62	-0.07	3
87.355	9.14	+0.70	+0.11	3
2440088.377	9.13	+0.79	+0.10	2
89.402	9.13	+0.77	+0.22	3
94.387	9.13	+0.81	+0.10	3
97.400	9.18	+0.84	+0.22	2
119.327	9.49	+1.02	+0.31	3
120.290	9.40	+1.04	-	3
121.246	9.42	+0.96	-	3

<u>n</u> is the number of observations used in the formation of a mean point for a night.

HD186440 (B9) was used as comparison star with V = 6.04, B-V = $-0\overset{m}{.}04$, U-B = +0.05.

O.P.ABULADZE
Abastumani Astrophysical Observatory
Mt.Kanobili, USSR

November 15, 1968

COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
Number 325

Konkoly Observatory
Budapest
1969 February 5

VISUAL OBSERVATIONS OF YZ CANIS MINORIS

The flare star, YZ CMi, was observed visually for 10 hours during the January 1969 international programme using the Armagh 10-inch refractor. Estimates of brightness were made at about one minute intervals using Pickering's fractional method, and the photo-visual sequence given by Mosidze and Chuadze (Ref.1) was utilized in the magnitude reductions.

One flare of 1.7 magnitude and 30 minute duration was detected on Jan.19 at $2^h0^m.2$ U.T. Extrapolation of the sequence during the flare maximum was made using the star, HD 62525, at 8^m5 (Ref.2). A visual light curve of the flare is shown, being the result of two independent observers (A,P). Hours of coverage are given in the Table, where parentheses indicate poor sky conditions.

Hours of Coverage

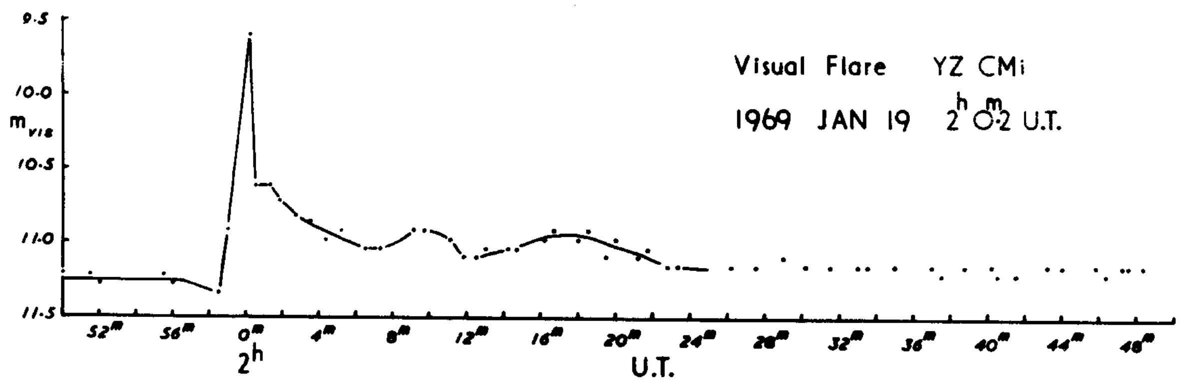
1969	U.T.	Observers
Jan.14	2325 - 2400	A,C,P
15	0000 - 0210, (0210 - 0303)	A,C,P
16	(2002 - 2020)	A,H,P
18	1945 - 2033, 2048 - 2118,	A,C,J2,P
	2142 - 2219, 2238 - 2311,	A,C,J2,P
	2315 - 2326, 2332 - 2400	A,C,J2,P
19	0000 - 0251	A,C,J2,P

Total coverage 9^h56^m over 3 nights

A.D.ANDREWS. P.CORVAN, B.HARDY,
P. and W.JOHNSTON, J.PERROTT
Armagh Observatory

1) L.N. Mosidze and A.D. Chuadze, Abastumani Obs.Bull.32, p.21, 1965.

2) A.J.Cannon and E.C.Pickering,Harvard Annals Vol.93,1919.



Visual Flare YZ CMi
1969 JAN 19 2h 0.2m U.T.
9.5
10.0
m_{vis}
10.5
11.0
11.5
52m
56m
0m
2h
4m
8m
12m
16m
20m
24m
28m
32m
36m
40m
44m
48m
U.T.

COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 326

Konkoly Observatory
Budapest
1969 February 7

PROPOSALS TO FLARE STAR OBSERVERS

With the rapid increase in both the number of observers and the quantity of flare observations which has taken place in the last few years, several problems of standardisation and homogenisation of observational data have revealed themselves. It has become clear that the existing, various ways of observing and of publishing results cannot provide data suitable for future statistical investigations.

Drawing from the accumulated experience of many observers, the 'Working group on flare stars' of Commission 27 would like to suggest that further work on UV Ceti-type stars be based on the following considerations.

1) Photoelectric monitoring should be carried out in one of the standard UBV spectral bands (c.f.Johnson,H.L. 1955, Ann.d'ap., 18, p.292) within a closely-matched photometric system. Multi-colour observations of flares are most desirable, but continuous monitoring should be done bearing in mind that the effectiveness of flare detection increases towards shorter wavelengths.

2) In order to study the slow (secondary) and possibly secular light variations it is necessary to determine differential magnitudes and colours of the flare stars with respect to one, or better two comparison stars in the proximity. It is felt that this additional information on secondary variation is well worth the slight loss of monitoring time. The following comparison stars are suggested to improve the combining of results from different observers.

<u>YZ CMi</u> Stars a and c (BD +3°1783) in I.B.V.S. No.265, 1968.

<u>AD Leo</u> Companion star at 1!7 N. See I.B.V.S. No.307, 1968.

<u>UV Cet</u> Stars d and e in Ap.J. Vol.109, p.534,1949.

<u>V 1216 Sag</u> Stars d and e in I.B.V.S. No.273, 1968.

Whilst the colours of some of these comparison stars do not closely match the flare stars the possible variability of the redder stars makes them somewhat less suitable. Details of mirror-photomultiplier-filter combinations, and transformation equations from instrumental to standard system, when applied, should be stated.

3) Data on monitoring should include, whenever possible:

a) The date and Universal time of the star and end of effective coverage given in tabular form, noting all interruptions of more than one minute.

b) The standard deviation of random noise fluctuations, typical of the night or series of nights, given in magnitude form,

$$\sigma \text{ (mag)} = -2.5 \log (|\sigma|/I_0)$$

where I_0 is the intensity deflection (less sky) of the quiet star.

The sampling time interval for σ should be that used throughout for the detection of small flares. The detection criterion is normally given by the 3-sigma rule.

c) A limiting magnitude for flare detection in the UBV spectral bands, defined with sufficient accuracy by,

$$m_{lim} = m_0 - 2.5 \log (|3\sigma|/I_0)$$

$$= m_0 + \sigma \text{ (mag)} - 1.19$$

where m_0 is the mean apparent magnitude of the quiet star in the UBV system for the night or series of nights, for each filter.

4) The following standardised data on flares is also requested:

a) The date and Universal time of flare maximum.

b) The durations before and after maximum in the spectral band used for monitoring for all flares exceeding 3σ-deviation at maximum. Difficulties are frequently experienced here and individual treatment is almost inevitable. It is suggested that pre-flares be omitted and that the duration on the primary rising branch be given. The greatest difficulty is met with on the descending branch, particularly when the star does not return to normal brightness. It should be stressed that the quoted duration after maximum need only be an indication, and cannot be a satisfactory time scale for large and small flares alike, and for flares of differing forms.

c) The standard deviations (as 3b) near all flares in each spectral band in which the flare is observed, using the same sampling procedure as in the general detection.

d) The maximum intensity in the magnitude scale, approximately in the UBV system, in each spectral band if possible, as defined by,

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

where I_{o+f} is the total intensity deflection (less sky) of star plus flare at maximum. It should be noted that statistical investigations in which the values Δ m have been used may be strongly affected by the observational selection; therefore it is desirable to express the measured fluxes of flares in stellar magnitude (or in absolute units).

e) The integrated intensity (in minutes) of each flare over the total duration, including pre-flare if present, as given by,

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

f) The light curves in relative intensity units (as indicated in the integral) for all observed flares. Sufficient time resolution should be employed to retain all reasonable detail as dictated by the study of standard deviations and the time constant of the equipment.

g) The air mass (or secant of zenith distance) at the time of all flares, together with remarks on sky conditions, including seeing and moonlight, to aid in the weighting of suspected flares.

A.D.ANDREWS — Armagh Observatory

P.F.CHUGAINOV, R.E.GERSHBERG — Crimean Observatory

V.S.OSKANIAN — Burakan Observatory

COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 327

Konkoly Observatory
Budapest
1969 February 8

NEW VARIABLE STARS IN THE CENTRAL REGION OF THE GLOBULAR CLUSTER M 15 = NGC 7078

By blinking some 103a-O photographs of the globular cluster M 15 taken at Asiago at the cassegrain focus of the 122 cm telescope (scale: 1 mm = 10"6) the following new variable stars have been found in the central region:

Var.No.	x"	y"	m_p	Küstner's No.
106	-30.3	+12.8	15.5-16.0	438
107	-32.5	-21.8	15.5-15.9	424
108	-32.4	-51.1	15.5-15.9	425
109	+12.7	-31.3	15.5-16.1	633
110	+31.7	-37.4	15.5-16.0	726
111	+41.7	- 0,7	15.3-16.2	777
112	+55.5	+35.0	15.3-16.3	822

Magnitudes of the new variables have been determined in about thirty plates by visual estimates with stars of Johnson and Schwarzschild (Ap.J. 113,630,1951). All of the variables belong to the RR Lyrae type; Nos.106 to 110 very likely are RR-c stars of small amplitude.

January 31, 1969

L.ROSINO

Asiago Astrophysical Observatory
of the University of Padua

COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 328

Konkoly Observatory
Budapest
1969 February 10

MINIMA OF ECLIPSING VARIABLES

During September 1968 - January 1969 the eclipsing variables were observed visually by the writer in Cracow's Observatory Station "Fort Skala" near Bielany: $\lambda = -1^h19^m18^s.58$, $\varphi = 50°03'15''.1$, mainly by Expedition Refractor (O = 203 mm, f = 227 cm). The heliocentric moments of minima and limits of errors were determined by tracing-papers method. (O-C)-s were computed with the elements given in "Rocznik Astronomiczny Observatorium Krakowskiego 1969".

Letter n after moments of minima denotes normal minima.

N denotes number of observations.

	JD ⊙		N	O - C
XZ And	2440188.510 n	±0ᵈ.005	13	0ᵈ.000
	203.436	0.004	18	-0.004
	207.506 n	0.005	13	-0.006
	233.299	0.004	17	-0.002
WZ And	202.373	0.007	16	+0.002
	206.543 n	0.004	18	-0.002
	232.293	0.005	15	+0.009
CX Aqr	204.239	0.003	20	+0.015
TV Cas	203.279	0.004	8	+0.006
AB Cas	151.574	0.003	13	+0.010
	188.478 n	0.003	33	+0.008
	203.518 n	0.005	31	+0.013
	232.220	0.003	10	+0.011
IS Cas	206.559 n	0.006	24	+0.000
	232.342	0.003	18	+0.002
IV Cas	206.554 n	0.005	28	+0.044
BR Cyg	160.252	0.004	15	0.000
	204.230	0.005	14	+0.003
V 456 Cyg	127.429 n	0.006	26	+0.005

	JD⊙			N	O - C
Z Dra	2440206.585		± 0.003	18	+0.004
	232.378		0.003	17	+0.006
TW Dra	229.172	n	0.006	20	0.000
AF Gem	230.276	n	0.004	12	0.000
VX Lac	151.401		0.004	19	-0.001
	207.275	n	0.005	18	-0.001
RS Lep	207.551	n	0.005	18	+0.012
UZ Lyr	204.319	n	0.008	23	+0.007
EW Lyr	160.356		0.002	23	+0.030
EQ Ori	207.439		0.004	20	-0.002
ET Ori	230.369		0.005	18	+0.008
	231.315		0.006	14	+0.003
	232.260		0.004	20	+0.002
U Peg	206.260	n	0.004	20	-0.009
DI Peg	128.360		0.004	12	+0.022
RV Per	229.339	n	0.005	12	+0.010
	233.288		0.004	15	+0.012
ST Per	233.159	n	0.004	20	+0.002
XZ Per	188.466	n	0.007	22	+0.023
	203.440		0.009	17	+0.027
	232.234	n	0.008	31	+0.029
RW Tau	207.444		0.005	22	+0.020
	232.368		0.004	23	+0.025
AC Tau	207.393		0.005	19	+0.046
X	160.376		0.004	17	-0.001
	188.549		0.004	15	-0.003
	230.319	n	0.006	29	-0.009
	233.234	n	0.002	25	-0.009
RW UMa	151.321		0.008	18	-0.032

Cracow Astronomical Observatory
Cracow, January 1969

PIOTR FLIN

COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 329

Konkoly Observatory
Budapest
1969 February 11

FLARE ACTIVITY OF DO CEPHEI

DO Cep (Krüger 60 B, BD +56°2783 B) was monitored photoelectrically in the ultraviolet for a total of 27.8 actual observing hours, as shown in Fig.1. Ten short-duration increases in brightness were recorded; however, this activity was not uniformly distributed since five of these brightenings occurred within a four-hour period on September 15,1968. Light curves of the ten events exhibited shapes characteristic of the photoelectrically observed variability of the better-studied UV Ceti-type stars.

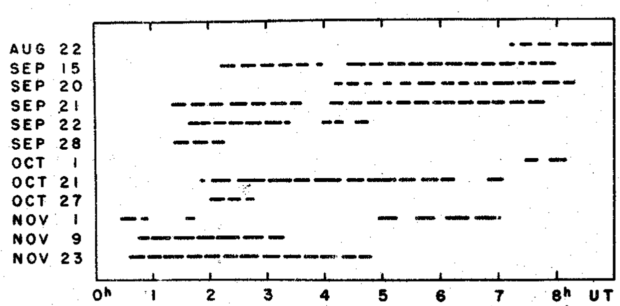


Fig.1. Photoelectric coverage of DO Cep during 1968.

The observations were made with the 24-inch Cassegrain at Mt. Cuba Observatory using an EMI 6256S photomultiplier,a Corning 7-54 (standard U) filter, and a quartz Fabry lens. In the photometer diaphragm it is impossible to separate DO Cep from the more luminous Krüger 60 A. Thus, the photoelectrically recorded flares represent increases over the combined brightness of both components of this binary system. Presumably,it is the fainter star exhibiting these latest flares since it was unambiguously the fainter star which brightened on the 1939 flare-discovery plate (1).

Table I summarizes the observed events. The change in the system's brightness from its quiescent level is expressed in magnitudes by

$$\Delta m_{systen} = 2.5 \log \frac{S}{Q},$$

where S = measured deflection on the chart record

Q = interpolated quiescent deflection.

If Kruger 60 A is 1.81 magnitudes brighter in U than DO Cep, then the magnitude change in DO Cep alone is

$$\Delta m_{DO\ Cep} = 2.5 \log \left(\frac{S}{Q} - 0.841\right) + 2.00.$$

Because of the background noise, an increase in the system's brightness averaging 0.10 magnitude over a 0.3-minute interval would not usually be tabulated as real. No.1 in Table 1 is such a borderline case. No.8 is so short as to raise the question of its being spurious, although this spike stood three times higher than the largest peaks considered to be noise. On the other hand, the elevated signal around Nos.2 and 5 seems real enough but changes to slowly to meet some definitions of a flare. Activity around No.5 may have a total duration of twice that tabulated and may include more than one event. Outside of the identified brightenings, slower variations having an amplitude less than 0.2 magnitude were observed with respect to the comparison star (BD +56°2777). However, neither Krüger 60 A nor the comparison star were established as nonvariable.

Statistics regarding flare frequency should take into consideration the fact that an event as short as No.8 would only have been detected within the actual monitoring time of 27.8 hours; whereas, the effective observing time during which a flare such as No.10 would have been detected is better estimated as 36 hours, because its duration was long compared with the interruptions to measure sky and the comparison star.

Table 1

No.	U.T. of Max. Date 1968	Time	Δm_{system} Ultra-Violet	Rise Time (min.)	Total duration (min.)
1	Sep 15	$2^h 17^m.8$	0.17:	0.21	0.7*
2	Sep 15	3 35.6:	0.13	1.2-2.4*	4.0-5.2
3	Sep 15	4 34.2	0.26	0.52	2.0
4	Sep 15	5 15.2	0.33	0.40	3.1
5	Sep 15	6 15.2	0.21	1.3*	3.5
6	Sep 20	5 25.7	0.20	0.3	0.6
7	Sep 20	5 26.1	0.73	0.22	3.5
8	Oct 21	2 31.5	0.45	0.05	0.16*
9	Oct 21	5 52.2	1.28	0.29	10-16
10	Oct 27	2 21.1	2.11	0.67	18 ?
	"	2 21.6	1.20		
	"	2 22.1	0.76		
	"	2 23.1	0.46	Decay curve of flare No.10.	
	"	2 24.1	0.37		
	"	2 25.1	0.28		
	"	2 26.1	0.22		
	"	2 27.1	0.21		

* Reality of flare less certain.

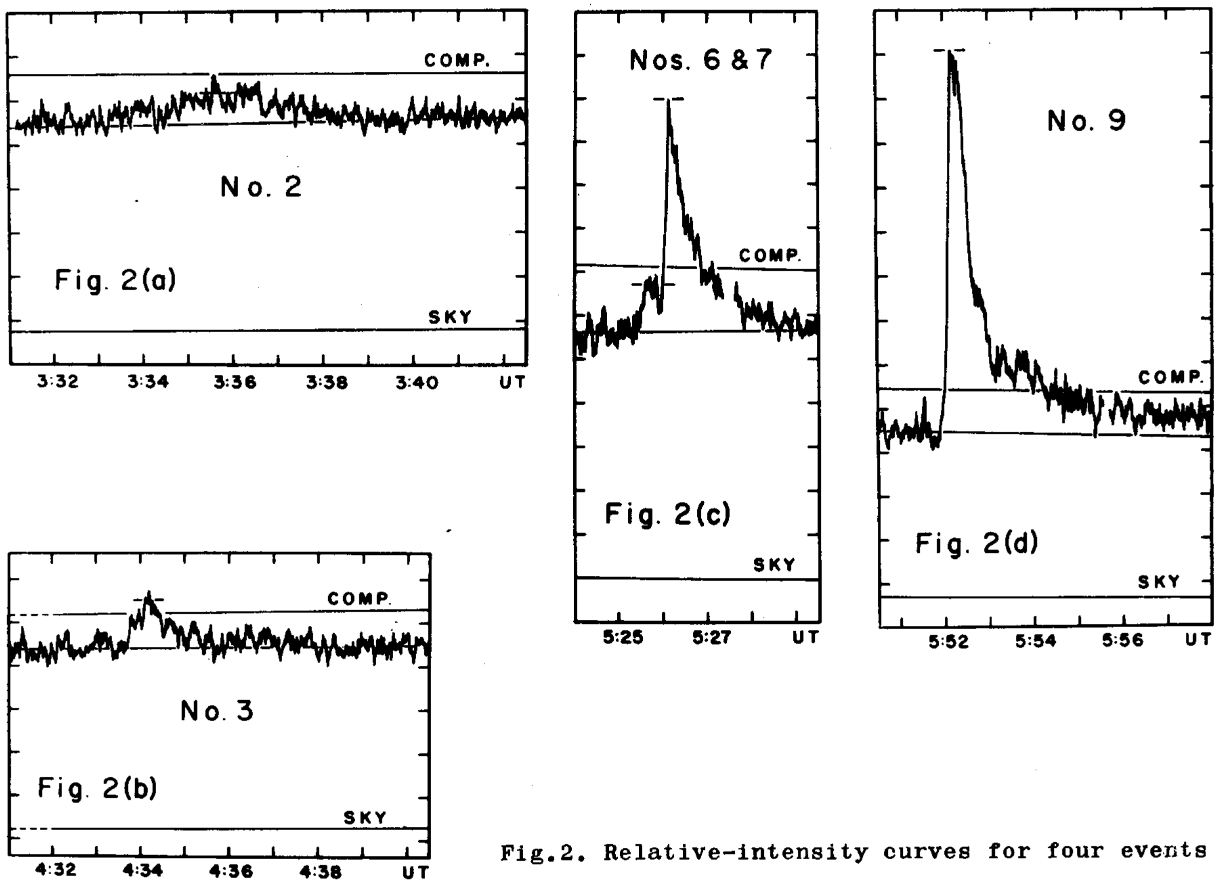


Fig.2. Relative-intensity curves for four events

Tracings from the chart recorder are reproduced in Fig.2 to illustrate in detail some of the light curves. Interpolation lines represent levels for Krüger 60 AB at quiescence, for the comparison star, and for the background sky. The minor flare in Fig.2(b) rises more rapidly than it falls but has no sharply peaked maximum. The more gradual and symmetric rise and fall in Fig.2(a) has even less suggestion of a fast flare component. Fig.2(d) shows a rapid rise and a return that bears some similarity to the stepwise decay of the December 13, 1958 flare of YZ CMi observed by Roques (2). A seeming drop of 0.11 magnitude at 6:08 UT from a final elevated plateau to the quiescence level would be convincing were it not for the definite interference of clouds 15 minutes later. In Fig.2(c) the peak is sharper and immediately followed by a more continuous decline. A notable brightening is seen just preceding this event and has been tabulated as a separate flare. The largest flare (No. 10) required amplifier gain changes and is not reproduced here. Values in Table 1 illustrate its sudden increase and relatively smooth decline. Clouds which appeared 11 minutes after the peak prevented following this flare back to quiescence.

Mt. Cuba Observatory
University of Delaware

RICHARD B. HERR
JOSEPH A.BRCICH

1) P.van de Kamp and S.L.Lippincott, P.A.S.P.Vol.63, p.141, 1951.

2) P.E.Roques, Ap.J. Vol.133, p.914, 1961.

COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 330

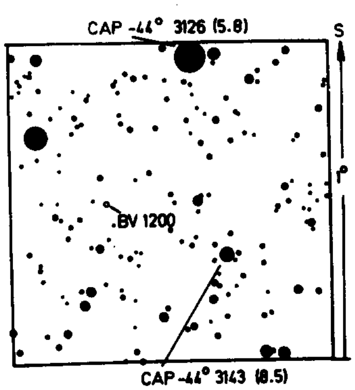
Konkoly Observatory
Budapest
1969 February 12

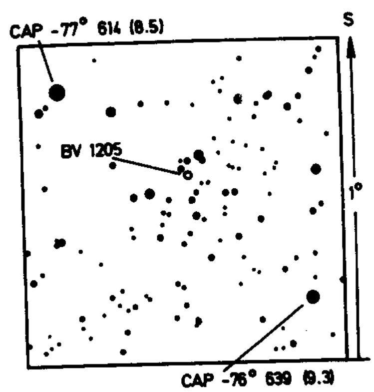
Veröffentlichungen der Remeis-Sternwarte Bamberg
Astronomisches Institut der Universität Erlangen-Nürnberg
Vol.VIII, Nr.82

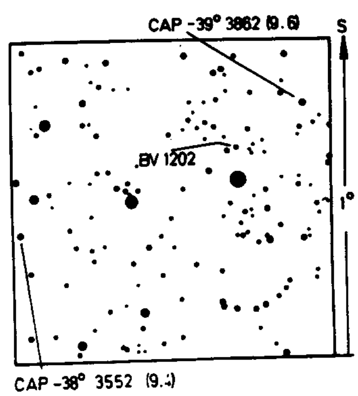
NEW BRIGHT SOUTHERN VARIABLE STARS

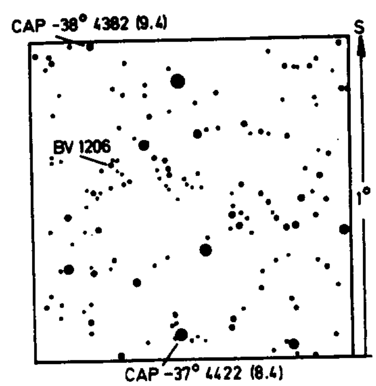
The plates, which have been taken in New Zealand at Mt.John Observatory University, were exposed with the same cameras, lenses and treatment as in South-Africa at the Boyden-Observatory. We have to thank for payment of the observer (Mr.PATTERSON) by the National Science Foundation (USA). This second shipment of plates (600) comprising the declination zones -77°, -64°, -51° and -38° for all RA led to the following discoveries:

										Apg
BV 1197	Men	=	CAP -79°	186	($8^m_,6$)	=	HD	38031	(F8)	$0^m_,25$
BV 1198	Pup	=	CAP -34°	1162	(8,2)	=	HD	54579	(Go)	0,25
BV 1199	Vol	=	CAP -65°	967	(9,3)					0,40
		=	CSV 1329 = S 4903							
BV 1200	Vel	=	CAP -44°	3096	(9,8)					0,30
BV 1201	Vel	=	CAP -42°	3467	(8,0)	=	HD	79459	(Ao)	0,35
BV 1202	Ant	=	CAP -39°	3853	(10,3)					0,20
BV 1203	Car	=	CAP -65°	1215	(8,6)	=	HD	87072	(Ko)	0,30
BV 1204	Car	=	CAP -66°	1291	(7,4)	=	HD	91272	(B5)	0,20
BV 1205	Chr	=	CAP -77°	630	(9,6)	=	HD	92785	(Mc)	0,45
BV 1206	Ant	=	CAP -37°	4409	(10,0)					0,50
BV 1207	Cen	=	CAP -50°	4110	(10,2)					1,40
BV 1208	Cen	=	CAP -49°	4382	(9,6)					0,30
BV 1209	Mus	=	CAP -69°	1617	(8,3)	=	HD	104191	(Ao)	0,60
BV 1210	Cru	=	CAP -58°	4289	(8,3)	=	HD	108396	(Mb)	0,25
BV 1211	Cen	=	CoD -40°	8057	(10)					0,25
BV 1212	Aps	=	CAP -79°	789	(8,9)	=	HD	130338	(G5)	0,40
BV 1213	Aps	=	CAP -72°	1802	(6,0)	=	HD	137387	(B5)	0,25
BV 1214	Nor	=	CAP -50°	8585	(9,4)					0,30
BV 1215	Ara	=	CAP -46°	8391	(8,2)	=	HD	154339	(B5)	0,40
BV 1216	Aps	=	CAP -81°	787	(9,2)	=	HD	156191	(Mb)	0,40
BV 1217	Ara	=	CAP -47°	8688	(10,0)					0,50
BV 1218	Tel	=	CAP -52°	11179	(8,9)	=	HD	171379	(F2)	0,20
BV 1219	Tel	=	CAP -47°	9166	(10,3)					0,90
		=	CSV 4508 = S 5060							
BV 1220	Pav	=	CAP -74°	1884	(9,2)	=	HD	190912	(Ko)	0,25


CAP -44° 3126 (5.8)
S
1°
BV 1200
CAP -44° 3143 (8.5)


CAP -77° 614 (8.5)
S
BV 1205
1°
CAP -76° 639 (9.3)


CAP -39° 3862 (9.6)
S
BV 1202
1°
CAP -38° 3552 (9.4)


CAP -38° 4382 (9.4)
S
BV 1206
1°
CAP -37° 4422 (8.4)

		A_{pg}
BV 1221 Mic	= CAP −40° 9420 (10^m,6)	1^m,50
BV 1222 Mic	= CoD −37°14310 (9,6) = CSV 5420 = S 5124	1,20
BV 1223 Gru	= CoD −38°15133 (9,9) = CSV 5575 = S 5145	0,60

Four of these stars are listed as Sonneberg variables but are not named. Variables given in the CSV - Catalogue, which are confirmed in Bamberg, generally get a BV number.

BV 1166 - 1196: vide Veroffentlichungen der Remeis-Sternwarte Bamberg, Vol. VII, Nr. 73 and Nr.76. (These stars are fainter, they are not in the standard catalogues).

Stars fainter than 9^m,5 are given with the surrounding star fields.

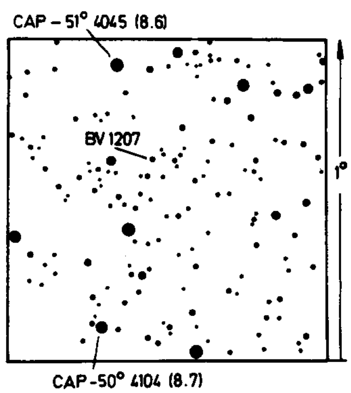
The elements for the following six eclipsing binaries have already been derived with the help of the Sonneberg sky patrol (Miss GESSNER). These are only preliminary periods.

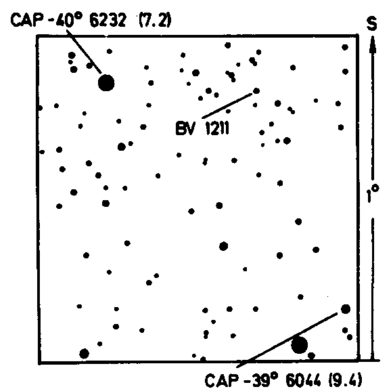
S = Sonneberg plates, NZ = New Zealand plates, and all other minima: South-Africa (Bamberg) plates.

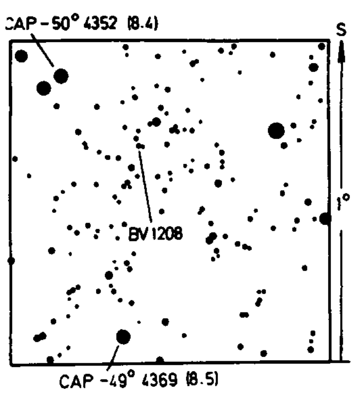
<u>S 4903</u> = CSV 1329 = CAP −65°967 (9^m,3) = <u>BV 1199</u>

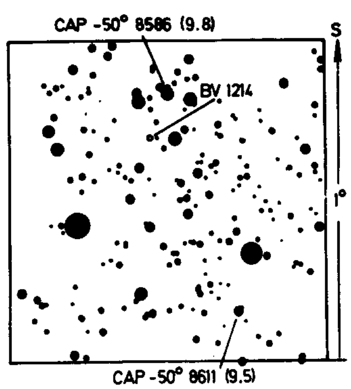
Min = JD 242 8485.575 + 2^d,694 185 . E

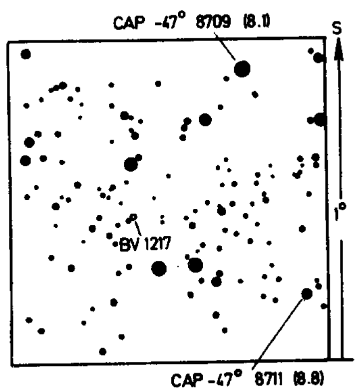
M i n i m a		E	O − C
242 8485,585	(S)	0	+0,010
8682,237	(S)	73	−0,013
8811,627	(S)	121	+0,056
8892,451	(S)	151	+0,054
243 4485,484	(S)	2227	−0,041
8381,494	(½)	3673	+0,178
8435,359	(½)	3693	+0,159
8443,354		3696	+0,071
,399	(½)	3696	+0,116
8505,217		3719	−0,032
8739,551	(¾)	3806	−0,092
8785,428	+	3823	−0,016
8812,315		3833	−0,071
9173,333		3967	−0,074
,372	+	3967	−0,035
9181,330	(½)	3970	−0,159
,375	(½)	3970	−0,114

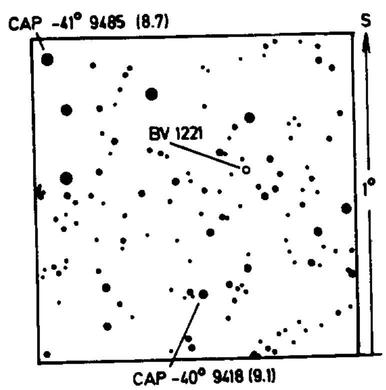

CAP – 51° 4045 (8.6)
BV 1207
1°
CAP -50° 4104 (8.7)

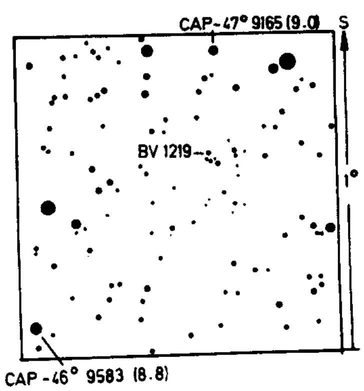

CAP -40° 6232 (7.2)
S
BV 1211
1°
CAP -39° 6044 (9.4)

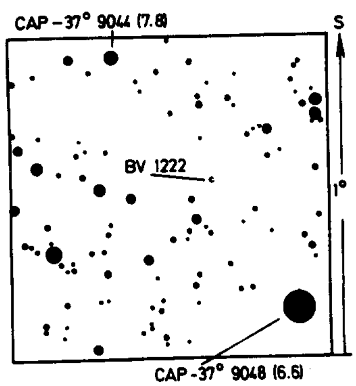

CAP -50° 4352 (8.4)
S
BV 1208
1°
CAP -49° 4369 (8.5)

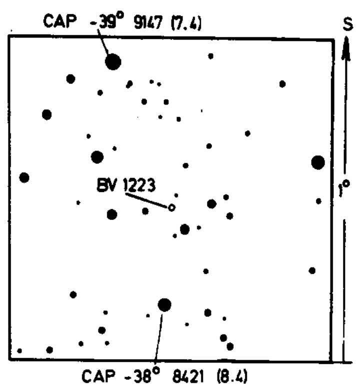

CAP -50° 8586 (9.8)
S
BV 1214
1°
CAP -50° 8611 (9.5)


CAP -47° 8709 (8.1)
S
1°
BV 1217
CAP -47° 8711 (8.8)


CAP -41° 9485 (8.7)
S
BV 1221
1°
CAP -40° 9418 (9.1)


CAP-47° 9165 (9.0)
S
BV 1219
1°
CAP -46° 9583 (8.8)


CAP -37° 9044 (7.8)
S
BV 1222
1°
CAP -37° 9048 (6.6)


CAP -39° 9147 (7.4)
S
BV 1223
1°
CAP -38° 8421 (8.4)

M i n i m a	E	O - C
243 9200,262 (¾)	3977	-0,087
,309 +	3977	-0,040
9235,230 (½)	3990	-0,143
9526,364 +	4098	+0,019
,410 (¾)	4098	+0,065
9553,321	4108	+0,034
9935,885 (NZ)+	4250	+0,024

Ampl. $0^{m}{,}50$, without secondary minimum, EA

C.HOFFMEISTER, Erg AN 12, Nr.1 (1949): EA

BV 1201 = CAP -42°3467 ($8^{m}{,}0$) = HD 79 459 (Ao)

Min = JD 243 8379,575 + $1^{d}{,}475$ 205 . E

M i n i m a	E	O - C
243 8379,542	0	-0,033
8382,545	2	+0,020
8385,543 (¾)	4	+0,067
8441,399 (¾)	42	-0,135
8490,272	75	+0,057
8841,292	313	-0,022
8844,293	315	+0,029
8869,233	332	-0,110
8872,227	334	-0,066
9118,543	501	-0,110
9198,313	555	-0,001
9201,311	557	+0,047
9232,237	578	-0,006
9235,230	580	+0,036
9862,101 (NZ)	1005	-0,055
9907,964 (NZ)	1036	+0,077
9915,976 (NZ)	1041,5	-0,025

Ampl. $0^{m}{,}45$, with a weak secondary minimum, EA

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

Min = JD 243 4315,550 + $3^d,247$ 625 . E

M i n i m a	E	O - C
243 4315,597 (S)	0	+0,047
4419,434 (S)	32	-0,040
8206,220 ++	1198	+0,015
8521,251 +	1295	+0,027
,296	1295	+0,072
8547,198 ++	1303	-0,007
,242 +	1303	+0,037
8560,198 +	1307	+0,002
,242 +	1307	+0,046
8901,213 +	1412	+0,017
,258	1412	+0,062
8904,287 (½)	1413	-0,157
8914,208 +	1416	+0,021
,254 +	1416	+0,067
9268,214 +	1525	+0,036
,259 (¾)	1525	+0,081
9294,208 +	1533	+0,049
9972,889 (NZ)	1742	-0,024
,934 (NZ)	1742	+0,021
9998,872 (NZ)++	1750	-0,022
,917 (NZ)++	1750	+0,023

Ampl. $0^m,60$, without remarkable secondary minimum, EA

BV 1214 = CoD -59°9829 ($9^m,9$) = CAP -50°8585 ($9^m,4$)

Min = JD 242 8004.250 + $15^d,758$. E

M i n i m a	E	O - C
242 8004,310 (S)	0	+0,060
8334,419 (S)	21	-0,749
8366,320 (S)	23	-0,364
8666,334 (S)	42	+0,248
,366 (S)	42	+0,280
8902,610 (S)	57	+0,154
243 8498,433	666	-0,645
,456	666	-0,622
8530,424 +	668	-0,170
8577,290	671	-0,578
8877,491 +	690	+0,221
8940,312	694	+0,010

Minima	E	O - C
243 9318,226	718	-0,268
,271+	718	-0,223
9319,264	718	+0,770
9342,219+	719,5	+0,088
43,219	719,5	+1,088
9618,451+	737	+0,555
9680,878 (NZ)	741	-0,050
244 0026,892 (NZ)	763	-0,712
,938 (NZ)	763	-0,666
27,911 (NZ)+	763	+0,307
,954 (NZ)	763	+0,350

Ampl.0^m,30, with very deep secondary minimum, EB or EA

BV 1215 = CoD -46°11218 (9^m,0) = HD 154 339 (B5)
Min = JD 242 8716.400 + 4^d,995 25 . E

Minima	E	O - C
242 8716.244(S)	0	-0,156
8726.590(S)	2	+0,200
8781,265(S)	13	-0,073
243 8202,405+	1899	+0,025
8222,383++	1903	+0,022
8227,303++	1904	-0,053
8252,223+	1909	-0,109
8257,221	1910	-0,107
8262,223	1911	-0,100
8499,579	1958,5	-0,018
8524,477	1963,5	-0,096
8529,469+	1964,5	-0,100
8549,419	1968,5	-0,131
8584,336	1975,5	-0,180
8619,257	1982,5	-0,226
8634,218	1985,5	-0,251
8916,438(¾)	2042	-0,268
9291,389+	2117	+0,045
9301,375+	2119	+0,040
9346,222+	2128	-0,072
9356,233	2130	-0,050
9680,927(NZ)	2195	-0,047
9973,122(NZ)	2253,5	-0,074
244 0003,062(NZ)	2259,5	-0,105

Ampl.0^m,40, with a deep secondary minimum, EB

S 5145 = CoD -38°15133(0^m,9) = BV 1223 (CSV 5575)

Min = JD 242 7994.600 + 2^d,296 720 . E

Minima	E	O - C
242 7994,590(S)	0	-0,010
8047,579(S)	23	+0,155
8364,562(S)	161	+0,190
8667,614(S)	293	+0,071
8699,525(S)	307	-0,168
8720,535(S)	316	+0,171
8774,410(S)	339,5	+0,074
8784,434(S)	344	-0,238
8806,305(S)	353,5	-0,185
8813,316(S)	356,5	-0,065
8891,300(S)	390,5	-0,169
243 4541,552(S)	2850,5	+0,152
4573,478(S)	2864,5	-0,076
8318,280	4495	-0,076
8643,401	4636,5	+0,059
8697,251+	4660	-0,064
,295+	4660	-0,020
9380,419	4957,5	-0,170
9680,167(NZ)	5088	-0,144
244 0043,167(NZ)	5246	-0,026

Ampl.0^m,60, with similar deep secondary minimum as the primary minimum, EB

C.HOFFMEISTER, Erg AN 12, Nr,1 (1949) : EA

Remeis-Observatory Bamberg
Mt.John-Observatory New Zealand
1969 February 10

W.STROHMEIER and I.PATTERSON

COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 331

Konkoly Observatory
Budapest
1969 February 12

FLARES OF YZ CMi OBSERVED AT OKAYAMA 14 TO 16 DECEMBER, 1968 AND 14 TO 25 JANUARY, 1969

A continual photoelectric monitoring of the flare star YZ CMi was done with the 91-cm reflector of the Okayama Station from 14 to 16 December, 1968, and from 14 to 25 January, 1969. The large flare on 14 January 1968, of which the maximum ΔB was more than 1.8 magnitudes may be the largest one ever observed for YZ CMi. The following Table shows the time of monitoring and the time of flares. Some more details will be oublished in the Tokyo Astronomical Bulletin.

