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INFORMATION BULLETIN ON VARIABLE STARS

Nos. 601-700

1971 December – 1972 July

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Konkoly Observatory
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1971 December 21

PHOTOELECTRIC OBSERVATIONS OF THE FLARE STAR UV CET DURING THE 1971 OCTOBER 11-27 INTERNATIONAL PATROL

The preliminary results of UV Cet photoelectric observations carried out at the Catania Astrophysical Observatory during the observing period proposed by the IAU Working Group on Flare Stars (Andrews et al. 1971, IBVS 516) are given.

The observations were made in b light with a 91 cm cassegrain type reflector feeding a classical one-channel photoelectric photometer.

The patrol intervals in U.T. are given in Table 1. During the 1511 hours of patrol time 9 flares were observed, the characteristics of which are given in Table 2. The light curves of the observed flares in the b color of our natural system are shown in Figures 1-3.

The explanation of symbols and details of the observing equipment can be found in a preceeding number of this Bulletin (Cristaldi and Rodonò 1971, IBVS 525).

Cataina Astrophysical Observatory, Italy
December 6, 1971

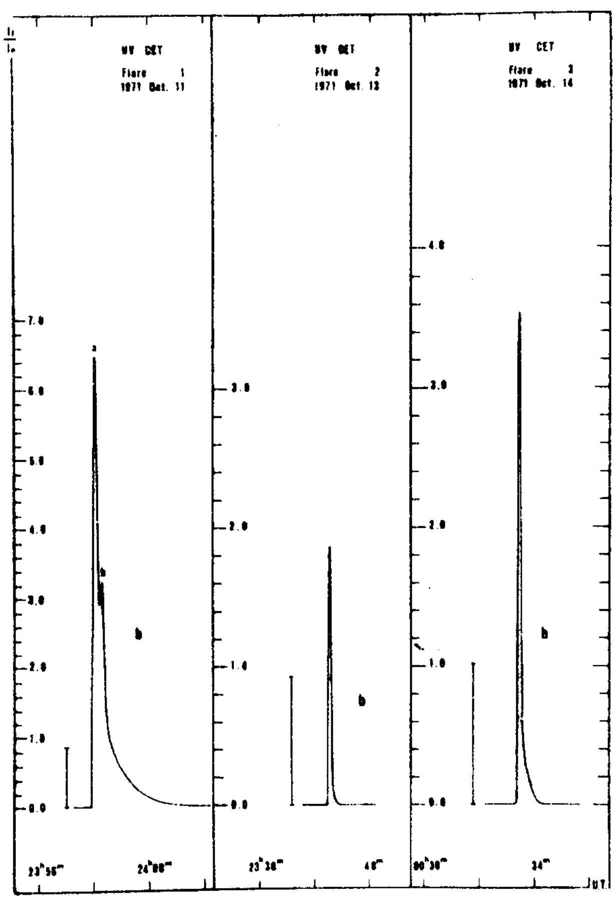
S.CRISTALDI and M.RODONO

Table 1. Detailed Coverage

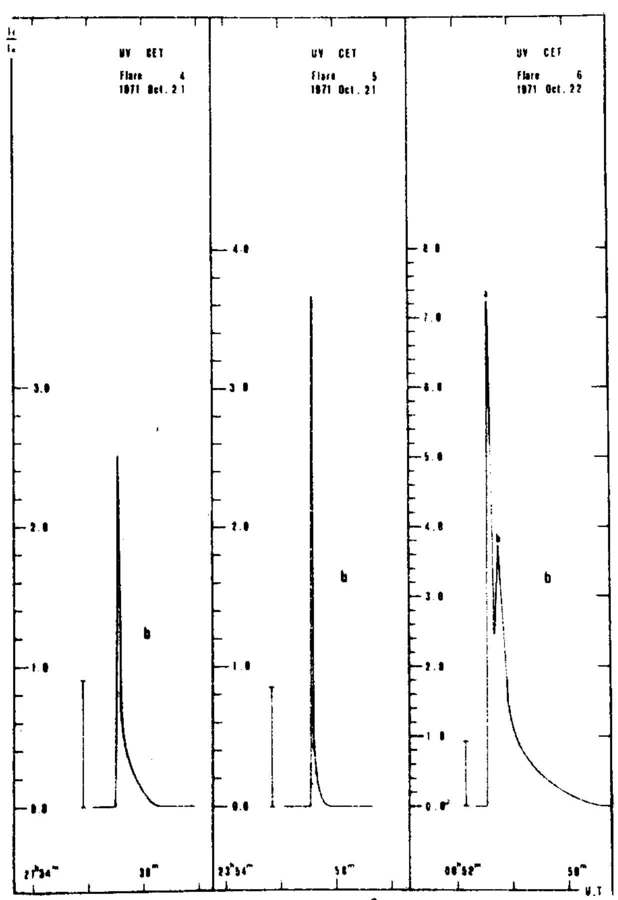
Date 1971 Oct.	Coverage (U.T.)	Total coverage	$\overline{3\delta/I_o}$
11-12	22^h46^m-2258; 2300-2310; 2312-2328; 2330-2340; 0000-0004; 0006-0108; 0110-0124	145^m	0.40
12	2131-2205; 2207-2215; 2216-2239	65	0.50
13	2137-2257; 2324-2400; 0000-2502	178	0.46
16-17	2240-2400; 0000-0025; 0028-0054; 0101-0131	161	0.40
21-22	2108-2222; 2250-2400; 0000-0058; 0100-0101	204	0.41
23	2024-2149	85	0.16
24-25	2156-2212; 2244-2312; 0004-0013; 0021-0034	66	0.14

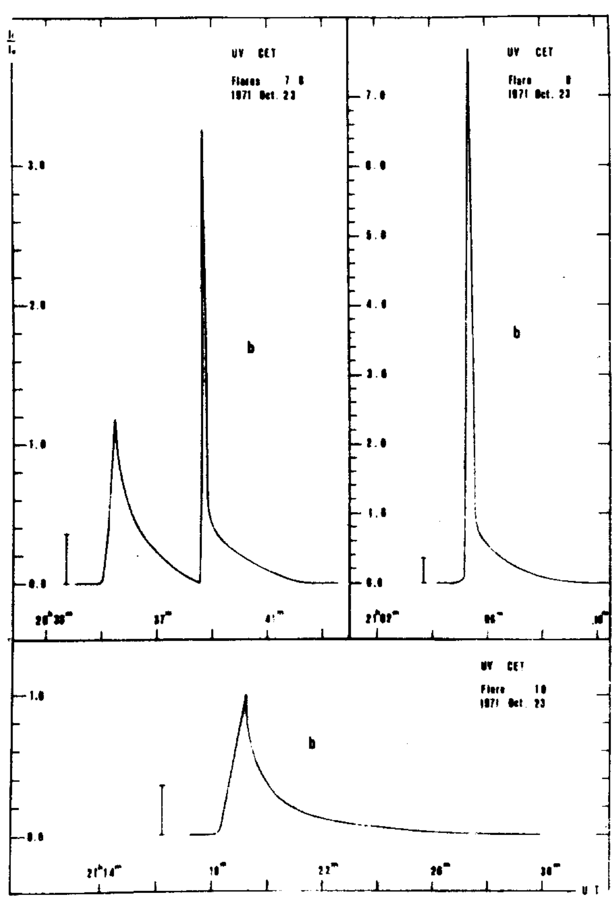
Table 2. Characteristics of Flares

no.	t_{max}(U.T.) October	JD 244...	d_b	d_a	$\frac{3\sigma}{I_{or}}$	$(\frac{I_f}{I_o})_{max}$	Energy P	erg	Air mass	f	sky
1/71a	11, $23^h58.3^m$	1236.5037	0.2	3.3	0.40	6.48	2.70	$1.33x10^{30}$	1.47	2	1
2/71	13, 23 40.6	1238.4916	0.1	0.3	0.43	1.85	0.22	$1.09x10^{29}$	1.46	0	4
3/71	14, 00 33.5	1238.5283	0.1	0.7	0.49	3.53	0.52	$2.56x10^{29}$	1.58	0	4
4/71	21, 21 37.1	1246.4057	0.1	1.4	0.42	2.51	0.57	$2.81x10^{29}$	1.51	0	1
5/71	21, 23 57.2	1246.4613	0.1	0.5	0.39	3.66	0.32	$1.58x10^{29}$	1.44	0	0
6/71	22, 00 53.2	1246.5419	0.1	3.9	0.42	7.22	4.00	$1.97x10^{30}$	1.85	2	0
7/71	23, 20 35.4	1248.3623	0.4	3.1	0.16	1.17	1.15	$5.67x10^{29}$	1.73	0	2
8/71	23, 20 38.7	1248.3649	0.2	3.6	0.16	3.26	0.87	$4.32x10^{29}$	1.71	0	2
9/71	23, 21 05.4	1248.3834	0.2	3.8	0.17	7.69	2.38	$1.17x10^{30}$	1.58	0	2
10/71	23, 21 19.2	1248.3930	0.9	7.9	0.16	1.00	1.53	$7.54x10^{29}$	1.54	0	2



I_f / I_o
UV CET
Flare 1
1971 Oct. 11
UV CET
Flare 2
1971 Oct. 12
UV CET
Flare 3
1971 Oct. 14
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
a
b
b
b
b
23h56m
24h00m
23h36m
40m
00h30m
34m
U.T.


UV CET
Flare 4
1971 Oct. 21
UV CET
Flare 5
1971 Oct. 21
UV CET
Flare 6
1971 Oct. 22
b
b
b
a
b
U.T


UV CET
1971 Oct. 23
b
0.0
1.0
2.0
3.0
37^m
41^m
UV CET
1971 Oct. 23
b
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
UV CET
Flare 10
1971 Oct. 23
b
0.0
1.0
22^m
26^m
30^m
U T

COMMISSION 27 OF THE I. A. U.
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NUMBER 602

Konkoly Observatory
Budapest
1971 December 21

PHOTOELECTRIC OBSERVATIONS OF V 1216 SGR DURING THE 1971, JUNE 16-30 INTERNATIONAL PATROL

According to the observing schedule of cooperative observations proposed by the IAU Working Group on Flare Stars (Andrews et al.1971, IBVS 516), V 1216 Sgr was patrolled at the Catania Astrophysical Observatory for about 28.5 hours.

The observations were carried out with a 61 cm universal type reflector feeding a synchronous u, b, v photometer.

The detailed coverage intervals are given in the accompaniing table. No flare activity was detected during our patrol.

The explanation of symbols and details of the observing equipment can be found in a preceeding number of this Bulletin (Cristaldi and Rodonò, 1971, IBVS 525).

Date 1971 June	Coverage U.T.	Total coverage	$\overline{3\sigma/I_0}$
16	00^h38^m-0115; 0117-0142; 0146-0158; 0200-0202.	76^m	0.43/0.10/0.06
19-20	2309-2320; 2322-2332; 2339-2345; 2352-2357; 0002-0007; 0011-0045; 0059-0114; 0116-0130; 0132-0143; 0145-0157; 0159-0207	131	0.19/0.03/0.02
20-21	2317-2337; 2339-2400; 0000-0002; 0005-0013; 0044-0108; 0110-0126; 0128-0148; 0150-0203	124	0.24/0.04/0.02
21-22	2245-2306; 2311-2330; 2334-2348; 0025-0027; 0029-0040; 0042-0100; 0102-0119; 0129-0141; 0143-0153; 0155-0201; 0203-0205	132	0.24/0.04/0.02
22-23	2206-2255; 2257-2306; 2308-2323; 2325-2338; 0012-0052; 0054-0126; 0128-0137; 0141-0151; 0157-0204;	184	0.21/0.04/0.02
23-24	2136-2156; 2207-2224; 2259-2310; 2313-2321; 2323-2333; 0041-0049; 0051-0100; 0102-0114; 0116-0130; 0132-0143	120	0.29/0.04/0.04
24-25	2308-2314; 2322-2333; 2335-2346; 0032-0052; 0123-0136; 0138-0152;	75	0.20/0.04/0.03

Date 1971 June	Coverage U.T.	Total coverage	$\overline{3\sigma/I_o}$
25-26	22^h32^h-2312; 2314-2330; 2332-2350; 2352-2400; 0000-0010; 0012-0030; 0125-0140; 0142-0159; 0201-0208	149^m	0.26/0.06/0.03
26-27	2246-2324; 2328-2334; 2336-2350; 2352-2400; 0000-0011; 0041-0049; 0052-0109; 0111-0131; 0133-0208;	157	0.30/0.05/0.03
27-28	2147-2201; 2204-2221; 2223-2229; 2255-2312; 2334-2400; 0000-0042; 0105-0123; 0125-0210	185	0.21/0.03/0.02
28-29	2155-2208; 2210-2225; 2227-2246; 2248-2257; 2259-2312; 2335-2350; 2351-2359; 0002-0021; 0023-0042; 0044-0100; 0103-0139; 0141-0149; 0151-0153; 0155-0204; 0206-0212	206	0.24/0.03/0.02
29-30	2202-2208; 2209-2215; 2217-2227; 2229-2245; 2247-2303; 2305-2310; 2338-2356; 2357-2400; 0000-0014; 0016-0032; 0033-0050; 0052-0109; 0111-0127; 0128-0145; 0151-0154; 0156-0207	191	0.25/0.04/0.02

Catania Astrophysical Observatory
Italy
December 6, 1971

S.CRISTALDI and M.RODONÒ

COMMISSION 27 OF THE I. A. U.
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NUMBER 603

Konkoly Observatory
Budapest
1971 December 21

A NEW VARIABLE STAR IN OPHIUCHUS

On the occasion of visual observations of the irregular variable V 513 Oph it turned out that the star

$18^h7^m40^s$	$+5°10'.1$	(1855.0)
$18^h12^m20^s$	$+5°11'.4$	(1950.0)

used as comparison star had sometimes shown lightvariations between 10.3 and 11.3 visual magnitudes. The observations were carried out with the 26 cm refractor of the Hamburg Observatory.

The light curves obtained for the intervals J.D. 2440417-561, 40797-906 and 41145-268 showed irregular oscillations with a cycle of about 100 days. Shorter waves of 25 to 35 days were superposed on these oscillations.

The light variation of the star was confirmed by Dr. P.Ahnert (Sonneberg Observatory).

According to its image on the photographic Franklin-Adams-Chart No.110 the star seems to be scarcely coloured.

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ON THE SPACE DISTRIBUTION OF FLARE STARS IN PLEIADES

Recently we have reported (1) that according to our study of the distribution of the known flare stars in the Pleiades region there is a "cavity" in the distribution of flare stars in the central part of the cluster around Alcyone.

Later P.N.Kholopov (2) has found that the results of his own study of the same problem contradict this conclusion and has tried to explain our result as "an apparent one" caused "by using too narrow zones for star counts and by neglecting the natural uncertainty of the derived F (r) values".

Here we would like to show that P.N.Kholopov's inference is the consequence of a misunderstanding.

1. It is evident that if there is a concentration or a cavity of stellar space density in some system, then for its detection and study it is important to find exactly its centre and to use it for the determination of space density distribution. Any displacement from this centre must bring to the misrepresentation of the true distribution.

In our study (1) we have tested different points as the centre of the subsystem of flare stars in the Pleiades cluster and have at last chosen Alcyone which turned out as the best one in the sense of the manifestation of the observed cavity of flare stars in the subsystem.

Meanwhile, as one can judge from P.N.Kholopov's article (3), in his study the surface density distribution of flare stars has been determined taking as the centre of their concentration a point which is 5'.25 to the west from Alcyone.

The possible influence of this difference in the choice of the centre on the surface density distribution of flare stars derived by the method of concentric zones can be illustrated by the following example. Of 165 known flare stars in the Pleiades region brighter than $18^m.5$ (pg) (4-9) only one lies in the central circle of radius $0^\circ.2$ around Alcyone. While in the circle of the same radius around the point served as the centre in (3) there are 8 flare stars brighter than $18^m.5$. Hence the ratio of the corresponding surface densities will be 8. At the same time 6 out of 8 flare stars in the second case are placed in the ring $0^\circ.18$-$0^\circ.20$ from the centre and none of two others is situated nearer than $0^\circ.12$.

Thus the displacement of the centre from Alcyone only by 0°1 can yield serious changes in the surface density distribution of flare stars derived when the method of concentric zones is used for star counts.

2. However, it is clear that in order to find the stellar space density in the central region of the cluster we must use not only the surface distribution of flare stars in the central part around Alcyone but also their surface distribution in the peripheric regions (for example to exclude the influence of the outher shell of flare stars).