Date	Time of Monitoring	Time of max.	max. ΔB	Duration	Integr. intensity
1968 Dec. 14^d	$15^h42^m - 18^h15^m$	$17^h21^m.3$	$>1.81^{mag}$	12^{min}	6^{min}
15	14 49 -19 30	15 25.5	0.17	0.7	0.1
		17 33.5	0.52	6	2
		19 12.3	0.24	3.2	0.2
16	13 10 -13 53	13 46.3	0.41	1.5	0.15
	14 04 -15 09				
	15 20 -15 50				
1969 Jan.14	14 26 -15 03				
	17 47 -18 16				
15	10 20 -13 04				
	13 09 -13 21				
	16 10 -16 18				
	16 26 -17 50				
	18 36 -19 03	18 47.2	0.37	0.3	0.06
17	11 05 -13 36				
	16 16 -18 44	17 31.4	0.92	4	0.7
	18 50 -19 31				
19	12 50 -13 12				
	16 47 -16 58				
	17 13 -17 19				
21	11 09 -15 09				
22	13 30 -19 00				
23	10 00 -11 56				
	13 00 -17 22	16 19.0	0.45	2.4	0.2

$$\text{Integrated intensity} = \int \frac{I_{flare} - I_{normal}}{I_{normal}} dt.$$

Tokyo Astronomical Observatory
February 7, 1969.

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

COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 332

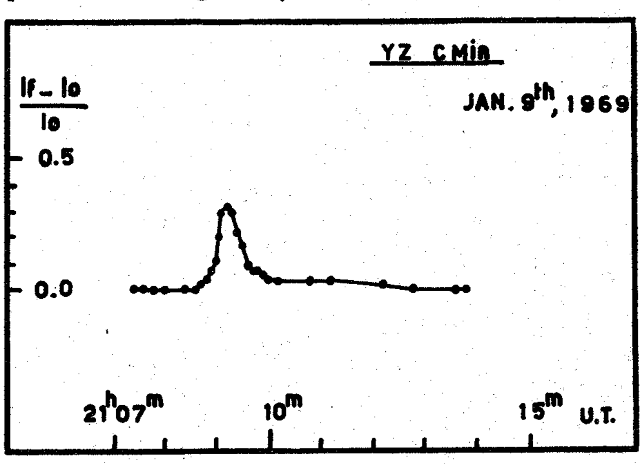
Konkoly Observatory
Budapest
1969 February 19

PHOTOELECTRIC OBSERVATIONS OF YZ CMi

The data obtained at Catania Observatory during the January, 1969 international patrol of the flare star YZ CMi are reported.

Our photoelectric observations were carried out with a 91 cm cassegrain and a 61 cm quasi-cassegrain telescopes both equipped with EMI 6256 S photomultiplier-tubes. These devices were working in B (λ_{eq} = 4300 Å) and V (λ_{eq} = 5150) lights respectively.

The data given in the Tables I and II agree with those preliminarily suggested by the "Working group on UV Cet-type stars" (Chugainov, 1968).



During the observing period January 11-25, we were able to observe for 19,55 hours and we did not observe any flare. The flare,the characteristics of which are reported in Table II was observed two nights before the beginning of the planned international patrol. The light curve of the flare is drawn in Fig.1.

Catania Astrophysical Observatory
February 10, 1969

S.CRISTALDI
M.NARBONE
M.RODONO

Reference

Chugainov P.F. 1968 Private communication.

Table I

M, N Jan.	Tl	L	Detailed Coverage	TC	Δm_{lim}	CTC
09–10	91	B	20^h48^m–20^h52^m, 2056–0212, 0214–0323, 0325–0339.	$6^h.72$	$-0^m.04$	$6^h.72$
13–14	91	B	1918–1920,1922–1946,2033–2056,2058–2205, 2207–2212,0133–0147.	2.25	.05	
	61	V	2100–2118,2120–2150,2153–2158,2200–2207, 0200–0203,0205–0224.	1.37	.06	2.65
18–19	91	B	2311–2314,2316–2320.	0.12	.04	
	61	V	2224–2230,2234–2319.	0.85	.06	0.87
20–21	91	B	1932–2002,2004–2006,2008–2140,2338–0012, 0016–0121,0123–0134.	3.90	.06	
	61	V	1946–1958,2000–2026,2028–2050,2053–2112, 2115–2127,2130–2136,2341–0010,0022–0051, 0053–0105,0107–0125,0127–0128.	3.10	.05	4.00
21–22	91	B	1834–1838,1920–1946,1949–1955,1957–2013, 2015–2019,2022–2049,2118–2130,2150–2223, 2237–2303,2305–2307,2309–0000,0003–0010, 0035–0045.	3.73	.06	
	61	V	2034–2100,2102–2142,2145–2211,2217–2256, 2258–2312,2314–0022,0024–0042.	3.85	.04	5.20
22–23	91	B	1858–1925,1936–2033,2036–2213,2215–2221, 2223–2227,2230–2256,2258–2319,2323–0054, 0056–0149,0152–0219,0221–0228,0230–0253, 0255–0304.	6.47	.05	
	61	V	1920–1927,1930–2016,2021–2034,2037–2056, 2139–2202,2223–2246,2303–2306,2341–0041, 0106–0115,0118–0128,0130–0157,0159–0202, 0205–0225,0228–0252,0257–0308.	4.97	.03	6.85

Table II Observed Flare

Jan 9/10 CTC $6^h.72$, L:B, beginning $21^h06^m.6$ U.T., t_{max} $21^h07^m.2$, end $21^h10^m.8$,

Δm_{lim}: $-0^m.04$ $\left[(I_{o+F}-I_o)/I_o\right]_{max}$: 0.33, Integrated intensity 0.22 min.

COMMISSION 27 OF THE I. A. U.
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NUMBER 333

Konkoly Observatory
Budapest
1969 March 5

PHOTOELECTRIC OBSERVATIONS OF AD LEO, DURING THE 1969, 10-24 FEBRUARY INTERNATIONAL PATROL

The photoelectric observations of the flare star AD Leo (BD +20°2465, m_V=9.4, m_B=10.9) carried out at Catania Observatory during the planned period are reported.

Two cassegrain reflectors of 91 cm and 30 cm apertures, the former working at λ_{eq}=4300 Å and the latter at λ_{eq}=5150 Å, were employed.

The characteristics of our observations and the obtained data are given in Tables I and II.

Few measurements of the comparison star BD +20°2475 (m_V=8.91, m_B=9.16), which was occasionally checked with BD +21°2193 (m_V=7.73, m_B=9.07), were performed.

Taking into account the overlapping coverages of the two telescopes, we obtained a combined total coverage (CTC) of 25.47 hours. The four flares observed during the latter period are drawn in Fig.1.

Catania Astrophysical Observatory
February 26, 1969

S.CRISTALDI
M.NARBONE
M.RODONO

Tab.I

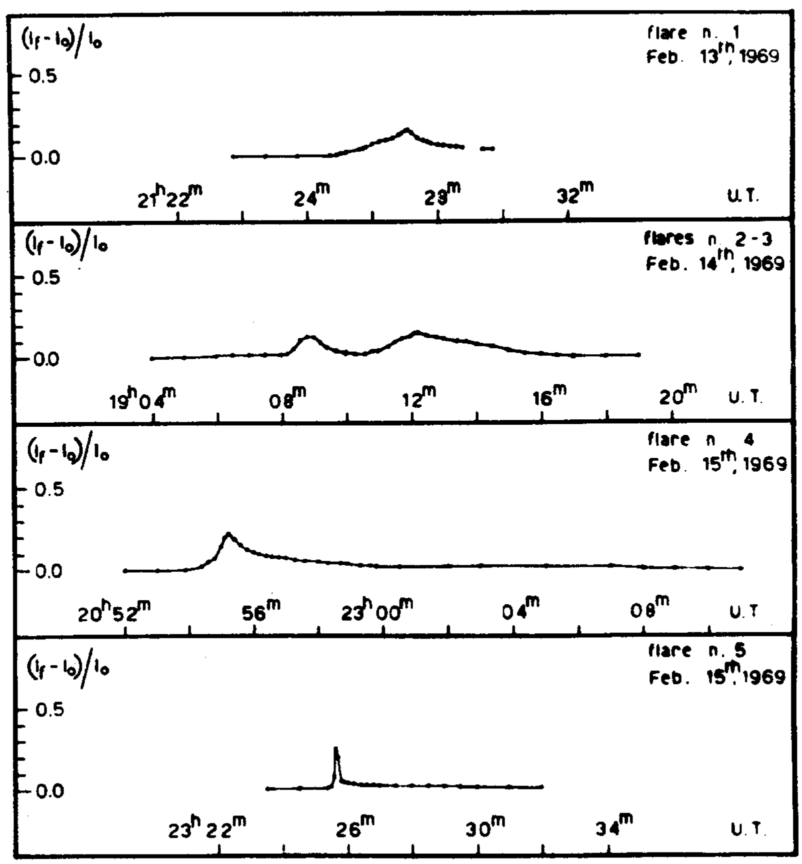
N Feb.	Tl	L	Detailed Coverage (UT)	TC	Δm_{lim}	CTC
08-09	91	B	01^h31^m-0255; 0258-0327; 0331-0452.	194^m	-0.015	194^m
13-14	91	B	2008-2142; 2147-2225.	132	-0.035	132
14-15	91	B	1902-1948.	46	-0.034	
	30	V	1916-1927; 1932-1948.	27	-0.025	46
15-16	91	B	2025-2035; 2037-2205; 2212-2307; 2313-008; 0013-0044.	239	-0.020	
	30	V	1945-2032; 2053-2231; 2238-2330; 2339-2349.	177	-0.025	272
17-18	91	B	1938-1957; 1959-2035; 2041-2056; 2104-2134; 2136-2147; 2153-2210; 2213-0040; 0045-0139; 0142-0151; 0201-0220; 0224-0349.	442	-0.030	442
21-22	91	B	1911-2036; 2038-2134; 2141-0124; 0128-0300.	442	-0.018	442

Tab.II

Tab.II

Observed Flares

N Feb.	CTC	Nr	Tl	L	t_b	t_{max}	t_e	Δm_{lim}	$\left(\frac{I_{o+F}-I_o}{I_o}\right)_{max}$	P
13-14	132^m	1	91	B	$21^h26^m.9$	$21^h29^m.1$	?	-0.035	0.147	?
14-15	46	2	91	B	19 08.0	19 08.8	$19^h10^m.6$	-0.034	0.126	$0^m.188$
		3	91	B	19 10.6	19 12.2	19 17.0	-0.034	0.149	0.502
15-16	272	4	91	B	20 54.4	20 55.2	21 10;0	-0.020	0.222	0.574
		5	91	B	23 25.4	23 25.65	23 31.0	-0.020	0.142	0.092



$(I_f - I_o)/I_o$
flare n. 1
Feb. 13th, 1969
0.5
0.0
21h22m
24m
28m
32m
U.T.
$(I_f - I_o)/I_o$
flares n. 2-3
Feb. 14th, 1969
0.5
0.0
19h04m
08m
12m
16m
20m
U.T.
$(I_f - I_o)/I_o$
flare n. 4
Feb. 15th, 1969
0.5
0.0
20h52m
56m
23h00m
04m
08m
U.T
$(I_f - I_o)/I_o$
flare n. 5
Feb. 15th, 1969
0.5
0.0
23h22m
26m
30m
34m
U.T.

COMMISSION 27 OF THE I. A. U.
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NUMBER 334

Konkoly Observatory
Budapest
1969 March 6

AD LEO

A continual photoelectric monitoring of the flare star AD Leo was done with the 30-cm reflector of the Okayama Station from 10 to 24 February 1969. During 19 hours of monitoring in total, only one flare-like activity was observed as shown in the following table.

Table 1.
Flares of AD Leo observed at Okayama,
10 to 24 February, 1969

Date 1969 Feb.	Time of Monitoring	Flares: Time of max.	max. m(B)	Duration	Integrated intensity
10^d	$12^h14^m-13^h18^m$				
	13 50 -16 01				
	16 23 -17 49	$16^h36^m.2$	$0,13^{mag}$	4^{min}	0.2^{min}
11	16 41 -20 26				
12	12 31 -14 00				
	14 18 -15 03				
	15 47 -17 35				
	17 56 -18 40				
14	13 25 -14 00				
	16 26 -16 45				
16	16 29 -17 02				
24	12 45 -13 32				
	13 50 -14 29				
	16 10 -18 57				

Tokyo Astronomical Observatory
February 25, 1969

K.ICHIMURA
T.NOGUCHI
E.WATANABE

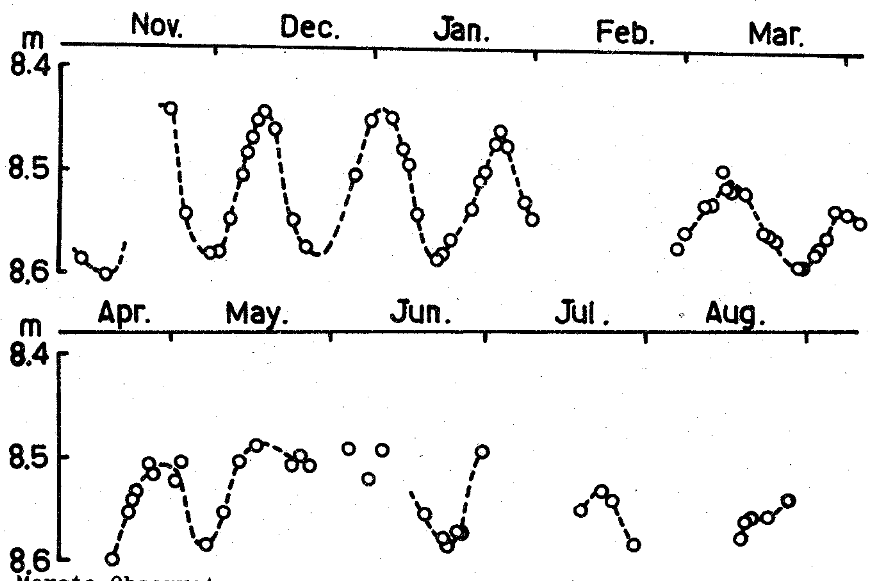
COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS

NUMBER 335

Konkoly Observatory
Budapest
1969 March 6

A NEW DECREASE IN THE LIGHT VARIATION AMPLITUDE OF RU CAMELOPARDALIS

Contrarily to the expectations that RU Cam should have recovered the old light amplitude during 1968, the light curve we give shows a decreasing. From these photoelectric V observations obtained from November 1967 until August 1968 at the Merate Observatory we see that after a quite regular decreasing as far as March, during the following months some peculiarities in the light variations occured.



Merate Observatory
February 27, 1969

P.BROGLIA G.GUFRRERO

Editor's note: According to Dr.Szeidl's observations at the Konkoly Observatory the star's regular variation is now recovering after an irregular phase of several months (s. also the Proceedings of the IAU Colloquium on "Non-Periodic Phenomena in Variable Stars" held in Budapest, 1968. Sept.5-9).

L. DETRE

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

NUMBER 336

Konkoly Observatory
Budapest
1969 March 14

THE FLARE STAR AD LEO

During the February 1969 international observing session on AD Leo, the star was patrolled for 28 hours by a team of observers in the United Kingdom. All observations were visual. A summary of the hours of coverage and the times of two suspected flares of small amplitude is given below.

1969	U.T.	Observers
Feb.8	2115-2233	L
11	1851-1908, 1933-2050	L
12	2037-58, 2108-2214, 2255-2319	A, H, J, P
14	2000-2400	A, G, H, P, Pi
15	0000-53, 1846-2400	A, G, H, L, P, Pi
16	0000-35, 1940-2400	A, G, H, L, P
17	0000-35, 2125-2400	A, G, H, L, P
18	0000-50	G
20	2130-50, 2305-2400	G
21	0000-0105	G
22	2045-2300	M

Total Coverage 28^h20^m (Observers: A.D.Andrews, J.S.Glasby, B.Hardy, W.Johnston, R.J. Livesey, P. Moore, J. Perrott, H.S.Piper)

Suspected Flares

1969	U.T.	Δm_{vis}	Duration (mins)	Observer	Remarks
Feb.14	2000	~0.5	~8	G	Flare in decline at start of observations.
16	2016	0.5	8	A,P	

A comparison photoelectric magnitude sequence was kindly supplied by L.H.Solomon prior to publication. We gratefully acknowledge the cooperation of members of the British Astronomical Association, in particular, Mr. J.S. Glasby, Director of the Variable Star Section.

Armagh Observatory
March 6, 1969

A.D.ANDREWS
J.PERROTT

COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 337

Konkoly Observatory
Budapest
1969 March 18

Z CHAMAELEONTIS

Photoelectric observations of this U Geminorum variable made with the 91-centimeter Cassegrain reflector at Cerro Tololo Inter-American Observatory show it to be an eclipsing binary.

Details concerning the 8 observed minima are presented below. Times of minima are best satisfied by the light elements

$$\text{Min} = \text{JD } 244\ 0264.6826 + 0^{d}.074502\ E.$$

Observations of Z Chamaeleontis

Minima	E	O - C	Depth (1)	Depth (2)
244 0264.6826	0	0.0000	1.86	1.57
0265.7259	14	+0.0003	2.11	1.97
0265.8002	15	+0.0001	1.70	1.50
0267.5880	39	-0.0002	1.93	1.47
0269.6741	67	-0.0001	2.06	1.81
0269.7488	68	+0.0001	--	--
0272.5798	106	0.0000	1.74	1.32
0274.7404	135	0.0000	1.73	1.36

Light curves indicate that the entire eclipse lasts some 7 minutes, with minimum being 2.5 to 3 minutes long. In all cases, the descending branch of the light curves is not as steep as the ascending one.

The last two columns of the table give the mean depth of minimum relative to the average brightness of the system before and after eclipse, respectively, in blue light. No value is given for eclipse 68 as the sky became overcast shortly after this minimum had taken place.

Further details on this interesting object will be published elsewhere.

Medford, Massachusetts
March 10, 1969

G.S.MUMFORD
Tufts University

COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 338

Konkoly Observatory
Budapest
1969 March 29

PHOTOELECTRIC OBSERVATIONS OF UV Cet AND YZ CMi

This is a report on photoelectric observations of the flare stars UV Cet and YZ CMi made as a part of co-operative programmes in the periods of 14-28 October 1968 and 11-25 January 1969.

Simultaneous registrations in the wave-length intervals 3300-3640, 4140-4290 and 5100-5300 A were obtained with a three-channel photometer at the 70-cm reflector. The data given below refer only to the interval 4140-4290 A.

The time intervals covered by observations are included in Table I. Brackets denote uncertain observations. The total coverage for UV Cet is equal to 24.2 hours and for YZ CMi to 34.0 hours. Table II contains the flare characteristics according to the proposals given earlier (1). The quantity Δm_{lim} is found by the formula

$$\Delta m_{lim} = -2.5 \log 3 \sigma / I_o$$

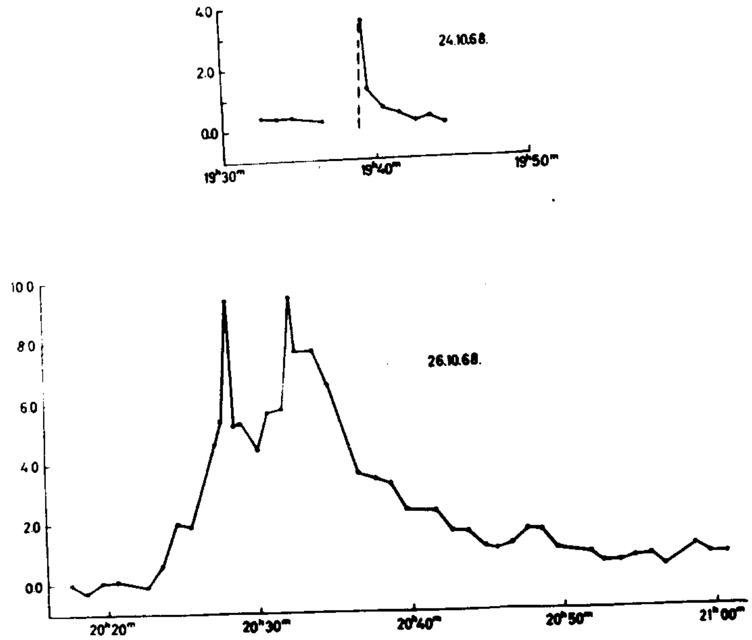
and the integrated intensity P by the formula

$$P = \int \frac{I_{o+f} - I_o}{I_o} \cdot dt \quad .$$

The light curves of flares (Figs.1,2) have the relative intensities $(I_{o+f} - I_o)/I_o$ as ordinates and Universal Times as abscissae.

P.F. CHUGAINOV
Crimean Astrophysical Observatory

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



4.0
2.0
0.0
19h30m
19h40m
19h50m
24.10.68.
10.0
8.0
6.0
4.0
2.0
0.0
20h20m
20h30m
20h40m
20h50m
21h00m
26.10.68.

Fig. 1

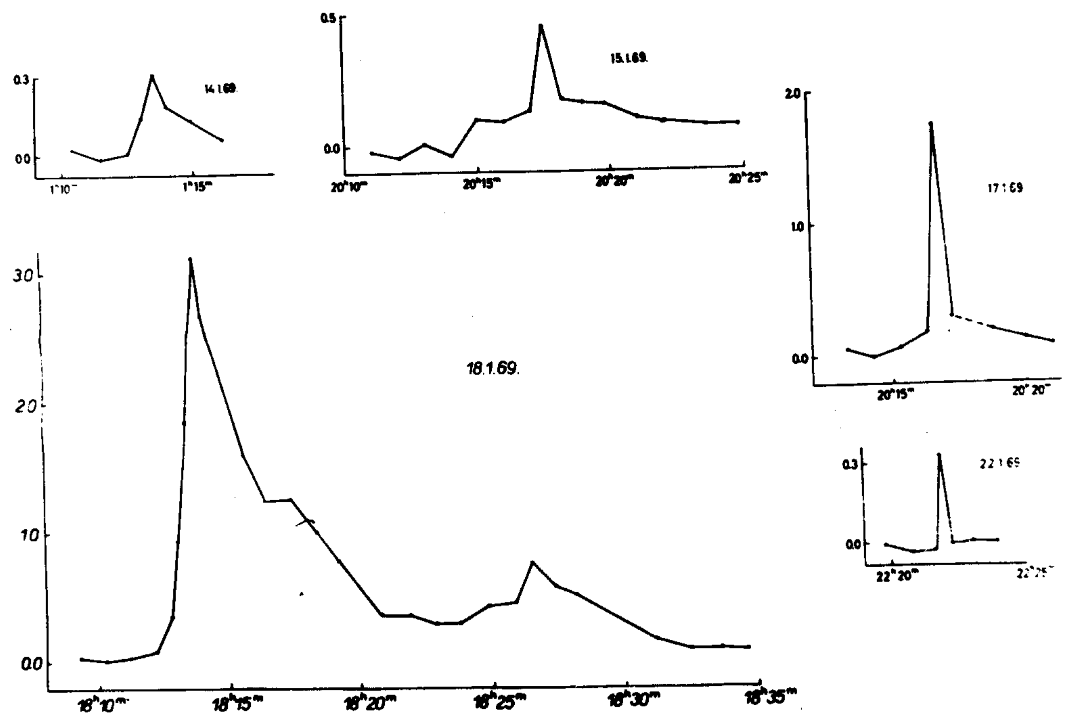

14.1.69.
15.1.69.
17.1.69
18.1.69.
22.1.69
0.3
0.0
0.5
2.0
1.0
30
20
10
0.0
20h15m
20h20m
20h25m
20h10m
18h10m
18h15m
18h20m
18h25m
18h30m
18h35m
22h20m

Fig. 2

Table I.

Star	Date		Coverage (UT)
UV Cet	October 22	1968	$18^h40^m-24^h00^m$
	23		$00^h00^m-01^h00^m, 18^h40^m-24^h00^m$
	24		$00^h00^m-00^h29^m, 18^h48^m-19^h37^m,$ $19^h39^m-22^h59^m$
	25		$18^h56^m-20^h31^m$
	26		$18^h22^m-21^h01^m, 21^h23^m-22^h14^m,$ $22^h29^m-23^h00^m$
	27		$17^h45^m-20^h02^m$
YZ CMi	January 13	1969	$22^h20^m-23^h45^m, 23^h54^m-24^h00^m$
	14		$00^h00^m-02^h20^m$
	15		$(17^h37^m-18^h17^m), 18^h17^m-19^h39^m,$ $19^h43^m-19^h49^m, 20^h08^m-20^h26^m,$ $(20^h26^m-21^h13^m), 21^h22^m-22^h40^m,$ $(22^h40^m-23^h42^m)$
	17		$19^h29^m-20^h19^m, 20^h28^m-24^h00^m$
	18		$00^h00^m-02^h00^m, (17^h33^m-18^h00^m),$ $18^h00^m-18^h43^m, 18^h52^m-19^h15^m,$ $19^h25^m-20^h49^m, 20^h53^m-22^h05^m,$ $(22^h05^m-22^h55^m), 22^h55^m-24^h00^m$
	19		$00^h03^m-00^h09^m, 21^h28^m-22^h26^m$
	22		$17^h10^m-23^h07^m, (23^h07^m-23^h24^m),$ $23^h24^m-24^h00^m$
	23		$00^h00^m-01^h15^m$

Table II.

Star	Date and UT of flare maximum		Durations before and after maximum, minutes t_b	t_a	Δm	Δm_{lim}	Integrated intensity minutes	Air mass
UV Cet	Oct.24	$19^h39^m.2$	?	5	1.63	0.68	3.6	2.43
	Oct.26	$20^h28^m.0$	5.4	33	2.54	0.52	90.2	2.20
YZ CMi	Jan.14	$01^h13^m.5$	1.0	2	0.28	0.15	0.40	1.98
	Jan.15	$20^h17^m.5$	(3.5)	7	0.40	0.20	1.20	1.42
	Jan.17	$20^h16^m.6$	0.4	4	1.07	0.17	1.44	1.40
	Jan.18	$18^h13^m.8$	1.6	21	1.53	0.26	15.2	1.99
	Jan.22	$22^h21^m.9$	0.3	0.4	0.31	0.16	0.10	1.37

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Budapest
1969 March 29

PHOTOELECTRIC OBSERVATIONS OF YZ CMi

The results of photoelectric observations of the flare star YZ CMi made as a part of cooperative programme in the period of 11-25 January 1969 are given here.

The observations were obtained in the B-band with the 64-cm meniscus telescope. The total coverage is equal to 33.7 hours. The content of Tables I,II is identical with those of paper (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.

N.I.SHAKHOVSKAYA

Crimean Astrophysical Observatory

(1) P.F.Chugainov, (Photoelectric observations of UV Cet and YZ CMi), I.B.V.S. No 338, 1969

Table I

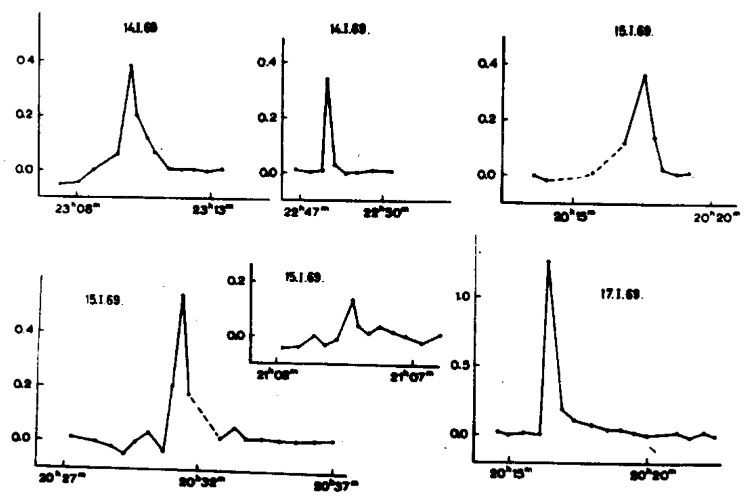
Date 1969	Coverage (U.T.)
January 14,	$18^h12^m-18^h30^m$, $19^h00^m-19^h35^m$, $19^h56^m-20^h40^m$, $20^h59^m-21^h42^m$, $21^h45^m-22^h02^m$, $22^h04^m-23^h04^m$, $23^h08^m-23^h37^m$, $23^h41^m-23^h55^m$
January 15	$01^h33^m-01^h39^m$, $01^h42^m-01^h55^m$, $01^h56^m-02^h00^m$, ($18^h20^m-18^h27^m$, $18^h28^m-18^h32^m$, $18^h35^m-18^h38^m$, $18^h45^m-19^h01^m$, $19^h09^m-19^h43^m$, $19^h50^m-19^h54^m$, $20^h11^m-20^m46^m$, $20^h48^m-21^h14^m$), $21^h18^m-21^h59^m$, $22^h00^m-22^h39^m$, $22^h40^m-23^h12^m$, $23^h14^m-23^h34^m$, $23^h37^m-23^h55^m$
January 16	($00^h00^m-00^h11^m$, $00^h12^m-00^h22^m$, $00^h23^m-00^h29^m$, $00^h30^m-00^h49^m$, $00^h50^m-00^h57^m$)
January 17	$19^h41^m-20^h01^m$, $20^h03^m-21^h09^m$, $21^h14^m-21^h32^m$, $21^h33^m-22^h42^m$, $22^h47^m-23^h41^m$, $23^h41^m-23^h54^m$
January 18	$18^h00^m-18^h14^m$, $18^h15^m-18^h20^m$, $18^h22^m-18^h24^m$, $18^h27^m-18^h34^m$, $18^h37^m-18^h43^m$, $18^h44^m-19^h50^m$, $19^h51^m-20^h46^m$, $21^h09^m-22^h10^m$, $22^h11^m-22^h29^m$, $22^h30^m-23^h10^m$, $23^h14^m-23^h33^m$

Table I (cont.)

Date 1969	Coverage (U.T.)
January 19	$17^h53^m-18^h02^m$, $18^h04^m-18^h13^m$, $18^h14^m-18^h18^m$, $18^h28^m-18^h32^m$, $18^h36^m-19^h02^m$, $19^h08^m-19^h25^m$, $19^h27^m-21^h00^m$, $21^h02^m-22^h28^m$, $22^h29^m-23^h00^m$, $23^h03^m-23^h44^m$, $23^h46^m-24^h00^m$
January 20	$00^h00^m-00^h30^m$
January 23	$16^h58^m-21^h40^m$, $21^h49^m-22^h25^m$, $22^h29^m-24^h00^m$
January 24	$00^h00^m-00^h47^m$

Table II

Date and UT of flare maximum		Durations before and after maximum, minutes t_b	t_a	Δm	Δm_{lim}	Integrated intensity, minutes	Air mass
Jan.14	$22^h48^m.0$	0.2	0.7	0.32	0.06	0.32	1.36
Jan.14	$23^h10^m.0$	2.0	1.4	0.35	0.06	0.08	1.40
Jan.15	$20^h17^m.0$	?	0.7	0.32	0.10	0.37	1.42
Jan.15	$20^h31^m.5$	0.6	1.5	0.47	0.10	0.37	1.40
Jan.15	$21^h04^m.0$	0.3	2.0	0.16	0.07	0.08	1.34
Jan.17	$20^h16^m.3$	0.3	2.5	0.88	0.08	0.74	1.40
Jan.18	$18^h13^m.8$	9.0	20.0	1.50	0.08	11.59	2.14


14.I.69
0.4
0.2
0.0
23h08m
23h13m
14.I.69.
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0.2
0.0
22h47m
22h50m
15.I.69.
0.4
0.2
0.0
20h15m
20h20m
15.I.69.
0.4
0.2
0.0
20h27m
20h32m
20h37m
15.I.69.
0.2
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17.I.69.
1.0
0.5
0.0
20h15m
20h20m

Fig. 1

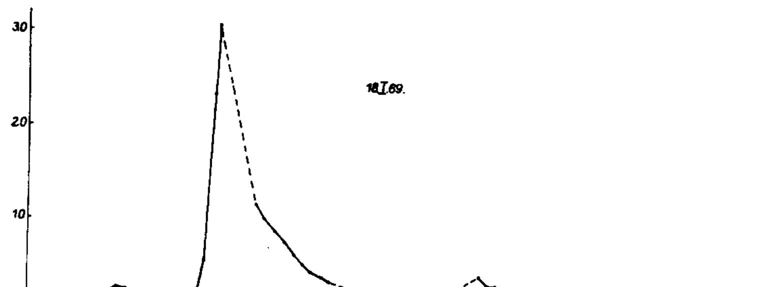
30
20
10
00
18.I.69.
18h05m
18h10m
18h15m
18h20m
18h25m
18h30m
18h35m
18h40m

Fig. 2

COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 340

Konkoly Observatory
Budapest
1969 March 29

PHOTOELECTRIC OBSERVATIONS OF AD Leo

The results of photoelectric observations of the flare star AD Leo made as a part of cooperative programme in the period of 10-24 February 1969 are given below.

The observations were obtained in the B-band with the 64 cm meniscus telescope. The total coverage is 33.3 hours. The content of Tables I, II is identical with those of papers (1) and (2). The light curves of flares (Figs.1, 2,3) are given in relative intensities.

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N.I.SHAKHOVSKAYA
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(1) P.F.Chugainov, (Photoelectric observations of UV Cet and YZ CMi), I.B.V.S. No 338, 1969

(2) N.I.Shakhovskaya,(Photoelectric observations of YZ CMi), I.B.V.S. No 339, 1969

Table I

Date 1969	Coverage (U.T.)
February 15	$16^h20^m-19^h10^m$, $19^h23^m-19^h26^m$, $19^h33^m-20^h08^m$
February 16	$19^h38^m-24^h00^m$
February 17	$0^h00^m-03^h30^m$
February 20	$18^h11^m-18^h18^m$, $18^h23^m-19^h08^m$, $19^h21^m-19^h24^m$, $21^h08^m-21^h39^m$
February 21	$16^h33^m-24^h00^m$
February 22	$00^h00^m-03^h15^m$, $17^h22^m-24^h00^m$
February 23	$00^h00^m-03^h15^m$

Table II

Date and UT of flare maximum		Durations before and after maximum, minutes		Δm	Δm_{lim}	Integrated intensity, minutes	Air mass
		t_b	t_a				
Feb.16	$22^h33^m.3$	0.9	17	0.33	0.017	1.77	1.10
Feb.16	$23^h11^m.5$	1.0	6	0.16	0.014	0.22	1.13
Feb.17	$01^h24^m.6$	0.2	5	0.16	0.018	0.24	1.44
Feb.17	$02^h00^m.4$	0.2	2	0.09	0.018	0.07	1.64
Feb.21	$23^h33^m.5$	1.7	8	0.12	0.020	0.51	1.18
Feb.22	$17^h30^m.5$	0.2	1	0.39	0.030	0.12	1.92
Feb.22	$18^h36^m.6$	1.0	11	0.84	0.020	1.99	1.46
Feb.23	$01^h00^m.2$	0.2	12	0.57	0.050	1.29	1.44

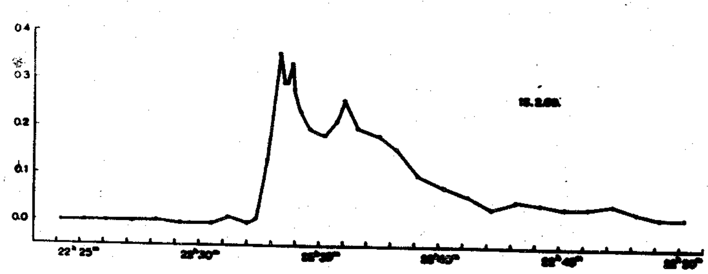


Fig. 1

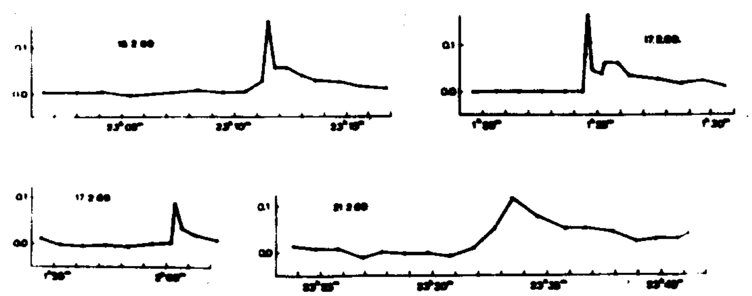


Fig. 2

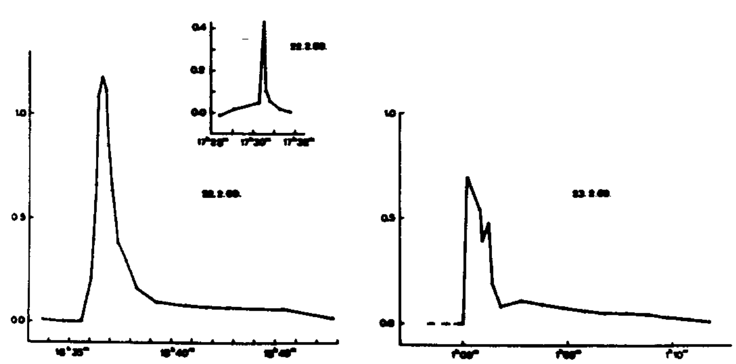


Fig. 3

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

NUMBER 341

Konkoly Observatory
Budapest
1969 April 3

MAXIMA OF CY AQUARII IN 1964 AND 1968
PERIOD DETERMINATION

Two maxima determined from light curves in 1964, and four in 1968, were used to establish a combined value of period for CY Aquarii (RA = 22^h36^m; D = 1°20'N, 1960).

Observations were made through a wedge photometer attached to the 12 1/2 inc (32 cm) refractor of the Observatório Nacional do Rio de Janeiro in the visual range.

Δm values were obtained from direct comparison between star Δ(RA) = -0.5 min, ΔD = +0°.5) and the variable, controlled by medium values of absorption when necessary.

The results are shown below, and are reliable within ± 1.5 min.

J.D. hel.	2 438	728.459	(1964)
		729.439	
	2 440	134.481	(1968)
		134.542	
		137.472	
		156.455	

Period as determined from a multiple combination of times above gives us (0^d.061 038 44 ± 3 s.d.) over more than 23 000 cycles.

Moreover we derived the times of critical point (maximum slope) in the rising branch of light curves and compared them - as phase - with later determinations as suggested by R.Zissel, in Astroph. J. n°.1363.

Results presented good agreement.

Rio de Janeiro, Observatório Nacional
Brasil

1969/MAR/10
JBJ/fbs.

J.BARROSO,Jr.

COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 342

Konkoly Observatory
Budapest
1969 April 4

A STANDARD COMPARISON SEQUENCE TO THE FLARE STAR YZ CANIS MINORIS

Standard two-colour photoelectric observations of comparison stars in the field of the flare star, YZ CMi, have been made by J.Eksteen at the Boyden Observatory. Several different magnitude sequences are currently being utilized to reduce flare observations of this star and this new photometry should improve the standardisation of material. With present increasing attention towards the secondary, possibly secular, variations of flare stars these results may be particularly valuable. The colour and magnitude sequence is also suitable for the description of flares observed visually and photographically with amplitudes of one and two magnitudes, respectively.

The 16-inch Nishimura reflector equipped with an E.M.I. 6256 photomultiplier and standard B and V filters was employed on two nights, 13 and 14 March 1969. Transformation to the Johnson standard photometric system was effected by the observation on each night of five bright stars (See Table 1) from the Arizona-Tonantzintla Catalogue (Ref.1), observed before and after the sequence.

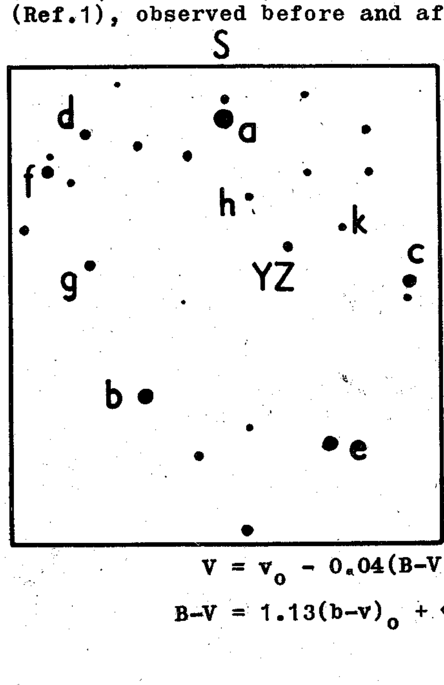


Table 1

BS	V	B-V
2646	$3^m.43$	$1^m.72$
2827	2.44	-0.09
2970	3.93	1.02
3045	3.35	1.25
3165	2.25	-0.27

Since the H.T.voltage was lowered for these bright stars, the zero point constants for each night in the V transformation were determined for the sequence by means of a fainter star in the field which had been observed earlier in the Johnson system (star c in Ref.2). The magnitude and colour transformation equations, in standard notation, were found to be:

$$V = v_o - 0.04(B-V) + \text{const.} \pm 0.034$$

$$B-V = 1.13(b-v)_o + \left\{ \begin{matrix} 0.683 \\ 0.653 \end{matrix} \right\} \pm 0.025$$

The large mean error in V for these bright stars reflects the scatter in the original measures (Ref.1) due no doubt to the rather large zenith distances employed at Catalina and Tonantzintla. This uncertainty is reduced, however, in our sequence by taking the local zero point star. Atmospheric extinction coefficients, typical of Boyden, $k_V=0.23$ and $k_{b-v}=0.10$, were applied at the small air masses encountered which were never greater than 1.3.