Nevertheless, the knowledge of the surface density distribution in the central part can give some information about the existence of a cavity in the space distribution. In particular it can be shown that when there is a cavity in the central region of a system then surface stellar density in its central part must not decreasing one (constant or increasing) with the distance from the centre. As one can see from the data followed it is what we observe in the central part of the Pleiades cluster around Alcyone in projection (4-9).

Distance pc	Area of zone (π^{-1} pc^2)	Number of stars all	$\leqslant 18^m_.5$
0-1.0	1.00	25	21
1.0-1.4	0.96	24	14
1.4-1.7	0.93	23	20

Of course, the natural uncertainties of the numbers of flare stars presented here are not negligible, but these data can be considered as a qualitative evidence in favour of the existence of the cavity in the space distribution of flare stars in the Pleiades cluster.

3. It is well known that the method of concentric zones for star counts used in P.N.Kholopov's study (2,3) is very sensible to the choice of the width of these zones, and the influence of this choice is significant for the stellar distribution derived.

Taking into account this fact in our study (1) we have used another method (10) which is based only on the "averaged" onedimensional distribution of stellar density. Being free from the influence of the choice of the zone width for starcounts, it can be used successfully for detection of finer details in the radial distribution structure.

4. Thus we have seen that the conclusion that the minimum in the distribution of flare stars in the Pleiades cluster obtained in (2,3) is absent, is possible only if one uses a centre which is at some distance from the centre of the cavity and applies the method of concentric zones for star counts. Therefore P.N.Kholopov's incorrect conclusion

(2) is the consequence of the roughness of his solution of the discussed problem (3). The study of this problem by the correct method shows that the cavity of flare stars in the Pleiades cluster is detected even in the case of P.N.Kholopov's choice of the centre.

In conclusion it is necessary to note that in spite of the evidences in favour to the existence of a cavity in the space distribution of the known flare stars in the Pleiades cluster it can not be excluded yet that it is an observed phenomenon only, but not a real one. What is the true cause of such peculiarity in the derived space distribution of flare stars we don't know. May be, it is caused by some selection effect. But independently of its interpretation it is important to mention that when we consider the distribution of observed flare stars in the Pleiades region in the correct way, and neglect the possible selection effects, we come inevitably to the idea of a cavity or at least of a minimum of the space density of flare stars in the central part of this system.

The details of our study of the considered problem with a discussion of the possible interpretations of the observed phenomenon will be published later.

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REFERENCES

1. L.V.Mirzoyan, M.A.Mnatsakanian, IBVS, No.528, 1971.
2. P.N.Kholopov, IBVS, No.566, 1971.
3. P.N.Kholopov, Astr.Zu., 48, 529, 1971.
4. G.Haro, Stars and Stellar Systems, vol.7, ed.B.M.Middlehurst and L.H.Aller, Univ. Press, Chicago, 1968, p.141.
5. G.Haro, E.Chavira, Bol.Obs.Tonantzintla, 5, No.31, 23, 1969.
6. V.A.Ambartsumian et al, Astrofizika, 6, 7, 1970.
7. G.Haro, E.Chavira, Bol.Obs.Tonantzintla, 5, No.34, 181, 1970.
8. G.Haro, G.Gonzales, Bol.Obs.Tonantzintla, 5, No.34, 191, 1970.
9. V.A.Ambartsumian et. al, Astrofizika, 7, 319, 1971.
10. M.A.Mnatsakanian, Dokl.Acad.N.Armenian SSR, 49, 33, 1969.

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PROGRAMME OF COOPERATIVE FLARE STAR OBSERVATIONS FOR 1972

The Working Group on Flare Stars after consultations with members announces the following programme of cooperative observations:

YZ CMi	9 - 23 January
AD Leo	8 - 22 February
V 645 Cen	6 - 21 April
V 1216 Sgr	3 - 17 July
EV Lac	1 - 15 September
UV Cet	1 - 15 October

P.F. CHUGAINOV
Crimean Astrophysical Observatory

COMMISSION 27 OF THE I. A. U.
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NUMBER 606

Konkoly Observatory
Budapest
1971 December 28

A LATE TYPE VARIABLE IN NGC 6819

Barkhatova and Vasilevsky (1967) suspected that a red star, situated 4' from the centre of the old open cluster NGC 6819, might be a variable star (Fig.1, star no. 352).

Photoelectric measurements of this star have been made on the UBV-system with the 60 cm-reflector of the Lund Observatory. These measurements clearly confirm that the star is variable. Photoelectric data and some other measurements as well are given in Table 1 and Fig.2.

As can be seen from Fig.2, the star is probahly a variable of irregular type. From two objective prism plates it has been classified as an M4 giant.

The cluster diameter is 8' (of Fig.1), and the variable star is likely to be a physical member of the cluster. As the apparent distance modulus of the cluster is about $12^{m}_{.}6$ (Lindoff (1972)), the absolute magnitude of the variable star is $(-2^{m}_{.}6)-(-2^{m}_{.}2)$. As $E_{B-V} \approx 0^{m}_{.}3$ the intrinsic colours are $(B-V)_0 \approx 1^{m}_{.}2$ and $(U-B)_0 \approx 0^{m}_{.}9$.

References:

Barkhatova,K.A., Vasilevsky,A.E., Var.Star.Bull. 16, 171, 1967. Burkhead,M.S., Astronomical Journal, 76, 251, 1971. Lindoff,U., Reports from the Observatory of Lund, No.4, in press. Purgathofer,A. Mitteilungen der Universitaets-Sternwarte, Wien, Band 13, 7 (1966).

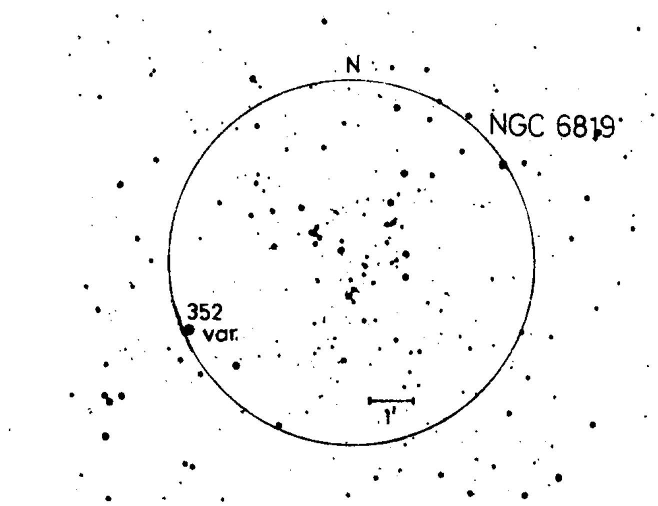

Fig.1. The open cluster NGC 6819 and the variable star no. 352.

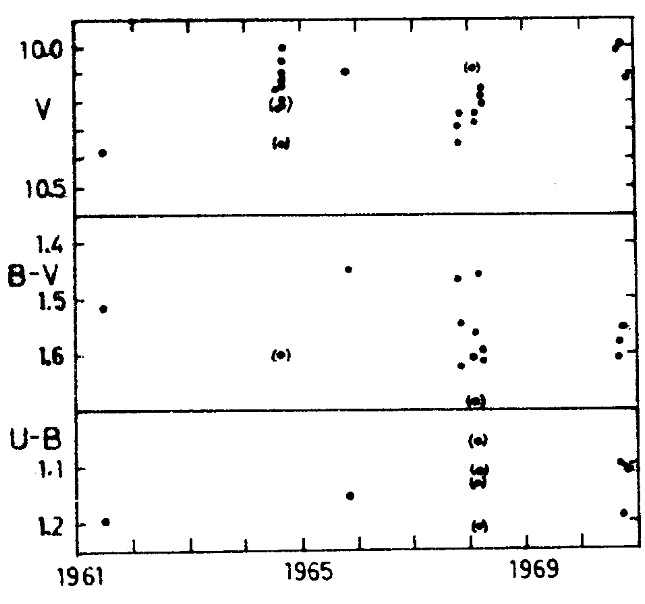

Fig. 2. Observed magnitudes and colours for star no.352

Table 1

Magnitudes and colours of the variable star No.352 in NGC 6819

Date	V	B-V	U-B	Remarks
1961	10.38	1.52	1.20	Purgathofer (1966)
1964 Oct.	10.00 10.35	1.6	–	Barkhatova, Vasilevsky (1967)
1965 Nov.23	10.08	1.45	1.16	Lindoff, photographic plates
1968 May 23	10.34	1.47	–	Lindoff, photoelectric
1968 May 24	10.29	1.55	–	" "
1968 May 29	10.26	1.64	–	" "
1968 July 23	10.09:	1.69:	–	" "
1968 July 26	10.24	1.57	1.22	" "
1968 July 28	10.27	1.61	1.13:	" "
1968 Aug. 20	10.20	1.62	1.12:	" "
1968 Aug. 22	10.18	1.59	–	" "
1968 Aug. 23	10.17	1.46	1.06:	" "
1970 Sept.26	10.01	1.61	1.19	" "
1970 Sept.28	10.01	1.58	1.10	" "
1970 Oct. 23	10.11	1.55	1.11	" "
?	10.00	1.59	1.14	Burkhead (1971)

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COMMISSION 27 OF THE I. A. U.
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NUMBER 607

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Budapest
1971 December 28

THE CHANGING PERIOD OF DL CASSIOPEIAE

DL Cas is an eight day classical Cepheid in the open cluster NGC 129. It had been suspected by Gunther (1953, Astr. Nachr., 281, 267) of having a changing period because various authors in the past had obtained slightly different periods, ranging between 7.99988 and 8.0012 days. The star has now been investigated on Harvard plates of the AC series taken with a 1.5-inch Cooke lens (scale 600"/mm) between 1898 and 1953. Dr. E.B.Newell and two of his graduate students, who had been investigating other aspects of the cluster, took part in the observations:

Hoffleit	1160 estimates
Newell	124
S. Danford	182
H. Falk	321
TOTAL	1 787

The star, 9.17 - 10.6 mag (pg), is greatly overexposed on many of the plates and is also frequently affected by overlapping images of a nearby star, resulting in appreciable magnitude scattering in the derived light curves. Phases were first computed on the basis of a close approximate period, and mean light curves were then derived for successive intervals of 1000 days. Corrections to the period were then ascertained from the deviations of the various mean curves from one-another. Within a 1000-day interval a change in the fifth place of the period is scarcely significant. The one constant period, 8.00026 days, that best represents the observations was independently determined and is very close to the period given in the recent General Catalogue of Variable Stars, 8.00027 days. However, the dispersion of the observations at the steepest part of the ascending light curve appears excessive. The deviations from the mean show progressive, non-linear changes in phase. Several trial changing periods were therefore derived. These improved the dispersion, but the nature of the correction term was not sufficiently definitive.

Almost twenty years have elapsed since the last of the Harvard patrol plates on this region. Subsequently, in 1957 and 1959, two excellent photoelectric light curves were obtained by Arp, Sandage and Stephens (1959, Astrophys. J., 130, 80) and Oosterhoff (1960, Bull. Astr.Inst. Nether., 15, 199), respectively. While their phases did not deviate greatly from the predicted values, they did suggest the need for more recent observations. Hence my summer student assistants at the Maria Mitchell Observatory and I obtained 28 additional short exposure plates with the 7.5-inch Cooke triplet in the summer of 1971. These new observations definitely confirm that the period is not constant.

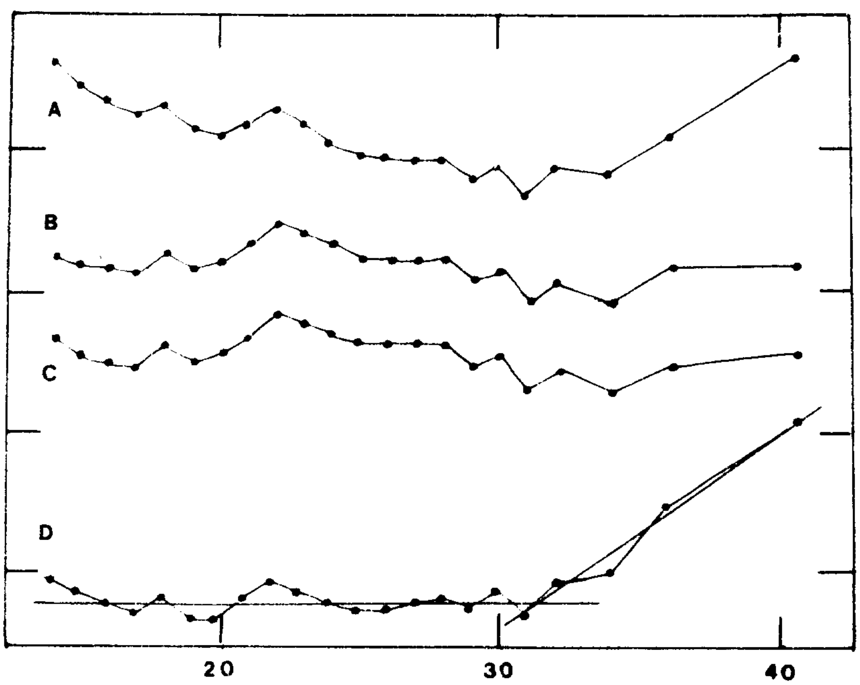

Figure 1. Deviations of phase of steepest ascent as function of J.D. Ordinate markers at intervals of 0.1 period. Abscissae, (JD-2400000)/1000

In Figure 1 and Table I the deviations of the individual 1000-day mean curves for each 1000-day interval from their common mean are represented for several of the more promising solutions. The top curve is for the basic constant reciprocal period of 0.124996. Next, a parabola and a cosine curve were fitted to the deviations.

TABLE I. Dispersion in Ascending Phase
for Various Reciprocal Trial Periods

	1/Period	Phase	Correction	σ	n	JD Interval*
A	0.124996	0		±0.025	22	14–41
B	0.124996		$-4.10^{-10}(JD-2427000)^2$	.012	22	14–41
C	0.124996		$+0.04 \cos 0\overset{\circ}{.}01(JD-2427000)$	.012	22	14–41
D	0.125000	0		.031	22	14–41
E	0.125000	0		.008	18	14–31
	0.124987	0		.007	5	31–41

*(JD-2400,000/1000)

The Table shows the dispersion at the phase of steepest ascent, computed as $\sigma = \pm\sqrt{\Sigma(\varphi_a - \varphi_o)^2/n}$ where φ_a is the observed mean phase of ascent in any particular 1000-day interval, and φ_o is the overall mean of these phases; n is the number of 1000-day intervals represented.

The parabolic term (B) and the cosine term (C) provide practically identical improvement. This is possible because the observations span less than half a cycle of the assumed cosine curve. In the final curve in Figure 1, and lines E of the Table, it is seen that an abrupt change in period after JD 2431000 (ca 1945) represents the present observations satisfactorily. The reciprocal period prior to that time was 0.125000, and later, 0.124987, corresponding, respectively, to periods of 8.00000 and 8.00083 days. The resulting light curves are shown in Figure 2, where the dots represent means from the Harvard plates in successive 1000-day intervals, the open circles represent single observations by Arp *et at* and by Oosterhoff, and the crosses the individual Maria Mitchell Observatory plates.

It is curious to note that the periods obtained are so close to exactly eight days that even over a 50-year interval the points show significant gaps in the light curve at every one eighth of the period for observations made at a single location.

Scattered previously published observations (cited by Gunther, 1953), although on possibly different magnitude-systems, are not in contradiction to the present results. The Harvard estimates, handicapped as they are by large observational uncertainties, seem to suggest that the star may also undergo slow variations in amplitude or magnitude at maximum. Photoeledtric observations of DL Cas over the next decade would be needed to confirm or refute this suspicion.