Photometric results from the two nights are given in Table 2, together with two additional fainter stars from Ref.2. In Fig.1 star a is HD 62525. A comparison of common stars in the photovisual and photographic sequences presently in use shows that of Mosidze and Chuadze (Ref.3) to be in fair agreement, but that of Bateson et al. (Ref.4) to be systematically $0^m.6$ brighter. An unpublished photoelectric sequence by Solomon (private communication) shows agreement for our star b but large differences in colour and magnitude for star e which has consequently been removed from our sequence.

Table 2

Star	Nightly Values				Adopted Sequence	
	V		B-V		V	B-V
a	$8^m.08$	$8^m.12$	$0^m.89$	$0^m.88$	$8^m.10$	$0^m.89$
b	10.52	10.53	0.43	0.51	10.52	0.47
c	-	-	0.47	0.51	10.72	0.50
d	10.71	10.74	1.49	1.48	10.72	1.49
e	10.95	10.99	0.94	0.85	-	-
f	10.98	11.01	0.26	0.28	11.00	0.27
g	11.70	11.70	0.17	0.16	11.70	0.17
h	-	-	-	-	12.46	0.95
k	-	-	-	-	12.47	1.13

YZ CMi was observed on both nights and the results are given in Table 3. No sensible variation is evident as compared with my previous measures (Ref.2).

Table 3

J.D. -2440000	V	B-V
$294^d.804$	$11^m.24$	$1^m.60$
295.794	11.24	1.56

REFERENCES

1) H.L.Johnson et al., Com. of Lunar and Plan. Lab. No. 63 (1966).
2) A.D.Andrews, I.B.V.S., No.265, (1968).
3) L.N.Mosidze and A.D.Chuadze, Abastumani Obs.Bull.32, p.21, (1965).
4) F.M.Bateson et al., Charts for Southern Variable Stars Series 5 (issued from Mt.John University Obs.New Zealand).

Armagh Observatory
28 March, 1969

A.D.ANDREWS

COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 343

Konkoly Observatory
Budapest
1969 April 7

PHOTOELECTRIC OBSERVATIONS OF UV Ceti

The flare star UV Ceti was observed photoelectrically with the 36-inch reflector of Steward Observatory in the period of co-operative observations 14-28 October, 1968.

The U magnitude of the star was measured continuously with an integration time of 15 seconds. V and B magnitudes were measured at the beginning and end of each series of observations. Several UBV standards were observed before and after the observations of UV Ceti.

The dates and times of coverage are given in Table I. Table II contains the characteristics of the observed flares which are obtained according to the proposals given in [I]. The columns give: 1) the date; 2) the time, UT, of flare maximum; 3) the flare intensity at maximum expressed in U magnitude scale; 4) the integrated intensity of the flare found by the formula: integrated intensity =

$$\int \frac{I_{o+f} - I_o}{I_o} \, dt,$$

were I_0 is the mean intensity of the star radiation just before and after the flare, and I_{o+f} is the intensity of the star radiation during the flare; 5) U_0= the U magnitude corresponding to the intensity I_0; 6) U_{lim}= the limiting magnitude, i.e.magnitude of the imaginary flare which could be detected on the background of noise fluctuations. This value was found by the formula $U_{lim} = -2.5 \lg \frac{3\sigma}{I_o} + U_o$, where σ = the standard deviation of noise fluctuations expressed in the same units as I_0. Finally,Col 7) gives the air mass, M(z), corresponding to the flare maximum. The time intervals between the maximum of the flare and its beginning and end are not obtained from our observations because these might be distorted by the integration process. The light curves of the flares are given below in relative intensities $(I_{o+f}-I_o)/I_o$ (Figs.1-8).

Note that U_0 and U_{lim} differ from one flare to another.This is due (except possibly for the flare 19.10.68), to the secondary variations of the star. The amplitude of these variations, as obtained from our observations, is about $0^m_.1$ in the V and B-bands and $1^m_.5$ in the U-band (see also [2]).

It is interesting to note that the largest of the observed flares (18.10.68) took place during the deep minimum of the slowly varying component of the star radiation. The flare of 19.10.68 may be erroneous because of possible interference of clouds before and after the flare.

Table I

Date	UT of coverage	Remarks
Oct 15	6^h46^m–6^h54^m, 7^h00^m–8^h29^m, 8^h33^m–8^h40^m	Clouds at horizon
16	7^h32^m–7^h49^m, 7^h51^m–8^h06^m, 8^h12^m–8^h48^m, 8^h56^m–9^h24^m	
17	7^h44^m–8^h56^m, 9^h06^m–10^h01^m	
18	6^h32^m–6^h57^m, 7^h03^m–7^h27^m, 7^h30^m–9^h49^m	
19	7^h58^m–9^h50^m, 9^h52^m–10^h27^m	Clouds at end
21	6^h15^m–7^h05^m, 7^h11^m–7^h24^m, 7^h27^m–7^h30^m, 7^h33^m–7^h55^m, 7^h58^m–8^h00^m, 8^h03^m–8^h32^m, 9^h32^m–10^h13^m	
23	6^h13^m–8^h41^m	

Fig.1

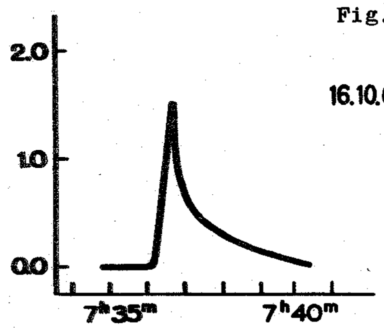


Fig.2

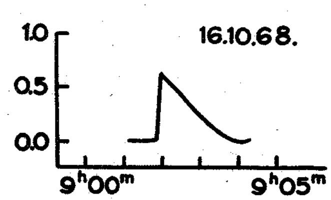


Fig.3

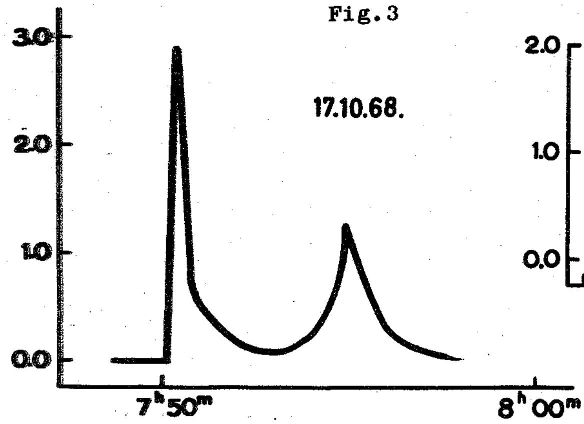


Fig.4

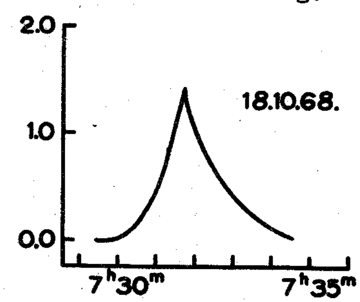


Fig.5

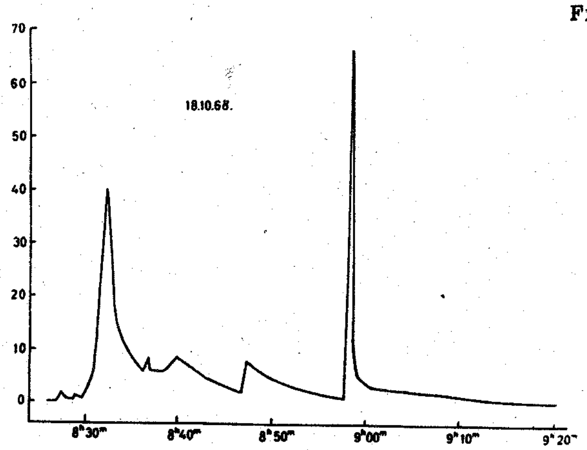


Table II

Date	UT	Flare Intensity at Maximum	Integr. Intensity, minutes	U_o	U_{lim}	M(z)
October 16	$7^h36^m.7$	14.26	1.4	14.69	15.39	1.56
	9 02.0	15.48	0.6	14.75	15.35	1.76
17	7 50.4	13.53	3.1	14.73	15.77	1.58
	7 54.9*	14.45		14.73	15.77	1.58
18	7 31.7	14.81	2.1	15.22	15.92	1.56
	8 32.1	11.66	254.0	15.68	15.51	1.67
	8 58.3*	11.13		15.68	15.51	1.78
19	10 12.7	13.86	5.2	14.30	14.65	2.47
21	8 04.1	13.24	5.0	14.92	15.47	1.63
23	7 47.4	12.99	22.8	14.90	15.77	1.61
	8 23.0	14.67	1.4	14.90	15.77	1.71

* secondary maximum of previous flare

Fig.7 Fig.6

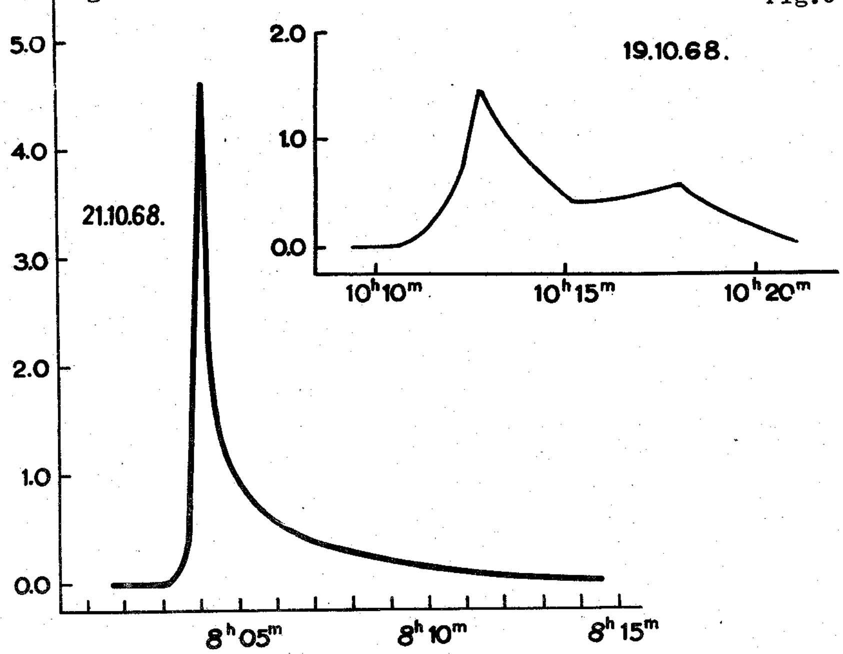
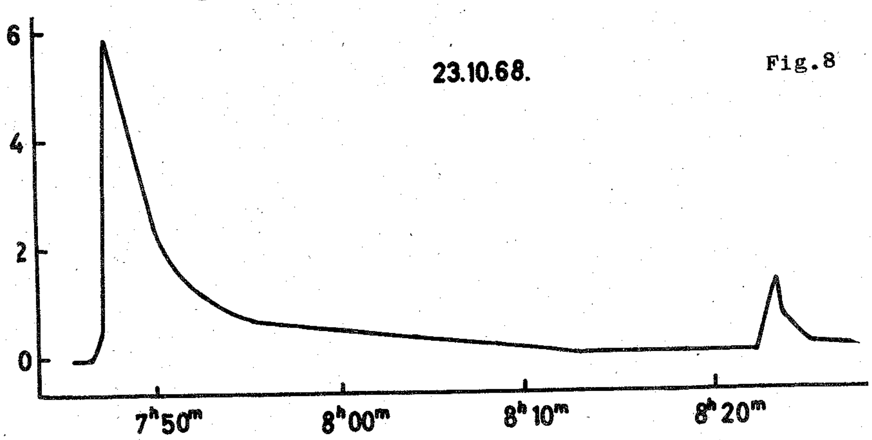


Fig.8



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(1) A.D.Andrews, P.F.Chugainov, R.E.Gershberg, V.S.Oskanjan, I.B.V.S. No.326, 1969.
(2) W.E.Kunkel, I.B.V.S. No.315, 1968.

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COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 344

Konkoly Observatory
Budapest
1969 April 16

UBV PHOTOMETRY OF AK VIRGINIS

The eclipsing binary AK Vir was observed photoelectrically on 3 nights in June 1968 with the Dyer Observatory 24-inch reflector. The results are presented here now because the observations are not sufficient for a light curve solution and no further observations are planned.

Column 1 lists the heliocentric Julian date. Columns 2,3 and 4 list the differential V, B, and U magnitudes in the sense AK Vir minus comparison. The comparison star used was HD 123037, which is the visually brighter component of BD −17°4002.

Table A

24400..	Δ V	Δ B	Δ U	24400..	Δ V	Δ B	Δ U
23.6452	-	-	1.967	25.6991	3.540	-	-
.6460	-	1.862	-	.7004	-	3.436	-
.6468	2.095	-	-	.7017	-	-	3.557
.6478	2.093	-	-	.7024	-	-	3.675
.6490	-	1.832	-	.7036	-	3.417	-
.6502	-	-	1.945	.7050	3.496	-	-
.6566	2.058	-	-	.7099	3.383	-	-
.6581	-	1.727	-	.7108	-	3.213	-
.6593	-	-	1.803	.7120	-	-	3.365
.6601	-	-	1.821	.7130	-	-	3.423
.6614	-	1.754	-	.7145	-	3.180	-
.6625	2.084	-	-	.7158	3.291	-	-
25.6057	2.154	-	-	.7204	3.211	-	-
.6070	-	1.868	-	.7217	-	3.043	-
.6083	-	-	1.979	.7232	-	-	3.129
.6092	-	-	1.991	.7238	-	-	3.123
.6104	-	1.892	-	.7254	-	2.944	-
.6114	2.198	-	-	.7265	2.936	-	-
.6737	3.266	-	-	26.5870	2.065	-	-
.6748	3.299	-	-	.5880	-	1.798	-
.6795	3.408	-	-	.5892	-	-	1.931
.6809	-	3.290	-	.5898	-	-	1.921
.6822	-	-	3.455	.5906	-	-	1.922
.6829	-	-	3.439	.5918	-	1.746	-
.6840	-	3.374	-	.5926	2.049	-	-
.6850	3.483	-	-	.6006	2.032	-	-
.6891	3.506	-	-	.6018	-	1.746	-
.6902	-	3.441	-	.6032	-	-	1.840
.6914	-	-	3.635	.6042	-	-	1.868
.6921	-	-	3.579	.6062	-	1.789	-
.6932	-	3.445	-	.6080	2.066	-	-
.6947	3.582	-	-	.6090	2.062	-	-

The time of primary minimum was JD (hel.) 2,440,025^{d}695 ± 0^{d}001. The old ephemeris, 2,427,551.395 + 1^{d}193595, gives an O-C of +0^{d}036 and thus appears inadequate. The following new ephemeris, 2,440,025.6946 + 1.19359875, gives satisfactorily small O-C's for all known times of minimum. The last digit in each constant is probably significant.

Table B

Piotrowski (Acta Astronomica 2, 70)	+0^{d}0009 ± ?
Tsesevich (Odessa Izvestia, 4, part 3, 66)	-0.0004 ± 0.001
Soloviev (Variable Stars 12, 276)	-0.0008 ± ?
Hall (this paper)	+0.0004 ± 0.001

From the observations it can be seen that primary minimum is partial, 1^{m}49 deep in V, 0^{m}17 redder in B-V, and 0^{m}06 redder in U-B.

I am very grateful to Mr.Samuel L.Weedman for help with much of the data reduction.

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COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 345

Konkoly Observatory
Budapest
1969 April 21

PHOTOELECTRIC OBSERVATIONS OF THE FLARE STAR AD Leo

Continual photoelectric monitoring of the star AD Leo was realized on the 50 cm reflector of the Byurakan observatory during the series of co-operative observations of this star (10-24 February 1969). The observations were done in B approximately. The results of observations are:

1.- Coverage

Date of observations	Coverage UT
15-II-1969	1730-2400
16-II-1969	0000-0015
21-II-1969	1904-1913, 1930-1957, 2000-2032, 2035-2112, 2114-2200,

2.- Total coverage $9^h.16^m$

3.- The limiting magnitude for these two nights was m_{lim} = 14.13 (the normal B magnitude of AD Leo 10.90) and σ (mag) = +4.42

4.- No flare activity was noticed.

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Byurakan Astrophysical Observatory

FLARES OF AD LEONIS

The flare star AD Leo was observed photoelectrically for about 13 hours during the February 1969 international campaign. The continual photoelectric monitoring was carried out by the 24" telescope at the Konkoly Observatory using an EMI 9502B photomultiplier, Schott 13+BG12 filter combination and a quartz Fabry lens.

As comparison star we used the companion star at 1!7 N to AD Leo.

Table 1 shows the time of monitoring.

Table 1.

Date of observations	Coverage UT
1969 February 10	2104-2116,2123-2141,2150-2206,2215-2231, 2238-2255,2301-2317,2323-2339,2351-2400,
11	0000-0007,0011-0027,0031-0046,0049-0106, 0110-0126,0130-0145,0150-0206,0210-0226, 0231-0245,2049-2057,2101-2116,2119-2135, 2138-2153,2156-2210,2213-2228,2238-2254, 2257-2313,2316-2331,2333-2349,2351-2400,
12	0000-0007,0009-0025,0027-0038,0040-0101, 0103-0119,0121-0137,0140-0159,0201-0220, 0222-0237,0239-0255,0257-0315,0318-0331, 0348-0357
13	2237-2253,2255-2306,
18	2002-2018,2021-2037,2040-2112,2113-2131, (2132-2148),2152-2210,2211-2224,(2225-2241)

Total coverage: 12^h55^m (parentheses indicate poor sky conditions)

The limiting magnitude for the nights was about $m_{lim} = 13.2$.

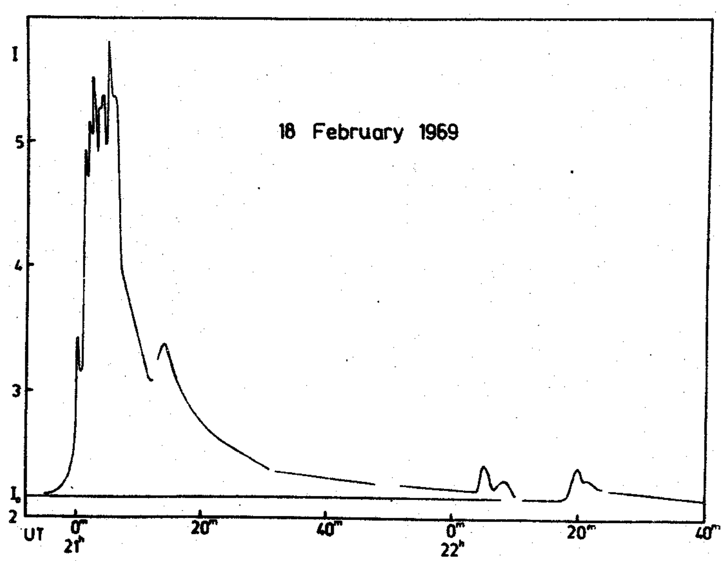
Some details of the recorded flares are summarized in Table 2.

Table 2.

UT of max	Maximum intensity (m_f-m_o)	Duration before max.	Duration after max.	Integrated intensity	Remarks
1969.Febr.					
$11^d23^h31^m$	0.15 mag	-		-	(1)
$18^d21^h05^m$	1.06	9 min	45 min	18 min	(2)(3)
21^h14^m	0.47	2	6	0.8	(2)(4)
22^h05^m	0.12	0.6	5	0.4	(2)
22^h20^m	0.1	1	4	0.5	(2)

Remarks:
(1) doubtful
(2) definite
(3) with multiple maximum
(4) superposed on the descending branch of the one magnitude flare.

The light curves in intensity units are shown in the Figure.



Some measurements were also obtained in visual spectral band. From these we can conclude a visual amplitude of 0.45 magn. for the 1969 February $18^d21^h05^m$ flare.

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COMMISSION 27 OF THE I. A. U.
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NUMBER 346

Konkoly Observatory
Budapest
1969 April 29

A NOTE ON THE MAGNETIC VARIABILITY OF THE MAGNETIC STARS·

If we accept the model of the inclined rotator for the magnetic stars, it ensues that the amplitude of the change of the magnetic field is given by the expression $\Delta H_e \sim H_{oe} \sin \alpha_o \sin i$, where α_o is the angle between the axis of rotation and the magnetic axis of the star, i is the angle between the line of sight and the axis of rotation, and H_{oe} is the effective field. It is evident that H_{oe}, α_o and the equatorial linear velocity v do not depend on i. In such a case the diagram (ΔH_e, v sini) must represent a dispersion of the points which correspond to the stars with respective parameters about a straight line passing through the beginning. Fig.I shows this diagram, where we have made use of 21 stars, for which the necessary data are available in [1,2] . On this diagram one can see two well represented linear concentrations of the points with an interval of ΔH_e between them of about 500–1000 gauss. There is a tendency for the decrease of ΔH_e with v sini,but the fact, that at v sini = 0 km/s one observes stars with very large ΔH_e and that both linear concentrations of the points do not tend toward the beginning of the diagram, is in favour of the conclusion, that the hypothesis of the inclined rotator is not able to cope with the observational data.

Besides, Fig.2 shows the diagrams (ΔH_e, B–V) and (ΔH_e, U–B), where we have made use of the data from [1,3] . Both diagrams present three well outlined zones in which the points are concentrated. While on the diagram (ΔH_e,B–V) these zones are almost concentric with an approximate centre B-V $\simeq$ 0,01 and $\Delta H_e \sim$ 500 gauss, on the diagram (ΔH_e, U-B) these zones stretch in the direction of the negative values of U-B. It is logical to group in zones the stars on these diagrams. From the 40 stars we have made use of, they are distributed on the diagram (ΔH_e, B-V) as follows: in the I. zone 21 stars, in the II. zone 14 stars, in the III. zone 2 stars, in the intermediate position between the I. and the II. zones there are only 3 stars. They are set low and maybe they represent the way of the passage of the stars from one zone of the diagram into another. It is worth noting that all stars attached to one of the groups α, β and γ, according to Babcock [4], lie in the same zone on both diagrams and only 5 stars lie in different zones, i.e. the zones are comparatively steady. These two diagrams allow us to associate the amplitude of the change of the magnetic field ΔH_e with the colour indices B-V and U-B and, hence, with the temperature which supports the above mentioned conclusion, that the change of the magnetic field is rather a function of the astrophysical parameters of the stars and not of the geometrical ones.

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3. Osawa: Annals of the Tokyo Astr.Obs., II serie, vol. IX. 123 (1965)
4. Babcock: in "Stellar atmospheres" ed. Greenstein, Univ. of Chicago Press 288 (1960)

Sofia, April 17, 1969.

RACHO RADKOV

Astronomical Observatory,
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Fig.1

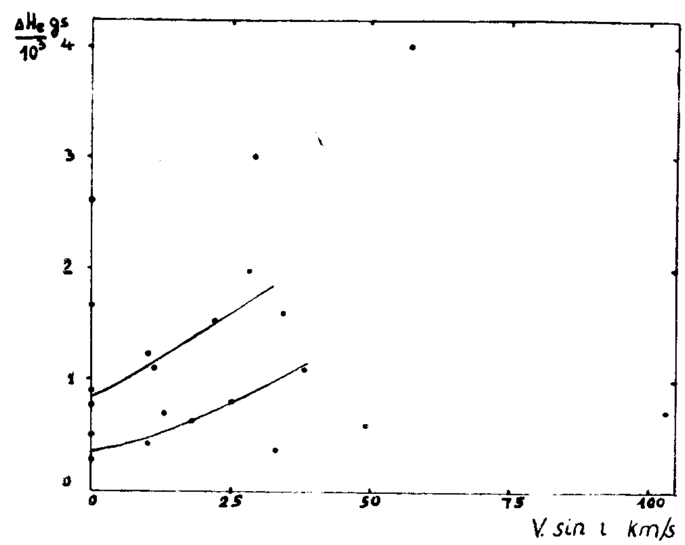
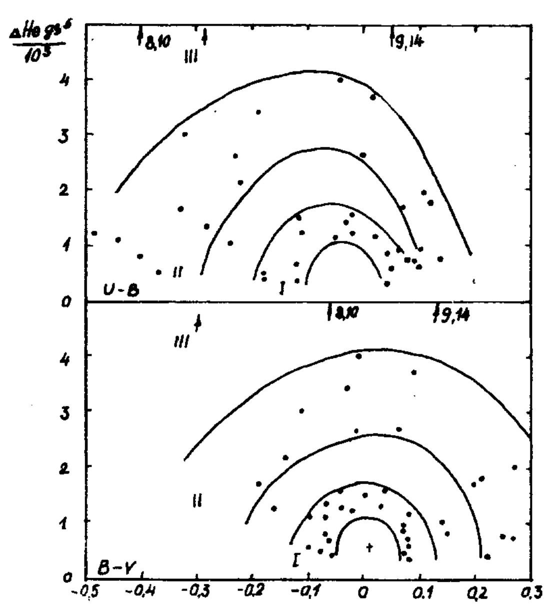

ΔHe gs / 10^3
4
3
2
1
0
0
25
50
75
100
V sin i km/s

Fig.2


ΔHe gs / 10^3
8,10
9,14
III
II
I
U-B
B-V
-0,5
-0,4
-0,3
-0,2
-0,1
0
0,1
0,2
0,3

COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 347

Konkoly Observatory
Budapest
1969 April 30

A SEARCH FOR THE VARIABLE OPTICAL COMPONENT OF THE PULSAR NP0527

The pulsar NP0527 is within about 1° of the pulsar NP0532 in the Crab Nebula and has a similar integrated electron density. As a result it has been suggested[1] that NP0527 was ejected from the Crab Nebula. The optical variation of NP0532 has been reported[2].

A blink search for a high velocity object at the position of NP0527 was made. Using a blue plate taken on 8 March 1969 on the 26" at Herstmonceux and a copy of the blue POSS print, the search was complete down to about $18^{m}5$, and an area twice the radio error box covered. Since the proposed proper motion is 4.8" per year, the motion of the pulsar over the seventeen years would be easily detectable. No such object was found. If the pulsar was ejected from the Crab, its average luminosity must be less than this limit.

A.J. PENNY

Royal Greenwich Observatory, 23rd April, 1969

1 Reifenstein, III, E.C., Brundage, W.D. and Staelin, D.H., Phys.Rev.Lett., 22, 311, 1969

2 Cocke, W.J., Disney, M.J. and Taylor, D.J., Nature, 221, 525, 1969

COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 348

Konkoly Observatory
Budapest
1969 May 2

HD 116994

At the beginning of 1968, the eclipsing variable BV 513 was put on our photometric observing program in B and V. Due to its proximity in the sky and its convenient color index, the star HD 116994 was chosen for comparison. Only after some five nights of observations, a preliminary reduction of the records was begun, and it was then discovered, that HD 116994 was itself variable. Another star was then chosen for comparison and observations were continued simultaneously on BV 513 and HD 116994. The observations of BV 513 against HD 116994 could still be used, at least for period study of HD 116994, once the light-curve and period of BV 513 was well established by the later observations. A total of about 1100 observations (B+V, and including those at the beginning) were obtained between February 4 and May 24. Only in mid-March it was found that the variability of HD 116994 had already been discovered in 1966 at Cerro Tololo.

HD 116994 is an intrinsic variable of very short period, $0,10225^d$, and low amplitude, about $0,18^m$, and may be classified as a dwarf cepheid.

Two peculiarities were noted in the present observations: variation of amplitude and variation of period.

The V-amplitude varied slowly between $0,16^m$ and $0,20^m$. If there is any periodicity at all, a period of about 60^d could be attributed, but some shorter period cannot be ruled out entirely. The Cerro Tololo observations show even an amplitude up to $0,22^m$; studying these, Kwan-Yu Chen finds a modulation period of $0,338^d$, but such a short modulation period could not be confirmed by the present observations.

To study period variation, an O-C diagram was constructed with $P = 0,10225^d$, including the Cerro Tololo observations. But it turned out that the variation of period (lengthening during the present observations) was such, that it is not possible to know the number of cycles between the 1966 and 1968 observations. So, any observation made between 1966 and 1968 would be of great value.

The results given above are only preliminary. The observations will be continued in 1969, as soon as possible in three or more colors. We would be very glad to receive any observation made since 1966 to improve the period and amplitude study.

Catalog data about this star are:

HD 116994 = SAO 240869; RA = $13^h25^m18^s$, D=−51°01'58" (1950);
$m_{pg} = 8,9$, $m_v = 8.7$.

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COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 349

Konkoly Observatory
Budapest
1969 May 5

PHOTOELECTRIC OBSERVATIONS OF UV Ceti

As part of the UV Ceti international patrol the star was monitored at the Boyden Observatory during eight nights in October 1968. The 16" Nishimura reflector was used, fitted with a standard Johnson B-filter and an EMI photomultiplier tube cooled with solid carbendioxide. The phototube output fed directly into a Hewlett Packard type DY-2460A amplifier.

As will be seen from Table I, 18 events were recorded with a total of 23 maxima over an observing time of approximately 30 hours. Inclement weather prevented further observations.

Δm is considered accurate to within 5%, spurious or instrumental flares being eleminated.

Flare activity was absent on two of the nights during the observation period, but on the night of 24-25 October enhanced activity was evident as a flare rate of one per hour, bringing the number for that night up to 6 with 10 maxima.

The flares had 4 typical characteristics of UV Ceti type flare stars. Additionally, about 30% of them showed a rapid decline after the flash phase followed by a secondary maximum and a gradual decline.

A note (1) concerning these observations has been published.

Ref.(1) J.P.EKSTEEN, MNASSA, 27, 145, 1968.

A.H.JARRETT and J.P.EKSTEEN
Boyden Observatory, Bloemfontein
Rep. of South Africa

TABLE I.

UV Ceti

Monitoring Time and Observed Flares

Date October 1968	UT	Total Hours Per Night	Flare No.	U.T. of maximum	Duration Min.	Δm
13	19.47-22.12, 22.44-23.40	3^h21^m	1	$20^h29^m.5$	8	0.20
			2a	22 52 7	2	0.23
			2b	22 55 4	8	0.70
			3	23 08 5	3	0.86
			4	23 22 0	7	0.81
14	20.34-22.18, 22.26-23.52	3 02				
15	20.15-21.39	1 24				
19	17.37-21.11, 22.07-23.12	4 39	5	19 29 6	3	0.44
			6	20 00 3	3	0.44
23	22.03-22.30, 22.36-0.00	1 51	7	23 10 8	7	0.44
24	0.00-01.30, 17.34-23.33, 23.47-0.00	7 47	8	01 03 9	1.5	0.41
			9	18 23 1	18	0.54
			10a	19 31 5	9	0.61
			10b	19 39	3	0.90
			11	19 41 9	3	0.39
			12a	20 43 3	3	0.52
			12b	20 46 9	2	0.52
			13a	22 41 2	3	0.64
			13b	22 46 9	3	0.46
			14	23 08 3	3	0.28
25	0.00-01.05, 20.7.3-21.29, 21.36-23.42	4 17	15	20 48 3	2	1.00
27	20.54-21.23, 21.37-21.47, 21.57-22.18, 22.24-22.46, 23.00-0.00	2 16	16a	23 43 5	1	0.30
			16b	23 45 0	3	0.19
28	0.00-01.11	1 11	17	0 21 4	3	0.49
			18	0 37 0	6	0.35

TOTAL: 29^h43^m (8 nights out of a 16-night period)

Fig.1

13-14.Oct.1968.

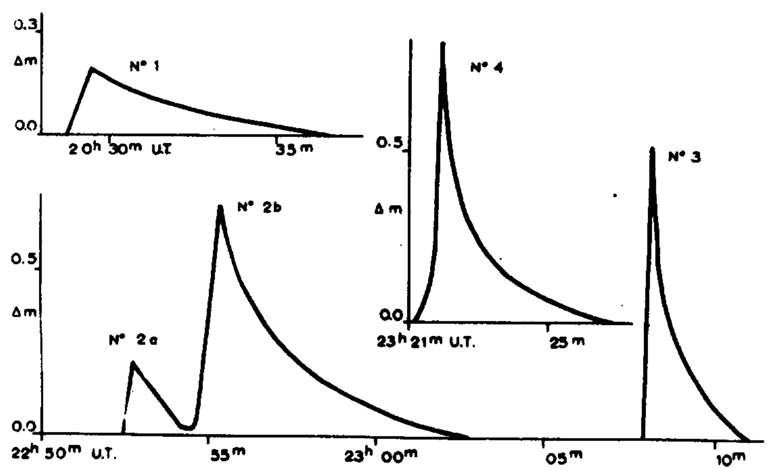


Fig.2

19-20.Oct.1968.

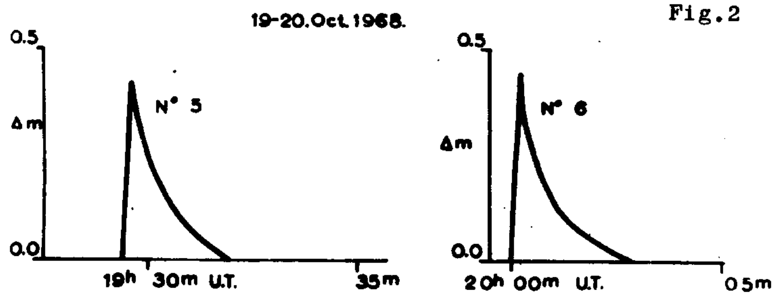


Fig.3

23-24 Oct 1968

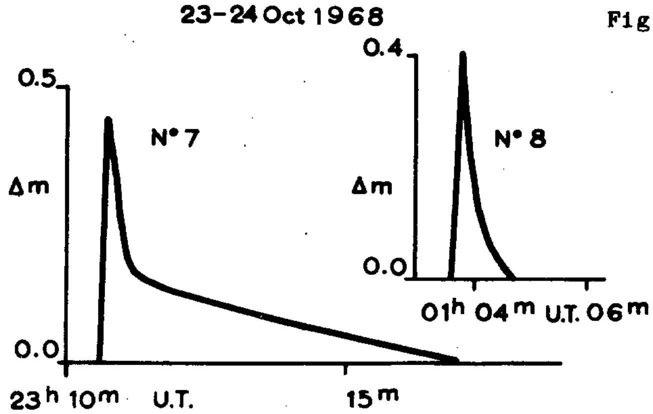


Fig.4

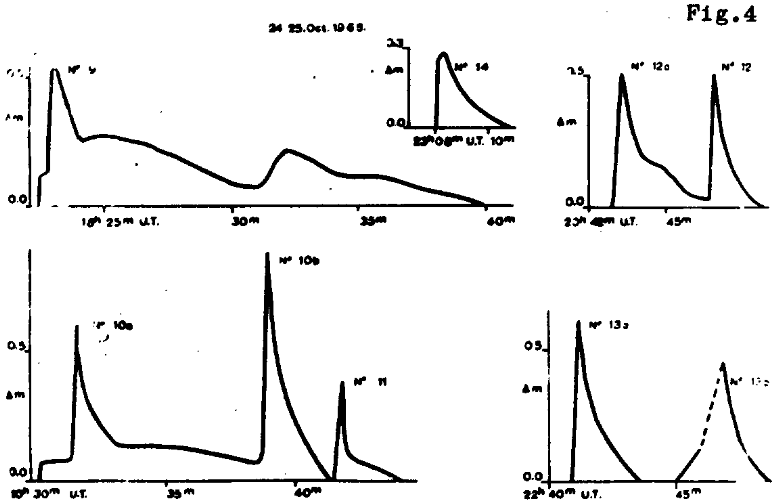
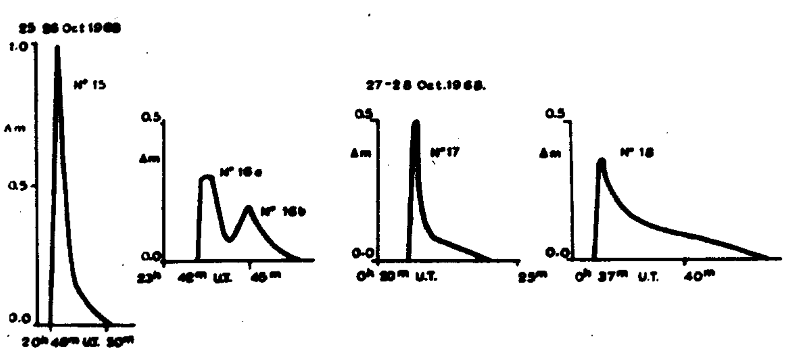

24 25.Oct.1968.
Nº 9
Δm
0.0
18h 25m U.T.
30m
35m
40m
Nº 14
0.0
23h 08m U.T. 10m
0.5
Nº 12a
Nº 12
Δm
0.0
23h 40m U.T.
45m
Nº 10a
Nº 10b
Nº 11
0.5
Δm
0.0
30m
U.T.
35m
40m
Nº 13a
0.5
Δm
0.0
22h 40m U.T.
45m

Fig.5


25 26 Oct 1968
1.0
Nº 15
Δm
0.5
0.0
20h 48m U.T. 50m
0.5
Δm
Nº 16a
Nº 16b
0.0
23h 48m U.T.
27-28 Oct.1968.
0.5
Δm
Nº 17
0.0
0h 20m U.T.
23m
0.5
Δm
Nº 18
0.0
0h 37m U.T.
40m

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Konkoly Observatory
Budapest
1969 May 13

PERIODS OF VARIABLES 5 AND 9 IN M13

Variables 5 and 9 (notation from Sawyer, 1955) in the globular cluster M13 = NGC 6205 have been investigated utilizing 57 recent plates taken on the Yale one-meter and U.S. Naval Observatory 1.5 meter reflectors. The following characteristics for the stars have been obtained (photographic magnitude and heliocentric dates are used):

Var	Max.	Min.	Epoch	Period	Class
5	14.6	15.3	2440046.7820	$0^d.381793$	RRc
9	14.6	15.3	2440038.8121	0.392713	RRc

The period derived for Variable 5 also fits the seven old observations by Shapley (1915) but fails to fit those of Kollnig-Schattschneider (1942). However, the Kollnig-Schattschneider observations fit reasonably well the period of Variable 9. Since the two stars form a close double (separation 2.5") and at the time she made her observations, Kollnig-Schattschneider did not know that both components are varying, it appears that her observations actually refer to the second star and were misidentified. Details of this investigation will be published elsewhere.

5 May, 1969

WAYNE OSBORN

Yale University Observatory

Kollnig-Schattschneider,E. 1942. Astr.Nach. 273, 145.
Sawyer,H.B. 1955. Publ. David Dunlap Obs. 1, 179.
Shapley,H. 1915. Mt.Wilson Contr. 6, 301 (No.116).

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Konkoly Observatory
Budapest
1969 May 30

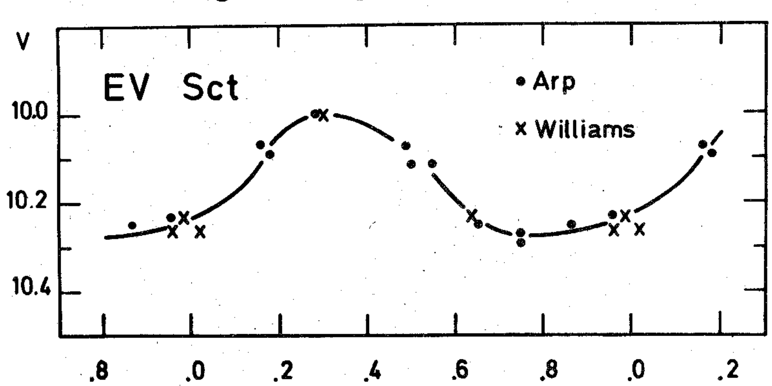
THE PERIOD OF EV Sct

Only 12 cepheids in galactic clusters are available for the calibration of the period-luminosity-colour relation (1). It is therefore surprising that the data for one of them, EV Sct, are uncomplete. First, the reality of the cluster NGC 6664, of which it is supposed to be a member, is still questionable as pointed out by Bakos (2) and J.Stock (cited by Becker, 3). Secondly, the light curve and the period of EV Sct as derived by Arp (4) is based on only 11 photoelectric observations.

It is the aim of this note to improve at least the latter situation. Williams (5) has observed EV Sct by narrow-band photometry in five nights and has derived V-magnitudes of the UBV-system. There is no indication that systematic errors are introduced by this magnitude transformation. Using these additional observations the period can be improved to $3\overset{d}{.}0910 \pm 0\overset{d}{.}0002$. This is sufficiently accurate that the much earlier observations by Bakos and Oosterhoff (cited by Bakos,2) can be unambiguously combined with the later observations. One finds then the elements:

$$\text{J.D.(Max)} = \underset{\pm 15}{2\,436\,120.998} + \underset{\pm 6}{3\overset{d}{.}09097} \cdot E$$

As seen in the figure this period brings the observations



by Arp (4) and Williams (5) to very good agreement. There is therefore no need to adjust the other photometric elements published by Arp (4).

Astronomisches Institut der Universitat Basel
May 18th, 1969

G.A. TAMMANN

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2. Bakos, G.A. 1950, Leiden Ann. 20, 177
3. Becker, W. 1963, Zeitschr. f. Astroph. 64, 77
4. Arp, H.C. 1958, Ap.J. 128, 166
5. Williams, J.A. 1966, A.J. 71, 615

COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
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Konkoly Observatory
Budapest
1969 June 2

THE FLARE STAR YZ CMi

Members of the Variable Star Section, Royal Astronomical Society of New Zealand, monitored YZ CMi during the periods 1969 Jan.11-25; Feb.10-24 for a total of 65 hours. The first period was for the international observing session; the second was chosen as the star selected by the I.A.U. Working Group for that period - AD Leo - is not well placed for N.Z. observers. All observations were visual except Feb.19 1230-1337 and Feb.22 1137-1302 (U.T.)., when Andrews and Rowe monitored YZ CMi with photoelectric photometer at the West Melton Observatory (Christchurch). A summary of the hours of coverage and times of 31 suspected flares are given below.

1969	U.T.	OBSERVERS
Jan.10	1037-1121	Bt
11	1105-1206	Jn
12	1006-1101; 1119-1202; 1235-1315	Bt
13	1135-1244	Jn
16	1001-1124	Bt
17	1345-1600	Jn
18	0945-1200; 1230-1340; 1424-1615	Bt; Hv; Mt.
19	0912-1345	Jn; MA; Wk.
20	0854-0910; 0931-1031; 1050-1317	Ce; Fe; Hv; Mt.
22	0852-0934; 1345-1615	MA; Jn.
24	0848-0936; 0950-1505	MA; Wk.
Feb.12	0912-1400	Bt; En.
13	0952-1200; 1242-1424	Bt
18	0815-1202; 1204-1300	Bt; MA; MJ; Wk.
19	0808-1337	Bt; Ce; En; MA; Wk; and p.e.
20	0922-0927; 1025-1130; 1141-1300	Bt; Ce
21	0819-1200; 1214-1245	Ce; Ci; Fe; Hv;MJ.
22	0900-1357; 1401-1430	Ce; Cs; En; Fe; MA and p.e.
23	0826-1012; 1018-1102	MA; Wk.

Total Coverage: - 65 hrs 4 mins. (Visual observers: - F.M. Bateson (Bt); G.W.Christie (Ci); S.Clements (Ce); R.W.Cross (Cs); R.W.Evans (En); D.C.Fisher (Fe); S.R.Hovell (Hv); M.V.Jones (Jn); B.F. Marino (MA); G.McCallum (MJ); V.L. Matchett (Mt); W.S.G.Walker (Wk). Photo-electric observers (p.e) F.Andrews and C.Rowe.

SUSPECTED FLARES

1969	U.T.	$\Delta m_{vis.}$	DURATION (mins).	OB-SERVER	REMARKS
Jan.16	$10^h04.5^m$	0.3	1.5	Bt	
	10 11.5	0.4)	12.5	Bt	
	10 13.0	0.4)			
18	10 23.5	0.3	2.5	Bt	
	13 30.25	0.3	3.5	Bt	
	14 37	0.3	4	Mt	
	15 02	0.3	2	Mt	
20	10 28.25	0.3	1	Fe	
	13 24.3	0.3	~ 4	Mt)	Suspect a period
	13 29.6	0.3	~ 1½	Mt)	of prolonged
	13 37.4	0.3	~ 1	Mt)	activity.
	13 38.6	0.3	~ 1	Mt)	
Feb.12	13 11.0	0.4)	13.5	Bt	
	13 18.5	0.3)		Bt	
	13 51.8	0.3	1	Bt	
13	10 27.0	0.6	3	Bt	
	10 35.0	0.3	3	Bt	
	10 49.0	0.3	15.5	Bt	
	11 26.5	0.3	1	Bt	
	11 30.0	0.6	6	Bt	
	12 56.0	0.3	3	Bt	
	13 17.5	0.3	2	Bt	
	13 22.5	0.3	1.5	Bt	
	13 40.0	0.3)	4	Bt	
	13 42.2	0.3)		Bt	
	13 52.5	0.4	5	Bt	
19	09 57.0	0.3	4	En and MA.	Independently observed at same time from separate sites.
20	12 24.5	0.3	1.5	Bt	
	12 40.5	0.3	1	Bt	
21	10 44.6	0.3	2	Fe	
22	09 55.5	0.2	2.5	Ce)	Same flare? Observed
	09 56.3	0.3	0.3	Fe	from separate sites.

Chart 151 (1) was used by all observers with magnitude sequence from Circular 135 (2). A full discussion of these results appears in Circular 136 (3).

Mt. John Observatory
1969 May 16

F.M. BATESON

REFERENCE

(1) Bateson,F.M., Jones,A.F., and Stranson,I. 1968. Charts for Southern Variables, Series 1. Published by F.M. Bateson, Lake Tekapo, N.Z.
(2) Circular 135, V.S.S., RASNZ. 1968
(3) Circular 136, V.S.S., RASNZ. 1969

COMMISSION 27 OF THE I. A. U.
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Konkoly Observatory
Budapest
1969 June 2

THE FLARE STAR V645 (PROXIMA) Cen

V645 Cen was selected for monitoring by members of the V.S.S., RASNZ during 1969 March. The selected period coincided with bad weather over N.Z. and only 15 hours of coverage was possible. All observations were visual. A summary of coverage and times of four suspected flares are given below.

1969		U.T.	OBSERVERS
March	14	1200-1500	Wk
	15	0906-1440	Ci; En; Hv; Mf; MA; Wk.
	18	0920-1030; 1045-1145; 1235-1336.	Bt
	19	0850-0932	Ce
	22	0920-1009; 1052-1105; 1122-1304	MJ.

Total Coverage: - $15^h 1^m$ (Observers: - F.M.Bateson (Bt); G.W.Christie (Ci); S.Clements (Ce); R.W.Evans (En); S.R. Hovell (Hv); B.F.Marino (MA); G.McCallum (MJ); B.Menzies (Mf); W.S.G.Walker (Wk).

SUSPECTED FLARES

1969		U.T.	Δm_{vis}	DURATION mins	OBSERVER
March	15	$12^h 39.25$ mins	0.4	7	Mf
	18	09 46.5	0.4	6	Bt
		11 01.0	0.3	6	Bt
		12 37.75	0.8	10	Bt

Charts 152 and 153 (1) were used with the sequence shown thereon. A discussion of the results appears in Circular 137 (2).

Mt. John Observatory
1969 May 17

F.M. BATESON

REFERENCE

(1) BATESON,F.M.; Jones,A.F. and Stranson,I. Charts for Southern Variables Series 5. 1968. Published by F.M. Bateson
(2) Circular 137, V.S.S., RASNZ. 1969

COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 354

Konkoly Observatory
Budapest
1969 June 2

THE FLARE STAR UV Cet

Members of the Variable Star Section, Royal Astronomical Society of New Zealand, monitored UV Ceti during the international observing session 1968 Oct.14 to 28 for a total of 27½ hours. All observations were visual except 1968 Oct. 27 1049.4 to 1314.1 when F.Andrews and Mrs.A. Andrews monitored UV Ceti with the photoelectric photometer at the West Melton Observatory attached to the 40cm reflector, using a B filter. This period coincided with very poor seeing throughout N.Z. with the result that such brightenings as were recorded visually do not exceed the errors of observation under the sky conditions prevailing. Three suspected flares were recorded photoelectrically and are listed below but are considered of low reliability because of the observing conditions at the time. A summary of the hours of coverage is given below.

1968	U.T.	OBSERVERS
Oct.14	0944-1148; 1155-1300	Ca; MA; Sa; Ve.
16	0809-1100; 1200-1320	Bt; MA; Ve.
17	0903-0912; 1101-1137	Ca; MA.
19	1100-1200; 1205-1220; 1310-1405	Bt
21	0945-1000; 1008-1021; 1026-1100	Ve
23	1345-1350; 1353-1429	Sa
24	0804-1131; 1224-1300	Fe; Gd; Hv; Lf; MA; Ve; Wk
26	0813-0818; 0821-0836; 0840-0930; 0934-1007; 1014-1100; 1200-1230 1300-1330	Le; Sa; Ve.
27	0800-0807; 1049-1318	MA; Sa and p.e.
28	0833-1400	Ci; Fe; Gd; MA; Wk.

Total Coverage 27hrs 33 mins.(Visual Observers:- F.M.Bateson (Bt); D.J.Cameron (Ca); G.W.Christie (Ci); D.C.Fisher (Fe); A.Goodfellow (Gd); S.R. Hovell (Hv); D. Lewthwaite (Le); G.L.Loftus (Lf); B.F.Marino (MA); J.V.Salisbury (Sa); C.W. Venimore (Ve); W.S.G.Walker (Wk). Photoelectric observers (p.e.); - F.Andrews and Mrs.A.Andrews.

SUSPECTED FLARES

1968	MAX. U.T.	Δm_B	Duration (B) mins.		REMARKS
Oct.27	$10^h50.9^m$	1.5	0.5	) p.e.	Of low reliability
27	11 11.8	0.7	0.5	)	due to sky con-
27	11 22.6	0.5	0.5	)	ditions.

Mt.John Observatory.
1969 May 17

F.M. BATESON

COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 355

Konkoly Observatory
Budapest
1969 June 7

LIGHT VARIATIONS OF SMALL AMPLITUDE IN THE RED GIANTS OF THE DISC POPULATION

Abstract

Light variations with amplitude greater than $0^m.05$ have been found in 78 bright, M-type stars. The variation for about one-half these objects has also been found by others. The boundary of the red instability region in the (M_B, T_e) plane is near the temperature represented by $(102,65) = -0^m.6$ (blackbody color temperature near 3400°) for these disk population stars. Comparison with the narrow band, continuum colors, (102,65), shows the lack of resolution, for these red giants, of the MK spectral types and the (B-V) colors.

....

Many red giants of spectral type M have been found to be slightly variable in light (e.g. Stebbins and Huffer 1930). Whether the variation is classified as semiregular (SR) or irregular (I) often depends on the amplitude of variation and the extent of the observations. Most are quasi-periodic and the known periods extend from 20 to more than a hundred days.

All of the M-type stars in the Bright Star Catalogue (BSC = HR) (Hoffleit 1964) that are south of 0° declination, and most of those in the north, have been observed in the narrow band (102,65,62) system (Eggen 1967 and Eggen and Stokes 1970). Extensive observations in the (UBV) system over several seasons have also been obtained for most of the stars. The 78 objects in Table 1, which omits known supergiants, have been found to have light variations (V_E) of at least $0^m.05$ and are not listed in the second edition of the VARIABLE STAR CATALOGUE (Kukarkin et al 1957). About one-half of these stars have also been found to be variable by others, mostly at the Cape Observatory (Cousins and Stoy 1963, Cousins, Lake and Stoy 1966, and subsequent issues of Monthly Notes of the Astronomical Society of Southern Africa). These objects are indicated by (1) in the last column of Table 1. Two northern stars found to be variable by Uppsala observers (Haggkvist and Oja 1966, Ljunggren and Oja 1964) are noted by (2) in Table 1. A light curve for HR 5134, with an approximate period of 80 days, has been

Table 1

Red Giant Variables of Small Amplitude

HR	V_E	(B-V)	(U-B)	(102)	(65,62)	(102,65)	ΔV	N	t (yrs)	ΔV (other)
46	$5^{m}.10$	$+1^{m}.62$	+1.82	$2^{m}.37$	$+0^{m}.55$	$-0^{m}.23$	$0^{m}.10$	16	4	$0^{m}.07$(1)
48	4.38	+1.63	+1.97	2.04	+0.485	−0.54	0.08	8	2	0.07(1)
105	4.85	+1.65	+1.80	2.09	+0.58	−0.15	0.11	6	3	0.1 (1)
257	5.70	+1.56	+1.75	2.27	+0.675	+0.47	0.20	8	3	0.13(1)
304	6.20	+1.64	+1.90	3.61	+0.56	−0.20	0.10	5	2	0.08(1)
435	6.30	+1.66	+1.86	3.45	+0.59	−0.03	0.15	6	2	0.15(1)
555	4.40	+1.60	+1.70	1.35	+0.65	+0.165	0.15	6	2	0.15(1)
587	5.50	+1.49	+1.38	1.69	+0.71	+0.745	0.20	5	2	0.11(1)
904	6.20	+1.74	+2.04	3.75	+0.48	−0.465	0.18	8	4	0.06(1)
911	2.45	+1.62	+1.94	0.09	+0.46	−0.555	0.05	8	3	0.06(1)
977	5.85	+2.15	–	2.59	+0.425	+0.005	0.3	3	2	0.4 (1)
1003	3.60	+1.60	+1.78	0.74	+0.60	−0.05	0.10	8	3	0.11(1)
1264	4.50	+1.64	+1.80	1.53	+0.60	−0.02	0.18	8	3	0.23(1)
1345	6.10	+1.63	+1.82	2.84	+0.66	+0.335	0.20	6	2	0.08(1)
1496	4.30	+1.59	+1.80	1.59	+0.575	−0.195	0.06	6	3	0.07(1)
1556	4.77	+1.79	+2.01	1.75	+0.61	+0.14	0.12	8	3	–
1695	5.20	+1.62	+1.84	2.41	+0.60	−0.03	0.10	4	2	–
1722	5.64	+1.58	+1.62	1.90	+0.71	+0.53	0.10	8	2	–
1939	6.30	+2.05	+2.09	3.00	+0.535	+0.08	0.19	6	2	–
1964	5.80	+1.72	+1.82	2.78	+0.60	+0.13	0.15	7	3	0.13(1)
2091	4.29	+1.70	+1.77	1.06	+0.61	+0.12	0.10	8	3	0.18(2)
2151	6.45	+1.58	+1.77	3.25	+0.725	+0.315	0.12	3	1	–
2203	5.60	+1.68	+2.00	2.76	+0.575	−0.10	0.11	4	1	–
2215	4.98	+1.83	+1.96	1.66	+0.615	+0.14	0.11	8	3	–
2393	6.30	+1.64	+1.91	3.53	+0.565	−0.105	0.13	4	1	0.13(1)
2631	5.99	+1.59	+1.67	2.79	+0.64	+0.14	0.13	6	2	–
3061	6.40	+1.56	+1.58	2.98	+0.72	+0.365	0.06	6	2	0.19(1)
3155	6.33	+1.57	+1.87	3.51	+0.60	+0.005	0.09	5	2	0.06(1)
3169	6.02	+1.64	+1.91	3.30	+0.55	−0.27	0.11	5	2	–
3521	6.30	+1.59	+1.55	3.40	+0.575	−0.09	0.14	7	2	–
3698	5.89	+1.60	+1.62	2.30	+0.705	+0.40	0.18	5	2	–
3793	5.90	+1.68	+1.68	3.07	+0.495	−0.135	0.07	5	2	–
3803	3.15	+1.55	+1.88	1.21	+0.375	−0.92	0.05	6	3	0.08
4007	6.20	+1.67	+1.75	3.11	+0.62	+0.055	0.25	8	2	0.23(1)
4045	6.30	+1.55	+1.43	2.84	–	+0.40	0.20	5	2	0.14(1)
4184	6.08	+1.60	+1.78	3.07	+0.61	−0.02	0.18	5	2	–
4463	5.71	+1.68	+1.93	2.88	+0.57	−0.30	0.19	6	2	0.23(1)
4483	5.26	+1.56	+1.57	1.90	+0.70	+0.37	0.12	8	2	–
4491	6.15	+1.62	+1.75	3.35	+0.61	−0.05	0.11	5	4	0.08(1)
4497	5.98	+1.66	+2.03	3.70	+0.47	−0.605	0.05	4	2	0.13(1)
4547	6.35	+1.66	+1.46	2.04	+0.77	+1.28	0.50	8	2	0.28(1)
4671	4.15	+1.58	+1.57	0.60	+0.69	+0.475	0.12	4	1	0.15(1)
4739	5.45	+1.58	+1.58	1.89	+0.715	+0.545	0.16	6	3	–

Table 1 - continued

HR	V_E	(B-V)	(U-B)	(102)	(65,62)	(102,65)	ΔV	N	t (yrs)	ΔV (other)
4755	6.06	+1.55	+1.54	3.26	+0.565	-0.085	0.07	4	1	-
4765	4.99	+1.61	+1.81	2.14	+0.57	-0.19	0.08	6	3	-
4858	6.40	+1.59	+1.81	3.85	+0.555	-0.36	0.06	5	2	0.05(1)
4902	4.78	+1.60	+1.54	2.15	+0.54	-0.30	0.06	6	4	0.10(1)
4938	6.22	+1.68	+1.83	3.48	+0.58	-0.125	0.09	4	1	0.11(1)
4949	5.50	+1.58	+1.50	1.91	+0.725	+0.50	0.13	6	2	0.33(2)
5052	6.15	+1.66	+1.81	3.32	+0.575	-0.175	0.17	5	2	-
5134	5.15	+1.62	+1.55	-	-	-	1.10	15	2	0.90(3)
Min	6.22	+1.58	+1.20	1.50	+0.92	+1.53				
5135	6.28	+1.67	+1.78	3.26	+0.64	+0.125	0.08	4	1	-
5192	4.23	+1.50	+1.44	0.31	+0.735	+0.78	0.09	10	3	0.1 (1)
5299	5.22	+1.56	+1.58	1.65	+0.70	+0.47	0.19	8	2	-
5331	6.48	+1.60	+1.77	3.65	+0.63	-0.125	0.25	4	4	-
5603	3.28	+1.68	+1.91	0.52	+0.555	-0.265	0.07	8	1	0.10(1)
5654	5.90	+1.51	+1.41	2.71	+0.635	+0.19	0.23	3	1	-
6020	4.71	+1.68	+1.67	1.38	+0.64	+0.34	0.15	8	1	0.16(1)
6128	5.22	+1.75	+2.05	2.64	+0.535	-0.275	0.14	8	7	0.06(1)
6242	5.93	+1.59	+1.65	2.57	+0.675	+0.29	0.20	5	1	-
6346	6.29	+1.56	+1.64	2.80	+0.695	+0.335	0.20	4	1	-
6429	5.92	+1.67	+1.80	2.87	+0.60	+0.065	0.10	6	2	0.14(1)
6495	6.21	+1.61	+1.67	2.78	+0.70	+0.36	0.16	5	1	-
6543	6.50	+1.56	+1.60	3.03	+0.72	+0.40	0.08	6	3	-
6832	3.08	+1.56	+1.70	0.31	+0.575	-0.24	0.07	12	1	0.06(1)
6834	6.05	+1.60	+1.56	2.89	+0.68	+0.25	0.14	5	1	0.10(1)
6861	6.18	+1.96	+1.86	2.24	+0.705	+0.82	0.22	6	2	-
7201	6.61	+1.56	+1.54	3.32	+0.65	+0.27	0.11	6	1	-
7509	6.44	+1.60	+1.53	2.52	+0.77	+0.75	0.22	4	1	-
7523	6.36	+1.61	+1.86	3.55	+0.64	+0.13	0.52	6	2	-
7650	4.55	+1.64	+1.81	1.30	+0.64	+0.185	0.15	8	3	0.11(1)
7951	4.41	+1.65	+1.90	1.76	+0.58	-0.21	0.06	12	1	0.08(1)
8416	5.13	+1.55	+1.65	1.97	+0.685	+0.235	0.09	5	2	-
8421	6.13	+1.60	+1.73	2.70	+0.655	+0.24	0.14	11	2	-
8481	5.30	+1.52	+1.10	0.91	+0.775	+1.18	0.36	8	2	0.06(1)
8560	4.15	+1.58	+1.70	1.09	+0.615	+0.055	0.11	5	1	0.09(1)
8582	4.75	+1.60	+1.70	1.87	+0.625	+0.005	0.09	6	2	0.2 (1)
9089	4.35	+1.60	+1.80	1.44	+0.575	-0.07	0.07	5	3	0.09(1)

obtained by Knipe (1963, (3) in Table 1). Table 1 includes the mean magnitudes, (V_E) and (102), and colors, (B-V), (U-B), (65,62), (102,65) and the observed range in V_E from the number of observations, N, in the number of observing seasons, t. The amplitude in (102) is only a small fraction of that in V_E (Eggen 1967).

Omitting named variables, and known supergiants, 12 stars found to be variable by Stebbins and Huffer are included in Table 1 and 19 are not. The stars in the later group (HR 211,750,1451,2609,2703,2967,3319,3870,5219,5300, 5452,6010,6452,6815,7566,8698, 8815, 8940 and 9047) were not, with the exception of HR 5300, observed adequately enough in the present program to deny the variation. With possible exception of HR 5452,6452 and 8047, these objects are all in the same range of color (102,65) as the stars in Table 1. It seems likely that all red giants with (102,65) redder than about $-0^m.6$ (blackbody temperature near 3400°) are variable; all stars redder than this, that have been adequately observed in the present program or by Stebbins and Huffer, have been found to vary in light. The correlation of the observed light amplitudes with (102,65) is shown in Figure 1 where the open circles represent stars from Table 1. The temperature scale in Figure 1 is that for blackbodies (Eggen 1967). A few named, small

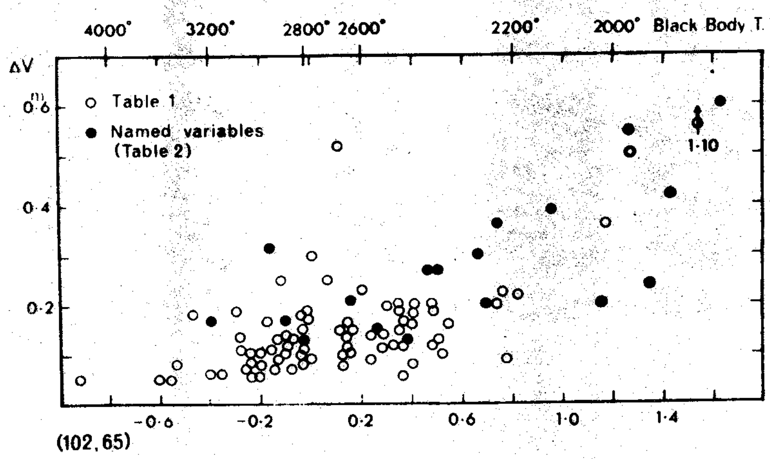

Fig.1
Observed amplitude in V_E correlated with the mean value of the continuum color (102,65)

amplitude variables are listed in Table 2 where the presently observed light range and number of observations is also given. These stars are shown in Figure 1 by filled circles. The approximate periods, in days, are listed in the last column of Table 2 when known. Most of these stars, and those in Table 1, are probably quasi-periodic in relatively short cycles. A selected group of southern objects from Table 1, now being monitored, have shown periods as short as 10 days.

Table 2

Named quasi-periodic red variables of small amplitude

Name	HR	V_E	(B-V)	(U-B)	(102)	(65,62)	(102,65)	ΔV	N	P (days)
Z Eri	832	$6^m.46$	$+1^m.58$	$+1^m.36$	$2^m.60$	$+0^m.775$	$+0^m.09$	$0^m.39$	7	80
RZ Ari	867	5.86	+1.44	+1.05	1.19	+0.91	+1.31	0.28	8	?
ρ Per	921	3.42	+1.61	+1.70	-0.12	+0.68	+0.35	0.13	5	40
RX Lep	1693	5.85	+1.51	+1.10	1.00	+0.89	+1.65	0.60	8	?
η Gem	2216	3.30	+1.60	+1.62	0.52	+0.54	-0.18	0.32	25	230
BQ Gem	2717	5.07	+1.64	+1.74	1.93	+0.665	+0.155	0.21	10	?
VZ Cam	2742	4.86	+1.63	+1.80	1.83	+0.645	-0.035	0.13	10	24
VY UMa	4195	5.95	+2.46	+4.45	2.86	+0.43	-0.10	0.17	10	?
VY Leo	4267	5.87	+1.43	+1.20	1.44	+0.88	+1.15	0.20	10	?
TU CVn	4909	5.90	+1.56	+1.44	1.96	+0.75	+0.70	0.20	4	?
W Boo	5490	4.77	+1.65	+1.89	2.36	+0.53	-0.39	0.17	6	?
RR UMi	5589	4.67	+1.57	+1.54	0.93	+0.72	+0.49	0.27	10	40
LQ Her	6039	5.76	+1.57	+1.59	2.25	+0.71	+0.455	0.27	9	?
AT Dra	6086	5.42	+1.62	+1.67	2.00	+0.67	+0.26	0.15	5	?
g Her	6146	5.08	+1.52	+1.12	0.10	+0.90	+1.28	0.55	14	70
OP Her	6702	6.06	+1.61	+1.56	2.14	+0.74	+0.66	0.30	8	?
R Lyr	7157	4.00	+1.58	+1.46	0.03	+0.76	+0.735	0.36	16	46
EU Del	7886	6.15	+1.38	+0.97	1.10	+0.915	+1.44	0.42	10	60

Table 3

Extreme Values of (102,65) for various spectral types

HR	Sp	(102,65)	b	HR	Sp	(102,65)	b
	K4III				M1III		
5241		-1.45	- 2°	1393		-1.03	-44
4143		-1.335	+10	4920		-0.765	+80
5598		-0.855	-12	7414		-0.44	-10
4145		-0.84	+29	5181		-0.49	+43
	K5III				M2III		
6076		-1.365	+21	1663		-0.96	-37
186		-1.285	-57	4449		-0.725	+28
5219		-0.26	+75	4586		-0.225	+36
1699		-0.58	-35	6128		-0.275	+27
	M0III				M3III		
5797		-1.135	+10	7686		-0.41	+22
8685		-1.13	-62	519		-0.39	-64
759		-0.53	-59	9089		-0.07	-66
4906		-0.585	+20	4763		-0.12	+ 6
4008		-0.605	+48		M4III		
				5603		-0.265	+29
				105		-0.15	-82
				4483		+0.37	+64
				4532		+0.38	+34

As accurate location of the border to the red instability region in the (M_B, T_e) plane, and its possible dependence on mass and chemical composition, may be of some importance when presently available stellar models are extended to cover this evolutionary state. Neither spectral types or B-V colors have enough resolution to locate this border accurately. The HR stars for which spectral types between K4 III and M4 III, on the MK system, are available are shown in Figure 2. The spread in (102,65)

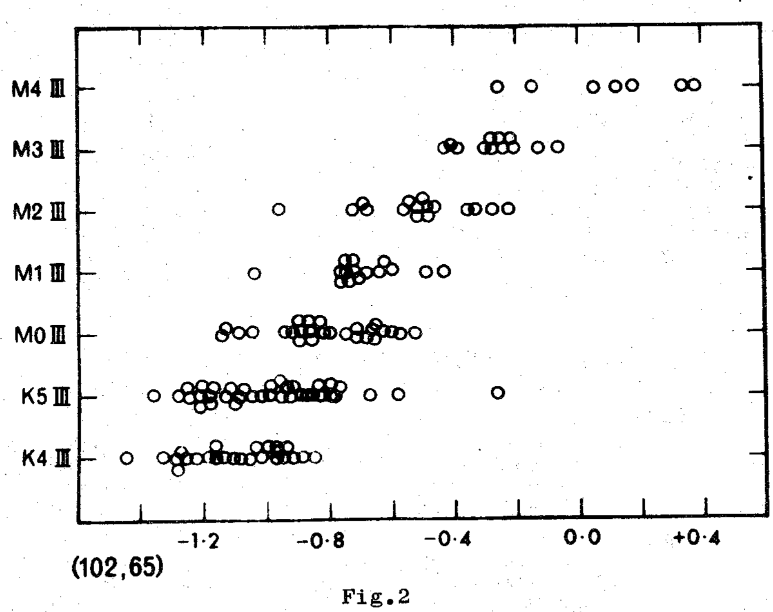

Fig.2

The spread of values of (102,65)
for MK spectral types

for each type is near $0^m.6$. The 2 or 3 bluest and reddest stars of each type are listed in Table 3. The relation between (B-V) and (102,65) for the non-variable stars is fairly well defined and is shown as the broad curve in Figure 3. However the stars in Tables 1 (open circles) and 2 (filled circles), with (102,65) redder than $-0^m.6$, show very little correlation with B-V. The (B-V) scale collapses near $+1^m.65$. A similar effect is seen in the (B-V) scale for dwarfs redder than $+1^m.4$ (e.g. Eggen 1965).

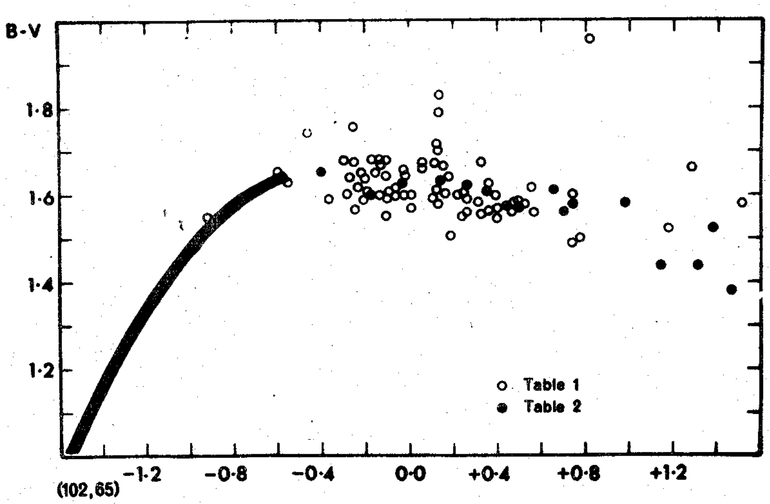

Fig.3
The correlation between the colors (102,65) and (B-V). The broad curve represents the nonvariable stars bluer than (102,65) = $-0^{m}.6$.

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ON A POSSIBLE METHOD OF IDENTIFICATION OF CEPHEID TYPES

The investigation of brightness-colour relation of variables of different types is carried out at the Main Astronomical Observatory of the Ukrainian Academy of Sciences.

The results of a great number of photoelectric observations of cepheids (RR Lyr, CW and Cδ types) in the U,B,V system are analized. The basic series of observation used in the present investigation are given in 1-7 .

The diagrams V versus B and U have been plotted and these dependences for all the stars under investigation proved to be linear. The values of ΔV/ΔB and ΔU/ΔB have been obtained. They are denoted by Δ_V and Δ_U respectively. These values were found to be different for different types of cepheids:

	Δ_V	Δ_U
RR	0.77±0.03	0.96±0.06
CW	0.71±0.03	1.13±0.05
Cδ	0.66±0.02	1.31±0.08

Mean error of $\Delta_{V,U}$ is ± 0.02

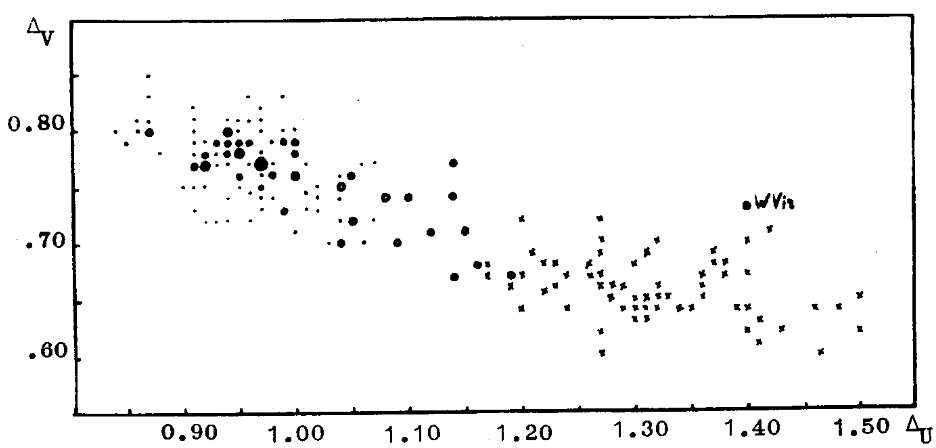
The diagram Δ_V versus Δ_U have been plotted (Fig.1) where points correspond to the RR Lyrae stars, circles to the CW stars and crosses to the Cδ stars. The dependence between Δ_V and Δ_U is:

$$\Delta_U = 3.39 - 3.16\ \Delta_V$$

Thus the result obtained shows that type of cepheid can be identified through photoelectric U,B,V observations without determining its light curves and periods.

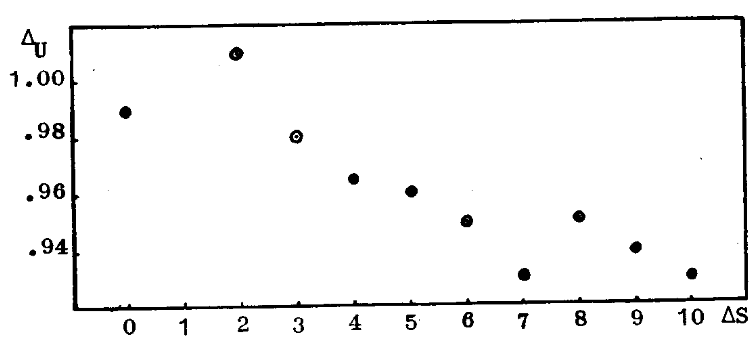
For instance BK Aur, TW CMa, U and X Vul have the values Δ_V and Δ_U adequate to classical cepheids and SZ Tau to CW stars (in the General Catalogue (8) the type of these stars is not identified). W Vir differs from other stars of that type. Its place on a Δ_V-Δ_U plane is far away from CW stars.

In addition the connection between Δ_U and metal content (ΔS) for RR Lyrae stars and between Δ_U and period for Cδ stars have been found (Fig.2 and Fig.3).



Δ_V
0.80
.70
.60
0.90
1.00
1.10
1.20
1.30
1.40
1.50
Δ_U

Fig.1



Δ_U
1.00
.98
.96
.94
0
1
2
3
4
5
6
7
8
9
10
ΔS

Fig.2

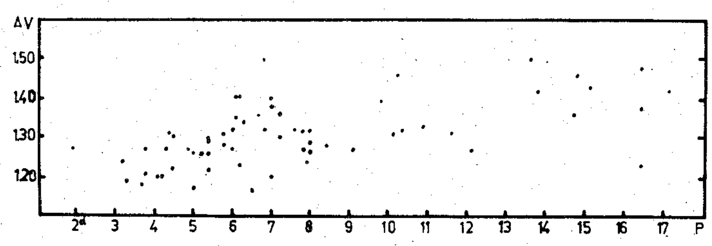


Fig.3

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OBSERVATIONS OF HELIUM STARS

At the Prague meeting of Commission 27 (1) I pointed out the similarity in composition between the hot helium stars and the R CrB variables. The compositions of hydrogen-poor stars have been summarized by Hack (2). Furthermore, MV Sgr has a light variation like R CrB and a spectrum like the helium stars BD +10°2179 and HD 124448 (3). These observations suggest that helium stars may vary in a similar manner to R CrB, and that they should be regularly observed.

I present here photoelectric observations of HD 124448, HD 160641 and HD 168476 made with the 24-inch (61 cm.) refractor and 40-inch (1.02 m.) reflector of the Royal Observatory, Cape of Good Hope, and with the 74-inch (1.88 m.) reflector of the Radcliffe Observatory, Pretoria. The 24-inch observations were made in the course of general photometric programmes and the mean results have been published (4,5). A single observation is estimated to have a standard deviation about $\pm$ 0^{m}02. I am grateful to the Officer-in-Charge at the Cape Observatory for permission to quote the individual results.

Observations with the reflectors were made in the course of a photometric programme on blue stars. The results are at present being prepared for publication. All observations were made by the author except those prior to 1963 which were made by Dr. A.J. Wesselink. I am grateful for his permission to quote these. The standard deviation of a reflector observation determined from a large number of observations is $\pm$0^{m}026 $\pm$0^{m}016 and $\pm$0^{m}022 at Radcliffe and $\pm$0^{m}016, $\pm$0^{m}009 and $\pm$0^{m}012 at the Cape in V, B-V and U-B respectively.

The observations are given in Table I transformed to the UBV system as defined by Cousins (6). Mean values of the reflector observations are as follows, giving double weight to the 40-inch results:

	V	B-V	U-B	
HD 124448	9^{m}99	-0^{m}09	-0^{m}80	
	$\pm$0.014	$\pm$0.013	$\pm$0.018	(s.d.)
HD 160641	9.86	+0.15	-0.85	
	$\pm$0.047	$\pm$0.011	$\pm$0.011	(s.f.)
HD 168476	9.30	-0.01	-0.69	
	$\pm$0.046	$\pm$0.010	$\pm$0.019	(s.d.)

TABLE I

Date		JD	V	B-V	U-B	$(U-B)_c$	Tel.
HD 124448							
1960 June	6	243 7094	9ᵐ98	-0ᵐ08	-0ᵐ80		74
1961 Mar.	7	7366	10.01	-0.11		1.17	24
Mar.	11	7370	10.01	-0.10		1.17	24
Apr.	24	7414	9.98	-0.08	-0.79		74
May	17	7437	10.01	-0.09	-0.81		74
May	19	7439	9.99	-0.08		1.16	24
June	6	7457	10.02	-0.12		1.16	24
1962 Apr.	29	7784	9.99	-0.08	-0.83		74
1964 Mar.	7	8462	10.00	-0.10	-0.77		74
July	14	8591	10.00	-0.09	-0.82		74
1968 Mar.	19	9935	10.00	-0.11	-0.80		40
Mar.	24	9940	9.98	-0.10	-0.79		40
Mar.	30	9946	9.98	-0.08	-0.79		40
Mar.	31	9947	9.98	-0.08	-0.78		40
Apr.	2	9949	9.97	-0.08	-0.80		40
1969 Apr.	5	244 0317	9.98	-0.09	-0.80		40
Apr.	7	0319	9.98	-0.08	-0.79		40
HD 160641							
1964 May	19	243 8535	9.86	+0.15	-0.84		74
July	14	8591	9.81	+0.15	-0.86		74
Aug.	9	8617	9.82	+0.16	-0.84		74
1968 Mar.	24	9940	9.89	+0.14	-0.84		40
Mar.	30	9946	9.84	+0.14	-0.85		40
Apr.	10	9957	9.90	+0.16	-0.85		40
HD 168476							
1960 Sep.	13	243 7191	9.39	-0.01	-0.66		74
Sep.	18	7196	9.40	-0.02	-0.68		74
1961 Apr.	21	7411	9.31	-0.02	-0.66		74
1963 July	10	8221	9.26	-0.01		1.21	24
July	19	8230	9.33	-0.02		1.19	24
July	26	8237	9.32	-0.02		1.21	24
July	29	8240	9.33	-0.01		1.23	24
July	31	8242	9.33	-0.01		1.21	24
Sep.	9	8282	9.30	+0.01	-0.67		74
Sep.	23	8296	9.26	-0.01	-0.67		74
1964 May	6	8522	9.30	0.00	-0.69		74
May	19	8535	9.33	-0.01	-0.66		74
June	14	8561	9.30	-0.03	-0.68		74
July	14	8591	9.29	-0.01	-0.69		74
Aug.	9	8617	9.30	-0.01	-0.68		74
Sep.	8	8647	9.33	-0.01	-0.68		74
1968 Mar.	24	9940	9.27	-0.03	-0.69		40
Mar.	30	9946	9.27	-0.01	-0.70		40
Mar.	31	9947	9.26	-0.01	-0.71		40
Apr.	10	9957	9.30	0.00	-0.70		40

The errors are the internal standard deviations for each star for an observation of unit weight, determined from the observations themselves. Consequently for the 40-inch observations they should be divided by $\sqrt{2}$.

These results show that no large variations have occurred during the periods of observation. While the magnitude of HD 124448 has remained constant, both HD 160641 and HD 168476 show micro-variation in magnitude but not in colour. HD 160641 is an O star (7) and HD 168476 is suspected of having an extended atmosphere (8). The observations of HD 168476 made in 1960 September were significantly different from the mean. Other stars observed on these two nights do not differ significantly from their means. HD 168476 was observed spectroscopically at the Radcliffe Observatory in 1952 and 1953 (9), and in 1960, 196', 1963 and 1964 (10). No significant changes in magnitude have been noted. A spectroscopic observation in 1969 April also showed no change. Because of the spectroscopic observations earlier in that year, the 1960 photometric observations would not appear to show HD 168476 emerging from a R CrB type minimum. The radial velocity may be variable with a small amplitude but no period has been found.