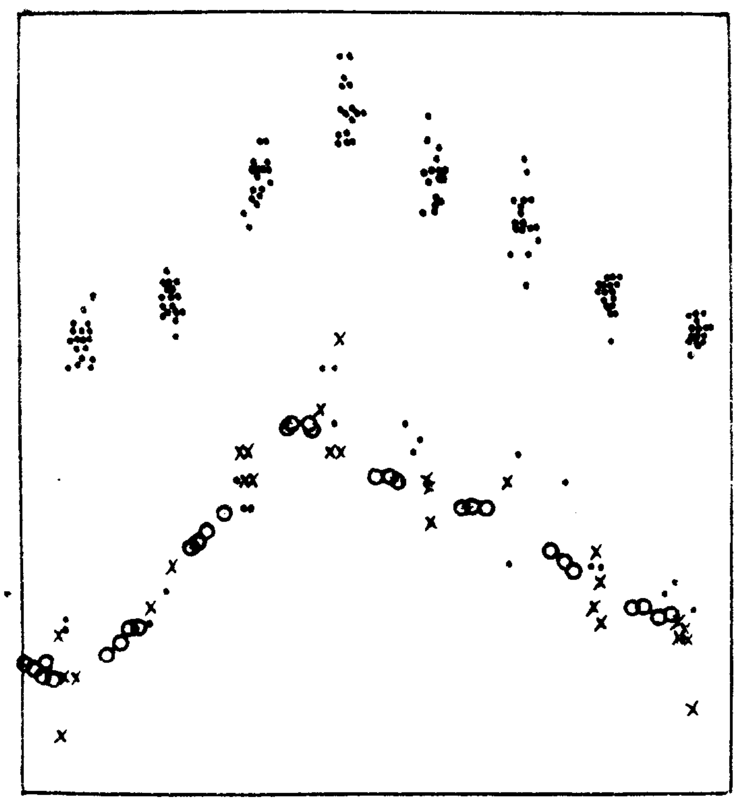

Figure 2. Upper diagram: the Harvard observations prior to JD 2431000 represented by reciprocal period 0.125000. Lower diagram: the later observations represented by 0.124987.

I wish to thank Dr. Newell for instigating this investigation, and the National Science Foundation for the grant to the Maria Mitchell Observatory, Nantucket, Massachusetts, which was used in part to obtain the 1971 observations and complete the numerical analysis of all of the observations.

DORRIT HOFFLEIT

Yale University Observatory
New Haven, Conn.
December 1971

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

NUMBER 608

Konkoly Observatory
Budapest
1972 January 1

EV Lac and UV Cet

Flare stars EV Lac and UV Cet were monitored photoelectrically with the 91-cm reflector of the Okayama Station. We used a new photometer to be described elsewhere for the simultaneous three-color photometry. EV Lac was monitored from 12 to 15 September, 1971, and UV Cet from 11 to 20 October, 1971. The observational results are summarized in Table 1 and 2.

Table 1

Flares of EV Lac observed at Okayama,
12 to 15 September, 1971.

Date 1971 Sept	Time of monitoring (UT)		Time of max. (UT)	Flares max. Δm	P	Duration	σ
12^d	10^h49^m-11^h20^m						U 0.14^{mag}
							B, V 0.05
13	10 42 -11 04	U	$10^h44^m.5$	0.75^{mag}	0.3^{min}	0.8^{min} (U, B, V)	0.09
		B		0.20	0.1		0.06
		V		0.12	0.1		0.05
	11 26 -12 15						
14	11 07 -11 30						
15	10 43 -14 17	U	11 31.7	0.66	0.7	2.5	U 0.16
		B		0.25	0.1	2.0	B 0.06
		V		-	-	-	V 0.04
		U	12 03.6	1.39	0.9	3.5	
		B		0.67	0.3	3.5	
		V		0.28	0.1	3.0	
	15 24 -16 52						

Table 2

Flares of UV Cet observed at Okayama,
11 to 20 October, 1971

Date 1971 Oct	Time of Monitoring (UT)	Time of max. (UT)	max. Δm	p min.	Duration min.	σ mag.
11^d	14^h44^m–17^h48^m	B $16^h37^m.8$	0.44	0.12	1.5	0.03
14	14 13 –18 40	B 14 54.8	0.53	0.1	0.5	
		B 14 58.4	0.36	0.1	0.3	
		B 16 36.6	1.88	9.5	13.0	0.02
		B 16 56.2	0.36	0.1	0.4	
		B 17 43.7	1.51	0.8	4.0	
15	13 06 –18 58	U 15 53.6	1.75	7.0	8.0	0.5
		B 15 53.2	0.84	2.2	9.0	0.05
		V 15 54.6	0.22	0.4	8.0	0.03
18	17 30 –18 50					
19	14 38 –18 20	U	1.63	0.5		
		B 14 47.4	0.83	0.3	0.8	
		V	0.26	0.1		
		U	1.67	2.0		U 0.5
		B 15 02.5	1.58	1.3	1.8	B 0.22
		V	0.78	0.3		V 0.06
		U	–	–		
		B 18 01.7	0.83	0.8	1.5	
		V	0.26	0.2		
20	12 36 –18 20	U	–	–		
		B 12 36.7	0.73	0.2	0.8	
		V	0.27	0.1		
		U	–	–		
		B 12 40.3	1.23	0.5	1.0	
		V	0.48	0.2		
		U	2.12	0.4	0.2	U 0.5
		B 14 05.8	1.36	0.3	0.2	B 0.22
		V	0.44	0.1	0.3	V 0.04
		U	1.97	–	0.5	
		B 14 44.1	0.50	0.2	0.3	
		V	0.21	0.1	0.5	
		U	3.60	10.0		
		B 15 59.0	2.65	8.0	5.1	
		V	1.16	1.8		

Tokyo Astronomical Observatory
23 December 1971.

K.OSAWA,
K.ISCIMURA,
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COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS

NUMBER 609

Konkoly Observatory
Budapest
1972 January 4

BAV - Mitteilungen Nr. 21

NEW ELEMENTS FOR WW CAM

Observations of WW Cam by BAV-members and observers in Switzerland during 1966-1971 show large $O-C_1$ against elements given by M.Huruhata and S.Gaposchkin in Bulletin of the Harvard College Obs. No.914 (1940):

Min = JD 2427 114.762 + $2^d.27436$. E.

The observed 10 minima (s. Table) led to the new elements:

Min = JD 2439 403.556 + $2^d.2743676$ E.

Residuals are given in the Table as $O-C_2$. The starting point of M.Huruhata's elements is badly represented ($O-C_2$= -0.386). Therefore, a change of period is supposed and the new elements may be taken only as instantaneous.

Time of min. (JD 24....)	obs.	n	$O-C_1$	$O-C_2$
39 403.549:	Br	4	+0.420:	-0.007:
40 073.359/	Br	9	+0.431	+0.002
288.289*	HP	14	+0.434	+0.004
381.531*	KL	8	+0.427	-0.003
422.468*	KL	13	+0.426	-0.005
438.402*	KL	9	+0.439	+0.009
804.568:	Br	9	+0.433:	+0.002:
811.400	Br	11	+0.442	+0.010
836.406	Br	12	+0.430	-0.002
41 267.388/	Br	13	+0.421	-0.012

Observers are Br=W.Braune, HP=H.Peter, KL=K.Locher.
: = not sure, / = secondary minimum, n is the number of individual estimates used for timing the respective minimum.
* = the observations are published in ORION No.113, 114, 115 (1969).

A complete description of the observations shall be published in BAV-Rundbrief No.1/2 (1972).

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COMMISSION 27 OF THE I. A. U.
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NUMBER 610

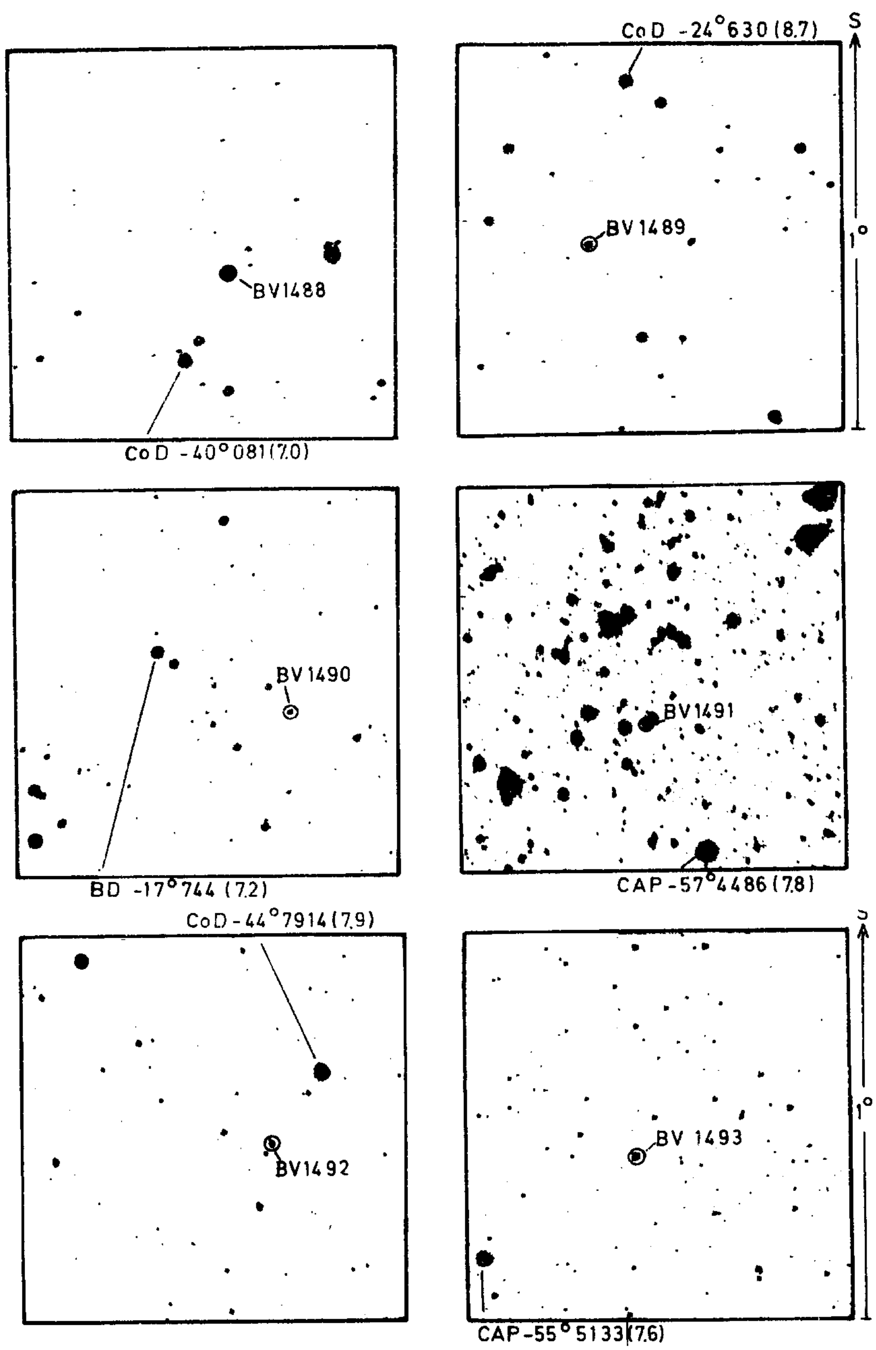
Konkoly Observatory
Budapest
1972 January 4

Veröffentlichungen der Remeis-Sternwarte Bamberg
Astronomisches Institut der Universität Erlangen-Nürnberg
Band VIII, Nr.99

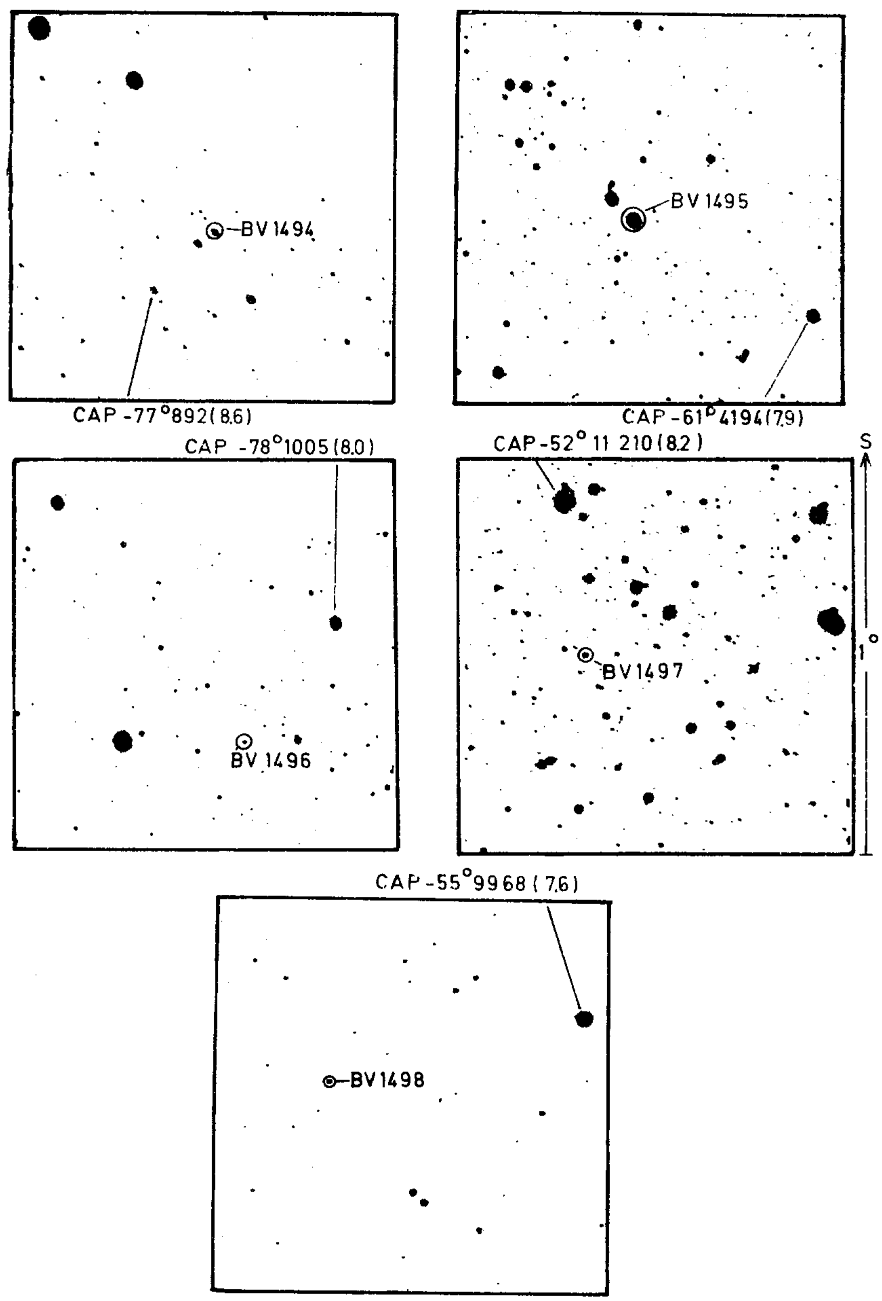
NEW BRIGHT SOUTHERN VARIABLE STARS

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

				A_{pg}
BV 1488 Phe	= CAP −40°32($8\overset{m}{.}2$)	= HD 2320 (A3)	= CoD −40°85($8\overset{m}{.}6$)	0.6
BV 1489 Cet	= CAP −23°176($9\overset{m}{.}8$)		= CoD −23°526($9\overset{m}{.}4$)	0.5
BV 1490 Eri	= BD −17°750($10\overset{m}{.}$)			0.4
BV 1491 Car	= CAP −57°4451($9\overset{m}{.}3$)	= HD 97726 (Ba)	= CoD −57°3785($9\overset{m}{.}3$)	0.5
BV 1492 Cen	= CAP −44°5910($8\overset{m}{.}8$)	= HD 106790 (A2)	= CoD −44°7906($9\overset{m}{.}2$)	0.3
BV 1493 Cru	= CAP −56°5346($8\overset{m}{.}2$)	= HD 109724 (B5)	= CoD −56°4556($8\overset{m}{.}1$)	0.6
BV 1594 Cha	= CAP −77°895($8\overset{m}{.}9$)	= HD 115637(Mb)	= CoD −77°593($8\overset{m}{.}7$)	0.6
BV 1495 Cen	= CAP −62°3703($8\overset{m}{.}2$)	= HD 120678 (B0)	= CoD −62°784($8\overset{m}{.}5$)	0.3
BV 1496 Aps	= CAP −77°1097($9\overset{m}{.}5$)		= CSV 7178 = S 5348	0.3
BV 1497 Tel	= CAP −52°11218($10\overset{m}{.}0$)		= CoD −52°8784($9\overset{m}{.}9$)	)0.4
BV 1498 Gru	= CAP −55°9955($9\overset{m}{.}2$)	= HD 218373 (Ma)	= CoD −55°9241($9\overset{m}{.}0$)	0.3



CoD -24°630 (8.7)
S
1°
BV1488
CoD -40°081 (7.0)
BV1489
BV1490
BD -17°744 (7.2)
BV1491
CAP -57°4486 (7.8)
CoD-44°7914 (7.9)
BV1492
BV 1493
CAP-55°5133 (7.6)
S
1°


BV 1494
CAP -77°892 (8.6)
BV 1495
CAP -61°4194 (7.9)
CAP -78°1005 (8.0)
BV 1496
CAP -52° 11 210 (8.2)
S
1°
BV 1497
CAP -55°9968 (7.6)
BV 1498

BV 1488 = CAP $-40^\circ 32 (8^m.2)$ = CoD $-40^\circ 85 (8^m.6)$ = HD 2320(A3)

Min = JD 2438309.365 + $1^d.510653 \cdot E$

Minima	E	O-C
38309.365	0.0	0.000
38315.369	4.0	-0.039
38318.369	6.0	-0.060
38340.292	20.5	-0.041
38614.528	202.0	+0.011
38642.446	220.5	-0.018
38670.374	239.0	-0.037
38695.340	255.5	+0.003
39053.350	492.5	-0.012
39361.490	696.5	-0.045
39383.418	711.0	-0.021
40415.233	1394.0	+0.018
40526.302	1467.5	+0.054
40823.093	1664.0	+0.001

Amplitude $0^m.5$ with a deep secondary minimum, EB

BV 1491 = CAP $-57^\circ 4451 (9^m.3)$ = HD 97726(B9) = CoD $-57^\circ 3785 (9^m.3)$

Min = JD 2438555.198 + $74^d.64 \cdot E$

Minima	E	O-C
38554.197	0	-1.001
38555.198	0	0.000
39972.888	19	-0.470
39972.934	19	-0.424
39973.905	19	+0.547
41092.822	34	-0.136
41092.876	34	-0.082
41093.844	34	+0.886

Amplitude $0^m.5$, EA
All other 277 plates show maxima.