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PROPERTIES OF THE OPTICAL RADIATION OF NOVAE AND SUPERNOVAE STARS

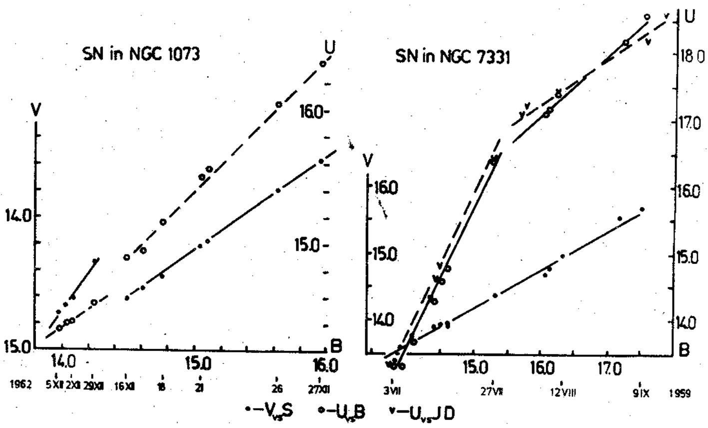
It was noticed that the relations between V,B or U,B photoelectric magnitudes can be described by linear regressive correlations for intrinsic variables of different types. The gradients $\Delta V/\Delta B$ and $\Delta U/\Delta B$ can be considered as quantitive characteristics of optical radiation properties when ΔV is not very small ($>0^m.5$). They reveal the process of variability in its development.

The changes of UBV magnitudes are plotted for four novae and four supernovae stars according to series of photoelectric observations with $\Delta V > 0^m.5$. The errors of gradients are smaller than 0,03 in all the cases. The N Her 1963 observations in (3,4,5) comprise the same time interval, while the differences in $\Delta U/\Delta B$ according to (4) and (5) reach 0,11, apparently being a sequence of peculiarities of individual ubv systems. Therefore one cannot conclude that gradient differences of such an order indicate different optical radiation properties of variable stars. The slopes of V,B and U,B relations change near minima for some novae. The above relations have a discontinuity near maximum for SN in NGC1073. Values of the both gradients before maximum differ from those after maximum. The gradient $\Delta U/\Delta B$ is different before and after the moment of the abrupt change of the light curve slope for SN in NGC 7331 (Fig.1)

Therefore on the basis of Table 1 there are reasons to conclude that the optical radiation properties before maximum differ from those after maximum for novae and supernovae stars. For novae the differences manifest mainly in U and for supernovae beside that in B and possibly in V regions. The optical radiation properties before maximum may be similar for novae and supernovae. After the maximum $\Delta V/\Delta B$ and $\Delta U/\Delta B$ both are close for different novae, while for supernovae $\Delta V/\Delta B$ are close and $\Delta U/\Delta B$ can be essentialy different. From the linear regressive dependences for V,B and U,B it follows that the relations between changes in UBV pe magnitudes are of a statistical nature and ΔV, ΔB and ΔU are proportional one to another in the same sence.

Table 1

	Before maximum		After maximum		Literat. source
	$\Delta V/\Delta B$	$\Delta U/\Delta B$	$\Delta V/\Delta B$	$\Delta U/\Delta B$	
N Her 1960			1,09	0,96	1
N Her 1960			1,10	1,05	2
N Her 1963			1,20	1,06	3
N Her 1963			1,14	1,03	4
N Her 1963			1,16	1,14	5
N Del 1967	1,00	0,69			6
N Del 1967	1,07	0,88			7
N Del 1967	1,10				8
N Del 1967			1,05	0,98	9
N Vul 1968			1,00	1,03	10
N Vul 1968			0,98	1,05	9
SN in Virgo			0,58	1,00	11
SN in NGC 1073	1,00	0,77	0,66	1,06	12
SN in NGC 3389			0,59	1,38	13
SN in NGC 3389 $B < 14\overset{m}{,}9$			0,54	1,35	14
SN in NGC 7331 $V < 16\overset{m}{,}7$			0,64	2,00	15
SN in NGC 7331 $V > 16\overset{m}{,}7$			0,64	1,00	15
mean	1,04 $\pm$ 0,03	0,78 $\pm$ 0,06	N 1,09 $\pm$ 0,02	N 1,04 $\pm$ 0,02	
			SN 0,61 $\pm$ 0,02	SN 1,0-2,0	



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ANALYSIS OF GRADIENT DIAGRAM FOR CEPHEIDS

As was found by E.S.Kheylo [1] all cepheids occupy a band on the plane (Δ_U, ΔV), where Δ_U = dU/dB, Δ_V = dV/dB, the band being elongated along the axis Δ_U. We shall call this plane the gradient diagram.Inside the band all cepheids separate according to their types. This paper is an attempt to explain such a location of cepheids on the gradient diagram.

Let us consider the light variations of cepheids to be connected with changes of dimension and of the black body temperature. In this case we can write for the luminosity in the Q-region

$$I_Q \sim R^2 I_Q(T), \qquad Q = U,B,V \qquad (1)$$

where R denotes the radius of star, I_Q (T) the radiation intensity in the isophotal wave length of Q for temperature T. Isophotal wave lengths were adopted to be 3680A for U, 4450A for B and 5460A for V [2]. The Wien formula gives satisfactory accuracy for $I_Q(T)$.

For radius changes from R_1 to R_2 and temperature changes from T_1 to T_2, equation (1) gives for the gradients

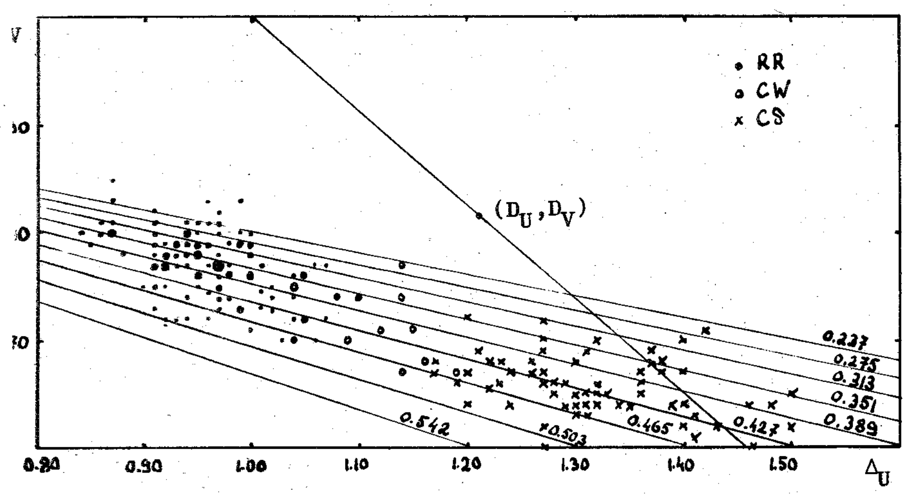
$$\Delta_U = \frac{a - C_U\ d}{a - C_B\ d}, \qquad \Delta_V = \frac{a - C_V\ d}{a - C_B\ d}, \qquad (2)$$

where a = 2 ln R_1/R_2 $\Delta R/R_2$ when changes of radius are small, d = $(T_2-T_1)/T_1T_2 = \Delta T/T_1T_2$.$c_U=3.91\cdot10^4$, $c_B=3.23\cdot10^4$, $c_V = 2.64\cdot10^4$. Educations (2) indicate, that Δ_U and Δ_V are linearly connected. This line passes through the point (1,1) and the point

$$D_U = 1.21, \qquad D_V = 0,815, \qquad (3)$$

which corresponds to the changes of the black body temperature only. In the Figure one can see that the cepheids are located below this line. Thus it is impossible to explane light changes of cepheids by the changes of dimension and of the black body temperature.

The changes of R or T in the U-region may be assumed to differ from those in the B- and V-regions. In this case $d_U \neq d_{B,V}$ or $a_U \neq a_{B,V}$.



Lines of equal m and the band of cepheids

Two hypotheses were considered

$$d_U \neq d_B = d_V , \qquad a_U = a_B = a_V \tag{4}$$

and

$$d_U = d_B = d_V = d, \qquad a_U \neq a_B = a_V \tag{5}$$

Better agreement seems to be achieved for the location of cepheids in the gradient diagram in the case (5). Then

$$\Delta_U = D_U \frac{m-1}{D_V-1} \left(1 - \Delta_V\right) , \tag{6}$$

where $m = a_U/C_U d$ is a free parameter. As follows from the Figure these lines occupy the cepheid band for m=0.23-0.58. Then Δ_U and Δ_V for a cepheid permit to obtain

$$\frac{a_U}{d} = C_U \quad 1 - \frac{\Delta_U}{D_U} \cdot \frac{1 - D_V}{1 - \Delta_V} \quad = \quad C_U \, m \tag{7}$$

and

$$\frac{a_U}{a} = D_U \frac{1 - \Delta_V}{D_V - \Delta_V} - \Delta_U \frac{1 - D_V}{D_V - \Delta_V} \tag{8}$$

Table 1

Star	Type	Δ_U	Δ_V	m	$\frac{a_U}{d}.10^{-4}$	$\frac{a_U}{a}$
δ Cep	Cδ	1.29	0.64	0.451	1.77	1.13
η Aql	Cδ	1.36	.65	.343	1.14	1.02
RS Cas	Cδ	1.24	.64	.465	1.82	1.18
XY Cas	Cδ	1,27	.75	.223	0.875	1.03
IX Cas	Cδ	1.27	.60	.513	2.01	1.16
ST Tau	CW	1.19	.67	.448	1.76	1.24
AP Her	CW	1.15	.71	.394	1.54	1.31
CC Lyr	CW	1.04	.75	.363	1.42	1.69
RR Lyr	RR	0.91	.73	.485	1.90	1.30
T Sex	RR	0.87	.80	.335	1.32	5.37
EH Lib	RR	0.97	.77	.355	1.39	2.20

Table 2.

Type	$\bar{\Delta}_U$	$\bar{\Delta}_V$	$\bar{m}$	$\frac{a_U}{d}.10^{-4}$	$\frac{a_U}{a}$
RR	0.96	0.77	0.362	1.42	2.24
CW	1.13	.71	.405	1.59	1.35
C	1.31	.66	.428	1.68	1.13

Tables 1 and 2 give the result of calculations according to expressions (7) and (8) for cepheids of different types. We came to the following conclusions:

1. The location of cepheids on the gradient diagram can be explained assuming that amplitude of radius changes in the U-region differs from those in the B- and V-regions.

2. It is possible to calculate the ratio of these amplitudes using the results of photoelectric observations eq.(8) . This ratio is the greatest for RR Lyr type and the smallest for classical cepheids.

3. Photoelectric observations permit to obtain the relation between changes of radius and temperature eq.(7) .

Kiev, June 19, 1969

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Veröffentlichungen der Remeis-Sternwarte Bamberg
Astronomisches Institut der Universität Erlangen-Nürnberg
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ELEMENTS FOR SONNEBERG VARIABLES (IX)

For 8 Sonneberg-Variables the derivation of elements was convenient by the Bamberg southern sky patrol. We want to mark these elements as preliminary so long there are no photoelectric measurements. We are very grateful for the extension by the Sonneberg plate material, taken by C.Hoffmeister. Miss H. Gessner was so kind to look for eclipses; we thank her very much. S 8455 = V 387 Cas at MVS 5, 12, 1968, was already treated by Miss I.Meinunger, finding also elements not published by her because of their uncertainty. Independently from her, we could now derive at Bamberg the same period published also by R.Weber in the Mainterne-Bulletin (April 1969). It was of great advantage to use plates taken by Mr. I.Paterson of the Mt.John Observatory, New-Zealand.

In all cases they are eclipsing binaries; 6 of them are named already, 2 are suspicious, they also get a BV-number according to our practice.

(S) = Sonneberg (NZ) = New Zealand (M) = Mainterne

S 5585 = CD Aps 1900: $16^h18^m00^s$,$-80°32'.8$, GCVS $10^m.5-11^m.5$

Min = JD 242 8693,550 + $0^d.893\,660$. E

Minima	E	B-R	Minima	E	B-R
24....			24....		
28693,532(S)	0	$-0^d.018$	38615,301(½)	11102,5	$-0^d.109$
36728,426(S)	9001	-0,021	38879,449	11398	-0,038
36781,221(S)	9050	+0,048	38884,407	11403,5	+0,005
38475,553	10946	+0,002	,443	11403,5	+0,041
38501,482	10975	+0,014	,454	11403,5	+0,052
38560,419	11041	+0,031	38917,361(½)	11440,5	-0,106
38577,334	11060	-0,096	,407	11440,5	-0,060
38587,251+	11071	-0,009	,453	11440,5	-0,014
,296	11071	+0,036	38939,399	11465	-0,037
,341(½)	11071	+0,081			

Minima	E	O-C	Minima	E	O-C
24.....			24.....		
38965,291	11494	+0,013	39300,369	11869	-0,031
,338	11494	+0,060	,410	11869	+0,010
38994,228	11526,5	-0,094	39315,245(½)	11885,5	+0,100
39214,523	11773	-0,086	39343,264	11917	-0,032
,599	11773	-0,010	,298	11917	+0,002
39300,322	11869	-0,078	,300	11917	+0,013
,367	11869	-0,033	39656,976+(NZ)	12268	+0,006
			39657,028 (NZ)	12268	+0,058

S 5647 = DU Aps 1900: $17^h10^m02^s$, $-78°17'.7$, GCVS 11^m-12^m
Min = JD 242 8687,375 + $3^d.087\ 910$. E

Minima	E	O-C	Minima	E	O-C
24.....			24.....		
28687,379(S)	0	+0,004	38914,438	3312	-0,094
28693,532(S)	2	-0,019	38917,453(½)	3313	-0,168
28755,329(S)	22	+0,020	,500	3313	-0,121
36728,384(S)	2604	+0,091	38939,304	3320	+0,068
36731,340(S)	2605	-0,040	,350(½)	3320	+0,114
38494,536	3176	-0,041	38942,307	3321	-0,017
38587,296	3206	+0,082	,352+	3321	+0,028
,341(½)	3206	+0,127	39294,342	3435	-0,004
38590,339	3207	+0,037	,388	3435	+0,042
,385	3207	+0,083	39300,410(½)	3437	-0,112
38877,491	3300	+0,013	,456	3437	-0,066
,513	3300	+0,035	39328,230	3446	-0,083
,538	3300	+0,060	,283+	3446	-0,030
38880,474	3301	-0,092	,349	3446	+0,036
38911,384	3311	-0,061	39618,451	3540	-0,125
38914,392	3312	-0,141	39670,967(NZ)	3557	-0,103
			71,014(NZ)	3557	-0,056

S 5931 = CSV 7496= CAP -57° 8150($8^m.8$)=HD 151 697(F_0)=BV 1259
Min=JD 243 6689,430+$1^d.484\ 060$. E Ampl.$0^m.40$ EA or EB

Minima	E	O-C	Minima	E	O-C
24.....			24.....		
36689,406(S)	0	-0,024	38915,394	1500	-0,126
36695,356(S)	4	-0,010	,441	1500	-0,079
36721,356(S)	21,5	+0,019	38933,354	1512	+0,025
36730,303(S)	27,5	+0,062	38939,304+	1516	+0,039
36747,400(S)	39	+0,092	,350	1516	+0,085
36779,231(S)	60,5	+0,015	38942,307	1518	+0,074
36790,340(S)	68	-0,006	,351	1518	+0,118
38228,315	1037	-0,085	39289,354(½)	1752	-0,149
38234,313+	1041	-0,023	,401	1752	-0,102
38258,219(½)	1057	+0,138	39301,375	1760	0,000
38501,571	1221	+0,104	39356,233	1797	-0,052
38553,417	1256	+0,008	39614,465+	1971	-0,056
38556,418+	1258	+0,041	,503	1971	-0,009
38577,334(½)	1272	+0,180	39679,927(NZ)	2015	+0,117
38605,299	1291	-0,052	39682,937(½)(NZ)	2017	+0,158
38620,227+	1301	+0,035	,885(NZ)	2017	+0,096
38887,449	1481	+0,126	39972,149(NZ)	2212	-0,022
			40026,937(NZ)	2249	-0,143

S 6471 = CI Eri = CAP -54° 401 (9^{m}2) = HD 12 241 (G_0),
GCVS 9^{m}6 - 10^{m}5

Min = JD 242 8782,475 + 3^{d}382 880 . E

M i n i m a 24.....	E	O-C	M i n i m a 24.....	E	O-C
28777,545(S)	-1,5	+0,145	38643,544+	2915	-0,026
28782,506(S)	0	+0,031	38723,313¼	2938,5	+0,245
28787,554(S)	+1,5	+0,005	39083,335+	3045	-0,009
28875,343(S)	27,5	-0,161	39088,312	3046,5	-0,107
36813,506(S)	2374	+0,074	39435,351½	3149	+0,187
36818,465(S)	2375,5	-0,041	39443,360½	3151,5	-0,261
38315,459+	2818	+0,028			

S 6654 = AA Hyi 1900: 00^{h}35^{m}20^{s}, -77°31!1, GCVS 11^{m}5-12^{m}5

Min = JD 242 8694,700 + 1^{d}150 272 . E

M i n i m a 24.....	E	O-C	M i n i m a 24.....	E	O-C
28694,661(S)	0	-0,039	38621,473	8630	-0,074
28762,625(S)	59	+0,059	,518	8630	-0,029
28777,502(S)	72	-0,018	,566½	8630	+0,019
28815,439(S)	105	-0,039	38643,401+	8649	-0,001
28837,371(S)	124	+0,034	,447½	8649	+0,045
28845,373(S)	131	-0,013	38696,285	8695	-0,030
28890,299(S)	170	+0,053	39326,592½	9243	-0,072
36784,535(S)	7033	-0,027	,625+	9243	-0,039
36792,538(S)	7040	-0,077	39378,417	9288	-0,009
,624(S)	7040	+0,009	,440	9288	+0,014
36814,459(S)	7059	-0,011	,462	9288	+0,036
36845,499(S)	7086	-0,028	39409,427½	9315	-0,057
38314,412	8363	-0,013	39446,270½	9347	-0,022
38367,310	8409	-0,027	39768,392	9627	+0,024
			,437	9627	+0,069

S 7158 = VW Phe = CoD -42° 496 (9^{m}5), GCVS 11^{m}-11^{m}5

Min = JD 242 8719,650 + 1^{d}742 160 . E

M i n i m a 24.....	E	O-C	M i n i m a 24.....	E	O-C
28719,592(S)	0	-0,058	36808,480(S)	4643	-0,019
28726,621(S)	4	+0,002	36815,469(S)	4647	+0,002
28747,506(S)	16	-0,018	38295,451	5496,5	+0,019
28791,556(S)	35,5	+0,059	38694,385	5715,5	-0,002
28802,349(S)	47,5	-0,054	38701,347	5729,5	-0,009
28809,375(S)	51,5	+0,004	38708,345	5733,5	+0,021
28816,429(S)	55,5	+0,089	39761,449	6338	-0,011
28864,321(S)	83	+0,072	39768,438	6342	+0,010
36794,583(S)	4635	+0,022	39790,969(NZ)	6355	-0,108

S 7148 = CSV 5906 = CoD −40° 288 (9^m5) = BV 1260,
Ampl. 0^m5 EW

Min = JD 242 8672,685 + 0^d613 229 5 . E

Minima 24.....	E	O–C	Minima 24.....	E	O–C
28672,659(S)	0	−0,026	38318,414	15729,5	−0,064
28699,612(S)	44	−0,055	38319,373	15731	−0,025
28722,623(S)	81,5	−0,040	38339,337	15763,5	+0,009
28830,322(S)	257	+0,037	38355,304	15789,5	+0,032
28842,300(S)	276,5	+0,057	38642,493	16258	−0,077
28861,295(S)	307,5	+0,042	38643,497½	16259,5	+0,007
36781,440(S)	13223	+0,021	38694,395+	16342,5	+0,007
36784,492(S)	13228	+0,007	38711,307	16370	+0,055
36788,476(S)	13234,5	+0,005	38726,271½	16394,5	−0,005
36789,442(S)	13236	+0,051	39006,504	16851,5	−0,018
36811,459(S)	13272	−0,008	39361,535	17430,5	−0,047
36842,464(S)	13322,5	+0,029	39389,458+	17476	−0,024
36847,375(S)	13330,5	+0,034	39414,323+	17516,5	+0,003
38283,496	15672,5	−0,028	39444,315½	17565,5	−0,053
38295,451	15692	−0,031	39445,314	17567	+0,026
38315,414+	15724,5	+0,002	39768,437	18094	−0,023

S 8455 = V 387 Cas 1900: $00^h54^m33^s$, +58°10', GCVS 13^m–13^m5

Min = JD 242 8523,713 + 1^d608 208 . E

Minima 24.....	E	O–C	Minima 24.....	E	O–C
28523,693(S)	0	−0,020	38343,432(S)	6106	+0,001
28951,514(S)	266	+0,018	38938,455(M)	6476	−0,013
29231,369(S)	440	+0,045	39123,430(M)	6591	+0,018
29374,465(S)	529	+0,010	39136,265(S)	6599	−0,013
30704,410(S)	1356	−0,033	39210,324(M)½	6645	+0,069
30791,319(S)	1410	+0,033	39353,482(M)	6734	+0,096
34797,331(S)	3901	−0,001	39361,458(M)	6739	+0,031
35371,461(S)	4258	−0,002	39414,459(S)	6772	−0,039
35400,421(S)	4276	+0,011	39443,439(S)	6790	−0,006
36656,414(S)	5057	−0,007	39477,233(M)½	6811	+0,015
36783,553(M)	5136	+0,084	39530,335(M)	6844	+0,046
38044,284(S)	5920	−0,020	39792,461(S)	7007	+0,035
38322,534(S)	6093	+0,010			

Remeis-Observatory Bamberg

1969 June 1

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and

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FLARES OF BD +13°2618

In the course of our programme of photoelectrical monitoring of a set of dM, dMe and UV Ceti type stars we have observed two flares on BD +13°2618.

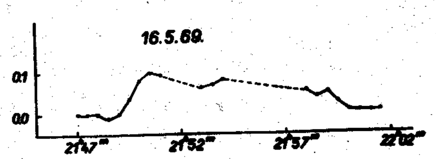
This star, CVS 6977 (1), spectral type dM2e, was observed earlier photographically by R.Weber (2) with the following results: $m_{p\ max}=10^m_.3$; $m_{p\ min}=11^m_.2$, type C (long-period cepheid). A.D.Andrews (3) observed this star photoelectrically as a suspected flare star with the following photometric results: V = $9^m_.56$; B-V = $1^m_.54$; U-B = $1^m_.20$; no flares were observed during a monitoring time of 1^h12^m.

Our photoelectric observations were made in the B-band with the 64 cm meniscus telescope. The time coverage is shown in Table 1. The total coverage was 31^h36^m. Table 2 contains the flare characteristics according to (4). The light curves of the flares have the relative intensities $(I_{o+f}-I_o)/I_o$ as ordinates and Universal Time as abscissae.

Dr.Vitrichenko obtained with the 122 cm reflector of the Crimean Astrophysical Observatory the spectrogram of this star with the dispersion of 130 Å/mm. The spectrum was taken during the photoelectrical monitoring when the star was in a quiet state. Only the H-alpha-line is visible in emission, its equivalent width is equal to 0.5A.

Table 1.

Date 1969		Coverage U.T.
April	22	$20^h10^m-15^m$; $21^h04^m-18^m$; $21^h24^m-38^m$
May	6	$19^h28^m-40^m$; $19^h44^m-20^h00^m$
	10	$18^h51^m-19^h08^m$; $20^h38^m-50^m$; $20^h54^m-21^h10^m$
	16	$19^h17^m-35^m$; $19^h37^m-20^h00^m$; $20^h39^m-21^h05^m$; $21^h09^m-54^m$; $21^h58^m-22^h02^m$; $22^h05^m-20^m$; $22^h28^m-32^m$
	18	$19^h35^m-20^h38^m$; $20^h39^m-21^h03^m$; $21^h13^m-38^m$
	23	$19^h00^m-19^m$; $19^h52^m-20^h30^m$; $20^h57^m-21^h25^m$
	27	$19^h25^m-30^m$; $19^h32^m-20^h04^m$; $20^h07^m-21^h09^m$
	30	$19^h34^m-20^h19^m$
June	1	$19^h00^m-20^m$; $19^h29^m-36^m$
	2	$19^h24^m-20^h06^m$; $20^h12^m-22^h13^m$
	5	$19^h42^m-54^m$; $20^h04^m-21^h46^m$
	6	$19^h10^m-20^h00^m$; $20^h18^m-22^h40^m$
	8	$20^h05^m-21^h30^m$; $21^h44^m-59^m$
	9	$19^h07^m-51^m$; $20^h10^m-21^h09^m$
	11	$19^h16^m-31^m$; $19^h34^m-20^h04^m$; $20^h16^m-56^m$; $20^h53^m-21^h37^m$
	12	$19^h04^m-38^m$; $19^h39^m-49^m$
	13	$19^h03^m-34^m$; $19^h37^m-20^h40^m$
	17	$19^h14^m-44^m$; $19^h45^m-20^h20^m$; $20^h30^m-21^h16^m$
	19	$19^h32^m-20^h30^m$; $20^h43^m-21^h00^m$
	20	$19^h12^m-45^m$; $19^h46^m-57^m$; $20^h14^m-21^h05^m$



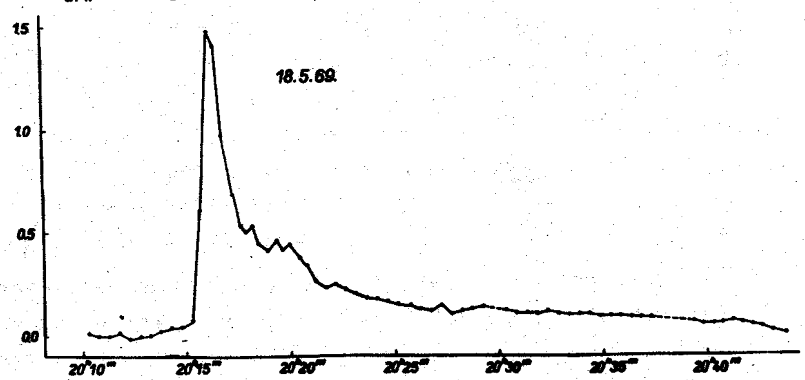


Table 2.

Date and U.T. of flare maximum 1969 May	Duration before maximum (minutes) t_b	Duration after maximum (minutes) t_a	Δm	Δm_{lim}	Integrated intensity, minutes	Air mass
16 $21^h50^m.5$	1.5	9.5	$0^m.10$	$0^m.03$	0.63	1.57
18 $20^h16^m.0$	2.0	27.5	0.98	0.03	6.10	1.30

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INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 362

Konkoly Observatory
Budapest
1969 July 8

THE MAGNITUDE, COLOR AND SPECTRUM OF RV Sgr(1)

During our survey of giant N stars (Hidajat,1965) in the Palomar-Groningen Variable Star Field 3 (2) (Plaut, 1969), we observed the changes of the color and spectrum of the variable star RV Sgr. The variations are summarized in the following table.

JD 2438 000+	V	V-I	M-type Spec.
964.17	12.1	+4.50	-
992.05	12.5	+4.73	-
994.13	-	-	9
998.16	-	-	8
JD 2439 000+			
001.15	-	-	8
002.15	-	-	6
293.27	11.9	+4.18	-
350.20	-	-	6.5
351.15	-	-	5-6
376.06	10.1	+3.25	-
384.05	9.7	+3.64	-

The photographic magnitudes and colors listed above were measured on Kodak 103a-D and I-N plates,exposed behind GG11 and RG 8 filters respectively to match the V-magnitude (of the UBV system) and the I-magnitude (of the Kron system). Pairs of V and I plates were always taken on the same night with the Bosscha Schmidt telescope.A standard photoelectric sequence in the field obtained by Wehinger (unpublished) has been used to calibrate the photometric scales. The spectral types have been determined on the unwidened spectral plates (I-N plus RG 8) with a dispersion of 1700A/mm at the atmospheric A-band. The Case system of classification (Nassau and Velghe, 1964) was used to determine the spectral types.

The magnitude, color and spectrum variations seem to be in agreement with the finding of Miss Houk (1969),who shows, that a variable with a period of 318 days would have on the average a spectral type M5 at maximum and M9 or M 10 at minimum.

We thank Dr. Nancy Houk for providing us with the A.A.V.S.O.Chart. The support of the photographic material provided by the Warner and Swasey Observatory is gratefully acknowledged.

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(1) R.A. = $18^h24^m.6$; Dec. = $-33^\circ.21'.3$ (1950)
(2) R.A. = 18^h26^m; Dec. = $-33^\circ.0$ (1950)

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PHOTOELECTRIC OBSERVATIONS OF THE FLARE STARS YZ CMi AND AD Leo

YZ CMi

In testing the feasibility of monitoring flare stars with an interference filter which passes the Calcium K line, a flare of YZ CMi was completely recorded during the period of co-operative observations of this star.

The filter, purchased for another purpose, is a Baird-Atomic Type S/UV with a maximum transmission of 57% at 3938Å and a half-peak bandwidth of 70Å as measured by Baird-Atomic,Inc. Except for this filter, the photoelectric setup was as described in I.B.V.S. No.329. Immediately prior to monitoring, a comparison was made between this filter and a broad-band U filter (Corning 7-54). At that time, 6^h02^mUT, the 53% illuminated moon was 20°.7 above the horizon. Use of the K-line filter decreased the measured flux from YZ CMi to 26% of that passed by the U filter; whereas, the background sky was reduced to only 8%. Photon noise was, of course, increased by restricting the bandpass. Also, to better follow rapid flares, the time constant (to 1/e) of the photometer was not increased but allowed to remain at about 1 3/4 sec. Thus, the intensity curve, illustrated in Fig.1, shows sharp noise fluctuations with a standard deviation estimated to be 26% of the star's deflection. Expressed in magnitudes, as recommended in I.B.V.S. No.326, σ(mag) is 1.46.

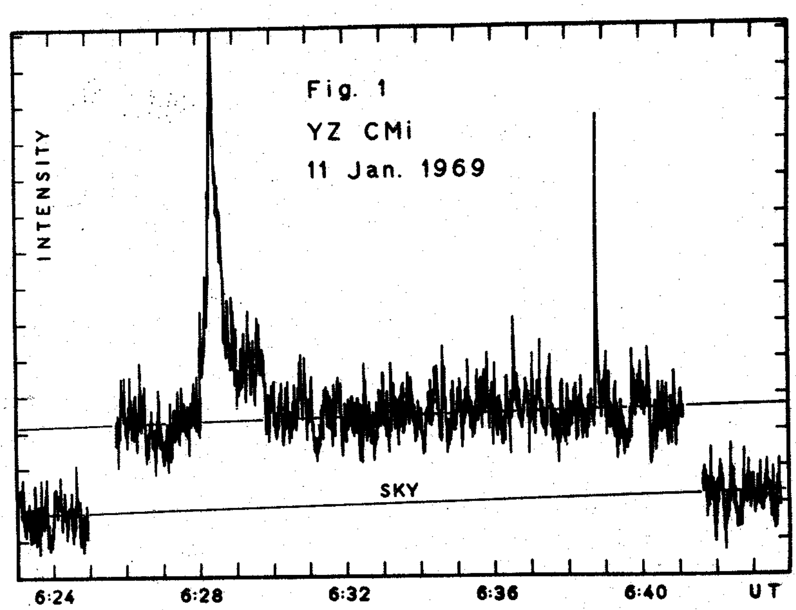
The flare at $6^h28^m.4$ UT caused the pen to just touch the stop at the edge of the chart. The peak at $6^h38^m.8$, which looks like a noise spike, would be of interest if it were stellar. No spurious event (as from a flashlight, switch, etc.) was noted at that moment, but electronic noise cannot be discounted. Table I summarizes the characteristics of

Table I. YZ CMi

11 Jan 1969 UT	Δm	Durations before and after maximum t_b	t_a	Integrated intensity P	Air mass	Altitude of 22½ day moon
$6^h28^m.4$	1.84	$0^m.4$	$2^m.6$	$2^m.2$	1.29	25°.5
$6^h38^m.8$	1.60	*	*	$0^m.15$	1.30	27°.5

* Total duration of 10 sec. Rise time between 1 and 3 sec.

these two peaks. Integrated intensity is computed according to the recommendation in I.B.V.S. No.326; however, Fig.1 is a direct copy of the photometer chart. The sky was clear and the seeing fair all night.



Coverage on 11 January 1969 totaled only 1.368 hours and was distributed as follows: $6^h12^m.0-6^h22^m.2$, $6^h25^m.7-6^h41^m.1$, $6^h44^m.6-7^h02^m.0$, $7^h06^m.0-7^h21^m.4$, $7^h25^m.6-7^h49^m.3$ UT. To establish a reliable background level at this low signal/noise and with the rising moon, interruptions to measure sky were relatively long and frequent. No comparison star was measured on this first night of observations. Further observations planned furing the 11-25 January co-operative period were prevented by bad weather.

AD Leo

Participation in the monitoring of AD Leo during the 11-24 February 1969 co-operative period was also limited to one night. Observations on two nights in March extended

Table II. Magnitude Differences between the Comparison Star and AD Leo using 3903-3973Å Filter

14 Feb. 1969		16 March 1969		23 March 1969	
UT	m_c-m_v	UT	m_c-m_v	UT	m_c-m_v
6^h00^m	1.28	4^h01^m	1.33:	4^h52^m	1.53
		4 38	1.40	5 17	1.75
		6 29	1.31	6^h10^m	1.49:
		7^h21^m	1.45		

the coverage to 5.397 hours. No flares were observed during this brief patrol. For each session the sky was clear and moonless, the K-line filter was used exclusively, and dif-

Table III. Coverage of AD Leo during 1969

Date	σ(mag)	UT Coverage
14 Feb.	2.37	$6^h01^m.4-21^m.0$, $6^h42^m.0-54^m.6$, $6^h58^m.2-7^h09^m.0$, $7^h18^m.0-35^m.3$, $7^h39^m.0-52^m.6$, $7^h57^m.7-8^h11^m.2$, $8^h28^m.7-8^h49^m.1$.
16 Mar.	1.62	$4^h04^m.6-18^m.0$, $4^h20^m.7-35^m.2$, $4^h38^m.8-5^h01^m.1$, $5^h03^m.4-21^m.7$, $5^h24^m.0-49^m.3$, $5^h51^m.9-6^h14^m.5$, $6^h30^m.5-40^m.0$, $6^h49^m.3-57^m.0$, $7^h01^m.0-7^h15^m.5$.
23 Mar.	1.87	$4^h55^m.5-5^h14^m.8$, $5^h17^m.6-45^m.0$, $5^h47^m.4-6^h08^m.6$.

ferential photometry was performed with respect to the comparison star suggested in I.B.V.S. No.326.

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COMMISSION 27 OF THE I. A. U.
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Budapest
1969 July 17

FLARE PHOTOMETRY OF AD LEO

As part of the international co-operative programme, observations were made at Boyden Observatory of AD Leo over the period 9th-24th February, 1969.

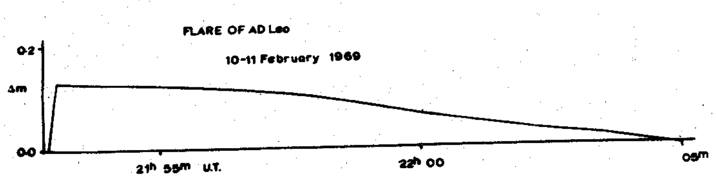
The instrument used in this monitoring was the 40 cm Nishimura reflector equipped with a Johnson B-filter and a solid CO_2 cooled E.M.I. 6256 photomultiplier tube feeding into a General Radio Company D.C. amplifier (Type 1230 - A).

Table I. Monitoring Time and Observed Flares

Date	U.T.	Total Hours per Night	Flare No.	U.T. of Flare	Duration (min)	Δm
Febr.1969						
9	$19^h24^m-21^h14^m$	1^h50^m				
10	19 50 -22 09	2 19	1	21^h53^m	12	0.17
19	18 44 -21 35					
	21 45 -23 05					
	23 13 -23 25	4 23				
20	18 54 -22 22	3 28				
21	18 40 -21 37	2 57				
	Total	14^h57^m				

As will be seen from Table I. the total monitoring time was 14^h57^m. During this time one event was recorded, a low magnitude flare with a relatively long duration of nearly 12 minutes (Fig.1).

Fig.1



Although this flare was a minor one so far as Δm was concerned, we consider it worthy of report as our equipment ensures an accuracy of better than 5 %. Especially interesting is the very gradual decline after the flash phase.

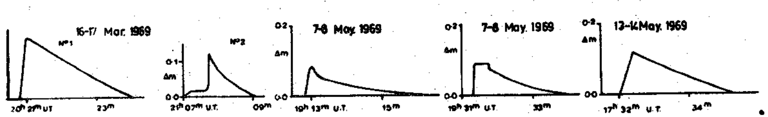
Further observations of AD Leo have been made since the February 1969 International co-operation period, the total additional monitoring time being 30^h20^m as shown in Table II. Five minor flares have been observed.

Table II. Monitoring Time and Observed Flares of AD Leo

Date	Universal Time of Coverage	Total Hours per Night	Flare No.	U.T. of Flares	Duration (mns)	Δm
Mar. 16	$17^h50^m-19^h17^m, 20^h46^m-21^h40^m$	2^h21^m	1	$20^h20^m.8$	6.2	0.17
			2	21 07.0	4	0.12
19	18 45 -21 35, 21 45 -23 05, 23 13 -23 25	4 22				
20	18 53 -22 22,	3 29				
21	18 40 -21 38	2 58				
	Total	13^h10^m				
May 7	$17^h33^m-18^h58^m, 19^h05^m-20^h18^m$	2^h38^m	1	$19^h12^m.8$	6.2	0.08
			2	19 31.3	5.1	0.09
13	16 52 -20 42	3 50	3	17 32.0	6.1	0.12
12	18 59 -20 40	1 41				
14	16 59 -19 44, 20 05 -20 30	3 10				
16	17 05 -18 01	0 56				
18	16 41 -18 11	1 30				
22	16 45 -20 10	3 25				
	Total	17^h10^m				

The most interesting was flare No.2 on the night of 16th-17th March 1969 in that a gradual rise preceded the flash phase. The other flares showed the more usual initial rapid increase in intensity, followed by a fairly gentle decline.

Fig.2



Boyden Observatory, Bloemfontein, RSA. 1st July, 1969

A.H.JARRETT and J.P.EKSTEEN

COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
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Konkoly Observatory
Budapest
1969 July 21

THE VARIABILITY OF HD 128661

HD 128661 = BD +36°2509 was reported by Jackisch (1968) to be probably an eclipsing variable with an eclipse duration of 4^h20^m.

Photoelectric observations in two wavelength regions were made on three nights with a 16-inch Gregorian f/35 reflector at the Tortugas Station of the New Mexico State University Observatory. An uncooled RCA 1P21 photomultiplier was used in conjunction with a DC amplifier and a Brown recorder. Standard B and V filters were used. The comparison and check stars were BD+36°2568 and BD+36°2505 respectively. No variation was noticed between the check and comparison

TABLE 1 OBSERVATIONS WITH THE V FILTER

J.D.hel	Δm	J.D.hel	Δm	J.D.hel	Δm	J.D.hel	Δm
2440361		.86177	-.150	.71656	-.212	.89819	+.085
.72181	-.151	.86385	-.150	.72593	-.118	.89541	+.102
.75305	-.149	.86559	-.174	.72836	-.122	.90860	+.049
.75583	-.157	.87739	-.181	.73079	-.142	.91069	+.050
.75722	-.148	.87913	-.168	.74121	-.201	.91346	+.054
.76659	-.163	.89996	-.137	.74294	-.199	.92562	+.081
.76698	-.178	.90170	-.160	.74468	-.169	.92805	+.055
.76937	-.149	.90343	-.175	.75475	-.141	.93950	+.057
.77666	-.168	.90552	-.151	.75648	-.140	.94124	+.011
.77840	-.149	.91628	-.159	.75857	-.172	.94263	-.002
.78014	-.129	.91836	-.136	.80930	-.124	.95270	-.072
.79055	-.151	.92010	-.114	.81138	-.143	.95409	-.123
.79298	-.141	2440362		.85860	-.081	2440383	
.79402	-.148	.68183	-.233	.85999	-.045	.70614	-.242
.80865	-.118	.68322	-.221	.86138	-.051	.70892	-.134
.81004	-.117	.68496	-.182	.87423	+.044	.71135	-.115
.81177	-.107	.69538	-.223	.87631	+.033	.72281	-.050
.81976	-.144	.69746	-.212	.87805	+.014	.72420	-.061
.82080	-.145	.70371	-.151	.89263	+.109	.73288	-.064
.84858	-.157	.71482	-.136			.73531	-.105
						.73739	-.175

TABLE 2 OBSERVATIONS WITH THE B FILTER

J.D.hel	Δm	J.D.hel	Δm	J.D.hel	Δm	J.D.hel	Δm
2440361		.86107	-.172	.71482	-.136	.89819	+.085
.72042	-.201	.86281	-.179	.71656	-.212	.89541	+.102
.75236	-.261	.86489	-.182	.72593	-.118	.90860	+.049
.75444	-.242	.87496	-.172	.72836	-.122	.91069	+.050
.76590	-.193	.87670	-.172	.73079	-.142	.91346	+.054
.76729	-.185	.87913	-.191	.74121	-.201	.92562	+.081
.76368	-.196	.89962	-.159	.74294	-.199	.92805	+.055
.77597	-.176	.90066	-.177	.74468	-.169	.93950	+.057
.77770	-.201	.90239	-.181	.75475	-.141	.94124	+.011
.77909	-.191	.90482	-.164	.75648	-.140	.94263	-.002
.79020	-.190	.91524	-.173	.75857	-.172	.95270	-.072
.79194	-.194	.91732	-.178	.80930	-.124	.95409	-.123
.79368	-.199	.91906	-.191	.81138	-.143	2440383	
.80726	-.194	2440362		.85860	-.081	.70510	-.251
.80934	-.184	.68183	-.233	.85999	-.045	.70755	-.238
.81108	-.164	.68322	-.221	.86133	-.051	.71031	-.173
.81837	-.177	.68496	-.182	.87423	+.044	.72177	-.159
.82010	-.180	.69538	-.223	.87631	+.033	.72350	-.156
.82149	-.175	.69746	-.212	.87805	+.014	.73184	-.152
.84753	-.209	.70371	-.151	.89263	+.109	.73427	-.156
						.73635	-.176

stars. An "eclipse" was observed on May 20-21, 1968 and the epoch of minimum determined by the tracing paper method was found to be:

$$t_{min} = \text{JD (heliocentric) } 2440362.9070.$$

This "eclipse" is considerably narrower than that observed by Jackisch being only about three hours long, but the depths are in good agreement. Tables 1 and 2 contain the observations. Δm is the magnitude of the variable minus that of the comparison corrected for differential extinction. JD is the heliocentric time of the observation.