Bamberg, December 1971

W.STROHMEIER

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

NUMBER 611

Konkoly Observatory
Budapest
1972 January 6

ORBIT OF RW CrB NOT ECCENTRIC

Since RW CrB was described (Fourth finding list of eclipsing binaries, Publications of the Univ. of Pennsylvania Astr. Series Vol.9. and Wood,F.B., Basic Astronomical data, page 379, Stars and Stellar Systems.) as an eclipsing binary with an eccentric orbit, photoelectric observations were made by one of us (E.F.M.) at the Kitt Peak National Observatory during 5 nights in June 1970.

The observations were made with single channel integrating photometers attached to the 50-inch and the no.3 16-inch telescope. For optimum efficiency, all observations were made in yellow light, where the shallow secondary minimum is deeper than in the blue. The star BD +29°2697 was used as the only comparison star. Table 1 gives the heliocentric Julian Date, the phase and the differences in magnitude between variable and comparison star. The magnitude system is that of the instruments, which is close to the V-system. A small systematic difference between the telescopes was removed by subtracting $0^{m}.01$ from all the 16-inch telescope results.

The phases were computed from the formula

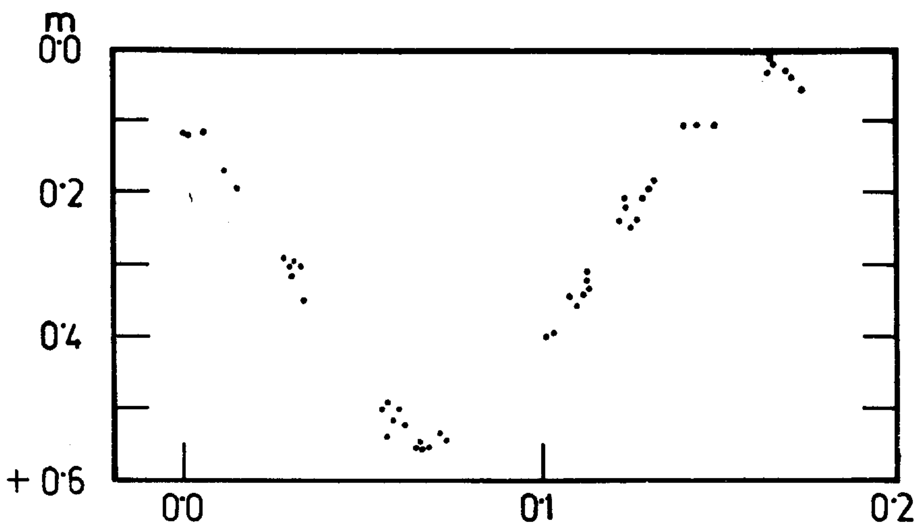
$$\text{phase} = 1.3766304\ (\text{JD hel} - 2400000)$$

in which the reciprocal period corresponds to the period as given in the 1969 General Catalogue of Variable Stars. The lightcurves of the minima are shown in the Figure.

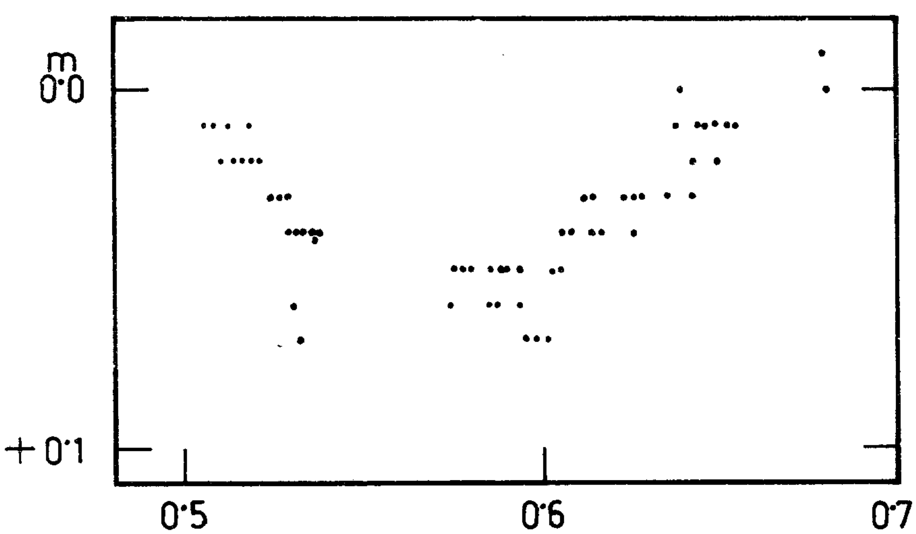
Table 2 gives the epochs of primary and secondary minimum and the corresponding phases.

The difference in phase between the minima is 0.4975 ± 0.0040 (s.e.), which is not significantly different from half a period.

This result could be explained assuming a sizeable eccentricity and a periastron length close to 90°; however we prefer to believe that the orbit has some arbitrary periastron length with an eccentricity near zero.



Primary Minimum



Secondary Minimum

TABLE 1

J. D. hel.	Phase	m
2440000+	P	
748.778	.006	+0.ᵐ12
.781	.011	+0.17
.783	.014	+0.19
.793	.028	+0.29
.795	.030	+0.30
.796	.032	+0.35
.847	.101	+0.40
.848	.103	+0.39
.875	.140	+0.11
.876	.142	+0.11
51.678	.000	+0.ᵐ12
.680	.001	+0.12
.700	.029	+0.30
.701	.030	+0.32
.701	.031	+0.30
.719	.056	+0.50
.720	.057	+0.49
.722	.060	+0.50
.723	.061	+0.52
.759	.111	+0.34
.760	.112	+0.32
.761	.112	+0.33
.767	.121	+0.24
.768	.123	+0.21
.768	.123	+0.22
.772	.129	+0.21
.773	.130	+0.19
.774	.131	+0.18
.797	.163	+0.03
.798	.164	+0.02
.799	.165	+0.02
.802	.169	+0.03
.803	.170	+0.04
.804	.172	+0.06
752.774	.507	+0.ᵐ01
.774	.508	+0.02
.775	.510	+0.02
.777	.512	+0.01
.778	.514	+0.02
.779	.515	+0.02
.782	.518	+0.02
.782	.519	+0.01
.783	.520	+0.02

TABLE 1 (Cont.)

J.D. hel.	Phase	m
2440000+	P	
752.786	.525	+0^m.03
.787	.526	+0.03
.788	.526	+0.03
.790	.529	+0.04
.791	.530	+0.04
.791	.531	+0.04
.793	.535	+0.04
.794	.536	+0.04
.795	.537	+0.04
.830	.585	+0.05
.831	.586	+0.06
.833	.589	+0.05
.834	.590	+0.05
.835	.593	+0.05
.836	.593	+0.06
.860	.626	+0.04
.860	.627	+0.03
.868	.637	+0.03
.869	.638	+0.01
.870	.639	+0.00
.872	.643	+0.01
.873	.644	+0.01
.876	.648	+0.01
.877	.649	+0.02
.879	.652	+0.01
.880	.653	+0.01
761.890	.057	+0^m.54
.892	.059	+0.52
.894	.062	+0.56
.895	.063	+0.56
.897	.066	+0.55
.898	.068	+0.56
.900	.071	+0.53
.901	.072	+0.54
.927	.108	+0.34
.928	.110	+0.36
.931	.113	+0.31
.939	.125	+0.25
.941	.127	+0.24
.957	.149	+0.11
63.687	.530	+0^m.06
.688	.531	+0.07
.718	.574	+0.06
.719	.575	+0.05
.721	.578	+0.05

TABLE 1 .(Cont.)

J. D. hel. 2440000+	Phase	m
63.722	.579	+0.^{m}05
.727	.586	+0.06
.735	.597	+0.07
.736	.598	+0.07
.738	.601	+0.07
.739	.602	+0.05
.739	.603	+0.05
.742	.606	+0.04
.743	.607	+0.04
.746	.612	+0.03
.747	.613	+0.03
.749	.615	+0.04
.749	.617	+0.04
.753	.623	+0.03
.757	.627	+0.03
.769	.643	+0.03
.770	.644	+0.02
.794	.679	-0.01
.796	.680	0.00

TABLE 2

Minimum	Julian Date	Phase
primary	2440748.7785	0.0725
secondary	2440749.1909	0.5750

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COMMISSION 27 OF THE I. A. U.
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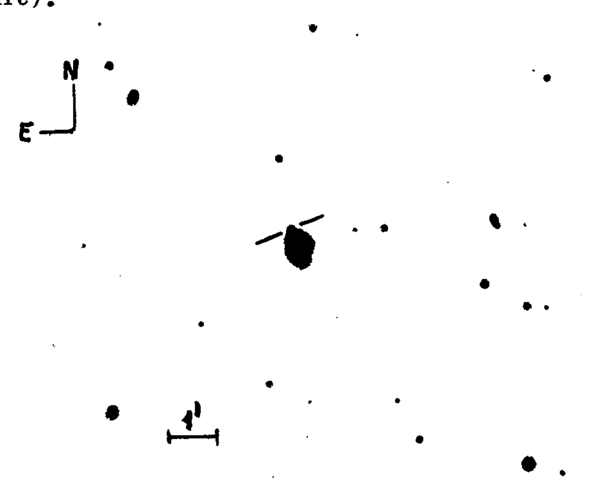
NUMBER 612

Konkoly Observatory
Budapest
1972 January 17

SUPERNOVA 1955 IN A PECULIAR GALAXY

By comparing Schmidt-plates of the Konkoly Observatory with the Palomar Sky-Survey prints a supernova has been found in a peculiar Galaxy of magnitude 14.7 on Field No 155 with the coordinates RA $11^h2^m.2$, D +30°18' (1950). The brightness of the SN is about 16,5 magnitude, its distance from the center of the galaxy is E 8".4, N 14".4 (s. Figure).



The Galaxy is No 5 - 26 - 47 in the Morphological Catalogue of Galaxies by B.A.Voroncov-Veljaminov and A.A.Krasnogorskaya.

M. LOVAS

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Budapest

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

NUMBER 613

Konkoly Observatory
Budapest
1972 January 20

THE COMING SHELL PHASE OF AX MONOCEROTIS

The $6^{m}.8$ star AX Monocerotis = HD 45910 (1900.0: $\alpha = 6^{h}25^{m}12^{s}$, $\delta = +5°56'.1$; 1972.0: α $6^{h}29^{m}03^{s}$, $\delta = +5°53'.4$) has long been known to have strikingly variable spectrum. For example, the hydrogen lines are at times broad, shallow, and structureless; at other times they have a pronounced structure similar to that of P Cygni or a very slow nova. The absorption component of the P Cygni profile is occasionally double or even triple, with very strong, deep and rather narrow components. Moreover, a metallic shell spectrum appears at times as a transient feature.

Mrs. A.P.Cowley (1) showed that this metallic shell spectrum appears periodically (although with variable duration and intensity) with the orbital period of the system, 232.5 days. AX Monocerotis is a binary: the primary component is something like B3:IV:ep, while the secondary, visible in the visual region of the spectrum, is about K2:II:. The metallic shell spectrum always appears roughly a quarter period before conjunction with the K star in front. The metallic shell may be associated with gas streaming from the K giant to the B component. In our model of the system, soon to be published, the K star originally was the more massive component, expanded to the Roche limit, has lost a considerable part of its mass, and is now near the end of the rapid phase of mass loss. The material that flows from it first forms a disk or ring around the B star and eventually is accreted by it. The P Cygni profiles of the emission lines indicate that the process of accretion is not quiet and leads to occasional outbursts or at least vivid surface activity. The metallic shell is probably associated with the original stream rather than with the gaseous structure enveloping the B star.

Systematic observations of AX Mon may verify this model and, if it is correct in principle, they may furnish very valuable material about the mass transfer in close binary systems and about the process of accretion of the material, as well as about the interaction between the B star and the circumstellar disk or ring around it.

A very favorable time for such observations is right now. Next conjunction with the K star in front will be on May 29, 1972. According to Cowley's 1962 observations, the metallic shell lines should appear around phase 0.80

(April 13) and attain their maximum strength around May 13. This would be too late for observations. However, in most cases the shell phases seem to have come earlier. Boyarchuk and Pronik (2) observed the onset of the shell lines at phase 0.65, which will be about March 9, and in the past it came as early as phase 0.6 (February 26). Magalashvili and Kumsishvili (3) observed in four cycles a rather pronounced decrease in the U magnitude of AX Monocerotis by about $0^m_.4$, while the B and V magnitudes showed little change. This phenomenon may be due to increased continuous absorption beyond the Balmer limit. The decline began around phase 0.55 (corresponding to February 15 this year), and the minima invariably occurred at phase 0.75 (April 2).

Spectroscopic and photometric observations as well as scanning the line profiles for rapid changes may be very rewarding in the coming weeks.

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References:

(1) Cowley A.P., 1964, Ap.J. 139, 817.
(2) Bojarcuk A.A., Pronik I.I., 1967, Izvestija Krymskoj Astrof. Obs. 37, 236.
(3) Magalasvili I.L., Kunsisvili Ja. I., 1969 Bull. Abastumani No.37, 3.

COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 614

Konkoly Observatory
Budapest
1972 January 20

IS NGC 404 A VARIABLE OBJECT?

While searching for the minor planet Appolo on a plate obtained on Nov.20, 1971 with the f/5 - 30 cm Sonnefeld astrographic lens of the Hohe List observatory, I notided a variable object in the position

$$RA_{1900} = 1^h03^m55^s; \quad D_{1900} = +35^\circ 11'.5.$$

It appears about $4^m.5$ magnitudes fainter than on VEHRENBERG's Atlas Stellarum chart No.93, and is close to the plate limit. A second plate, taken on Dec.14, 1971 confirms this. The position of this object coincides with that of the E0/S03 galaxy NGC 404.

On the Palomar Sky Survey print 0/406 it clearly appears non-stellar, yet on the relevant E plate it is outshone by the 6' distant bright star Beta And.

Though it is extremely difficult to compare the brightness of non-stellar objects with stellar images on Schmidt-plates, on this print it seems to have comparable magnitude with the not too distant image of BD +33°187 (HD 7254, B8, $m_{ph} \sim 6^m.5$). In Table 1 photographic magnitude estimates of the object on available charts and plates are given. These are based on a rough magnitude sequence of surrounding stars, which was derived from stars of SA 45. They are identified in the Figure and Table 2.

In addition it should be noted that HOFFMEISTER in 1966 thoroughly investigated the field around Beta And for variable stars, but obviously failed to detect variability of NGC 404.

1972, Jan.8.

E.H. GEYER

Astron. Inst. d. Universitat Bonn
Observatorium Hoher List
5568 DAUN/BRD

References:

HOFFMEISTER,C.: 1966, Astron.Nachr. 289, 205.
MARSDEN, B.G.: 1972, IAU Circular No.2380.