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Budapest
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EVIDENCE FOR VERY STRONG LIGHT-CURVE VARIATION
OF THE CEPHEID IU Cyg

Wachmann (A.A. 1966, Abh. Hamburg 6,283) has derived the light-curve and light-elements of the cepheid IU Cyg for the time interval 1907/1960 from 424 photographic observations, tied into a photoelectric sequence. He found two instantaneous systems of elements, the later one being:

$$J.D.(max) = 243\ 6788.7 + 31^{d}31451\ n.$$

Eggen's (O.J. 1969, Ap.J. 156,617) photoelectric observations of IU Cyg, made between June, 1962, and October, 1963, agree near maximum light very well with these element. They indicate, however, that the light curve of the variable has undergone drastic changes: Eggen's descending branch is much steeper and the asdending branch accordingly flatter; although Eggen's minimum is poorly determined, it is apparantly shifted by about 0.4 of the period to earlier phases. While on the basis of the older light curve the star was classified by Petit (M. 1960, Ann.Astr. 23,710) as a Delta Cep-type variable, Eggen's light curve is typical of W Vir-stars, which conforms with the period changes found by Wachmann and the great value of z, which one obtains from a population I period-luminosity relation (Fernie, J.D. and Hube, J.O. 1968, A.J. 73,492).

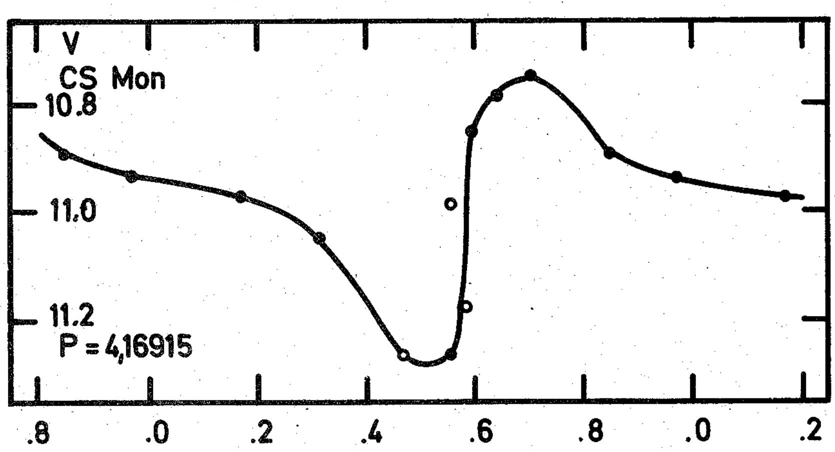
It is quite unlikely that the change of the light-curve is only the effect of photographic errors; this possibility is practically excluded by the shift of the minimum. A realistic estimate of the photographic errors even indicates that the increase in amplitude Δm_B from $1^{m}_{.}3$ to $\geq 1^{m}_{.}6$ is real.

Additional evidence for the supposed light-curve changes comes from the 8 photoelectric observations by Mitchell et al. (1960, Tonantzintla Bol. 3,153), which cover the interval from September, 1960, to December, 1961. The four observations near maximum fit Eggen's light-curve reasonably well; the four observations near minimum, however, exhibit a quite erratic behaviour. It seems indicated, therefore, that IU Cyg went through an unstable transitional phase in 1960/61 before assuming the light-curve defined by Eggen's 1962/63-observations.

July 10, 1969

REMARKS ON THE LIGHT-ELEMENTS OF CS Mon

The period of the Delta Cep-variable CS Mon was determined by Ahnert et al.(Ver.Sonneberg 1,47). On the basis of only 70 visual observations they found a period of 6.68073 days.Adopting this period Eggen (1969, Ap.J.156,617 found from eight photoelectric observations a most unusual light curve with a narrow, bright secondary maximum, which he considered to be confirmed by four photoelectric observation made by Walraven et al. (1958, B.A.N. 14, 81) and transformed into the UBV-system by Mitchell et al. (1964, Tonantzintla Bol.3,153). However this confirmation holds only if Walraven's observations are shifted by an arbitrary amount of about 0.55 periods. In addition the maxima determined by Ahnert et al. (Ver.Sonneberg 1,47) do not agree in phase with Eggen's light curve.



This evidence strongly suggests that the period for CS Mon is incorrect. The available data do not suffice to determine a reliable period; however, they do suggest that the period lies near four days. Eggen's observations can well be represented by an asymetric, but not unusual light curve with the following light-elements (see illustration, dots):

$$J.D.(max) = 2437899.0 + 4.16915\ n$$

The observations by Walraven et al. (open circles) scatter around the light curve by $\pm$ 0^{m}14, which does not seem to be prohibitive considering the necessary magnitude transformation.

July 15, 1967.

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Budapest
1969 July 22

REPORT ON THE OBSERVATIONS OF THE FLARE STAR AD Leo OBTAINED DURING 1969

The results obtained from our photoelectric observations of AD Leo carried out from February,9 to May, 24 at the Catania Observatory stellar station (Serra La Nave, 1700 m above sea level), are here reported.

The Cassegrain reflectors with photomultiplier + + filters combinations utilized are indicated in the following Table:

Telescope (aperture)	Photo-multiplier	Spectral response	Schott filters	Light
30 cm	EMI 6256 A	S 13	GG 14 (2 mm)	v
61 cm	EMI 6256 S	S 13	BG 12 (1 mm) + + GG 13 (2 mm)	b
91 cm	EMI 6256 A	S 13	BG 12 (1 mm) + + GG 13 (2 mm)	b

Considering only once the period of simultaneous observations at different instruments, we have gathered a total combined coverage of 58.4 hours in 18 nights. During this period 10 flares were observed.

No systematic measurements of the comparison star BD +20°2475 were made, but its luminosity was checked with BD +21°2193.

The data referring to the observations made during the international patrol planned by the Working Group on flare stars (Andrews, et al. 1968) have already been published (Cristaldi, et al. 1969), but they were included in this report in order to give all our observed data according to the standardised one proposed by Andrews, et al. (1969). The light curves of the flares no.1 to no.5 are here omitted because they have been already published on the $(I_{o+f}-I_o)/I_o$ scale (Cristaldi, et al. 1969).

The characteristics of our observations and the obtained data are given in Tables I and II. No transformation equations to the standard UBV system were applied, therefore the b and v lights quoted in the Tables are in our instrumental system. The accompanying Figures show the light curves of the observed flares. Unfortunately, the upper part of the most intense flare (no.10) was lost because the operator could not switch the instrumental sensitivity; therefore, the t_{max}, t_e, $I(m)_{max}$ and P data given in the Table II, are determined from a free-hand extrapolation of the light curve (broken line).

Finally, we should like to point out that in the case of a complex flare light curve (like the one indicated in the Figure as curve no.8-9) we consider the peaks as belonging to independent flares when separated by even a small interval of time during which the $(I_{o+f}-I_o)/I_o$ value drops to zero.

Catania Astrophysical Observatory, Italy.
1969, July 14

S.CRISTALDI, M.NARBONE and M.RODONO

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Andrews, A.D., Chugainov, P.F., Gershberg, R.E. and Oskanian, V.S. 1969, Comm.27 IAU, Inf.Bull.var.Stars, No.326

TABLE II

Observed Flares

M	D	CC	No	Tl	L	t_b	t_{max}	t_e	Δm_{lim}	$I(m)_{max}$	P	sec z
Feb.	13	132^m	1	91	b	$21^h26^m.9$	$21^h29^m.1$	?	$+3^m.7$	$+2^m.08$	?	1.205
"	14	46	2	"	"	19 08.0	19 08.8	$19^h10^m.6$	+3.7	+2.25	0.19^{min}	2.164
"	"	"	3	"	"	19 10.0	19 12.2	19 17.0	+3.7	+2.08	0.50	2.138
"	15	272	4	"	"	20 54.4	20 55.2	21 10.0	+4.2	+1.62	0.57	2.184
"	"	"	5	"	"	23 25.4	23 25.6	23 31.0	+4.2	+2.12	0.09	1.088
Mar.	01	483	6	"	"	22 59.0	22 59.9	23 00.0	+3.0	+2.12	0.06	1.051
Apr.	04	158	7	"	"	01 01.7	01 02.1	01 09.8	+4.4	+1.70	0.31	2.061
May	01	159	8	"	"	20 44.5	20 44.7	20 45.0	+3.8	+2.00	0.02	1.184
"	"	"	9	"	"	20 45.1	20 45.3	21 45.5	+3.8	+1.38	0.04	1.185
"	"	"	10	"	"	21 27.9	21 29.1	22 05.0	+3.8	-1.80	18.78	1.318

M = month; D = day; CC = combined coverage from different instrument; Tl = cm aperture of telescope; L = light; t_b = UT of the beginning; t_{max} = UT of the maximum intensity; t_e = UT of the end; $\Delta m_{lim} = -2.5 \log(3\sigma/I_o)$, where σ represents the standard noise fluctuation and I_o represents the intensity of the quiet star; $I(m)_{max} = -2.5 \log \left[(I_{o+f}-I_o)/I_o\right]_{max}$; $P = \int (I_{o+f}-I_o)/I_o \, dt$ (integrated intensity in minutes).

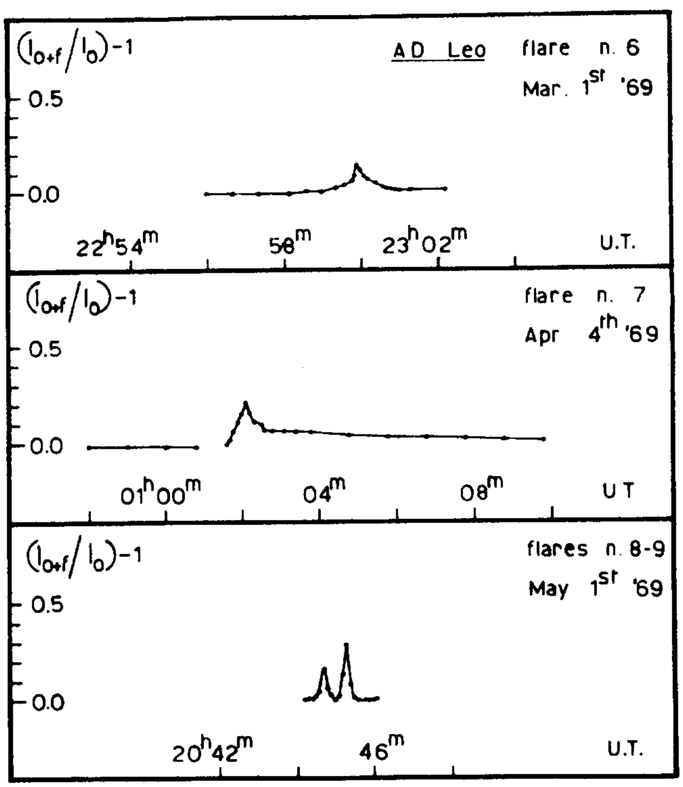
(I0+f/I0)-1
AD Leo
flare n. 6
Mar. 1st '69
0.5
0.0
22h54m
58m
23h02m
U.T.
(I0+f/I0)-1
flare n. 7
Apr 4th '69
0.5
0.0
01h00m
04m
08m
U T
(I0+f/I0)-1
flares n. 8-9
May 1st '69
0.5
0.0
20h42m
46m
U.T.

Fig.1

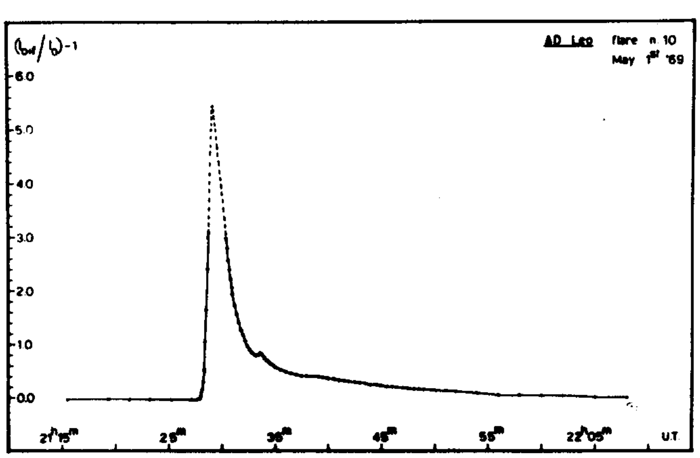
AD Leo
flare n 10
May 1st '69
6.0
5.0
4.0
3.0
2.0
1.0
0.0
21h15m
25m
35m
45m
55m
22h05m
U.T.

Fig.2

TABLE I

M	D	Tl	L	Detailed Coverage (UT)	TC	Δm_{lim}	CC
Feb.	09	91	b	01^h31^m-0255; 0258-0328; 0331-0411; 0413-0454.	195^m	+4.62	195^m
Feb.	13	"	"	2008-2142; 2147-2225.	132	+3.68	132
Feb.	14	"	"	1902-1948.	46	+3.72	
		30	v	1906-1927; 1932-1948; 1958-1959.	38	+4.05	47
Feb.15-16		91	b	2025-2035; 2037-2205; 2212-2307; 2313-0008; 0013-0044.	239	+4.25	
		30	v	1945-2032; 2042-2046; 2053-2231; 2238-2330; 2339-2349.	211	+4.08	292
Feb.17-18		91	b	1938-1957; 1959-2035; 2041-2056; 2104-2134; 2136-2147; 2153-2210; 2213-0040; 0045-0139; 0142-0151; 0201-0220; 0224-0349.	442	+4.25	442
Feb.21-22		"	"	1911-2036; 2038-2134; 2141-0126; 0140-0225; 0228-0300.	443	+4.35	443
Mar.01-02		"	"	1923-2131; 2133-2218; 2220-0015; 0017-0206; 0209-0226; 0230-0344; 0347-0401.	502	+2.82	502
Mar.	11	"	"	1951-2111; 2113-2126.	93	+4.48	93
Mar.	18	"	"	1850-2017; 2022-2057; 2105-2204.	181	+4.40	181
Mar.21-22		"	"	22^h56^m-2319; 2324-0007; 0010-0018; 0021-0051.	104	+4.40	104
Mar.31-01		"	"	2220-2249; 2251-2318; 2320-2349; 2351-0007; 0012-0055.	144	+3.08	144
Apr.02-03		"	"	1944-2208; 2210-2302; 2304-2312; 2314-2333; 2335-0015; 0018-0118.	323	+3.58	323
Apr.03-04		"	"	2216-2234; 2236-2317; 2322-0010; 0014-0034; 0039-0044; 0046-0116.	163	+4.56	163

TABLE I (cont.)

M	D	Tl	L	Detailed Coverage (UT)	TC	Δm_{lim}	CC
May	01	91	b	2004–2250.	166^m	+3.75	166^m
May	03	"	"	1941–2003.	22	+3.85	22
May	16	61	"	2028–2103.	35	+3.20	35
May	18	61	"	2009–2027; 2029–2142; 2145–2221; 2223–2301; 2304–2307.	168	+3.08	168
May	24	61	"	2058–2106; 2108–2129; 2132–2133; 2135–2155.	50	+2.62	50

M = month; D = day; Tl = cm aperture of telescope; L = light; TC = total coverage per night; $\Delta m_{lim} = -2.5 \log(3\sigma / I_0)$, where σ represents the standard deviation of the random noise fluctuations and I_0 represents the intensity of the quiet star; CC = combined coverage from different instruments.

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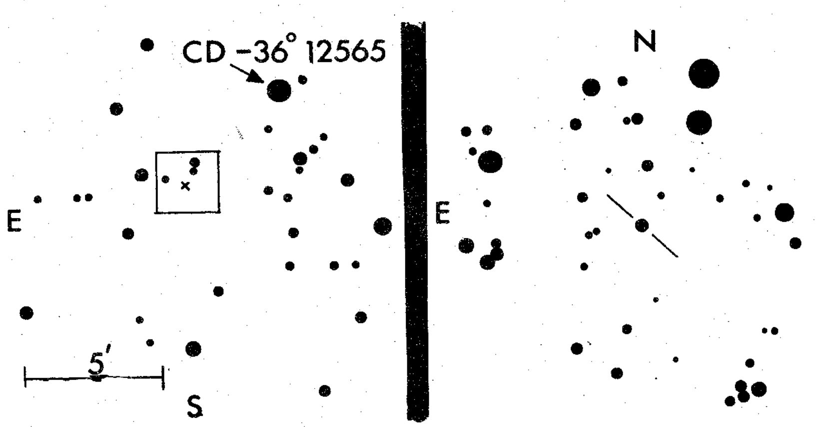
Konkoly Observatory
Budapest
1969 July 31

A NOVA IN CORONA AUSTRALIS

On objective-prism plates, taken about two years ago with the Curtis Schmidt telescope on Cerro Tololo, we have just discovered a star showing the spectrum of a nova in the early nebular stage of development. The approximate 1900 coordinates are: RA= $18^h18^m.0$, D= $-37°03'$, $l^{II} = 356°.9$, $b^{II} = -11°.1$.

The visually estimated relative strengths of the emission lines are given below along with the data describing the plates. No direct plates are available.



30 June 1967, IIa0, 11^m exp. 580 A mm^{-1} at H_γ

λ	Int.	λ	Int.
5007	5	4363 }	10
4959	2	H_γ }	
H_β	5	H_δ	5
4686	2	H_ϵ	2
4640	5	H_ζ	1

30 July 1967, 103aF+GG14, 9^m exp. 1000 A mm^{-1} at H_α

λ	Int.
H_α	10
5755	2
5007	5
4959	2

We estimate that on 30 June 1967 the star had m_{pg} about 13. According to the criteria given by McLaughlin (1), the spectrum at that time should correspond to a development stage about 5 magnitudes down from maximum light. Thus we presume that the nova attained about the 8th magnitude several months prior to our observations. Our two charts (an enlargement of the insert is on the right) identify the best candidate as the prenova which appears on the Palomar Survey southern extension chart 8626. We estimate the red magnitude to be about 17 which would give the nova a total range of about 9 magnitudes.

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(1) McLaughlin, D.B., Stellar Atmospheres, ed. J.L. Greenstein (Chicago: University of Chicago Press), chap. 17.

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NUMBER 369

Konkoly Observatory
Budapest
1969 August 7

NEW ELEMENTS FOR THREE ECLIPSING BINARIES

At the Ege University Observatory we obtained from April 1968 to August 1968 a great number of photoelectric minima of eclipsing binaries. Some of the O-C's show large, increasing O-C's against the elements in GCVS 1958 (I) and SAC 38 (II).

The new elements were calculated by the method of least squares. These new elements were checked by later minima which were not used for the calculation of these elements.

VW Cep

Min : JD 243 4780.433 $+0^d.2783192$. E (I)
Min : JD 243 9375.412 $+0^d.278317$. E (II)
Min : JD 243 9348.415 $+0^d.278314$. E (III)

Minima JD 24	Observer	O-C(I)	O-C (II)	O-C(III)
39348.4145	(IBVS 201)	-0.0715	-0.0332	-0.0005
39350.3623	"	-0.0720	-0.0336	-0.0009
39364.5574	"	-0.0711	-0.0327	+0.0002
39370.4027	"	-0.0705	-0.0320	+0.0009
39372.3512	"	-0.0703	-0.0317	+0.0012
39375.4124	"	-0.0706	-0.0320	+0.0009
39987.4237	Güdür+Pohl	-0.0832	-0.0398	-0.0003
40078.433	Ibanoglu+Güdür	-0.084	-0.0400	+0.0004
40137.435	Ibanoglu	-0.086	-0.0400	-0.0002
40358.4148	Ibanoglu	-0.0916	-0.0453	-0.0017
(*)40388.4715	Ibanoglu	-0.0934	-0.0468	-0.0014

UX Her

Min : JD 24 19876.4782 $+1^d.5488\ 563$. E $+0.010$ Sin $(0^\circ.03333\ E+263^\circ)$ (I)
Min : JD 24 19876.4782 $+1^d.5488\ 563$. E (II)
Min : JD 24 40022.4194 $+1^d.54885307$. E (III)

Minima	Observer	O-C(I)	O-C(II)	O-C(III)
JD 2440 ...				
022.4192	Kurutac, Güdür	-0.0346	-0.0329	-0.0002
039.4564	Baumbach, Meider	-0.0349	-0.0331	-0.0004
053.397	Kurutac, Güdür	-0.034	-0.032	+0.0001
403.4372	Ibanoglu	-0.0366	-0.0335	-0.0001
(*) 431.3161	Ibanoglu	-0.0396	-0.0341	-0.0005

AK Her

Min : JD 243 3515.720 $+0^d\!.42152143 \cdot E$ (I)
Min : JD 243 6757.6601 $+0^d\!.42152502 \cdot E$ (II)
Min : JD 243 8531.4318 $+0^d\!.42152309 \cdot E$ (III)

Minima	Observer	O-C(I)	O-C(II)	O-V(III)
JD 24	Krausser	+0.029	-0.005	+0.0002
38 531.432	Pohl	+0.032	-0.011	+0.0004
39 616.432	Pohl	+0.031	-0.012	-0.0014
39 980.419	Kurutac, Güdür	+0.036	-0.017	-0.0053
39 981.4730	Kurutac, Güdür	+0.036	-0.011	+0.0018
40 368.429	Kurutac	+0.035	-0.014	-0.0004
(*) 40 392.4562	Ibanoglu	+0.0356	-0.0141	0.0000

(I) GCVS (1958)
(II) SAC 38 (1967)
(III) New elements
* Minima for checking elements

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COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 370

Konkoly Observatory
Budapest
1969 August 13

A COMPARISON SEQUENCE TO THE FLARE STAR EV LACERTAE

Establishment of photoelectric comparison sequences to a number of flare stars may be valuable for a quick determination of magnitudes of these stars made in the course of visual, photographic or photoelectric flare monitoring. On the other hand, the need exists to study possible slow (secondary) light variations of flare stars. The sequence to the star YZ CMi has been recently given (ref.1) and now we have obtained one for the star EV Lac. Magnitudes and colours of both flare stars have been determined as well and these may serve as initial points in the studies of secondary variations.

The present observations were made at the Crimean Astrophysical Observatory on two nights. The 70 cm reflector equipped with an E.M.I.6256 photomultiplier and conventional UBV filters was used. Twelve stars in the cluster IC 4665 and five in Selected Areas SA 18 and SA 66 served as the standards for transformation of colour systems and extinction determinations. Magnitudes and colours of these stars were taken from papers of Johnson (ref.2) and Priser (ref.3). The resulting accuracy of observation was about $\pm 0^{m}.015$ for V magnitudes and (B-V) colours and $\pm 0^{m}.03$ for (U-B) colours. No systematic differences were found in observations between two nights.

Table I

Star	V	(B-V)	(U-B)
BD +43°4299	9.21	+1.17	+1.00
+43°4302	8.45	+0.46	-0.03
+43°4303	9.92	+1.40	+1.31
+43°4304	10.79	+0.24	-0.21
EV Lac	10.25	+1.58	+1.06
Optical companion, a few seconds of arc to the west of EV Lac			
(Hel.Ph.Cat.+43°22^h45^m No 115)	12.00	+0.74	+0.21
EV Lac + opt.companion	10.05	+1.37	+0.75

Table I contains the mean data of two nights (July 7-8 and 8-9). The V magnitude and (B-V) colour for EV Lac differ considerably from previous measurements of Mumford (ref.4) but if we compare his data with those contained in the last line of Table I it seems highly likely that he measured the total light of EV Lac and its optical companion.

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1) A.D.Andrews, I.B.V.S. No.342 (1969)
2) H.L.Johnson, Astrophys.Journ., 119, 181 (1954)
3) J.B.Priser, Publ.Astron.Soc.of Pacific, 78, 474 (1966).
4) G.S.Mumford, Astron.Journ., 61, 213 (1956).

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COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 371

Konkoly Observatory
Budapest
1969 August 18

UBV OBSERVATIONS OF NOVA DELPHINI 1967 (=HR Del) AND NOVA VULPECULAE 1968 No.1

The series of observation of both novae at Ondrejov Observatory (1,2,3) was discontinued in April, 1969. Since no new observations are planned, it was decided to publish the remaining data without further delay. Comparison stars for HR Del and Nova Vul 1968 No.1 were published in (1) and (3), respectively. There is also described the method of observation and reduction. EMI 6256 unrefrigerated photomultiplier attached to the 65 cm reflector was used and differential exctinction and conversion to the international UBV system was always applied. Quality q (3 is the best) is approximately proportional to the number of individual observation in a given night.

Nova HR Delphini

JD hel. 2440...	V	B-V	U-B	q
286.689	7.53	0.63:	-0.52	1
287.677	7.55	0.54	-0.49	2
319.619	7.68	0.60	-0.59	2
321.623	7.73	0.63	-0.54	1
326.611	7.68	0.67	-0.50	2

Comparison stars <u>e</u> and <u>f</u> from (1) were used

Nova Vulpeculae 1968 No.1

JD hel. 2440...	V	B-V	U-B	q
286.682	11.04	1.60	0.32	3
287.656	11.04	1.54	0.32	3
319.598	11.22	1.56	0.39	2
321.603	11.69	1.52	-	1
326.595	11.33	1.56	0.40	2

Comparison stars e and f from (3) were used

The V magnitudes of both novae are considerably brighter (about -0.7^m) than those obtained by Tempesti (4,5) in about the same time. Only minor part of the difference may be explained by colour terms in the equations of transformation that were apparently not known in Tempesti's measurements (at least one of his comparison stars was of late spectral type K0). However, the differences caused by emission features of the nova may be significant, but even this effect seems to be insufficient to explain the large shift of both magnitude scales.

References

(1) Grygar,J., Kohoutek,L., Harmanec,P., 1968, Bull.Astr. Inst.Csl. 19, 101.
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(3) Grygar,J., Kohoutek,L., 1969, Bull. Astr. Inst.Csl. 20, No.4 (in press).
(4) IAU Circ No.2139, 1969.
(5) IAU Circ No.2154, 1969.

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NUMBER 372

Konkoly Observatory
Budapest
1969 August 29

EMISSION OBJECT MHα 328-116 = V 1016 Cyg

Spectral observations of V 1016 Cyg = MHα 328-116 were carried out in the Cracow Observatory. The spectrograms were taken on July 23,26,27,28 and August 6, 1969 with a 5° objective prism attached to the 35 cm Maksutov reflector. The dispersion is 320 A/mm at H_γ. The ZU2 (ORWO-Astro-Special- unsensitized) plates were used.

Two plates, from July 23 and August 6, were calibrated photometrically and the intensities of the emission lines being the means of two night values were given in Table 1. All intensity estimates have been reduced for the plate sensitivity.

On the spectrum plate taken July 26, the lines FeII ($\lambda\lambda$4582.8, 4583.8), [Fe II] (λ4413.8), He I ($\lambda\lambda$ 4026.1, 3819.6) and He II (λ4685.7) appear to be somewhat stronger relative to the hydrogen lines than in the other spectra, especially He I (λ4026.1) and He II (λ4685.7).

In general, the spectrum of V 1016 Cyg = MHα 328-116 shows the character described by FitzGerald (1966) and McCuskey (1967). The continuum in extremely weak and on the plates obtained at Cracow it is impossible to find any traces of absorption lines.

However, some significant changes can be observed. The line He II (λ4685.7) was observed by FitzGerald (1966) in July and September 1965 to have a broad and very weak emission feature, later McCuskey (1967) observed it sharp and strong. The present observations of this line show it as a broad and rather weak feature. The [O III] lines are very strong but λ4363.2 mentioned by McCuskey to be considerably stronger relative to λ4958.9 and λ5006.8 [O III] is at present weaker than λ5006.8, which is extremely intense. The very strong intensity of the főrbidden lines [Ne III] is striking, especially at λ3868.7.

Cracow, August 1969

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References

Bloch, 1965 I.A.U. Circular No. 1927.
FitzGerald, Houk, McCuskey, Hoffleit, 1966, ApJ 144, 1135.
McCuskey 1967 I.A.U. Circular No. 2018.
Rosino 1965 I.A.U. Circular 1917.

Table 1

Identification of Emission Lines in V 1016 Cyg

Suggested identification		Element	Intensity* $I_{H_\beta} = 100$
3797.9 A		H 10	23.5
3819.6	very weak	He I	----
3835.4		H 9	36.8
3868.7		[Ne III]	265.8
3889.0		H 8	62.2
3967.5		He I	
3967.5	blend	[Ne III]	102.7
3970.1		Hϵ	
4026.2	very weak, visible on July 26 only	He I	----
4067.9		C III	
4068.6	blend	[S II]	15.3
4068.9		C III	
4076.2		[S II]	18.1
4101.7		H δ	44.6
4276.8		[Fe II]	
4287.4	line very large	[Fe II]	9.3
4305.9	blended	[Fe II]	
4340.5		H	59.9
4363.2		[O III]	116.4
4413.8		[Fe II]	
4414.4	band from λ4413	[Fe II]	7.2
4416.3	to λ4416	[Fe II]	
4470.3		[Fe II] ?	
4471.5	band from λ4470	He I	14.0
4472.9	to λ4473	Fe II	
4582.8	blend, very weak	Fe II	----
4583.8		Fe II	
4640.6		N III	13.9
4686.7	broad	He II	23.1
4713.4		He I	16.2
4861.3		Hβ	100.0
4921.9	blend	He I	91.0
4958.9		[O III]	
5006.8		[O III]	291.4

*intensities of the lines reduced for the plate sensitivity.

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Konkoly Observatory
Budapest
1969 August 30

1969 UBV OBSERVATIONS OF CG CYGNI

UBV photoelectric data, in the form of dual 10-second integrations in each filterband, of the eclipsing binary CG Cygni were taken during June 1969 at the Kitt Peak National Observatory using a 16" reflector. The observations are part of a continuing program, begun in 1965, the purpose of which is to study the asymmetries in the light curve maxima of close binaries. The data consist of differential values between the variable star and BD +34°4216. Phases were computed using the light elements

$$E = 2422967.4283 \quad \text{and} \quad P^{-1} = 1.5844252^{d-1}$$

Julian Date	Cycle Phase	DV	D(B-V)	D(U-B)
2440300+	27500+			
78.9286	87.2205	1.129	0.137	0.152
78.9310	87.2241	1.095	0.179	0.141
79.8932	88.7488	1.100	0.144	0.113
79.8957	88.7524	1.120	0.103	0.101
79.9040	88.7656	1.109	0.110	0.134
79.9063	88.7695	1.097	0.125	0.122
79.9406	88.8237	1.133	0.100	0.146
79.9432	88.8279	1.122	0.111	0.157
79.9467	88.8335	1.131	0.125	0.123
79.9486	88.8364	1.116	0.129	0.118
79.9527	88.8430	1.121	0.132	0.141
80.9343	90.3984	1.063	0.121	0.087
80.9362	90.4016	1.066	0.122	0.119
80.9378	90.4043	1.059	0.115	0.094
80.9396	90.4070	1.072	0.106	0.126
80.9422	90.4111	1.096	0.098	0.091
80.9438	90.4136	1.088	0.111	0.101
80.9447	90.4150	1.100	0.099	0.106
80.9457	90.4167	1.106	0.098	0.096
80.9476	90.4197	1.103	0.101	0.127
80.9508	90.4248	1.122	0.088	0.118
80.9525	90.4275	1.125	0.087	0.109
80.9535	90.4290	1.119	0.097	0.125
80.9555	90.4321	1.126	0.095	0.105
80.9578	90.4360	1.152	0.091	0.087
80.9594	90.4382	1.170	0.077	0.093

Julian Date	Cycle Phase	DV	D(B-V)	D(U-V)
2440300+	27500+			
81.9007	91.9299	1.256	0.179	0.145
81.9017	91.9314	1.277	0.166	0.156
81.9025	91.9326	1.292	0.172	0.136
81.9034	91.9341	1.297	0.184	0.141
81.9044	91.9358	1.318	0.180	0.194
81.9057	91.9377	1.354	0.167	0.190
81.9067	91.9392	1.359	0.178	0.179
81.9076	91.9407	1.389	0.176	0.180
81.9087	91.9424	1.420	0.173	0.191
81.9119	91.9478	1.490	0.185	0.203
81.9130	91.9492	1.500	0.195	0.198
81.9138	91.9504	1.551	0.170	0.272
81.9147	91.9519	1.534	0.204	0.225
81.9156	91.9536	1.570	0.199	0.236
81.9173	91.9563	1.605	0.188	0.258
81.9182	91.9578	1.620	0.188	0.300
81.9192	91.9590	1.629	0.222	0.238
81.9201	91.9604	1.639	0.217	0.301
81.9234	91.9658	1.729	0.229	0.289
81.9244	91.9675	1.750	0.229	0.290
81.9257	91.9692	1.765	0.252	0.318
81.9268	91.9712	1.790	0.241	0.293
81.9285	91.9741	1.796	0.259	0.291
81.9295	91.9756	1.802	0.253	0.315
81.9306	91.9771	1.808	0.236	0.328
81.9314	91.9783	*.787	0.266	0.334
81.9334	91.9817	1.805	0.229	0.331
81.9344	91.9834	1.795	0.227	0.307
81.9353	91.9849	1.786	0.227	0.303
81.9363	91.9863	1.756	0.235	0.321
81.9373	91.9880	1.722	0.234	0.312
81.9383	91.9895	1.727	0.219	0.297
81.9429	91.9968	1.638	0.184	0.295
81.9440	91.9983	1.587	0.207	0.271
81.9459	92.0015	1.545	0.215	0.270
82.8379	93.4148	1.103	0.113	0.079
82.8403	93.4185	1.101	0.110	0.092
83.8086	94.9526	1.568	0.192	0.212
83.8103	94.9556	1.613	0.195	0.208
83.8136	94.9607	1.686	0.187	0.274
83.8153	94.9634	1.729	0.198	0.247
83.8159	94.9641	1.739		
83.8162	94.9646	1.729		
83.8164	94.9653	1.751		
83.8167	94.9656	1.741		

Julian Date	Cycle Phase	DV	D(B-V)	D(U-B)
2440300+	27500+			
83.8170	94.9661	1.757		
83.8173	94.9666	1.767		
83.8175	94.9668	1.762		
83.8178	94.9673	1.764		
83.8180	94.9675	1.774		
83.8183	94.9680	1.779		
83.8186	94.9685	1.790		
83.8194	94.9700	1.807	0.225	0.310
83.8222	94.9741	1.834	0.210	0.338
83.8232	94.9758	1.847	0.207	0.354
83.8238	94.9768	1.838		
83.8241	94.9773	1.843		
83.8244	94.9778	1.825		
83.8246	94.9780	1.850		
83.8251	94.9788	1.836	0.233	0.316
83.8262	94.9805	1.832	0.212	0.319
83.8278	94.9832	1.825	0.239	0.294
83.8309	94.9880	1.771	0.194	0.316
83.8321	94.9900	1.734	0.203	0.274
83.8335	94.9924	1.697	0.207	0.278
83.8343	94.9937	1.691	0.189	0.283
83.8379	94.9993	1.600	0.204	0.276
83.8400	95.0024	1.571	0.205	0.241
83.8411	95.0044	1.547	0.189	0.251
83.8450	95.0105	1.474	0.169	0.217
83.8469	95.0132	1.455	0.147	0.218
83.8478	95.0149	1.406	0.167	0.234
83.8494	95.0171	1.397	0.160	0.200
83.8991	95.0959	1.099	0.130	0.162
83.9009	95.0991	1.106	0.142	0.147
83.9021	95.1011	1.101	0.132	0.141
83.9037	95.1035	1.107	0.129	0.143
83.9103	95.1138	1.089	0.169	0.113
83.9114	95.1155	1.095	0.124	0.163
83.9132	95.1184	1.091	0.119	0.142
83.9146	95.1208	1.097	0.139	0.136
83.9355	95.1536	1.100	0.112	0.137
83.9370	95.1560	1.097	0.120	0.129
83.9385	95.1587	1.090	0.117	0.147
83.9396	95.1602	1.082	0.125	0.129
83.9435	95.1665	1.083	0.133	0.129
83.9446	95.1680	1.083	0.122	0.151
83.9462	95.1707	1.078	0.126	0.150
83.9473	95.1726	1.083	0.125	0.142
84.8726	96.6387	1.102	0.105	0.121

Julian Date	Cycle Phase	DV	D(B-V)	D(U-B)
2440300+	27500+			
84.8742	96.6414	1.098	0.109	0.115
84.8771	96.6460	1.090	0.121	0.098
84.8785	96.6484	1.080	0.116	0.109
84.8800	96.6506	1.100	0.106	0.106
84.8826	96.6550	1.105	0.101	0.114
84.8837	96.6565	1.095	0.116	0.111
84.8855	96.6597	1.095	0.111	0.136
84.8867	96.6616	1.111	0.096	0.129
84.8937	96.6724	1.099	0.116	0.123
84.8976	96.6785	1.104	0.104	0.118
84.8987	96.6804	1.092	0.117	0.120
84.9003	96.6829	1.095	0.119	0.127
84.9015	96.6848	1.088	0.122	0.124
84.9241	96.7207	1.102	0.111	0.140
84.9260	96.7234	1.114	0.106	0.133
84.9294	96.7288	1.116	0.094	0.121
84.9311	96.7314	1.105	0.112	0.127

The light curve has apparently undergone a greater change between June 1967 and June 1969 than it had between October 1965 and June 1967, the maxima now appearing nearly equal.

Reference: Milone,E.F. 1969, I.A.U. Colloquium on Non-Periodic Phenomena in Varialbe Stars. p.457

E.F.MILONE

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Kitt Peak National Observatory
and The University of Maryland

COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 374

Konkoly Observatory
Budapest
1969 September 8

ON THE STAR N 98 IN NGC 2360

According to Baker's and Eggen's observations the star N 98 in NGC 2360 is a variable. Eggen (Ap.J.152, 83) has suggested, that if a variable is regular, its period may be a multiple of about 1 day.

At the request of Dr.Iorgensen,109 negatives have been obtained with exposure times of 4-5 minutes in V colour (GG11) by means of the Schmidt Camera (360-444 mm,F=630 mm) from December 13, 1968 through March 17, 1969. The cluster stars were used as standards. The mean square error does not exceed $0^{m}.05$. The star shows small fluctuations of light ($0^{m}.1$-$0^{m}.2$) near $12^{m}.80$ almost through the whole observational period.

One can hardly make any inference on periodic variations of the star from these data.

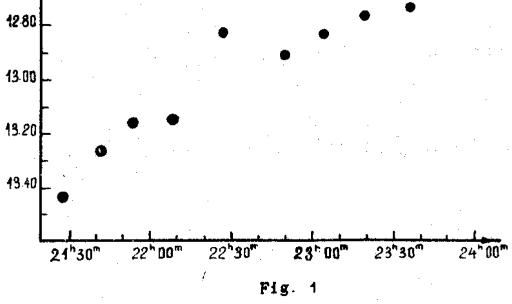

Fig. 1

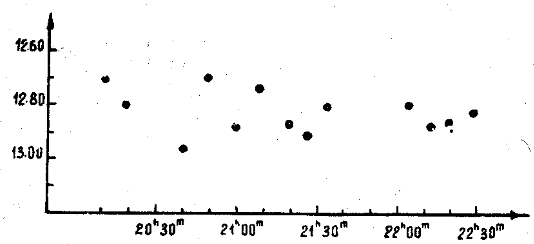

Fig. 2

The behaviour of the variable on December 20-21 and 21-22, 1968 attracts attention. The first night, nearly during 2 hours (U.T = $21^h29^m - 23^h50^m$), the variable brightened by $0^m.78$, the second night (U.T = $22^h31^m - 23^h43^m$) the increase of light amounted to $0^m.45$.

The observations of December 20-21 are given in Fig.1, those of January 17-18 in Fig.2, both covering more than 2 hours of slight fluctuations.

July 28, 1969

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

POSSIBLE OUTBURST OF HD 108486, OBSERVED 1965 APRIL 5

At a photoelectric test for small variability of A-stars, performed in 1965 at Kottamia Observatory, there were among others 28 stars of the Coma Cluster on the program. One of them was the Am-star HD 108486 = No.139 of Johnson and Kuckles, ApJ 122, p.209. During six nights in 1965 this object was compared in the V region 36 times respectively with the stars HD 108651 = No. 145 and HD 107935 = No.104. The mean error of one measurement was about ±0.008 mag. The observations were made within large intervals, mostly about one hour, as there were other stars to be tested as well.

On April 5, 1965, HD 108486 showed as increase of brightness of 0.15 mag. During the observation it was supposed at first that it might be a common light variation. But one hour later the observation showed again the normal brightness, so we have here most probably a small eruption. This observation seems to be quite certain,as the difference of brightness, deduced from the measurements, between the two comparison stars is constant,as well as the differences of brightness between the comparison stars and other test stars.

In 1967 and 1968 HD 108486 was compared with HD 108651 42 times in all with the 35-cm-mirror in the UBV-system here at Sonneberg.In all three colours the light fluctuations were not larger than 0.03 mag.

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COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 376

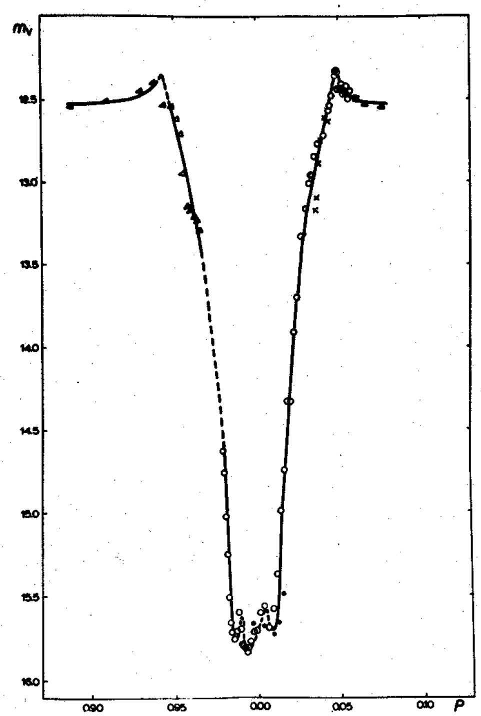
Konkoly Observatory
Budapest
1969 September 10

THE LIGHT CURVE OF 442 CAS (S 9484) DURING THE ECLIPSE OBTAINED BY T.V. OBSERVATIONS

The variable 442 Cas (S 9484) of the Algol-type was discovered by Hoffmeister in 1966. Its magnitudes at maximum and minimum and its elements were found to be $12^m.5$, $17^m.0$ and

$$T_{min} = 2430262^d.430 + 3^d.59225E$$

respectively (1). The minimum of the light curve is narrow and covers 0,09 of the period. To measure the minimum brightness by the method of photography is difficult owing to long exposures.



Light curve of 442 Cas during the eclipse. The different marks corresponds to different nights:
■ - J.D.2440213, ✕ - 38, △ - 41, ○ - 45, ● - 63, ▲ - 74.

The television observations of 442 Cas were made with the 0,5-meter telescope at the Crimean Astrophysical Observatory in the winter of 1968-1969. A new pick-up tube of high sensitivity with a multialkaly photocathod and yellow filter was used (2). The effective wavelength for stars of the spectral type G2 is 5500 A. The colour system is near that of the V. The exposure time of T.V.photographs was 1-4 minutes. 290 photographs of the variable in the phases 0,9-0,0-0,1 were taken during 6 nights. About 100 photographs in the maximum brightness were taken. The open cluster NGC 188 and NGC 7789 were observed as standards. The magnitudes of 32 stars in the neighbourhood of the variable were determined. The mean square error of a single observation is $0^m.1$. The maximum and minimum brightnesses of 442 Cas are $12^m.53$ and $15^m.73$, respectively. The light curve of the variable during the eclipse, drown from the elements mentioned above, is shown in the figure. Each mark is a normal point consisting of 3-6 observations. The variations of the minimum brightness are possibly real.It is interesting to note the peaks in the light curve before and after the minimum.

The epoch of the minimum observed is

$$T_{min} = 2440245^d.289 \pm 0^d.002$$

Crimean Astrophysical Observatory, USSR
26.8.1969

V.V.PROKOFJEVA, V.P.EPISHEV

REFERENCES

(1) Inf.Bull. on Var.St., Com.27 of the I.A.U.1968, N 269
(2) A.N.Abramenko, P.P.Petrov, V.V.Prokofjeva, Astr.Circ. USSR, 1968; N 491.

COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 377

Konkoly Observatory
Budapest
1969 September 10

V 348 Sgr BROUGHT UP TO DATE

The peculiar irregular variable V 348 Sgr (Ref.1) centered at $18^h\ 24^m$, -23°, was examined by Mrs.Jean Hales Anderson (Ref. 2) at the Harvard Observatory on over

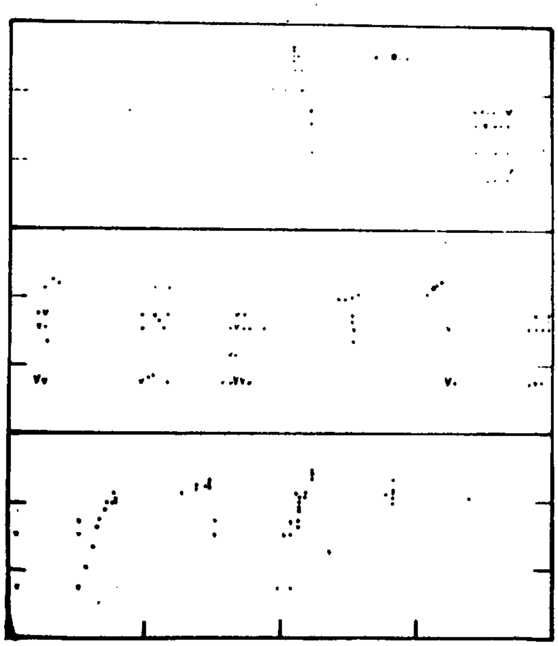


Fig.1. Estimates of V 348 Sgr from 1957 to 1969. Each strip represents an interval of 2000 days the first starting with JD 2435000, the last ending with 2441000. Abscissa markers indicate intervals of 500 days and the ordinate markers photographic magnitudes 13.0 and 15.0. Small symbols 1-4 observations; intermediate 5-9; and large 10-16.

500 patrol plates between JD 2415000 and 35000. It has now been examined on over 450 Nantucket plates taken with the Maria Mitchell 7½ Cooke Triplet Telescope giving a scale of 248" per mm. Figure 1 for JD 2435000 to 40500 brings the observations up to the present date. These magnitude estimates confirm earlier observations that the star V 348 Sgr is irregular.

I am deeply indebted to the U.S. National Science Foundation for the grant to the Maria Mitchell Observatory that made this investigation possible.

Nantucket, Massachusetts
September 2, 1969

NANCY J.GREGG

References:

(1) Herbig,G.H., Astrophys.J.Vol.127, No.2, 1958.
(2) Hoffleit,D., Astr.J. 63, No.2, p.78, 1958.

COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 378

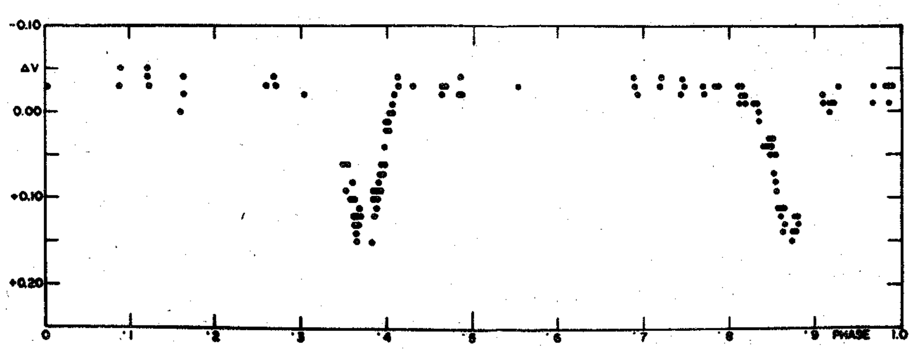
Konkoly Observatory
Budapest
1969 September 12

NEW BRIGHT ECLIPSING BINARY

As a result of a systematic search for eclipses among a group of double line spectroscopic binaries, not previously announced to be variable, the star BS 6611 was found to show primary and secondary eclipses of equal amplitude.

The observations were made with the photoelectric photometer of the Yale University Observatory 20-inch reflector at the Bethany Observing Station. A RCA 1P21 multiplier and a Schott GG 14 glass filter, producing magnitudes close to Johnson's V system, was used.

The companion (Δm = 3 mag., distance 38") was excluded from the measures.



BS 6604 has been used as the only comparison star. The star SAO 103020 has been measured to check the performance of the photometer.

The phases were calculated with the formula:

Phase = fraction of : (JD hel. - 2440130'7083) x 0'2568053

in which the reciprocal period corresponds to the spectroscopic period ($3^{d}.894$) as given by Petrie (1928).

The lightcurve is shown in the Figure, where the difference between variable and comparison star has been plotted against phase. The minima have the same depth of 0.3 magnitude. The exlipses are seen to be separated by half a period, which is compatible with a circular orbit.

BS 6611 is HD 161321. The star is No.491 of Batten's (1967) recent Catalogue of Spectroscopic binaries. The V Magnitude at maximum is 6.07.

More observations are planned to complete the descending branch at phase .35 and the rising branch at phase .90.

The investigation was supported in part by grant GP 7482 from the National Science Foundation.

Yale University Observatory
New Haven, Connecticut
8 September 1969

R.ZISSELL

References

Batten, A.H., Dom. Astr. Obs. Vol.XIII, 164 (1967).
Petrie, R.M., Dom. Astr. Obs. Vol.IV, 81 (1928).

COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 379

Konkoly Observatory
Budapest
1969 September 15

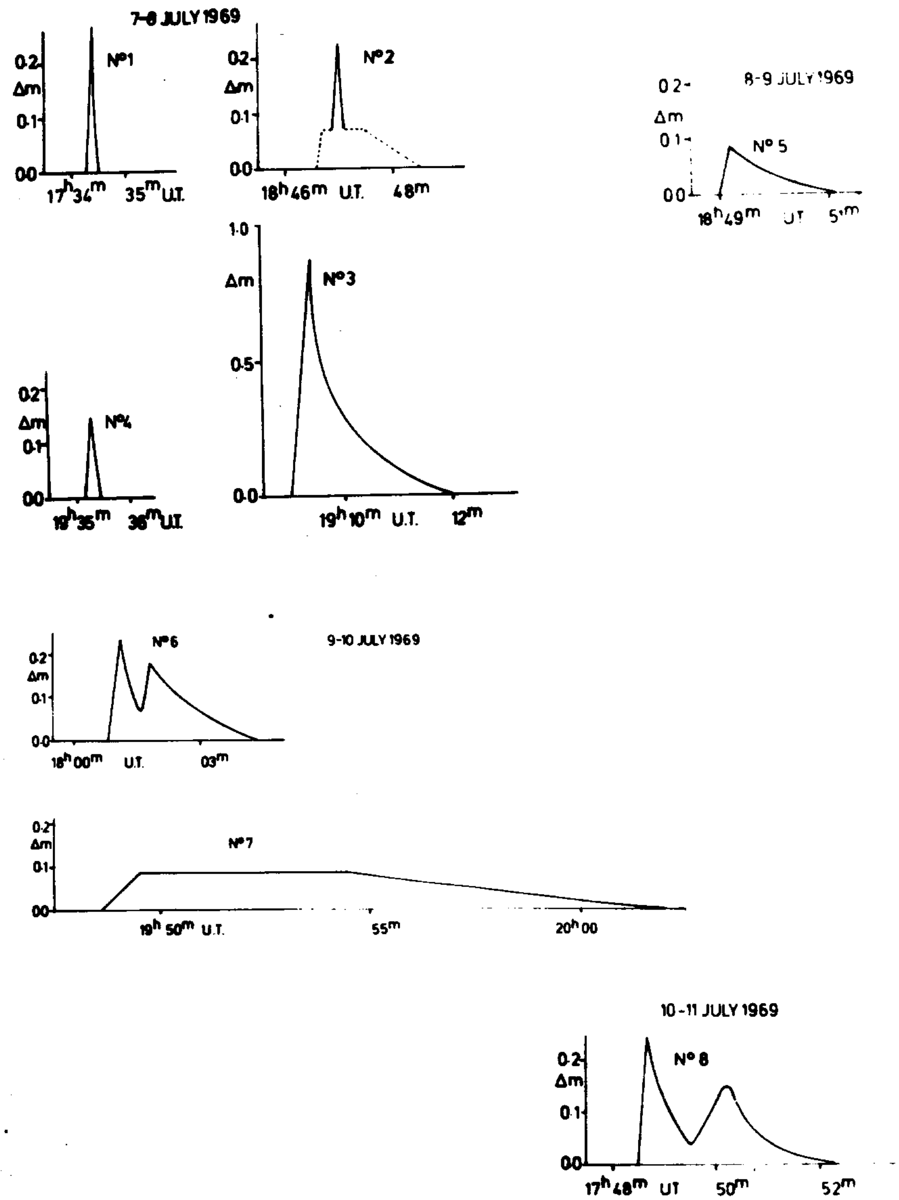
FLARE PHOTOMETRY OF V1216 SAGITTARII

As part of the flare star observing programme at Boyden Observatory, observations were made on V1216 Sagittarii (R.A. $18^h47^m.7$, Decl. $-23°32'$, visual magnitude 10.5) over the period 4th to 17th July, 1969. The monitoring time and flares are indicated in the following table, twelve flares being recorded over a monitoring time of 25^h11^m.

MONITORING TABLE OF V1216 SAGITTARII

DATE 1969 July	U.T.	TOTAL HOURS PER NIGHT	FLARE NO.	U.T. OF FLARE	Δm	DURATION (MINS)
4	18^h53^m–19^h39^m	0^h46^m	–	–	–	–
6	19 42 –20 19	0 37	–	–	–	–
7	17 28 –21 57	4 29	1	17^h34^m25	0.27	0.25
			2	18 46. 5	0.23	2.0
			3	19 09. 0	0.88	3.0
			4	19 35.25	0.15	0.25
8	17 20 –21 55	4 35	5	18 48. 0	0.09	2.0
9	17 51 –20 08	2 17	6	18 01.75	0.24	3.75
			7	19 48. 5	0.09	13.5
10	17 25 –20 27					
	20 37 –20 55	3 20	8	17 48. 0	0.24	3.75
11	17 14 –20 57	3 43	9	18 23.54	0.10	0.5
			10	18 36. 1	0.13	0.3
16	17 00 –19 37					
	19 49 –19 58	2 46	–	–	–	–
17	17 10 –19 48	2 38	11	19 35. 0	0.21	11.3
			12	18 31. 0	0.15	0.6
	TOTAL	25^h11^m				

The instrument used in this work was the 40 cm. Nishimura Reflector fitted with a standard Johnson B.Filter. As a detector we used a solid CO_2 cooled E.M.I. 6256 photomultiplier tube. The observing conditions were extremely good and particularly noteworthy are the relatively long duration low intensity minor flares, designated Nos.7 and 11.



7–8 JULY 1969
N°1
0.2
Δm
0.1
0.0
17h34m
35m U.T.
N°2
0.2
Δm
0.1
0.0
18h46m
U.T.
48m
N°3
1.0
Δm
0.5
0.0
19h10m
U.T.
12m
N°4
0.2
Δm
0.1
0.0
19h35m
36m U.T.
8-9 JULY 1969
N° 5
0.2
Δm
0.1
0.0
18h49m
UT
N°6
9-10 JULY 1969
0.2
Δm
0.1
0.0
18h00m
U.T.
03m
N°7
0.2
Δm
0.1
0.0
19h 50m
U.T.
55m
20h 00
10 - 11 JULY 1969
N° 8
0.2
Δm
0.1
0.0
17h48m
UT
50m
52m

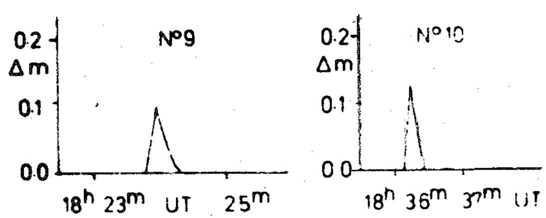
As previously remarked on by Andrews (1966), it is apparent that there is a tendency for flares to occur within a few hours of one another - also there is further evidence of the two day interval previously suspected from observations of V1216 Sagittarii.

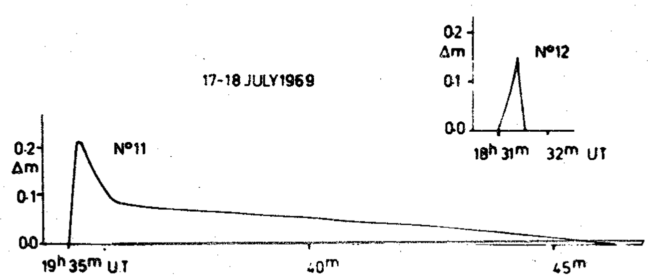
For example - the interval between flares are as follows:

1 + 6 - $47^h 38^m 0^s$	3 + 7 - $48^h 35^m 35^s$	7 + 10 - $46^h 47^m 56^s$
3 + 6 - 46 48 45	5 + 8 - 45 13 10	8 + 11 -145 47 1
		8 + 12 -144 43 0

(for the last two flare intervals, the difference is nearly 144 hrs. i.e. 3 x 48 hrs.)

11-12 JULY 1969





Reference: Andrews,A.D. 1966. PASP 78, 542.

5th September, 1969

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COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 380

Konkoly Observatory
Budapest
1969 September 14

ON THE PERIOD CHANGES OF PULSARS

For the pulsar NP 0527 it has been suggested that it was ejected from the Crab nebula in the supernova explosion in A.D. 1054, since its 1°2 angular separation from the Crab pulsar NP 0532 is small in comparison with the average density of pulsars, and the dispersion measures of these two pulsars differ by only 10 % (E.C. Reifenstein, III, W.D. Brundage, D.H. Staelin, Phys. Rev. Let. 22, 311, 1969). This hypothesis implies that the tangential velocity of NP 0527 is about 0.15c = 45000 km/sec, corresponding to an annual proper motion of 4"8. In a blink search for a high velocity star around the position of NP 0527 A.J. Perry (IBVS 347) found no such object down to about 18.5 magn.

But the high velocity of NP 0527 can be tested in another way. Even, when an object has a constant space velocity, its radial velocity is changing at a yearly rate of v^2t/r, where v denotes the tangential velocity of the object in km/sec, t the number of seconds in a year, and r the distance of the object in km. This change in radial velocity gives rise to an apparent period change of $\Delta P = v^2tP/rc$ per year. For an object with v = 0.15c at the distance of the Crab nebula (2000 ps) and having the period of NP 0527 (3^{s}745), the period change would be 12700 nsec/year. This is a figure 2-3 orders of magnitude higher than those obtained for the period changes of other pulsars (s. Table below), with the exception of NP 0532 and PSR 0833 - 45 for which the observed period changes amount roughly to the same value. Therefore, if NP 0527 was ejected from the Crab nebula in the supernova explosion in A.D.1054, it should show a comparatively rapid period increase.

The above mentioned effect always works in the same direction: it causes an increase of the period. Therefore, the observation that pulsar periods are (with only one anomalous temporary exception of PSR 0833-45, s. IAU Circ 2140) continuously increasing, does not necessarily indicate in all cases a real physical change, so much the more as there are some indications that pulsars were thrown out at high speeds in supernova explosions (G.Burbidge, F.Hoyle, Nature 221, 847). I have calculated the tangential velocities and the corresponding annual proper motions which are necessary to give the observed period changes for 6 pulsars as consequences of the changes in radial velocity. In the Table P is the observed period, ΔP the observed period change, r the distance in parsecs estimated from the dispersion measure (Nature, 222, June 7. 1969) and v the calculated tangential velocity. The calculated velocities are one order of magnitude lower than the value attributed to NPØ 0527.

Pulsar	P sec	P nsec.y^{-1}	r ps	v km sec^{-1}	Annual proper motion
CP 0328	0,715	60	430	3500	1",5
CP 0834	1,274	124	390	3300	1,8
CP 0950	0,253	37	60	1600	5,6
CP 1133	1,188	109	130	1900	3,0
HP 1506	0,740	167	>600	>6300	-
CP 1919	1,337	26	230	1150	1,0

Though the period changes of NPØ 0532 and PSR 0833-45 might be intrinsic (if not caused by a variation of integrated electron content along the line of sight, particularly in the vicinity of the source), it is premature to draw inferences for the evolution of pulsars from the observed period changes.

L.DETRE

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COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 381

Konkoly Observatory
Budapest
1969 September 20

TIMES OF MINIMA AND LIGHT ELEMENTS OF S VELORUM

S Velorum has been observed photoelectrically in the UBV system at Cerro Tololo Inter-American Observatory, Chile, with a 16 inch reflecting telescope. Since the primary minimum of the system has a duration of about 15^h there is no possibility to observe the entire minimum during an observing night. In two observing seasons four times of minimum at partial phases were observed. Comparisons of individual observations at these phases with a mean light curve give the following times of minimum for each light curve.

Epoch T_1	V)	JDhel 2438868.4994	$\pm$ 0.0012 m.e.
	B)	.4983	$\pm$ 0.0008
	U)	.4992	$\pm$ 0.0015
Epoch T_2	V)	JDhel 2438874.4334	$\pm$ 0.0005
	B)	.4325	$\pm$ 0.0007
	U)	.4314	$\pm$ 0.0007
Epoch T_3	V)	JDhel 2438880.3663	$\pm$ 0.0003
	B)	.3662	$\pm$ 0.0003
	U)	.3660	$\pm$ 0.0009

Epoch T_4 V) JDhel 2439099.9121 ± 0.0009
B) .9120 ± 0.0004
U) .9110 ± 0.0011.

These values were averaged giving weights w = 2, 2, and 1 for V, B, and U respectively, the results are:

	Minima	E	(O − C)
T_1)	JDhel 2438868.49911 ± 0.00053 m.e.	−9	−0^{d}00012
T_2)	JDhel 2438874.43264 ± 0.00071	−8	+0.00002
T_3)	JDhel 2438880.36620 ± 0.00010	−7	+0.00013
T_4)	JDhel 2439099.91202 ± 0.00037	+30	−0.00004

A least square solution gives the linear light elements:

$$\text{Min} = \text{JDhel } 2438921.90199 \pm 5^d9336663 \cdot E$$
$$\pm.00014 \quad \pm.0000025 \text{ p.e.}$$

The minimum E = 0 of the linear photoelectric light elements has been included with the older data as published by O'Connell (1954); the assigned weight is w = 9. These minima have been represented: a) by a linear ephemeris, b) by a linear representation excluding Roberts' observations (visual) before 1900, since O'Connell suggested that an abrupt change in the period occurred then. And c) a parabolic formula representing all times of minimum. The least square solutions with an IBM 7040 computer are:

a) $$\text{Min} = \text{JDhel } 2427612.3663 + 5.9336432 \cdot E$$
$$\pm.0057 \quad \pm.0000012 \text{ p.e.}$$

b) $$\text{Min} = \text{JDhel } 2431119.14527 + 5^d93365874 \cdot E$$
$$\pm.00074 \quad \pm.00000097 \text{ p.e.}$$

c) $$\text{Min} + \text{JDhel } 2427612.3560 + 5^d9336475 \cdot E + 4.47 \; 10^{-9} \cdot E^2$$
$$\pm.0016 \quad \pm.0000009 \quad \pm.55 \text{ p.e.}$$

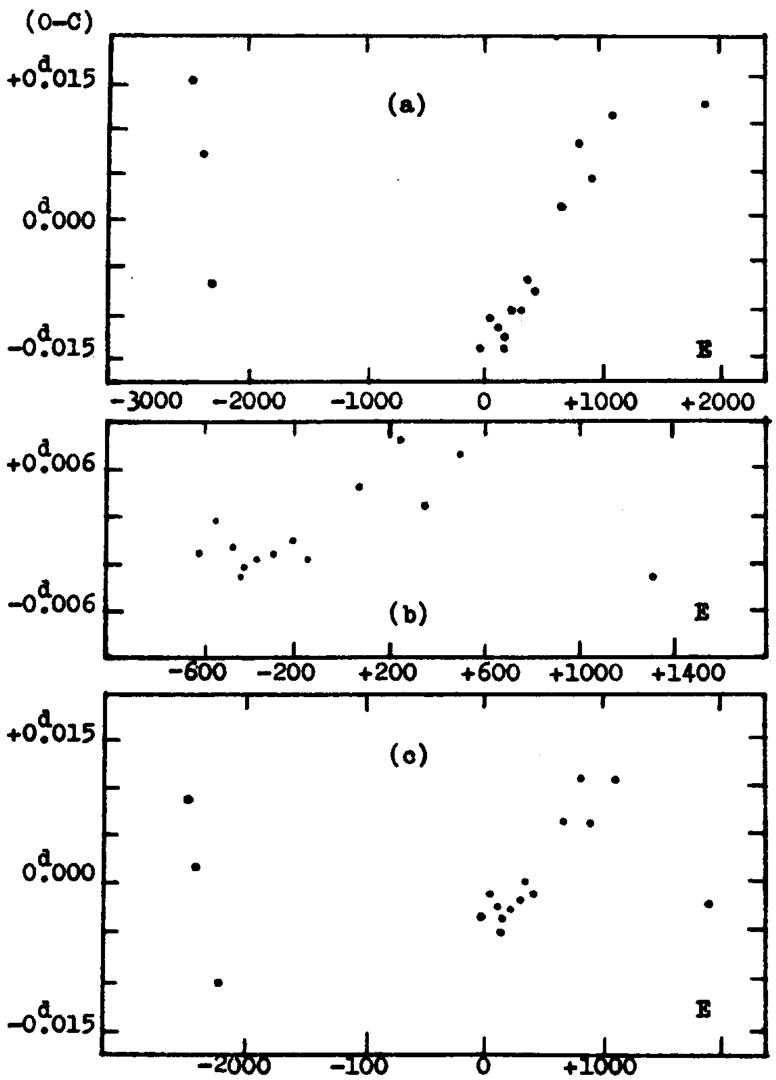

Figure 1. Residuals from eqs. a, b, and c.

The residuals (O-C) are given in Fig.1. There is no conclusive evidence that the period changed abruptly in ~1900, neither that the period increases continuously. However, more photoelectric data should be obtained in the future.

1969 September 11

R.F.SISTERO

Córdoba Observatory
and I.M.A.F.
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Argentina

Reference:

O'Connell D.J.K., S.J., 1954, Ric.Astr., 3, 90.

COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 382

Konkoly Observatory
Budapest
1969 September 30

UBV PHOTOMETRY OF GAMMA PEGASI

Gamma Pegasi (HR 39, MK standard of spectral type B2 IV, standard star of UBVRI photometry, a Beta Cephei-type variable) was observed by the author on two nights in October 1965 with a photoelectric photometer mounted in the Cassegrain focus of the Lowell Observatory's 21-inch reflecting telescope. An EMI 6256 S photomultiplier tube with a set of standard UBV filters and usual D.C. equipment were used. Star 34 Piscium (HR 26, spectral type B8 V) served as only comparison star. Its magnitude and colour indices on the UBV system were determined by comparison with standard stars on six nights in October and November 1965. The results are: $V=5\overset{m}{.}535\pm0\overset{m}{.}0013$, $B-V = -0\overset{m}{.}069\pm0\overset{m}{.}0015$, and $U-B = -0\overset{m}{.}194\pm0\overset{m}{.}0032$ (mean errors).

The V, B, and U magnitudes of the variable star are plotted against phase in Fig.1. Phases were computed from elements of maximum radial velocity of Sandberg and McNamara (P.A.S.P.72, 508. 1960), and then increased by 0.25. It may be seen from Fig.1. that light ranges in V, B, and U are equal to $0\overset{m}{.}017\pm0\overset{m}{.}002$, $0\overset{m}{.}018\pm0\overset{m}{.}001$, and $0\overset{m}{.}027\pm0\overset{m}{.}001$, respectively. The U-B colour index of the star is smallest around maximum light, while the B-V colour index is constant within $0\overset{m}{.}003$. In addition to the overall variability in the spectroscopic period of $3^h\ 38^m$, the B magnitude of Gamma Pegasi undergoes regular fluctuations with amplitude of $0\overset{m}{.}005$ in a short period equal to about 44^m, i.e. one fifth of the longer period. The phenomenon is less pronounced in the V and U magnitudes, probably because of observational errors. Local maxima of the light-curves in V, B, and U are shifted relatively to one another.

The mean V magnitude of Gamma Pegasi is equal to $2\overset{m}{.}823 \pm 0\overset{m}{.}002$, and its mean B-V and U-B colour indices are equal to $-0\overset{m}{.}227 \pm 0\overset{m}{.}003$ and $-0\overset{m}{.}870 \pm 0\overset{m}{.}004$, respectively. The mean U-B colour index determined by comparing the variable star alone with standards of the UBV system (on the same nights when the differential observations were made) turned out to be $-0\overset{m}{.}864$.

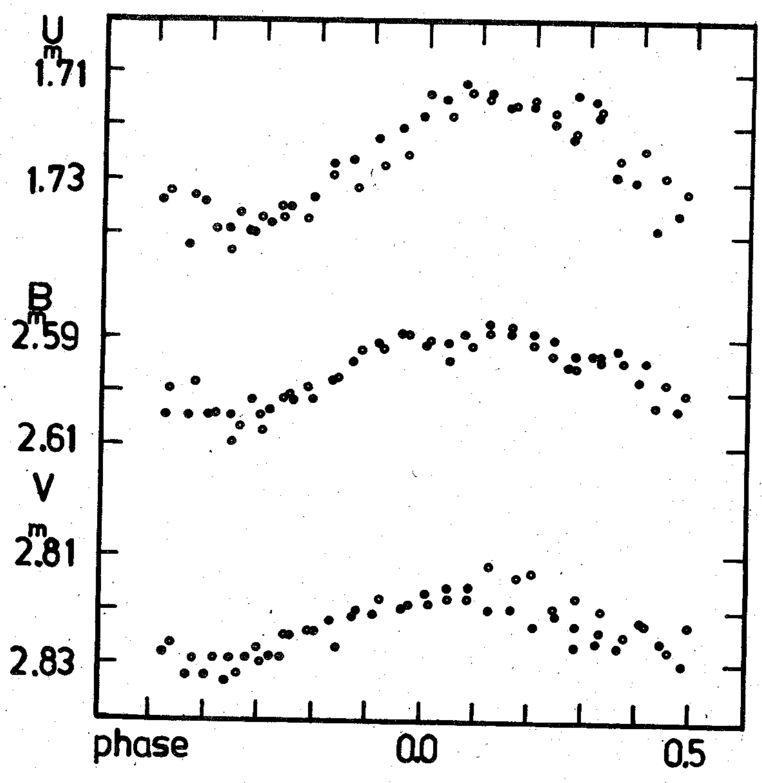

Fig. 1

The V, B, and U magnitudes of Gamma Pegasi plotted against phase. Circles denote observations taken on October 30, points those made on October 31, 1965.

September 20, 1969

MIKOLAJ JERZYKIEWICZ

Wroclaw University Observatory

COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 383

Konkoly Observatory
Budapest
1969 October 1

BD $-6^\circ 4932$, A NEW VARIABLE STAR

During the course of photoelectric photometry of the eclipsing binary BS Sct, it was discovered that the comparison star BD $-6^\circ 4932$ (= HD 174553) is variable. The purpose of this note is to alert photometric observers, because BD $-6^\circ 4932$ is (otherwise) a very attractive comparison star, not only for BS Sct but also for M11. In fact it was used as the reference star in the photometric study of M11 by Johnson, Sandage, and Wahlquist (Ap.J. 124, p.81). The preliminary ephemeris for maximum light is JD (hel.) $2,440,389^{d}.731 + 0^{d}.1591$. The range of light variation is about $0^{m}.10$ in V, and may be variable. Further details will be published elsewhere later.

September 18, 1969

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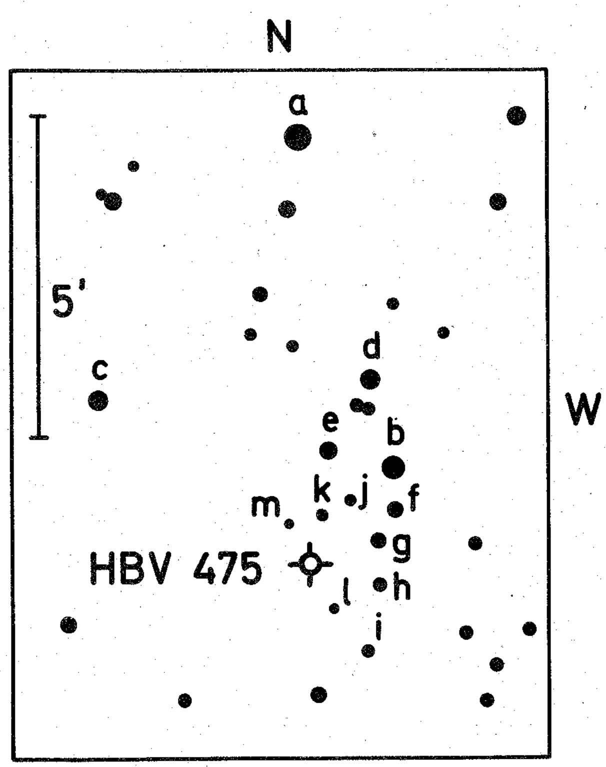
COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 384

Konkoly Observatory
Budapest
1969 October 3

HBV 475: A NEW PECULIAR EMISSION OBJECT IN CYGNUS

On an objective-prism plate (Schmidt-camera, 800/1200/2400, 4°-prism, 580 A/mm at H_γ) obtained on Aug.10/11, 1969, a star with very bright $H\alpha$ -line has been found. Its coordinates are:

$$RA_{50} = 20^h49^m02^s.56, \quad D_{50} = +35°23'36.8".$$



Direct photographs in August and September show that this object is about 2 mag. brighter, both in the blue and red region, compared with the Palomar Sky Atlas prints (see Table 1). Blue magnitudes were estimated using the photoelectric sequence in NGC 6913 (Ref. 1). The preliminary

Table 1

Plate No.	Date	B
PSA 0 279	1951 July 8/9	$14^m.5$
PSA 0 288	1951 July 12/13	14.2
GS 4364	1969 Aug. 22/23	12.4
GS 4433	1969 Sep. 19/20	12.6

Table 2

Star	B	Star	B
a = BD +35°4294	$11^m.1$	g	$14^m.5$
b = BD +35°4290	11.5	h	15.9
c	12.1	i	16.2
d	12.7	j	16.2
e	13.5	k	16.6
f	14.4	l	17.6:
		m	17.7:

examination of old plates indicates that before 1951 this star could have been fainter than $14^m.5$. Other measurements of its brightness would be therefore desirable. For that reason the identification chart with comparison stars, blue magnitudes of which have also been referred to NGC 6913, is presented.

Objective-prism spectra of HBV 475 in the region $\lambda\lambda$ 3600-6600 A show a very strong Hα line, strong Balmer series $H\beta$ - H_{10} and He I 5876, moderate [O III] 5007 and [Ne III] 3869, and faint He II + [Fe II] 5412-14, He I + [Fe II] 4471, perhaps also He I 3820 and O III 3444. The continuum is rather strong in red and violet.

There exist some similarities in the increase of brightness and in spectral characteristics between HBV 475 and the well-known emission object V 1016 Cyg (MHα 328-116), which lead to the suspicion that both stars could belong to the same type of objects.

REFERENCE

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Hamburg-Bergedorf Observatory
25 September, 1969

L.KOHOUTEK
(on leave from the Astronomical Institute of the Czechosl.Academy of Sciences, Praha)

COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 385

Konkoly Observatory
Budapest
1969 October 4

OBSERVATIONS OF AB COMAE

At the Maria Mitchell Observatory about 50 plates on a region in Coma Berenices have been obtained since 1964. The star AB Com was rediscovered and examined relative to nearby arbitrarily selected comparison stars by Janice White. The star had originally been discovered by Hoffmeister (S8491, 15^m - 17^m, A.N., 288, 49, 1964) who suspected it of being a U Gem star, or possibly an RW Aur type. Miss White's observations indicate maxima on JD 2438886 and 39256. The star was not seen at a plate limit of about 16^m on JD 38552, 40002-3, and 40348-382. These observations, combined with the published date of Hoffmeister's maximum, JD 38501, and its intermediate brightness on the Lick Atlas chart on JD 35163 would not be inconsistent with a Mira type period of 360 days. Further observations are needed.

This note stems from part of the work carried out by students at the Maria Mitchell Observatory under a grant from the U.S. National Science Foundation.

September 24, 1969

DORRIT HOFFLEIT
Maria Mitchell Observatory
Nantucket, Mass., U.S.A.

BD +18°4586

This star is lettered K in the sequence for HR (Nova) Delphini issued by the British Astronomical Association. The B.A.A. magnitude is given as 8.30; the B.D. magnitude is 8.2; the spectrum is late-type, and the orange colour is noticable in a small telescope.

Having used the star as a comparison for HR Delphini, I am now convinced that it is itself variable. The range appears to be from 7.8 to 8.3, and the period may be semi-regular (a few weeks?). I would however stress that these results depend entirely upon visual observations with the 12½ in. reflector in my observatory at Selsey, and will certainly need to be confirmed by more accurate methods before the variability of the star can be regarded as established.

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NOTE ON RU CAM

During several months in spring and summer of 1968 the star was of irregular character. The star recovered its periodic light variation in September, 1968 with an amplitude of $0^m_.1$ in V. Later the amplitude decreased to $0^m_.02$ in V, having reached its minimum value in April and May, 1969. Since then the amplitude was increasing and after three cycles it reached the values $0^m_.3$ in V and $0^m_.4$ in B.

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COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 386

Konkoly Observatory
Budapest
1969 October 6

PV CASSIOPEIAE - AN ECLIPSING BINARY
WITH ECCENTRIC ORBIT

As a part of the joint photoelectric program on eclipsing binaries of the Observatories Izmir and Nürnberg 4 photoelectric minima of this star were obtained with the 48 cm Cassegrain telescope at the University - Observatory of Izmir during the period 1968 September to 1969 September. They all show very big O-C's against the elements given in SAC 40 (1969) ($+0^d.061$, +0.060, +0.060, +0.062).

2 photoelectric minima, obtained by GEYER (1967 November and December), show the following O-C's against the same elements: $+0^d.027$, +0.056! The difference in epochs between the 2 minima of GEYER is uneven, while the differences in epochs between the 4 minima from Izmir and the second minima of GEYER are even!

GEYER has expressed the suspicion, that the uneven minima were not situated symmetrically between the even minima, consequently the star has an eccentric orbit and the period must be doubled.

P a r t 1. For all observed minima O-C's were calculated against elements with a mean period and the earliest observed (normal-) minimum (T_0). For the time interval JD 2415 600 to JD 2436 900 I found, with friendly help of Mr.HUTH, Sonneberg - Observatory, 130 photographic minima. In the last years 8 photoelectric minima (by GEYER and the Izmir Observatory) were obtained.

From 3 photographic minima I derived

T_o = JD 2415 764.553

The latest observed photoelectric minima is

T_n = JD 2440 479.474

The number of epochs between T_n and T_0 is

ΔE = 28 238

The mean period: $\bar{P}=(T_n-T_0): \Delta E = 0^d.8752362$

The O-C's were calculated with the elements:

Min JD 2415 764.553 + $0^d.8752362$. E

In Table 1 the mean values for $O-C_I$ (even E) and $O-C_{II}$ (uneven E) are given, each for a period of 2000 or 3000 epochs. n is the number of minima, from which $\overline{O-C}$ was calculated.