Table 1: Photographic magnitudes of the variable object

Source	Date	m_{ph}	Remarks
Franklin Adams chart No.141	1909.Jan.19	$11^m_.0$	non-stellar appearance
Carte d.Ciel +35°/No.8	1932 Dec.29	11.3::	
Palomar SS 0/406	1951 Nov.2/3	6.3::	non-stellar appearance
Lick Atlas	1954 Sep.24	9.6	
Falkauer Atlas chart No.93	1961 Sep.18	10.4:	
Falkauer Atlas chart No.65	1963 Jan.24	9.9:	
Atlas Stellarum chart No.93	1969 Jan.17	8.6:	
Atlas Stellarum chart No.65	1969 Aug.8/9	8.9:	
Hohe List plate A 2631	1971 Nov.20	12.9	
Hohe List plate A 2632	1971 Dec.14	13.2	non-stellar appearance?

Addendum:

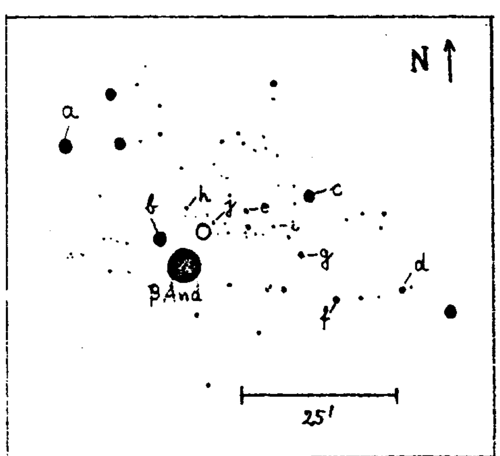
The brightness-comparison of non-stellar appearing objects on photographic plates obtained with different cameras is only possible if two conditions are fulfilled:

1) Identical photographic material has to be used.
2) The exposure times have to be adopted according the f-ratios of the cameras, e.g. $t_1/t_2 = (N_1/N_2)^2$; if N_1, N_2 denote the relevant focal ratios.

Since in no case of the above mentioned charts both conditions are matched, a variability of NGC 404 is irrelevant. The effect is in addition exaggerated if very short focus cameras are used, so that the angular resolution is determined by the resolution of the plate.

Table 2: Approximate photographic magnitudes of comparison stars

Star	Identification		m_{ph}
a	BD +35°218 =	HD 7044(F5)	$8^m_,65$
b	BD +34°199 =	HD 6892(F5)	8,90
c	BD +35°207 =	HD 6679(F8)	9,30
d	BD +34°182 =	HD 6542(K5)	9,85
e	-	-	10,95
f	-	-	11,40
g	-	-	11,95
h	-	-	12,60
i	-	-	12,95
j	-	-	13,50



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

NUMBER 615

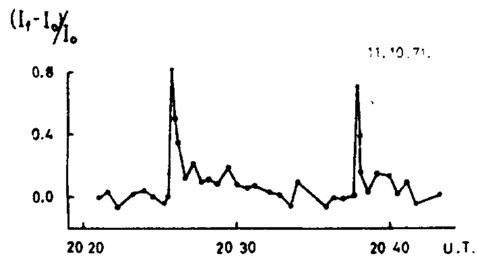
Konkoly Observatory
Budapest
1972 January 21

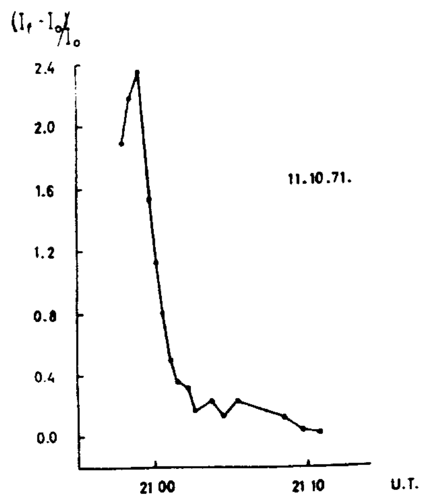
PHOTOELECTRIC OBSERVATIONS OF THE FLARE STAR UV Cet

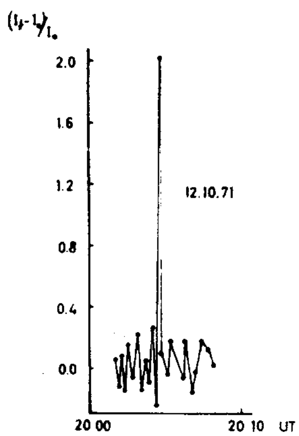
The continuous photoelectric monitoring of the flare star UV Cet was carried out at the Crimean Astrophysical Observatory in the period of international patrol. October 11-27, 1971. The observations were made with the 64-cm meniscus telescope in the photometric system B. The coverage, characteristics of the observed flares and their light curves are given below. The explanation of designations and symbols can be found in Ref.1.

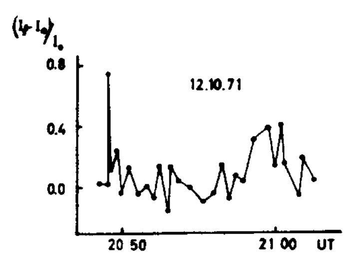
Coverage (U.T.)

Date, 1971	
Oct.11	19^h19^m-19^h30^m,1931-1937,1939-1955,1956-2015,2020-2034, 2035-2055,2058-2106,2107-2118,2120-2128,2134-2144, 2145-2155,2157-2224,2227-2234,2238-2253,2254-2349, 2354-2357,
12	1902-1935,1938-1959,2002-2032,2034-2044,2048-2103, 2106-2116,2118-2125,2127-2142,2144-2153,2155-2212, 2214-2215,2216-2234,2236-2250,2252-2319,2320-2325,
13	1845-1849,1850-1921,1923-1932,1933-1955,1958-2010, 2020-2036
14	1837-1840,1842-1919,1920-1932,1934-1947,1948-2011, 2012-2115,2117-2123,2125-2138,2139-2153,2154-2224, 2227-2315,2316-2337,2338-2400
15	0000-0001,0003-0017,0019-0029
16	1851-1910,1912-2103
20	1846-1850,1853-1947,1948-2020,2051-2107,2108-2126, 2128-2135,2138-2348.
21	1838-2131.


$(I_f - I_o)/I_o$
11.10.71.
0.8
0.4
0.0
20 20
20 30
20 40
U.T.


$(I_f - I_o)/I_o$
2.4
2.0
1.6
1.2
0.8
0.4
0.0
11.10.71.
21 00
21 10
U.T.


$(I_f - I_o)/I_o$
2.0
1.6
1.2
0.8
0.4
0.0
12.10.71
20 00
20 10
UT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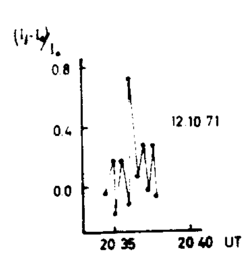
0.4
0.0
12.10.71
20 50
21 00
UT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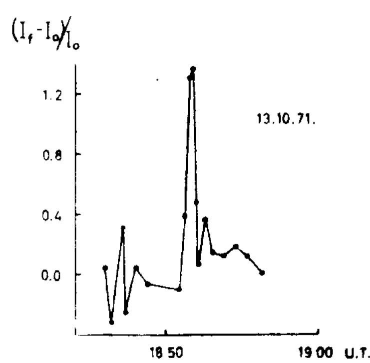
0.4
0.0
12 10 71
20 35
20 40
UT


$(I_f - I_o)/I_o$
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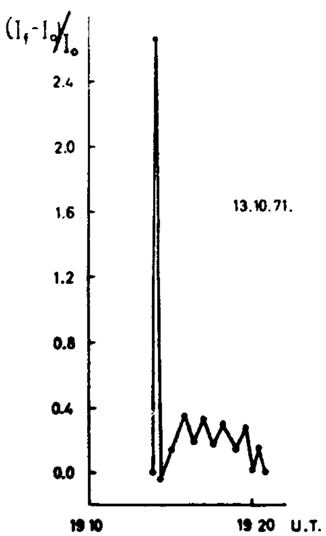
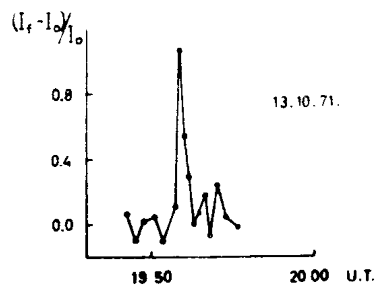
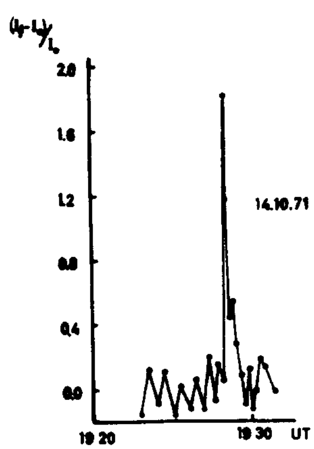
0.8
0.4
0.0
13.10.71.
18 50
19 00
U.T.



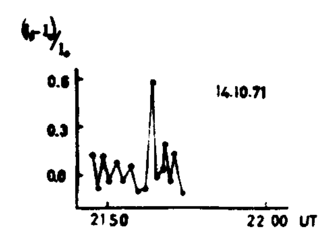
(I_f - I_o)/I_o
2.4
2.0
1.6
1.2
0.8
0.4
0.0
13.10.71.
19 10
19 20
U.T.



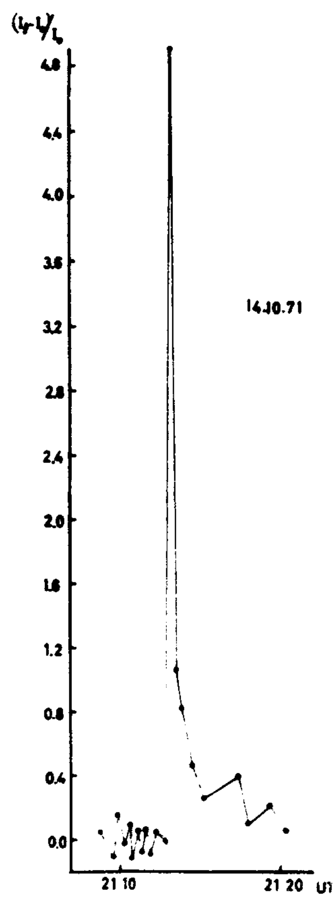
(I_f - I_o)/I_o
0.8
0.4
0.0
13.10.71.
19 50
20 00
U.T.



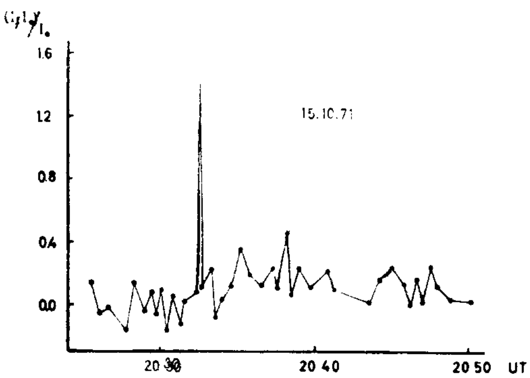
(I_f - I_o)/I_o
2.0
1.6
1.2
0.8
0.4
0.0
14.10.71
19 20
19 30
UT



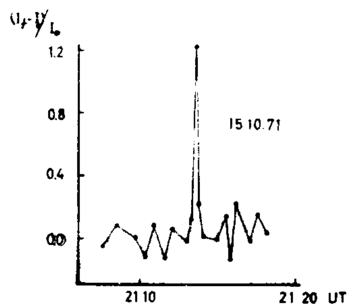
(I_f - I_o)/I_o
0.6
0.3
0.0
14.10.71
21 50
22 00
UT



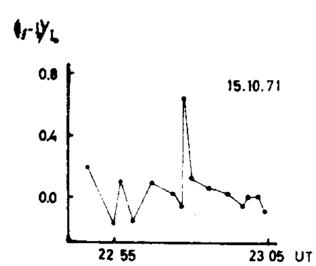
(I_f - I_o)/I_o
4.8
4.4
4.0
3.6
3.2
2.8
2.4
2.0
1.6
1.2
0.8
0.4
0.0
14.10.71
21 10
21 20
UT



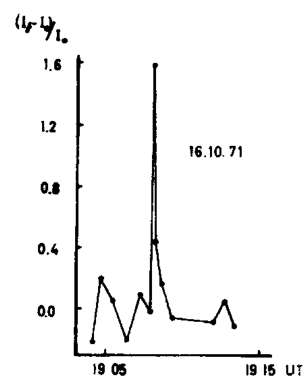
1.6
1.2
0.8
0.4
0.0
15.10.71
20 40
20 50 UT



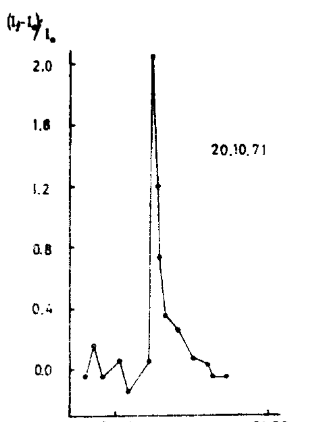
1.2
0.8
0.4
0.0
15.10.71
21 10
21 20 UT



0.8
0.4
0.0
15.10.71
22 55
23 05 UT



1.6
1.2
0.8
0.4
0.0
16.10.71
19 05
19 15 UT



2.0
1.6
1.2
0.8
0.4
0.0
20.10.71
21 40
21 50 UT

Characteristics of the flares observed

Date	U.T.	t_b	t_a	$(I_f-I_0)/I_0$	σ/I_0	P_B
1971	maximum	min.		maximum		min.
Oct.						
11	20 25.8	0.2	5.4	0.82	±0.04	0.98
11	20 37.9	0.2	5.4	0.71	0.06	0.48
11	20 59.1	-	11.7	3.54	0.08	6.74
12	20 04.6	0.15	0.15	2.01	0.16	0.30
12	20 36.1	0.1	0.1	0.72	0.16	0.21
12	20 49.1	0.1	0.8	0.74	0.09	0.17
12	20 59.5	3.5	3.0	0.35	0.09	0.72
13	18 51.7	0.5	3.6	1.36	0.25	1.49
13	19 14.0	0.1	6.8	2.66	0.17	1.86
13	19 51.7	0.2	3.8	1.06	0.09	0.77
14	19 28.3	0.1	3.1	1.81	0.13	0.74
14	21 13.2	0.4	7.1	4.90	0.09	4.32
14	21 57.8	0.3	0.3	0.57	0.09	0.17
15	20 32.5	0.1	17.7	1.62	0.11	2.72
15	21 13.6	0.3	4.6	1.22	0.09	0.48
15	22 59.5	0.1	5.3	0.64	0.14	0.19
16	19 08.0	0.1	5.3	1.58	0.15	0.40
20	21 42.4	0.2	5.9	2.05	0.11	1.46

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

Reference:

1 A.D.Andrews, P.F.Chugainov, R.E.Gershberg, V.S.Oskanian, Comm.27 I.A.U. Inf.Bull.Var.Stars No.326, 1969.

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

NUMBER 616

Konkoly Observatory
Budapest
1972 January 22

PHOTOELECTRIC OBSERVATIONS OF THE FLARE STAR EV Lac

The continuous photoelectric monitoring of the flare star EV Lac was carried out at the Crimean Astrophysical Observatory in the period of the international patrol, September 11-27, 1971. The observations were made with the 64-cm meniscus telescope in the photometric system B. The coverage, characteristics of the observed flares and their curves are given below. No reductions were made to exclude the light of the optical companion of EV Lac. The explanation of designations and symbols can be found in Ref.1. stars were presented by different authors. In order to study EV Lac from this point of view we made comparisons of it with the stars BD +43°4304 (a) and BD +43°4303 (b). The observations accumulated for three seasons, 1969-1971, show that the range of secondary variations is about $0^m.03$ (in the B light). Observations obtained in June-September 1971 give some indication of a period of about 5 days in the changes of the undisturbed star brightness. But a periodicity is not confirmed from the observations obtained in October 1971.

The mean differences in the B magnitudes of EV Lac and the comparison star BD +43°4303 for 4 nights in the period of cooperative observations are: 1971 Sep. 11/12: +0.113, 22/23: +0.115, 26/27: +0.125, 27/28: +0.110. In order to show how this mean differences were obtained we give Figure 1 where the individual measurements of the magnitude difference are shown as points and the straight lines show the mean difference for each of 4 nights.