Table 1

E	n_I	n_{II}	$(\overline{O-C})_I$	$(\overline{O-C})_{II}$	$\Delta(\overline{O-C})_{II-I}$	
0 – 3000	8	8	$-0^{d}.025 \pm 13$	$-0^{d}.001 \pm 8$	$+0^{d}.024$	pg
3000 – 6000	4	7	-0.008 ± 5	$+0.027 \pm 14$	$+0.035$	"
9000 – 12000	10	5	-0.002 ± 13	$+0.014 \pm 10$	$+0.016$	"
12000 – 14000	11	8	-0.011 ± 15	$+0.028 \pm 15$	$+0.039$	"
14000 – 16000	17	9	-0.006 ± 7	$+0.001 \pm 6$	$+0.007$	"
16000 – 18000	8	6	-0.005 ± 9	$+0.019 \pm 7$	$+0.024$	"
18000 – 20000	6	9	-0.005 ± 10	-0.004 ± 10	$+0.001$	"
20000 – 22500	8	6	$+0.003 \pm 7$	-0.007 ± 10	-0.010	"
24000 – 28500	5	3	$+0.0005 \pm 4$	-0.0280 ± 5	-0.0285	pe

The $O-C_{II}$'s (uneven E) are systematically greater than those with even E ($O-C_I$) for the period E=0 to E=17000. At E = 19000 the O-C's are equal, thereafter the $O-C_{II}$'s are smaller than $O-C_I$. The mean errors of the O-C's are large, but there are some real effects:

1.) PV Cas has an eccentric orbit, and
2.) perhaps an apsidal motion with a period longer than about 120 years.
3.) The period must be doubled.
4.) At present time we have Min I – Min II = 0.5 . P $+0^{d}.029$

P a r t 2. For minima I new light-elements were calculated by the method of least squares. From photographic estimates 4 normal - minima were derived (each from 5 to 8 minimas, published by BUSCH, FILIN, GEYER, PEROVA and STROHMEIER). 1 photoelectric minimum of GEYER was used, and 4 photoelectric minima from Izmir (observed by GÜLMEN, GÜDÜR, IBANOĞLU and KURUTAC) were combined to 2 normalminima. Table 2 gives the observed Minima, $0-C_1$ (elements of SAC 40, 1969), $0-C_2$ (new elements)

Table 2

Min. (JD)		$0-C_1$	$0-C_2$
24 28 796.814	pg	$-0^d.015$	$0^d.000$
31 018.164	"	−0.001	−0.001
32 439.548	"	+0.008	−0.001
34 608.391	"	+0.028	+0.005
39 835.2976	pe	+0.055	−0.0022
40 129.3805	"	+0.061	+0.0011
40 479.4735	"	+0.061	−0.0006

C_1: (SAC 40) Min JD 2428 126.402 + $0^d.875231$. E
2P = 1.750462

C_2: (POHL) Min JD 2428 796.8142+ $1^d.75047346$. E
±17 ±38

$$\text{Min I} - \text{Min II} = 0.5 \cdot P + 0^d.029 = 0.516 \cdot P$$

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COMMISSION 27 OF THE I. A. U.
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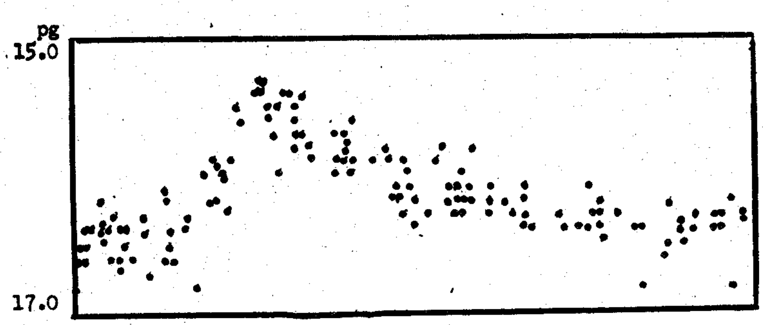
NUMBER 387

Konkoly Observatory
Budapest
1969 October 6

PERIODS FOR TWELVE NEW VARIABLE STARS IN SAGITTARIUS

Periods have been determined for twelve new variable stars in Sagittarius, listed in the Table. The variables have been examined on Harvard and Nantucket plates by the persons noted in the column headed "Obs." Two of the stars are of special interest. The observations of Var.No.5 cannot be represented by a constant period but are adequately satisfied by the small additional secular term. The earliest observation is for 1899, the latest, 1951. This star is a member of the globular cluster, M28. The semi-regular star, No.12, shows two intervals of regularity separated by an interval of seemingly random phases.



Observations of Var.5 represented by Ep. + Phase =
$1^{d}.729305+2\cdot10^{-9}$ (J.D. - 28000)^2

No	RA(1900)	Dec	Max	Min	Type	Per	J.D.	ep	Sp
	18^h								
1	11^m29^s	$-27°51'.6$	11.1	12.1	SRa	$57^d.3$	36050	76	M2
2	14 02	-22 58.2	13.7	[15.0	EA	21.466	32473.23	463	
3	15 09	-23 08.4	14.3	16.3:	SRa	186	24400	70	M:
4	18 23	-22 21.3	14.0	15.5	SRa	112.5	32063	88	M
5	18 34	-24 55.8	15.4	16.6	RR	0.5782670	28022.400		
6	18 47	-26 32.4	13.7	[14.5	M	189	33850	50	M8
7	18 50	-26 39.0	15.0	[16.0	M	262	27980	38	M:
8	18 56	-26 29.6	14.0	15.5	SR	117.5:	25775		
9	19 58	-23 03.7	14.4	16.3	C	14.40	28022	611	
10	20 59	-22 21.1	15.0	[16.0	M	281	26560	32	
11	23 58	-25 38.0	14.0	15.0	RR	0.565429	33858.392		
12	25 36	-26 22.8	14.1	[15.5	SRa	149	{26200 36100		M2:

*Observers and computers are Linda Deery (observer for No.5); Hoffleit (observer for Nos.1,2,3,6,7,9,10,12 and computer for Nos.1,2,4-12); Joann Lawless (observer for No. 11); Joyce Pasdoe (observer for No.5); Zora Prochazka (observer for Nos.8,11); Ethel Richardson (observer for Nos.3,8).

Notes:

No.5. Changing period: Max = $28022.400+P_o.E+4.10^{-10}E^2$

6. Images affected by companion

11. Large magnitude scatter from blended images

12. The period represents all observations for J.D. 2423500-27000, and J.D.33000-40100, but with a 70 day shift of phase between the two groups. J.D.2427000-33000 not well represented.

DORRIT HOFFLEIT

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COMMISSION 27 OF THE I. A. U.
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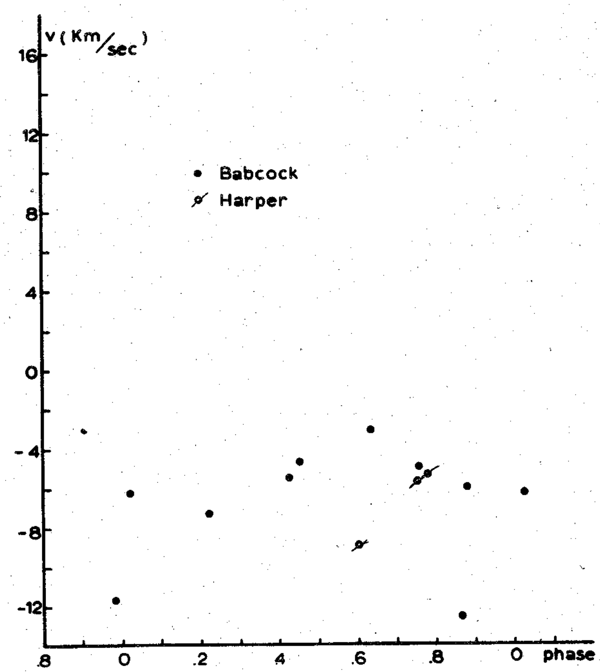
Budapest
1969 October 10

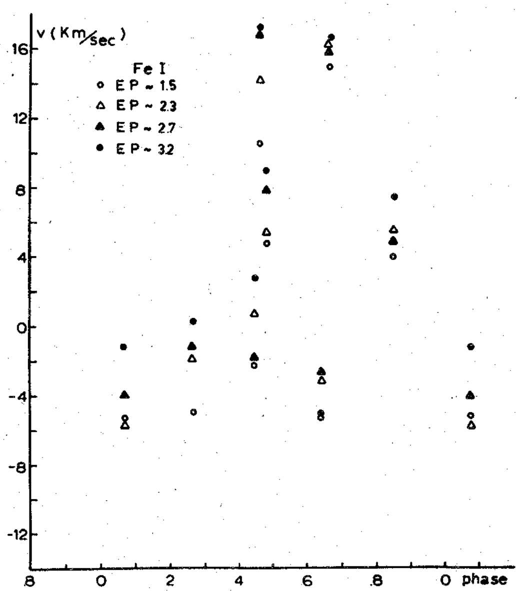
THE MAGNETIC STAR 53 CAMELOPARDALIS

The study of high dispersion spectra (9.7 A/mm) of the spectrum variable A2p star 53 Cam is in progress. The magnetic variations have been studied by Babcock (1) and Preston (2).

The photoelectric variations have been investigated by Jarzebowski (3), Rakos (4) and Preston - Stepien (5): phase relation between the light and magnetic variations depends on wavelength.

The radial velocity measures do not follow a regular curve and are shown in figure 1 and 2. (The elements are





those of Preston and Stepien (5)). Present velocities show more positive values than those of Babcock (6) and Harper (7). As for HD 125248 (8) these observations can be explained with an orbital motion about an unseen companion but more observations both photoelectric and spectrographic are needed. A similar conclusion is suggested by observations in progress by Preston (private communication by A.I.Deutsch).

Stratification effects are present as shown in Figure 2. The line intensities and widths are variable. The variations of Ti II are out of phase with those of Mg I and II, Eu II and the K line of Ca II.

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NUMBER 389

Konkoly Observatory
Budapest
1969 October 4

A NOVA IN SAGITTARIUS

Patrol plates of the Galactic centre taken by R.G. Welch of Auckland 1969 June to September have revealed a probable nova. The approximate co-ordinates for 1950 are: R.A. 18^h 28.3^m Dec. S. 32° 38'. The following approximate photographic magnitudes have been found:

1969 U.T.	
June 19.46	11 ?
July 4.46	8.1
11.43	6.5
20.44	7.6
Sept.16.43	10.5

Exposure times varied from 8 to 14 minutes. Cameras were Heliar anastigmat 7in, f/4.3 and Petzval type 8.4in, f/4.2. The discovery was only made in September when Welch compared photos taken on July 20 and September 18.

A photoelectric observation at the Auckland Observatory on September 20.4 (U.T.) using B.D. -32° 14235 as a comparison star gave the V magnitude as 11.3; B-V=-0.061; U-B = -0.478. The observation was made by Menzies and Christie and reduced by Walker.

FRANK M.BATESON
Director.
V.S.S., R.A.S.N.Z.

1969.October 6

18 Pooles Road,
GREERTON, TAURANGA, NEW ZEALAND.

COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
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Budapest
1969 October

MINIMA OF R CMa

The eclipsing binary R CMa was observed photoelectrically in yellow and blue light with a 1P21 photomultiplier attached to the 15-inch refractor of the Nizamia Observatory, Hyderabad, India, during 1967. BD −15° 1734 and BD −15° 1732 were used as primary and secondary comparision stars respectively. There was no significant difference between the times of minimum light at the two wavelengths. The heliocentric times of minimum light given below are averages from the two wavelengths and were obtained by Hertzsprung's method.

Minimum (Primary)	O−C
J.D. 2439533.179	$-0^{d}.196$
2439802.403	−0.192

The residuals were computed using E.F.Guinan's unpublished ephemeris:

$$\text{Min} = 2420213.1393 + 1^{d}.13594988\ E\ .$$

October 1, 1969.

CHARYULU, G.K.
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University of Pennsylvania
Philadelphia, Pennsylvania.
U.S.A.

CATALOGUE OF PHOTOMETRIC SOLUTION OF ECLIPSING STARS

R.H. Koch, M. Plavec, and F.B. Wood are presently compiling a critical Catalogue of Photometric Solutions of Eclipsing Stars from analyses already in the literature. This task should be completed by April 30, 1970. Authors who have unpublished manuscripts (already accepted for publication) which may not appear before that date are invited to send a copy of each manuscript to:

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COMMISSION 27 OF THE I. A. U.
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NUMBER 391

Konkoly Observatory
Budapest
1969 October 16

OO Aql - AN ECLIPSING BINARY WITH RAPIDLY SHORTENING PERIOD

At the University - Observatory of Izmir 2 photoelectric minima of the eclipsing variable OO Aql (W UMa-type) were obtained during the last months. The O-C's against the elements, given in GCVS 1958 (I) and SAC 40, 1969 (II) are increasing (see table). New elements were calculated by the method of least squares (III and IV).

In the table the minima 1,3 and 4 are normalminima, calculated from 16, 28 and 12 visual determined minima (published in IBVS). The Observers are: Ashbrook, Baldwin, Cook, Howell, Monske, Lowder and Williams. The other minima are photoelectric, 2 from Pohl, number 5 and 6 from Ibanoglu and Kurutaç.

The calculation with all 6 minima gives the elements III; the $O-C_{III}$ show clearly, that the period has shortened between JD 2437 000 and 2440 000. From minima 3 to 6 I have obtained the elements IV, which gave very small O-C's and may be valid at present time.

No.	Minima JD.	O-C(I)	O-C(II)	O-C(III)	O-C(IV)
1	2437 200.532	$-0^d.011$	$+0^d.001$	$-0^d.008$	
2	38 239.466	-0.009	+0.007	+0.006	
3	39 300.681	-0.025	-0.006	+0.003	$-0^d.001$
4	39 714.728	-0.030	-0.010	+0.003	+0.001
5	40 068.4638	-0.038	-0.0166	-0.0011	-0.0002
6	40 366.4544:	-0.044	-0.0211:	-0.0031:	-0.0002:

I Min	JD 2434	$226.4113+0^d.50679597 \cdot E$	(GCVS 1958)
II "	" 37	$192.4222+0.506794387 \cdot E$	(SAC 40,1969)
III "	" 37	$200.540+0.50679006 \cdot E$	(Pohl)
IV "	" 39	$300.682+0.5067868 \cdot E$	(Pohl)

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COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 392
Konkoly Observatory
Budapest
1969 October 17

A SPECTROSCOPIC STUDY OF THE ECLIPSING BINARY R CANIS MAJORIS

It is well known that the main feature of this close binary system is that both components have too small masses compared with those expected from their luminosities or spectral types; it is also well known that the period has abruptly shortened around 1914 and it is still shortening. The results obtained from former observations do not agree well and there is no reason to prefer any one of the available orbits.

Spectroscopic observations of this binary has been done at the Observatory of Merate by the writer from January 1966 at a dispersion of 34 A/mm, and a new set of elements has been derived from 17 plates without undertaking a least squares solution. The results are the following ones:

$K = 26.0$ $\quad$ $a \operatorname{sen} i = 0.406 \cdot 10^6$
$V_0 = -45.5$ $\quad$ $f(m) = 0.0021$

eccentricity assumed = 0.00. A new orbit has also been computed from all the 81 observations available, covering about 40 years, from the year of the sudden change of the period, by means of the programme by Bertiau. The results are:

K	$= 25.07 \pm 2.61$	P	$= 1.1359 \pm 0.0015$
V_0	$= -39.80 \pm 2.20$	T_0	$= 2432891.510 \pm 0.018$
e	$= 0.046 \pm 0.104$	$f(m)$	$= 0.0020$
ω	$= 149^\circ.77 \pm 1.85$	$a \operatorname{sen} i$	$= 0.391 \cdot 10^6$

From the mass function computed in this way and assuming (Kitamura) for the primary component a normal F1 V mass of 1.7 $\odot$, we deduced a mass ratio of 0.12; in this case the radius of the secondary component exceeds its Roche limit. If on the contrary, we assume that the secondary fills exactly its Roche limit, we deduce a total mass of only 0.31 with a mass ratio of 0.24. We may confirm in this way the result by Kitamura of a mass loss through the Lagrangian point L_2.

Finally we notice that the velocity V_0 of the center of mass has diminished in a way that may be an evidence of the existence of a third body with very long secondary period.

Osservatorio Astronomico di Brera-Milano P.GALEOTTI

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Kitamura, Astrophys. and Space Science, 3, 163, 1969

COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 393

Konkoly Observatory
Budapest
1969 October 17

A SPECTROSCOPIC STUDY OF THE TRIPLE SYSTEM VV ORIONIS

The importance of a new spectroscopic study of this eclipsing system has been pointed out by several authors. VV Orionis consists of a system of three bodies; but the orbit of the 3rd body is given, with great reserve, only by Daniel who lists the approximate values of the elements. There is also a great uncertainty in the mass ratio of the two principal bodies ranging from $m_2/m_1=0.34$ according to the catalogue by Kopal and Shapley to $m_2/m_1=1.0$ according to Struve and Luyten.

From 26 plates (dispersion 34 A/mm) secured at the Observatory of Merate we have computed new spectroscopic elements by means of the programme by Bertiau; we have then computed the following orbital elements of the long period variation from all the residuals obtained up to date, covering about 200 cycles of the 3rd body:

$K = 15.75 \pm 4.98$	$P = 115.8741 \pm 0.0139$
$V_0 = 0.778 \mp 4.00$	$T_0 = 2419827.129 \pm 9.933$
$e = 0.295$	$f(m) = 0.042$
$\omega = 46°.06 \pm 2.38$	$a \sin i = 24.237 \cdot 10^6$

After correction for the 3rd body in our velocities, we have computed the following elements for the two principal bodies:

$K = 139.92 \pm 8.86$	$P = 1.4854 \pm 0.035$
$V_0 = 26.34 \mp 7.70$	$T_0 = 2440251.801 \pm 1.285$
$e = 0.077 \mp 0.74$	$f(m) = 0.419$
$\omega = 84°.25 \mp 2.66$	$a \sin i = 2.85 \cdot 10^6$

From the microphotometer tracings we have noticed that the violet (red) side of the hydrogen lines have faint extensions when the primary receeds (approaches): this effect must be due to the secondary component. We have measured the relative Doppler shifts of the two components from the tracings and, within the large uncertainties of such measures, we have determined K_2 about 320 km/sec. This gives a mass ratio of $m_2/m_1=0.44$.

We have then determined the masses of the three bodies, without any assumption:

$M_1 = 10.2$ $M_2 = 4.5$ $M_3 = 2.3$

Osservatorio Astronimoci di Brera-Milano

G.BELTRAMI, P.GALEOTTI

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COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 394

Konkoly Observatory
Budapest
1969 October 21

MINIMA OF ECLIPSING VARIABLES

Visual observations of the eclipsing binaries U Cep, RZ Cas, ST Per, UX UMa, X Tri, Z Dra, U Sge and RW Tri were carried out in July-October 1968. For the determination of moments of minima and studying variations of their periods UX UMa and RW Tri were observed with the 19-inch reflector, U Cep and RZ Cas with a binocular and the rest of the stars with the 8-inch refractor. All the observations were made at the astronomical station "Majaki" of Odessa observatory with kind permission of Prof. V.P. Tsessewich.

Star	J.D.hel.	E	O-C	n	n_1	n_2	W	Observer
U Cep	2440....							
	086.4957	12519	+^{d}.3900[1]	26	16	10	2	Surkova
	096.4620	12919	+.3852	29	15	14	2	"
	111.4211	12925	+.3864	37	24	13	2	"
	116.4211	12927	+.3841	20	10	10	2	"
	121.3883	12929	+.3820	26	12	14	2	"
	151.3052	12941	+.3841	23	11	12	2	"
RZ Cas	084.3022	19016	-.0312[2]	25	13	12	2	Surkova
	.3049		-.0285	20	9	11	1	Skatova
	085.4978	19017	-.0309	12	5	7	1	Surkova
	.4965	19017	-.0322	15	5	10	1	Skatova
	097.4458	19027	-.0354	16	5	11	1	Surkova
	121.3564	19047	-.0298	15	8	7	1	"
	139.2878	19062	-.0272	15	10	5	2	"
	151.2418	19072	-.0257	14	5	9	2	"
ST Per	087.4986	3987	-.058[3]	19	9	10	1	Surkova
	095.4412	3990	-.060	35	21	14	2	"
UX UMa	112.2689	64936	-.0059[4]	13	2	11	1	Surkova
	114.2556	64946	-.0059	9	2	4	1	"
	123.2822	64992	-.0062	6	4	2	1	"
	151.2105	65134	-.0052	14	8	6	2	"
	152.1952	65139	-.0049	18	9	9	2	"
	153.1773	65144	-.0051	16	2	14	2	"
U Sge	081.4414	6789	+.0080[5]	28	13	9	2	Skatova
	098.3438	6794	+.0073	29	11	18	2	"
	125.3876	6802	+.0061	27	13	14	2	"
	135.5318	6805	+.0085	22	10	12	2	"

Star	J.D.hel.	E	O-C	n	n_1	n_2	W	Observer
X Tri	2440....							
	084.5833	11599	$+^{d}.0366$ [6]	22	13	9	1	Skatova
	085.5552	11600	+.0363	29	13	7	1	"
	086.5282	11601	+.0348	24	12	12	1	"
	121.5041	11637	+.0343	25	13	12	1	"
	123.4457	11639	+.0358	14	10	4	1	"
RW Tri	094.4713	20260	+.0018 [7]	17	9	8	0,5	Skatova
	108.3849	20320	+.0024	16	9	7	1	"
	116.5003	20355	+.0019	16	8	8	1	"
	117.4277	20376	+.0017	15	6	9	0,5	"
	121.3699	20359	+.0019	18	9	9	1	"
	123.4565	20385	+.0016	16	9	7	1	"
	151.2829	20505	+.0020	19	11	8	1	"
Z Dra	088.965	5024	+.0226 [8]	17	9	8	1	Skatova
	111.5781	5041	+.0278	22	12	10	1	"
	114.2881	5043	+.0230	19	9	10	1	"
	118.3607	5046	+.0232	24	12	12	1	"
	126.5032	5052	+.0211	22	12	10	1	"
	149.5804	5069	+.0219	25	14	11	1	"

n = total number of estimates of brightness; n_1 = number of estimates in ascending branch; n_2 = number of estimates in descending branch; W = weight of observation.

O-C calculated from the elements:

1. Min hel. JD = 2407890.2957 + $2^{d}.4929005$. E
2. Min hel. JD = 2417355.4233 + $1^{d}.1952519$. E
3. Min hel. JD = 2429528.5897 + $2^{d}.6483488$. E
4. Min hel. JD = 2427341.2221 + $0^{d}.196671379$. E
5. Min hel. JD = 2417130.4151 + $3^{d}.3806184$. E
6. Min hel. JD = 2428815.7484 + $0^{d}.9715382$. E
7. Min hel. JD = 2435396.5142 + $0^{d}.231883283$. E
8. Min hel. JD = 2433268.7074 + $1^{d}.3574376$. E

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COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 395

Konkoly Observatory
Budapest
1969 October 23

AN RR LYRAE STAR WITH A CHANGING PERIOD

The variable star discovered by Dr.Dorrit Hoffleit at $18^h\ 26^m\ 54^s$ and $-25°\ 15!8$ (1900) was examined visually this summer, under the direction of Dr.Dorrit Hoffleit at the Maria Mitchell Observatory, on Harvard plates ranging in Julian Days from 2423948 to 2433858, and on Nantucket plates ranging in Julian Days from 2437824 to 2440417. The brightness of the star varied between 14.0 and 15.7 magnitude.

The variable is found to be of RR Lyrae, subclass b type with a period of $0\overset{d}{.}534829$ that operates from J.D. 2423948 to 2433858, and another period of $0\overset{d}{.}534869$ that operates from J.D.2437824 to 2440417. The later period P' is related to the earlier period P by the relation

$$1/P' = 1/P - 0.000139$$

There is an indication of an evolutionary change in the structure of the star between J.D.2433858 and 2437824, for which there are no plates available. According to the graph of the phase of maxima against the Julian Days (Figure 2) this change took place about 1955-1956.

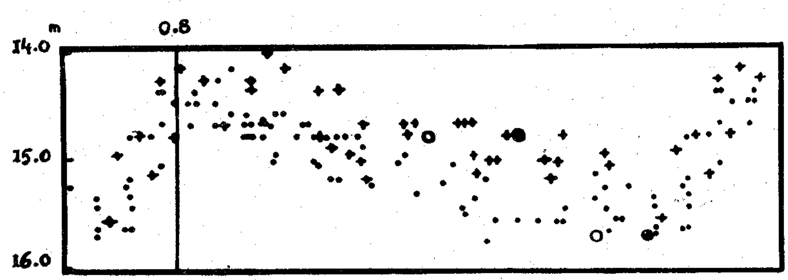

Figure 1:

The light curve obtained for the variable with brightness expressed in magnitudes as a function of phase of the period. Dots:Harvard observations; crosses: Nantucket observations; open circles: Lick observations using the period $0\overset{d}{.}534829$; open circles with crosses: Lick observations using the period $0\overset{d}{.}534869$.

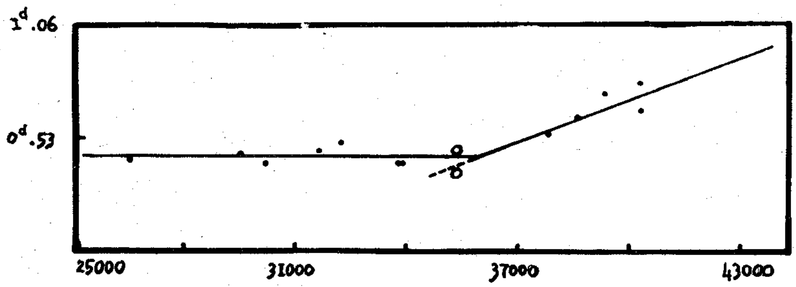

Figure 2:
The phases of maxima expressed in days as a function of Julian Days for the period 0d.534829. Dots: Harvard and Nantucket observations; open circles: Lick observations.

The Lick Observatory Atlas contains two charts of the variable. On one chart taken on July 5, 1954, the star appears to be of magnitude 14.9, and another taken on July 13, 1955 to be of magnitude 15.7. Both observations fit the light curve using both the early and the late periods; but the later period of 0d.534869 is better, confirming the occurrence of the change of the period around 1955.

Using the period 0d.534829, the maxima occur at phases as shown in Table I

TABLE I. Observed Maxima on Harvard Plates

J.D. 2400000 +	Phase	J.D. 2400000 +	Phase
26564.347	0.820	31638.315	0.898
28022.292	0.821	32293.519	0.968
29520.355	0.831	33836.398	0.774
30168.536	0.771	33858.326	0.774

Using the period 0d.534869 the maxima occur at phases as shown in Table II

TABLE II. Observed Maxima on Nantucket Plates

J.D. 2400000 +	Phase	J.D. 2400000 +	Phase
37824.756	0.769	39272.737	0.937
38612.639	0.808	40000 +	0.5 to 0.9

I am deeply indebted to the U.S. National Science Foundation for the grant to the Maria Mitchell Observatory that made this investigation possible.

Nantucket, Massachusetts
October 14, 1969

JANET AKYUZ

Ege University Observatory
Izmir, Turkey

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

NUMBER 396

Konkoly Observatory
Budapest
1969 October 29

RADIAL VELOCITY OBSERVATIONS OF THE ECLIPSING SYSTEM HD 128661

The star HD 128661 was announced as a probable eclipsing variable in Information Bulletin No. 314 by G.JACKISCH who observed what appeared to be a minimum at JD 2438906.455. In Information Bulletin No.365 A.J.Harris recorded observations of another minimum at JD 2440362.907. The star is listed as a spectroscopic binary in Wilson's General Catalogue of Radial Velocities, but no orbit has been published.

We have obtained 20 spectrograms of HD 128661 with a dispersion of 12 A/mm between JD 2440260 and JD 2440353. The velocities from these plates indicate that the period is very close to $3^d.33$, the range being about 150 km/sec. It seems almost certain from these observations that the number of cycles between the two minima referred to above is 437 and that the period is therefore $3^d.33284$. (In view of the fact that we see no sign of a second component in our spectra it appears likely that both Jackisch and Harris have observed the primary minimum. The uncertainty as to whether Jackisch's published time of minimum is geocentric or heliocentric is not significant in our determination of the period.)

There is evidence in our velocity curve of orbital eccentricity such that the secondary minimum should follow the primary by $1^d.51$.

October 20, 1969.

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COMMISSION 27 OF THE I. A. U.
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Konkoly Observatory
Budapest
1969 November 3

THE VARIABILITY OF BV 789

The eclipsing binary BV 789 was found by Strohmeier (IBVS no.225, 1967) to have the following ephemeris:

$$\text{Min.I} = \text{JD } 2425501.350 + 0^d.558139 \text{ E.}$$

Photoelectric observations were made by the author at Cerro Tololo Inter-American Observatory in Chile on five nights during July and August of 1969. These observations cannot be fitted to the above ephemeris. It was found that the period is actually nearly one day instead of somewhat more than half a day as given in the above ephemeris. No times of primary minimum were observed at Cerro Tololo, but the previously observed times of minimum light yield the following ephemeris:

$$\text{Min.I} = \text{JD } 2425501.340 + 0^d.9972646 \text{ E.}$$
$$\pm 5 \quad \pm 5 \text{ p.e.}$$

Minimum	E	O–C
2425501.376	0	$+0^d.036$
6899.478	1402	−0.027
7666.370	2171	−0.031
7685.337	2190	−0.012
7984.509	2490	−0.020
8045.343	2551	−0.019
8078.286	2584	+0.015
8391.424	2898	+0.012
8396.426	2903	+0.027
2431651.498	6167	+0.028
8236.411	12770	+0.002
8264.315	12798	−0.017
8278.272	12812	−0.022
8283.269	12817	−0.011
8297.228	12831	−0.014
8580.478	13115	+0.013
8582.471	13117	+0.012
8587.431	13122	−0.015
8615.391	13150	+0.022
8634.310	13169	−0.007
8643.311	13178	+0.018
8662.240	13197	−0.001

Minimum (contd.)

2438994.321	13530	$-0^{d}.009$
9300.501	13837	+0.011
9321.464	13858	+0.032
9373.282	13910	-0.008
9377.285	13914	+0.006

BV 789 was observed together with a comparison star, HD 187952. The magnitudes and colors of these stars are as follows:

	V	B-V
BV 789 (at max.)	9.56	+0.31
HD 187952	9.29	+0.38

Although the spectral types of BV 789 (HD 188297) and HD 187952 are listed as A0 and A2, respectively, in the Henry Draper Catalogue, their colors correspond the those of main sequence stars with respective spectral types of F0 and F2.

BV 789 is practically constant in light during the portions of its light curve outside eclipses. The secondary minimum is about $0^{m}.07$ deep in either yellow or blue light. From the photographic data, it is assumed that the primary minimum is at least $0^{m}.55$ deep. Thus BV 789 is an Algol-type eclipsing binary rather than a W Ursae Majoris star. Since the period of BV 789 is very nearly equal to one day, it will not be easy to obtain a complete light curve of this star at only one observing site.

October 27, 1969

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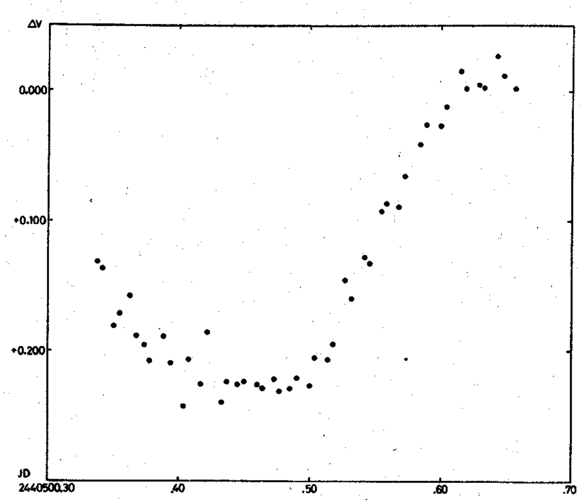
COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 398

Konkoly Observatory
Budapest
1969 November 4

HD 216711, PROBABLY AN ECLIPSING VARIABLE

Photoelectric measurements were made in a field in Cepheus during September and October 1969 with the 61 cm telescope of the Lund Observatory. HD 216711 was one of the standard stars used. In the night of 1969, October 5-6 (JD 2440500.3 - 2440500.7) the magnitude variation shown in the Figure was recorded. The variation in B-V and U-B is



less than 0^m.01. HD 216711 is of spectral type B1 V (Jaschek, Conde and de Sierra, 1964) and its magnitude and colours are given by Hiltner (1956) as V = 9.05, B-V = +0.62, U-B = -0.33.

The mean error of one measurement is less than $0^m.02$. The star was also observed in the following intervals:

JD 2440478.306 - .628
2440479.424 - .527
2440481.292 - .354
2440482.285 - .619
2440504.343
2440506.410 - .598

No variation was recorded in these intervals.

October 1969

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References:

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Jaschek C., Conde H., and de Sierra A.C., Catalogue of Stellar Spectra Classified in the Morgan-Keenan System, La Plata (1964)

COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 399

Konkoly Observatory
Budapest
1969 November 4

EV LAC

A continual photoelectric monitoring of the flare star EV Lac was done with the 91-cm reflector of the Okayama Station in the period from 2 to 19 September 1969. During the 33 hours of monitoring in the magnitude B, 12 flares were observed as shown in the following table. By the observations, the sum of the light of EV Lac and its optical companion was measured. The values of m_f (B), P and σ in the table are the results corrected for this companion. The magnitude difference between EV Lac and the companion was assumed to be 0.91 magnitudes according to the Information Bulletin No.370.

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

$$m_f = m_0 - 2.5 \log I_{0+f}/I_0$$

$$P = (I_{0+f}-I_0)/I_0 \cdot dt,$$

$$\sigma(\text{mag}) = 2.5 \log (I_0+\sigma)/I_0.$$

Tokyo Astronomical Observatory
30 October 1969.

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

Flares of EV Lac observed at Okayama,
2 to 19 September, 1969.

Date 1969 Sept.	Time of monitoring (UT)	Time of max. (UT)	m_f (B)	P	Duration	σ
						mag
2^d	$13^h34^m-13^h56^m$					0.06
4	12 01 -13 00					0.04
	13 17 -14 04					0.07
5	15 19 -15 54					cloudy
	16 36 -16 54		mag	min		0.07
	17 08 -18 27	$18^h21^m.0$	0.28	0.36	2.1^{min}	0.07
6	13 13 -14 10					0.07
	14 31 -14 49					0.07
7	13 14 -13 33					cloudy
8	11 57 -12 30					0.07
11	12 43 -13 00					0.07
12	10 23 -18 50	17 31.8	0.28	0.24	2.0	0.04
15	12 10 -17 00	13 45.8	>0.9	>0.8	>2.6	cloudy
		15 50.6	>0.9	>1.5	>3.4	cloudy
16	10 27 -11 02					0.08
17	11 52 -12 00					0.04
	12 07 -12 20					0.04
	12 54 -13 17					0.04
	14 01 -14 16	14 09.5	0.15	0.07	0.9	0.04
	14 54 -15 10					0.04
	15 13 -15 34					0.04
	15 50 -16 05					0.04
	16 17 -16 28					0.04
	16 35 -19 15	18 14.1	0.28	0.24	3.7	0.04
		18 24.3	0.20	0.07	0.8	0.04
18	10 23 -15 30	11 26.1	0.08	0.04 }	2.5	0.03
		11 26.8	0.13	0.03 }		0.03
		12 46.9	0.10	0.19	3.3	0.03
		15 12.2	0.28	0.09	1.3	0.03
19	10 40 -14 12	12 20.5	0.33	0.23	4.2	0.04

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Konkoly Observatory
Budapest
1969 November 5

EMISSION OBJECT V 1016 CYG (MHα 328-116)

As part of a continuing study of the emission object V 1016 Cygni we have obtained slit spectra at 12 and 40 A/mm at the David Dunlap Observatory on photometrically calibrated Kodak IIaO Plates, and at 130 A/mm on IaO plates at the Warner and Swasey Observatory. At the latter we have also obtained objective prism spectra on unfiltered IN plates. A report on the results of our studies from 1966 to 1968 will appear elsewhere (FitzGerald and Houk, 1970). Here we present preliminary data for four plates obtained at David Dunlap Observatory May 4, July 31, August 7, and August 28, 1969. The plates of July 31 and August 7 have been calibrated for spectral sensitivity from spectrograms of α Lyrae obtained on the same night. The absolute energy distribution used for α Lyrae is that of Code (1960). The results from a plate taken October 31, 1968 (FitzGerald and Houk, 1970) are included for comparison.

Table 1 gives the log intensities of the stronger lines, uncorrected for spectral sensitivity; corrected log intensities are given in brackets. The latter should be comparable with the intensities given by Kurpinska (1969), the former with those given by FitzGerald and Houk (1970), but not FitzGerald et al. (1966).

Table 1

Log Intensities of Plates Taken in 1969 (log $I_{H\beta}$ = 2.00)

Measured λ	Identification	Oct.31 1968	May 4	July 31	Aug.7	Aug.28
3797.88	H 10	0.74			0.34(0.38)	1.05
3820.12	HeI-22	0.25				0.43
3835.41	H9	0.76			0.63(0.61)	1.15
3839.85	FeV-3F					0.77
3838.92	NeIII-1F	1.85	2.01	2.00(1.96)	1.86(1.81)	1.96
3888.91	H 8	1.45	1.12	1.03(0.98)	1.38(1.32)	1.70
3967.43	NeIII-1F	1.62	1.73	1.69(1.67)	1.82(1.74)	1.94
3970.2	Hε	1.19				
4026.42	He I-18	0.40		1.21(1.14)	0.30(0.20)	0.80
4068.66	S II-1F	0.60			0.36(0.25)	0.91
4070.84, 4072.06	Fe III-4F	0.45			0.30(0.17)	0.95
4101.82	Hδ	1.49	1.44	1.56(1.45)	1.66(1.54)	1.76
4340.69	Hγ	1.81	.88	1.80(1.65)	1.96(1.77)	1.89
4363.21	O III-2F	1.92	2.08	2.09(1.94)	2.07(1.88)	2.06
4471.47	He I-14	0.82	0.54		1.01(0.81)	1.36
4641.17	N III-2	0.49		0.28(0.14)	0.47(0.28)	0.97
4686.17	He II-1	1.54	1.42	0.91(0.75)	1.53(1.35)	1.64
4713.51	He I-12	0.42			0.36(0.18)	0.74
4861.26	Hβ	2.00	2.00	2.00(2.00)	2.00(2.00)	2.00
4959.03	O III-1F	1.75	1.77	1.77(1.97)	1.79(2.13)	1.88
5006.62	O III-1F	1.97	2.08	2.13(2.50)	2.07(2.63)	2.02

On the whole the spectra show the same characteristics as previously reported (FitzGerald et al. 1966; McCuskey, 1967; and FitzGerald and Houk, 1970). However, there are some marked changes. As suggested by Kurpinska the strength of He II λ4686 decreased markedly in July 1969, but contrary to Kurpinska's report it remained sharp. This decrease in strength was accompanied by a smaller decrease in the Hydrogen lines H8 to H10, and by an increase in strength in the HeI lines λλ4026 and 4471. By August 7 He II λ4686 had returned to the intensity observed in 1967 and 1968; the other lines also returned to approximately the same intensities. Furthermore, the strengths of the lines of [Ne III], [O III], Hβ ,

$H\gamma$, and $H\delta$ have shown no large change since 1967. (The observation of McCuskey (1967) comparing the [O III] lines λ4363 and λ5007 is with reference to uncalibrated plates. The absolute strength of λ5007 is greater than that of λ4363, and has been so since 1965). An objective prism plate taken August 4-5 indicates that the strength of He II λ4686 had returned to its 1968 strength by that time. Comparison of Table 1 with the observations of Kurpinska reveals other differences between our observations and his, especially at short wavelengths. Some, but not all, of these differences must be due to the different emulsions and/or reduction procedures used.

Our plate of August 28, 1969, is well exposed, showing a faint continuum and about 90 emission lines. No absorption lines are seen. Emission lines of the following are observed: H, He I, He II, N III, O II, O III, O IV, [O II], [O III], [Ne III], [S II], [A IV], [Fe II], [Fe III], [Fe V], [Fe VI], and possibly [Ti III]. The latter has not been noted before and the identification is uncertain. The permitted iron lines are completely absent.

Table 2

Radial Velocity Measures

Date	Dispersion (A/mm)	Velocity (km/sec)
October 31, 1968	12	-62.1 ± 1.7
May 4, 1969	12	-50.3 ± 2.2
July 31, 1969	12	-60.1 ± 2.6
August 7, 1969	40	-49.8 ± 5.7
August 28, 1969	40	-72.3 ± 2.6

In addition to the short term changes observed in the helium line strengths, the radial velocity observations, Table 2, show that changes are occuring in the emitting regions. However, the line widths and profiles remain essentially unchanged from 1968, when the object exhibited a constant radial velocity of about -60 km/sec. A full discussion of this year's observations will be published later.

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