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

Reference:

(1) A.D.Andrews, P.F.Chugainov, R.E.Gershberg, V.S.Oskanian, Comm.27 I.A.U. Inf.Bull.Var.Stars, No.326, 1969.

Date, 1971 Oct.	Coverage (U.T.)
11	17^h35^m-17^h47^m,1750-1814,1820-1842,1847-1908,1910-1932, 1934-2011, 2016-2044, 2047-2210, 2214-2243, 2247-2257, 2301-2313, 2316-2340, 2343-2400
12	0000-0001, 0004-0048, 0051-0125, 1730-1752, 1753-1807, 1812-1835, 1838-1847, 1853-1904, 1920-1926, 1928-1955, 1959-2005, 2103-2123, 2129-2142, 2210-2234, 2238-2304, 2312-2344, 2349-2400
13	0000-0001, 0002-0027, 0032-0044, 0046-0049, 0056-0104, 0109-0111
15	1741-1749, 1812-1928
17	1725-1759, 1805-1858, 1908-2023, 2027-2029
18	1749-1806, 1827-1921, 1925-1947, 1952-2022, 2025-2111
22	1719-1739, 1754-1836, 1840-1854, 1858-1951, 1955-2014, 2017-2034, 2037-2053, 2056-2116, 2119-2209, 2212-2322, 2331-2400
23	0000-0044, 0048-0105, 1715-1727, 1730-1750, 1752-1816, 1819-1835, 1837-1854, 1901-1925, 1929-2003, 2005-2024, 2029-2048
26	1645-1701, 1703-1722, 1724-1753, 1755-1810, 1838-1908, 1914-1935, 1940-2000, 2007-2031, 2035-2100, 2105-2142, 2149-2207, 2211-2226, 2228-2250, 2254-2255, 2257-2258, 2301-2302, 2307-2338, 2340-2400
27	0004-0005, 0008-0009, 0012-0013, 0016-0031, 0033-0037, 0040-0101, 0103-0105, 1648-1717, 1722-1751, 1754-1849, 1852-1949, 1955-2033, 2037-2119, 2124-2136, 2140-2141, 2145-2146, 2149-2150, 2153-2217, 2221-2222, 2225-2226, 2229-2230, 2234-2302, 2305-2321, 2325-2345, 2347-2400
28	0006-0030, 0033-0053, 0055-0111, 0114-0117

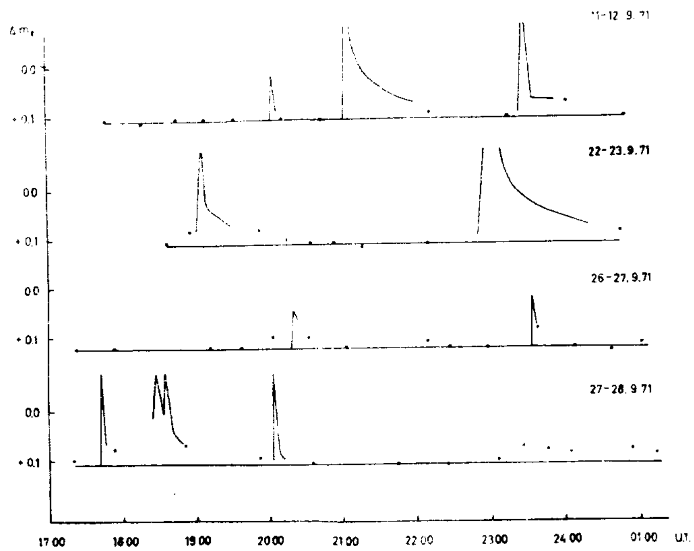


Figure 1

Characteristics of the flares observed

Date 1971 Sept.	U.T. maximum	t_b minutes	t_a minutes	$(I_f - I_o)/I_o$ maximum	σ / I_o	P_B minutes	Notes
11	20 04.8	0.5	4.1	0.09	±0.010	0.14	
11	21 05.0	1.6	44.7	0.82	0.015	5.56	1
11	23 28.2	1.3	30.2	0.43	0.007	1.92	
12	22 51.7	0.9	10.1	0.14	–	0.77	2
16	18 52.8	0.6:	14.2:	0.4:	–	1.0:	3
22	19 06.3	0.5	27.9	0.36	0.015	1.86	
22	22 56.9	3.8	63.1	1.59	0.010	10.16	
26	20 21.3	1.6	7.9	0.08	0.015	0.40	
26	23 34.8	0.9	2.0	0.10	0.013	0.26	
27	17 43.5	1.0	7.5	0.30	0.014	0.47	
27	18 29.3	4.0	20.7	0.31	0.020	3.26	4
27	20 04.3	0.8	8.2	0.21	0.013	0.55	

Notes:
1. Secondary maximum at 21 07.7.
2. Interference of clouds; the light curve is not presented.
3. Complex event in the interval 18 52–19 07; interference of clouds; the light curve is not presented.
4. Secondary maximum at 18 35.8.

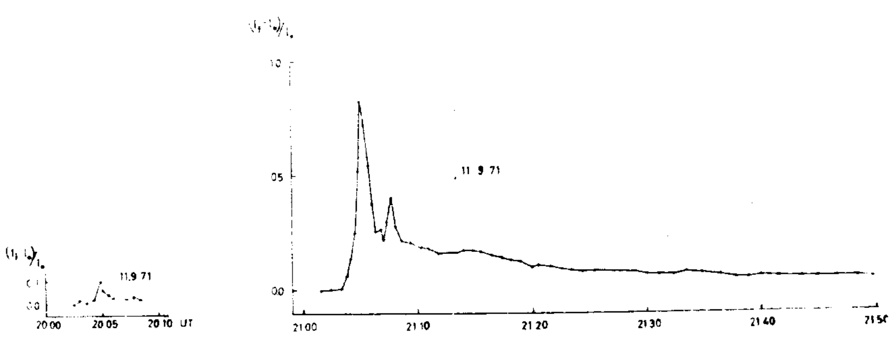
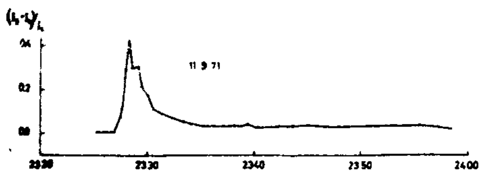
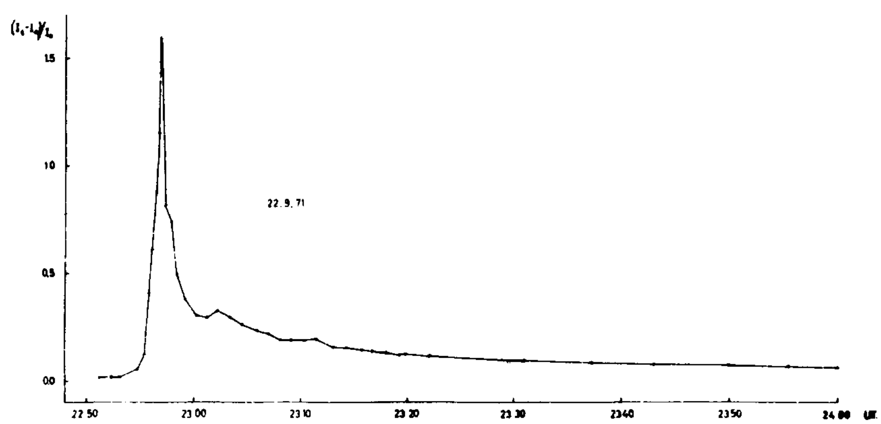
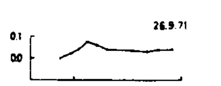


Figure 2


11.9.71
0.4
0.2
0.0
2330
2340
2350
2400
UT

22.9.71
0.4
0.2
0.0
1900
1910
1920
1930
UT

1.5
1.0
0.5
0.0
22.9.71
22 50
23 00
23 10
23 20
23 30
2340
2350
24 00
UT

28.9.71
0.1
0.0
23 30
23 40
UT

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0.0
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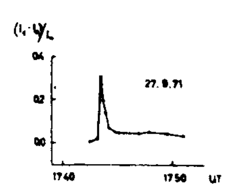
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1750
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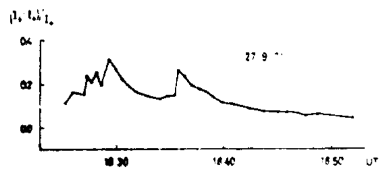
0.4
0.2
0.0
18 30
18 40
18 50
UT

0.2
0.0
20 00
2010
UT

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

NUMBER 617

Konkoly Observatory
Budapest
1972 January 24

SIX VARIABLE STARS IN SAGITTARIUS

Recent results (Table) and finder charts (Figure 1, approximately 10' x 10') are given for three new and three rediscovered variable stars in Sagittarius.

No.	Name	R.A.(1900) Dec.	Max.	Min.	Type	J.D.	Period
1		18 07 12-25 48.4	11.5	15:	R CrB		
2		18 23 10-24 37.6	14.2	[16	M	26120	320
3		18 24 02-23 19.3	14.5	15.8	M	26560	210
4	IU Sgr	18 28 58-31 22.4	13.5:	17.	M	41095	269
5	V1938 Sgr	18 41 43-27 44.0	13.8	[16.3	M	41180	254
6	V 963Sgr	18 43 25-31 40.5	11.0	[17.0	M	40480	261

Examining Nantucket plates with the Rodman blink microscope, Esther Hu found a new R Coronae Borealis type star (Figure 2). Deepest observed minima occurred in July 1936, July 1944 and May 1971. Notified about this discovery Dr.George Herbig at Lick Observatory kindly reports that two low dispersion spectra obtained by Harlan at the Crossley reflector on September 20 and 21, 1971 (during ascending light) show "an absorption-line spectrum without G-band that is a good match for R CrB at the same dispersion."

The second and third stars in the Table, I discovered on Harvard plates. A twelfth magnitude star is approximately one minute of arc north following the variable. V 2565 Sgr closely follows and is generally blended with this bright star. (Both variables are indicated in Figure 1 in the chart for Variable 2; the charts show South at the top, so that the bright star is below Variable 2.) These stars are in a crowded region; hence few plates besides some 50 of the Harvard A series (24-inch Bruce refractor) were useful for magnitude estimates. Likewise, the third star in the Table is too close to the bright star, CoD $-23^{\circ}14427$, to be measurable on the Nantucket plates. The period depends upon Harvard plates taken between 1924 and 1951.

My estimates on IU Sgr (rediscovered by Miss Hu) yield a period of 269 days. This does not agree with the period of 382 days previously published by Innes (Union Obs. Cir. No.37, 1917) whose estimate of the period depended upon only 15 observations. These observations are satisfied by the new period, whereas the older period does not represent the recent observations.

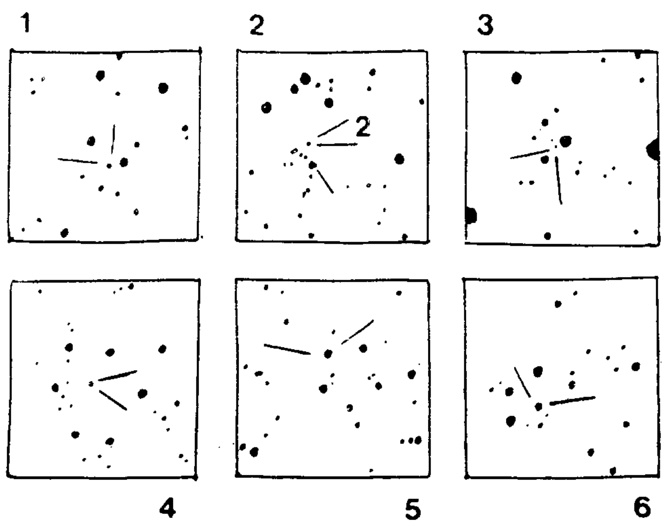

Figure 1

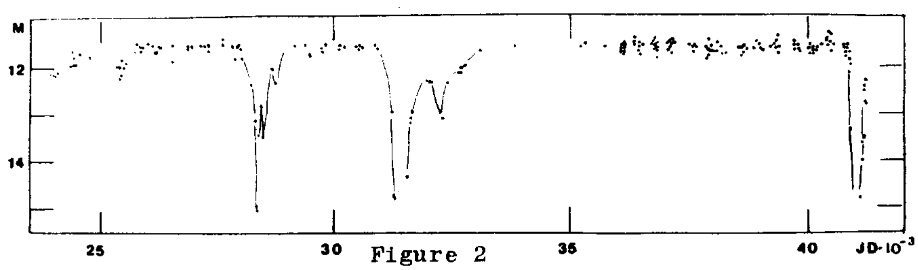

Figure 2

From Miss Hu's estimates of V1938 Sgr on Nantucket plates, I redetermined the period, confirming the earlier published value (Hoffleit, Astron. Jour., Vol.63, p.78,1964).

V963 Sgr was rediscovered by Judy Karpen who estimated its brightness on over 100 Nantucket plates for 1957-71. Innes (loc.cit.) had indicated a period of 258 days based on only 17 plates. Erleksove (Ast.Cir.U.S.S.R. No.171, p.23, 1956) published two Julian days, one for a probable, the other for a definite maximum. The General Catalogue gives this epoch of maximum and a period of 256.5 days. Neither of these periods represents the new observations, whereas the period of 261 days from the Nantucket observations also satisfies the cited published earlier observations.

We are grateful to the U.S.National Science Foundation under whose support the main part of this work, as well as that reported in Information Bulletin 592, was carried out.

DORRIT HOFFLEIT

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

NUMBER 618

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Budapest
1972 January 28

SUSPECTED DUPLICITY OF THE Ap STAR 53 Cam

The radial velocity measures of spectra taken during different cycles (1967-1969) did not satisfy the wellknown period of about 8 days of this magnetic and photometric variable (Inf.Bull.Var. Stars No.388.) A new series of spectra covering a little more than one cycle had been taken on February 1970 (dispersion 12 A/mm). The 8^d-period variations of radial velocity are evident from Fig.1.

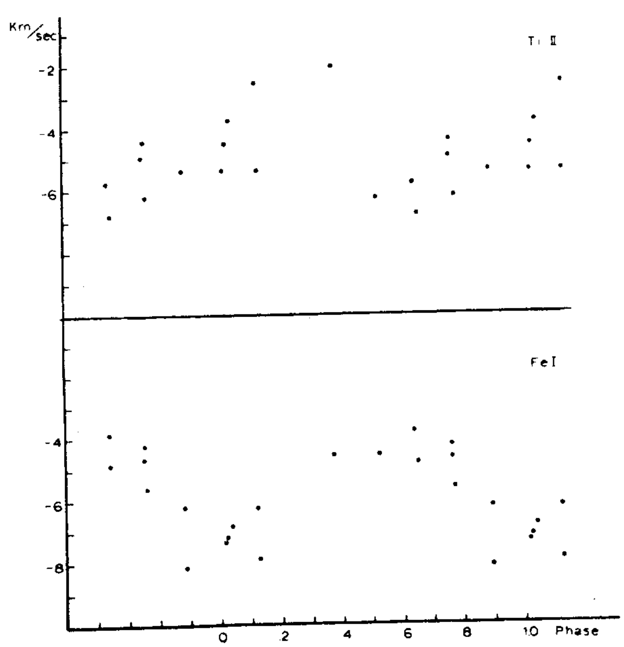

Figure 1

These variations appear to be superimposed on a longer still unknown period (see Fig.2); the radial velocity of FeI lines shows a maximum positive value between October 1967 and March 1968, becomes negative again on March 1969 and is still negative on December 1971 (not plotted). A correction has been allowed for, in order to reduce all the observations to phase zero, assuming that the amplitude of the 8^d-variations remains constant.

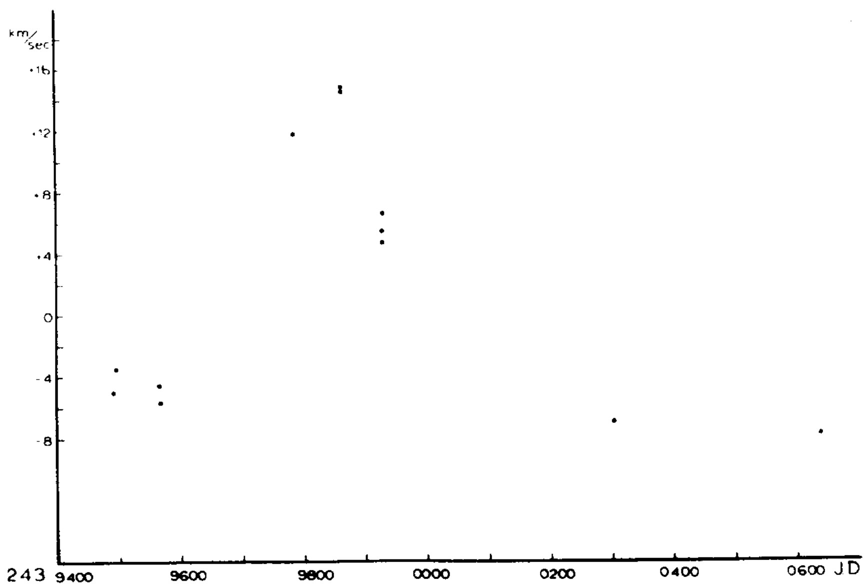

Figure 2

These observations can be explained with the hypotesis of a duplicity: 53 Cam should describe an eccentric orbit around an unseen companion. The period is probably of several years but more observations are needed to determine it.

21 st January 1972

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

NUMBER 619

Konkoly Observatory
Budapest
1972 January 28

THE NEW COMPANION OF THETA CORONAE BOREALIS

On July 1971 the Bureau for the Astronomical Telegrams diffused the announcement of the discovery by Couteau of the duplicity of Theta CrB (Couteau, 1971) with a companion whose brightness seemed to be rapidly diminishing. Subsequent communications confirmed the brightness variation of the secondary star as shown in the following table.

May 10	Theta CrB is observed visually as a single star	Couteau 1971
Jun 24	Theta CrB is estimated 0^m.5 brighter than accounted in the photometric catalogues	Locher 1971
Jun 29	Theta CrB appears to be double; the companion at the distance 0".46 with magnitude 5^m.5	
Jul 2	The star appears double: distance and magnitude of the companion 0".47 and 6^m.7	Couteau 1971
Jul 7	No indication of the presence of emission object brighter than 8^m.5 is found in the spectrogram	Honeycutt and Chaldu 1971
Jul 8	The spectroscopic results of the preceding day are confirmed	Hube 1971
Jul 9	Theta CrB appears double: distance and magnitude 0".55 and 6^m.7	Worley 1971

On July 8, immediately after the announcement of the Couteau's discovery, the star was observed with the photoelectric photometer attached to the 40-cm refractor of the Teramo Observatory and other few observations were performed until October 16 in the attempt to ascertain the fading of the companion through the variation of the whole brightness of the system. Eta CrB was used as comparison star adopting the V magnitude 4^m.98 (Blanco et Al. 1968). The magnitudes so obtained are reported in the following table together with all previous brightness determinations we have been able to collect.

Photoelectric magnitudes of Theta CrB

Date	V	N	Authority
ante 1958	4^m.22	?	Mandoza 1958
1956-1963	4.15	2	Ljunggren, Oja 1964
1963-1965	4.13	3	Iriarte et al. 1965
1964-1965	4.15	2	Haggkvist, Oja 1966
1970			
June 16	4.20*	19	Roark 1971
17	4.19*	42	"
18	4.21*	37	"
19	4.22*	32	"
20	4.20*	17	"
Sept.15	4.15*	?	"
16	4.14*	?	"
1971			
July 8	4.12	4	Burchi, Tempesti
11	4.15	3	" "
18	4.12	4	" "
25	4.14	4	" "
Oct. 16	4.15	4	" "

*Band of 234 A half-width centered at 5507 A

The table shows no evident change of brightness; true microvariations of the star may be present in the Teramo observations and a confirmation is found by a careful analysis of Roark's observations. In the course of the Teramo observations the companion was not seen, but the photometric equipment did not allow the full exploitation of the resolving power of the telescope. Since on May 10 Theta CrB was observed single, the appearing of the companion cannot be ascribed to the effect of orbital motion as suggested by Worley (1971); the sudden increase of brightness that seems to be happened between May 10 and June 24 gives a full explanation of the phenomenon. With the parallax 0".015 (Hoffleit 1964) and the mass relevant to a main-sequence B7 star, the orbital period results of the order of some decades and the suggestion of Worley might hold only if one refuses the observation of May 10 and assumes the companion be still visually detectable. The lack of informations on visual observations of the companion after July 9 confirms our conclusion.

The Teramo observations show the star to be constant at the normal brightness from July 8 to October 16, that indicates the secondary star be dropped at a magnitude >8^{m}0 already on July 8. This result is in agreement with the statement of Honeycutt, Chaldu and Hube, but it is difficult to reconcile with the brightness value given by Worley: his estimate should be in error of more than one magnitude. From the observation of Locher we may infer the magnitude 4^{m}8 for the secondary star: its previous invisibility requires therefore a light-variation amplitude of at least 6^{m}0.

Attention is called on the quasi periodic strong light variations of Theta CrB found in the shorter wave lengths by Roark (1971).

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Osservatorio astronomico di Teramo
Italy

References:

Blanco,V.M. et al. 1968, Publ. U.S. Nav. Obs. second series XXI
Couteau, P., 1971, Circ.Bur. cent.int.Telegr.astr.n.2339
Häggkvist,L., Oja T. 1966, Medd.Uppsala astr.Obs. n.155
Hoffleit,D. 1964, Catalogue of Bright Stars, third rev. edition (Yale Univ. Obs., New Haven)
Honeycutt,R.K., Chaldu R. 1971, Circ.Bur.cent.int.Telegr. astr. n.2340
Hube,D.P. 1971, Circ.Bur.cent.int.Telegr.astr. n.2340
Iriarte,B. et al. 1965, Sky Telesc. 30, 21
Locher,K. 1971 Circ.Bur.cent.int.Telegr.astr.n.2342
Ljunggren,B., Oja, T. 1964, Medd.Uppsala astr.Obs. n.147
Mendoza,E.E. 1958, Astrophys. J. 128, 207
Roark,T.P. 1971 Astr. J. 76, 634
Worley,C.E. 1971, Circ.Bur.cent.int. Telegr.astr. n.2340

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

NUMBER 620

Konkoly Observatory
Budapest
1972 January 28

SOME RECENT OBSERVATIONS OF UV CETI

Introduction

Investigation of the flare star UV Ceti (R.A. = $01^h37^m.2$. Dec.= $-18°08'$ (1966.0), Mag vis. 12.9, spectrum type dM5.5e) have been made from Boyden Observatory using the 40 cm aperture Nishimura (Cassegrain) Reflector. Observations have all been with a solid carbon-dioxide cooled EMI type 6256 photomultiplier tube photometer fitted with a Johnson B. filter. The photometric accuracy was considered to be just within five per cent and the associated time constant of the photometer was one second.

Observations

Details of the monitoring carried out during the recent International Co-operative period from 11th-27th October, 1971 are given in the following table.

Results

Eight flares were recorded during the observational period. The level of activity was quite high; with an average $(I_{o+f}-I_o)/I_o$ of 1.37. The flares all showed the typical characteristic flash phase of UV Ceti type flare stars followed by a gradual decline. In one (flare No.3) there is the usual rapid decline after the flash phase followed by a secondary maximum and then a slow fall off in intensity. Several similar flares have been previously recorded by Jarrett and Eksteen (1969, 1970).

Deductions

Using the data in the table along with that from UV Ceti flares observed in recent years at Boyden by Jarrett and Eksteen (1969, 1970), involving 70 flares in all, we conclude that there is a flare recurrence period of very nearly 24^h (or an integral multiple thereof as the recorded flares were not always on consecutive nights), with a probable error of ± 4 minutes.

Monitoring Table of UV Ceti

Date 1971 Oct.	U.T.	Total Hours per Night	Flare No.	U.T. of Flare	Duration	$\frac{I_{o+f}-I_o}{I_o}$
12	22^h03^m - 23^h28^m	1^h35^m	1	$23^h12^m.9$	3.1	0.86
18	19 46 - 21 58		2	19 07.6	4.4	1.77
	22 48 - 23 13	2 37	3	19 56.6	5.6	1.11
19	17 40 - 21 58		4	18 37.5	0.5	1.10
	22 20 - 23 00	4.58	5	20 10.0	8.5	2.19
20	17 39 - 19 03					
	22 18 - 23 45	2.51				
21	18 36 - 18 50					
	21 10 - 21 45					
	22 24 - 22 46	1 11				
25	18 29 - 21 20		6	19 17.1	2.9	1.14
	22 10 - 23 03	3 44				
26	18 07 - 21 16		7	18 44.3	2.0	1.10
	21 53 - 23 59	5 15	8	19 56.3	3.0	1.70
	Total	22^h11^m				

Mean $\frac{I_{o+f}-I_o}{I_o} = 1.37$

Note: I_o is the intensity deflection less sky background of the quiet star. I_{o+f} is the total intensity deflection less sky background of the star plus flare at maximum.

A.H.JARRETT and J.P.EKSTEEN

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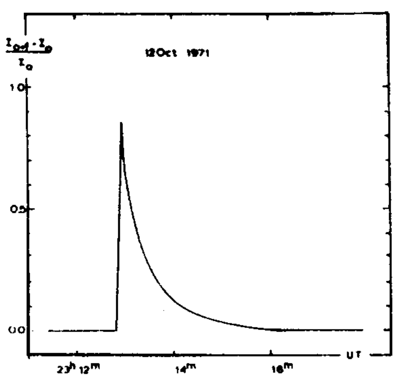
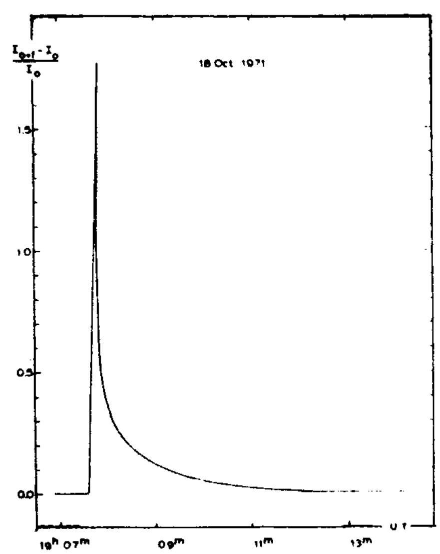
References

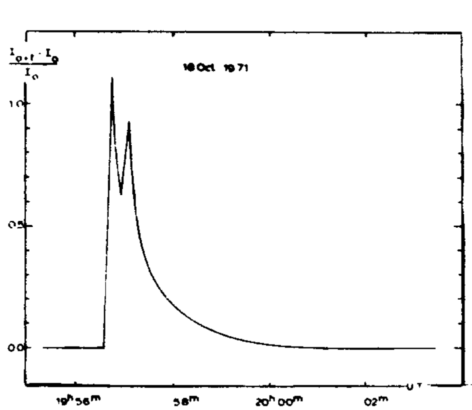
A.H.Jarrett and J.P.Eksteen, 1969, IBVS, No.349.
A.H.Jarrett and J.P.Eksteen, 1969, IBVS, No.406.
A.H.Jarrett and J.P.Eksteen, 1970, IBVS, No.412.
A.H.Jarrett and J.P.Eksteen, 1970, IBVS, No.484.
A.H.Jarrett and J.P.Eksteen, 1970, Monthly Notices of the Astronomical Society of Southern Africa, XXIX, No.8, 115.



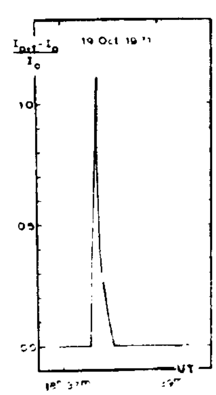
12 Oct 1971
1.0
0.5
0.0
23h 12m
14m
16m
UT



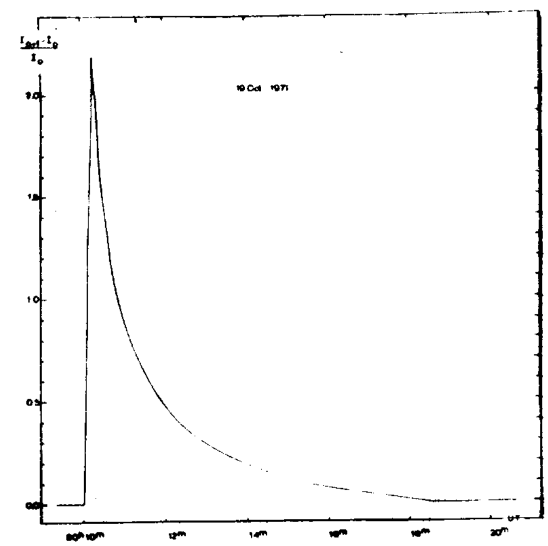
18 Oct 1971
1.5
1.0
0.5
0.0
19h 07m
09m
11m
13m
UT

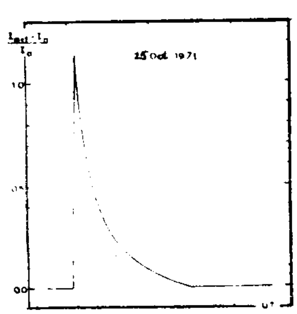


18 Oct 1971
1.0
0.5
0.0
19h 56m
58m
20h 00m
02m
UT



1.0
0.5
UT


19 Oct 1971
2.0
1.5
1.0
0.5
0.0
UT


25 Oct 1971
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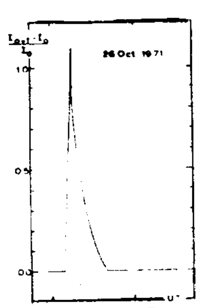
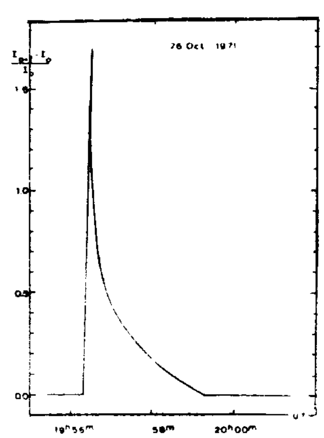
0.0
UT


26 Oct 1971
1.0
0.5
0.0
UT


26 Oct 1971
1.0
0.5
0.0
58m
UT

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

NUMBER 621

Konkoly Observatory
Budapest
1972 January 31

VARIATIONS OPTIQUES DE LA RADIOSOURCE OJ 287

L'objet identifié avec la radiosource OJ 287 (VRO 20.08.01), habituellement de magnitude 14,5 environ ayant été signalé de magnitude 12,4 à la fin de septembre 1971 par N.E.Kurochkin (1), onze clichés en ont été pris avec le télescope Schmidt de 60 cm d'ouverture de l'Observatoire de Haute-Provence entre le 21 octobre et le 16 décembre 1971. Le premier de ces clichés a été posé par F.Dossin et tous les autres par Mme M-P Véron. L'émulsion Kodak IIaO employée avec un filtre Ilford 805 a fourni des magnitudes B.

Nous avons mesuré ces clichés avec le photomètre à iris de l'Observatoire de Meudon en utilisant les étoiles de comparaison données par T.D.Kinman et E.K.Conklin (2). Trois autres étoiles voisines servant de contrôle ont été également measurées sur tous les clichés. Le tableau I donne les magnitudes des étoiles 1,2,3,4 de comparaison et celles que nous avons obtenues pour les étoiles de contrôle a,b,c (Voir figure). Les résultats pour QJ 287 figurent dans le Tableau II.

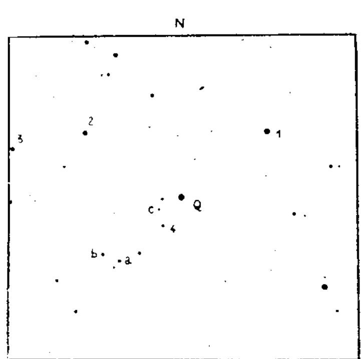


Tableau I

Etoiles	B	Etoiles	B
1	12,17	a	14,61
2	13,50	b	14,84
3	14,11	c	15,50
4	15,06		

L'écart quadratique moyen pour les étoiles de contrôle est de ±0,06 m. Le tableau II donne sur trois mois une amplitude de 0,4 m environ, semblable à l'amplitude de variation trouvée par Kinman et Conklin (2) en avril et mai 1971. La variation d'amplitude 0,08 m enregistrée au cours de la nuit du 17 novembre avec trois observations nous parait trop faible pour être significative.

La radiosource QJ 287, observée par B.H.Andrew, G.A.Harvey et W.J.Medd aux longueurs d'onde 2,8 et 4,5 cm (3) s'est montrée exceptionnellement active. Les paramètres de la polarisation optique sont également variables (2).

Enfin le spectre observé par G.Adam et al. (4) se réduit entre 3900 et 4900 A à un fond continu sans raies d'émission notables, toutes circonstances qui apparentent étroitement cet objet à BL Lac (VRO 42.22.01). Des observations plus nombreuses seraient donc désirables.

Table II

Magnitudes de OJ 287

N°Cliché	Date	TU 1971	B	N°Cliché	Date	TU 1971	B
GS 491	Oct	21,145	12,59	582	-	17,132	12,75
553	Nov	14,134	12,89	600	-	18,181	12,76
565	-	15,082	12,97	647	Déc	12,992	12,69
576	-	16,130	12,89	661	-	14,006	12,94
580	-	17,089	12,75	684	-	16,090	12,88
581	-	17,109	12,67				

Ch. BERTAUD. C.POLLAS

Observatoire de Meudon

(1) Kurochkin N.E. - I.A.U. Circ N°2365.
(2) Kinman T.D., Conklin E.K. - Astrop.Letters, 1971, vol.9, p.147
(3) Andrew B.H., Harvey G.A., Medd W.J. - Astrop.Letters, 1971, vol.9, p.151.
(4) Adam G., Floquet M., Marchal J., Schneider M. - C.R.Acad. des Sci., à l'impression.

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INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 622

Konkoly Observatory
Budapest
1972 February 3

NOVAE IN M 31 DISCOVERED AND OBSERVED AT ASIAGO FROM 1963 TO 1970

Since 1953 a survey for novae in the galaxy M 31 has been carried out with the 122 cm telescope of the Asiago Astrophysical Observatory. Magnitudes, positions and light-curves of 46 novae discovered by the writer from 1953 to 1963 have been published some years ago in the Annales d'Astrophysique 27, 5, 1964. The present communication reports a list of other 44 novae found at Asiago from 1963 to 1970. Two of the objects may be recurrent novae having had two different maxima in the course of a few years.

The following Table I gives: Asiago serial number; approximate X and Y coordinates, measured from the centre along the two axes of M 31 (the X axis having the direction NE-SW, positive towards NE); date of discovery; observed maximum (pg); estimated maximum; epoch; velocity of decline (the average rate, in magnitudes per day, employed by the nova to drop two magnitudes below maximum). Some of the novae have been independently discovered by Börngen (A.N. 291, 19, 1969) and by Sharov and Alknis (Astr.Circ. No.507, 514, 560; 1969). References are given in the Notes to Table I.

Observations and light curves of the new novae, identification charts and discussion will be reported in a forthcoming paper.

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Asiago Astrophysical Observatory

Notes to Table I:

1.- Nova 48 coincides with Nova 79. Very rapid decline. Recurrent nova?
2.- Börngen N.8.
3.- Börngen N.9.
4.- Börngen N.10.
5.- Börngen N.12.
6.- Börngen N.14.
7.- Börngen N.15.
8.- Coincides with N.81. Foreground U Gem variable or recurrent nova ?
9.- Börngen N.18.
10.- Börngen N.20.
11.- Börngen N.22.
12.- Börngen N.25.
13.- See Note 1.
14.- Sharov N.1.
15.- See Note 8.
16.- Sharov N.6.
17.- Sharov N.7.

TABLE I – Novae in M 31 discovered at Asiago from 1963 to 1970.

Nova	X	Y	Date of discovery	Obs. Max. (pg)	Est. Max.	Epoch	Rate of decline	
47	+ 9′.8	+ 3′.8	1963 Sep 14	17.2	15.0	Sep 10		
48	– 4.7	+ 7.1	" 17	17.8	17.8	" 15		1
49	–27.0	– 6.1	Oct 17	16.5	16.35	Oct 7	0^d.09	2
50	+ 7.6	– 0.4	" 23	16.95	16.8	" 21		3
51	–10.2	+ 1.6	Dec 11	16.3	16.3	Dec 12		4
52	+ 2.0	– 0.7	1964 Jan 4	16.25	16.25	Jan 4	.125	
53	– 5.8	– 2.9	" 4	16.95	16.95	" 6	.04	
54	+ 1.3	– 0.7	Aug 7	16.4	16.25	Aug 6	.044	
55	+ 3.8	– 5.1	" 13	17.3	17.3	" 7	.04	
56	+ 1.1	– 0.1	Oct 7	17.1	–	–		5
57	– 0.1	+ 1.5	Nov 6	14.95	14.95	Nov 7	.22	6
58	+ 1.5	+ 0.9	Dec 13	16.6:	16.5	Dec 15	.15	
59	– 4.8	+ 2.0	" 24	17.3	17.3	Nov 2		
60	– 0.5	+ 0.4	" 24	17:	16.4:	Dec 13:	.13:	
61	+15.2	– 1.7	" 31	16.7	16.7	" 31		
62	+ 5.8	– 2.5	1965 Jun 28	17.25	17.0:	Jun 26		7
63	+ 8.3	– 1.9	Sep 5	17.7	17.7	Sep 5	.07	
64	+ 7.4	– 2.1	Dec 22	15.3	15.3	Dec 26		
65	+ 1.7	– 1.8	1966 Jan 2	17.3	17.3	Jan 1		
66	–11.0	–11.4	Aug 12	16.4	16.4	Aug 12		8
67	– 4.7	– 1.0	Sep 7	16.2	16.2	Sep 11		9
68	– 0.2	– 7.9	" 8	17.05	17.05	" 8		
69	– 6.2	+ 2.4	" 10	17.1	17.1	" 10		10
70	+ 1.6	– 2.1	Nov 8	17.0	17.0	Nov 8	.07	
71	+ 0.3	+ 5.5	" 8	17.6	17.6	" 18		
72	+ 2.6	– 1.4	1967 Jan 5	17.1	17.1	Jan 5		
73	–12.4	– 2.0	Aug 11	17.8	–	–		11
74	+ 6.6	+ 2.7	Oct 26	17.4	17.3	Oct 24	.04	12
75	+ 1.7	– 0.1	Dec 21	16.8	16.8	Dec 21	.08	
76	+ 1.5	+ 2.8	Dec 28	16.1	16.1	Dec 27	.11	
77	– 6.2	+ 0.5	1968 Jan 2	15.9	15.9	Jan 2	.12	
78	+ 1.8	– 2.9	" 21	16.9	16.9	" 21	.08	
79	– 4.7	+ 7.1	Sep 25	17.25	17.1	Sep 24?		13
80	– 2.2	+ 5.0	Oct 23	17.4	17.4	Oct 23		14
81	–11.0	–11.4	" 25	17.7	17.7	" 25		15
82	– 2.9	– 0.1	Nov 21	17.9	17.9	Nov 21	.04	
83	– 3.1	– 0.5	Dec 19	17.35	17.0:	Dec 24		
84	– 3.5	+ 5.6	1969 Jan 19	17.0	17.0	Jan 21		
85	– 2.7	– 0.4	Sep 11	15.7	15.7	Sep 16	.12	16
86	– 2.1	+ 1.0	Oct 13	17.3	17.3	Oct 15		
87	+15.0	+ 5.0	Nov 10	17.0	16.7	Nov 14		17
88	–15.4	– 7.5	1970 Jan 3	17.5	17.5	Jan 2?		
89	+ 1.4	+ 0.8	Oct 10	16.8	16.8	Oct 10		
90	– 1.9	– 2.4	Oct 29	16.9	16.9	Oct 26		

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

NUMBER 623

Konkoly Observatory
Budapest
1972 February 4

A NEW FLARE STAR IN AQUILA

In the course of our spectral survey of infrared stars, we notice a 12-magnitude (pg) star, whose spectrum has shown a temporary emission line. The position of the star is (estimated from the positions of BD stars on the PSS) at R. A. = $18^h55^m.9$; Dec. = $+6°06'.5$ (1950).

Four spectra were obtained on three different nights with the Heidelberg Schmidt Telescope. Kodak 1N plates (behind an RG 5 filter) were used to record the spectral range between 6500A until about 8800A (Ackermann, 1970). On plate no.436 (see Table), an emission line at the expected position of $H\alpha$ can be observed. We are tempting to classify the line as $H\alpha$-line in emission.

Plate no.	Date	Spectrum
435	J.D.2441146.943	M3
436	160.937	Early M, with emission
437	160.967	Early M
466	180.846	M3

Sanduleak (1968) reported that in the spectra of flare stars which he detected spectroscopically, temporary Balmer lines, including $H\alpha$, in emission can be observed. Unfortunately, we have no spectral plate for the blue spectral regions to check the spectrum of the star in Aquila. However, the appearance of the $H\alpha$ line on plate 436 is accompanied by a decrease in intensity of the spectral regions to the red of that line. Spectral change similar to that observed here, has been detected earlier by Chugainov and Gershberg (Lovell, 1971) in the spectra of genuine flare stars.

We want to thank the Director of the Max Planck Institut for Astronomy for the facilities provided to us.

Landessternwarte and Max Planck Institut for Astronomy, Heidelberg

B. HIDAJAT
M.U. AKYOL

References:
Ackermann,G., Astron. and Astroph., 8, 315, 1970.
Lovell, Sir Bernard, Quart. J.R.A.S., 12, 98, 1971.
Sanduleak, N., I.B.V.S. 275, 1968.

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

NUMBER 624

Konkoly Observatory
Budapest
1972 February 8

A NEW FLARE STAR IN CYGNUS

During the nights of 12-13, 13-14 and 16-17 in November 1971, we took five plates centered at V 1057 Cygni with multiple exposures on each one. We used Eastman Kodak 103a0 plates behind an ultraviolet filter. The length of each exposure was 10 minutes with a time interval of less than 1 second between the exposures. On the first of the two plates (six different exposures in each) obtained the night of November 13-14, a very conspicuous flare-up was registered in a star that is rather faint at minimum. The

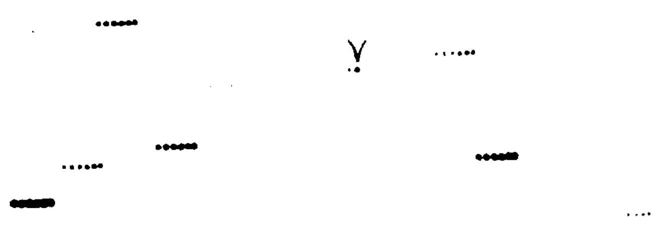

Fig. 1

rapid brightening of this star occurred during the fourth exposure of this first plate, reaching thus its maximum brightness. The star declined rapidly during the fifth and sixth exposure, as is shown in Fig.1. On the second multiple exposure plate taken immediately after the first one mentioned, the star was not visible any more.

The approximate right ascension and declination, the approximate ultraviolet apparent magnitude during minima, and the ΔmU, are given in Table I. Fig.2 is a copy of a Tonantzintla Schmidt camera red plate and will serve as identification chart.

Table I
Flare Star in Cygnus

Tonantzintla No.	R.A. (1950)	Dec.	Cygnus mU	ΔmU	Date of Flare-up
1	$21^{h}00^{m}.5$	$+42°07'.8$	18.0	4.5	1971 XI/14

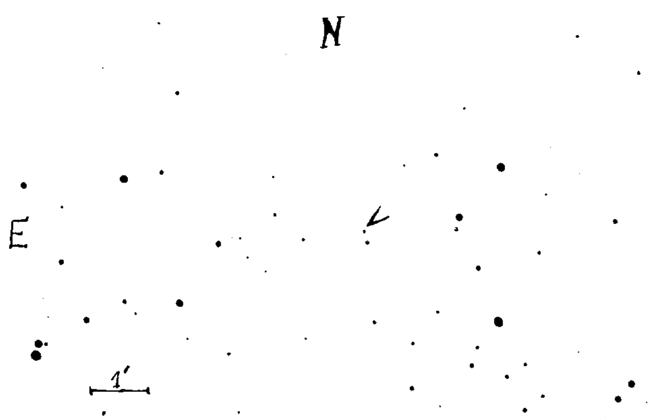

Fig. 2

It is interesting to note, first, that this new flare star in Cygnus was discovered in a rather small number of multiple ultraviolet exposure plates, 30 different exposures in all, covering a total of 5 hours of effective observation; and second, that the star is located near the edge of a somewhat obscure area south of the North America Nebula. As is well known, this region is characterized by the existence - apart from the bright and dard nebulae - of a good number of high luminosity stars, Be objects, T Tauri stars, and the remarkable V 1057 Cygni star which before its outburst was known as an advanced T Tauri type object. Because of the apparent magnitude and colors of this new "rapid" flare star during minima and the possible spectral type that is earlier than M, it seems highly probable that it is at the same distance as the great majority of the stars mentioned before.

January 25, 1972

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

NUMBER 625

**Konkoly Observatory
Budapest
1972 February 8**

THE DELTA SCUTI STARS
An Annotated Catalogue and Bibliography

A survey of the literature on the Delta Scuti stars has been completed and published by Michael A. Seeds and Gail A. Yanchak at the Bartol Research Foundation of the Franklin Institute. Data is given for 58 known Delta Scuti stars, and 97 suspected Delta Scuti stars. The catalogue contains, where available, V, B-V, U-B, spectral type, period, amplitude in V magnitude, v sin(i), radial velocity, and references. Tables of remarks give additional information and conflicting data. Each star is identified by HD number and the 1975 coordinates are given. A bibliography of 109 references includes a summary of each article. The catalogue and bibliography are cross referenced. An introduction to the Delta Scuti stars is also given. Interested observers should address requests for copies to the undersigned.

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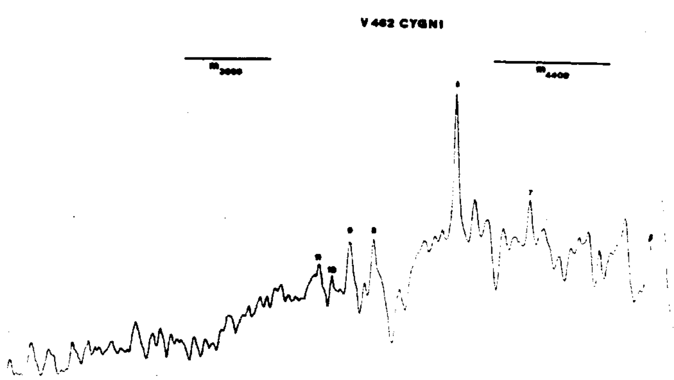
COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 626

Konkoly Observatory
Budapest
1972 February 8

V 462 CYGNI

The variable star V 462 Cygni was observed on objective-prism IIaO plates obtained on July 27, 1971 with the 60/90/183 cm, 4° prism (350 A/mm at H Gamma) Schmidt telescope at Campo Imperatore. The spectrum (see figure) is typical of a long period variable near maximum light. The spectral type is M7 or M8 with H Gamma to H_{11} in emission. Hδ is the strongest line with an equivalent width of 6.5 A. The star displays a strong ultraviolet excess. The following magnitudes were measured from the tracings: $m_{3600}=10.3$ (uncertain) $m_{4400}=11.8$, W.P. Bidelman kindly informed us that on the Warner and Swasey Observatory infrared plates it appears as a star of probably M7 spectral type. We aknowledge P.J.Treanor S.J. for helpful discussions.



Smoothed Intensity Tracing of V 462 Cyg

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

NUMBER 627

Konkoly Observatory
Budapest
1972 February 14

PHOTOELECTRIC OBSERVATIONS OF AD Leo AND EV Lac DURING THE 1971 INTERNATIONAL PATROL INTERVALS

As a part of regular flare star observations at Belgrade Astronomical Observatory, AD Leo and EV Lac were monitored during the international cooperative patrols including a NASA X-ray interval. The observations were made with the 65 cm refractor and the Belgrade photoelectric polarimeter.

The time coverage and other data, partly in accordance with Andrews at al. (1969), are given in Table I. The symbols used are as follows: In column σ_m the error of the observation is given according to formula $\log m(I_0+\sigma)/I_0$. Here I_0 represents the mean intensity deflection of the undisturbed star and σ is the standard deviation of random noise fluctuation. The quantity Δm_{lim} has been calculated from $\Delta m_{lim}=-2,5 \log (3\sigma/I_0)$.

During 377 minutes of AD Leo patrols no flare activity has been noticed. During 522 minutes of EV Lac monitoring one flare was observed. The characteristics of the flare are given in Table II and the light curve is shown in Figure 1.

In Table II Δt_1 and Δt_2 are durations of the flare before and after maximum. Δm_f has been found from $\Delta m_f = -2,5 \log (I_{0+f}/I_0)$ where I_{0+f} is the intensity deflection of the star at the moment of maximum. The integrated intensity is given in the column P and the air mass in the column X.

Results of the polarimetric analysis of the observed flare will be published later.

J. ARSENIJEVIĆ
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Reference:

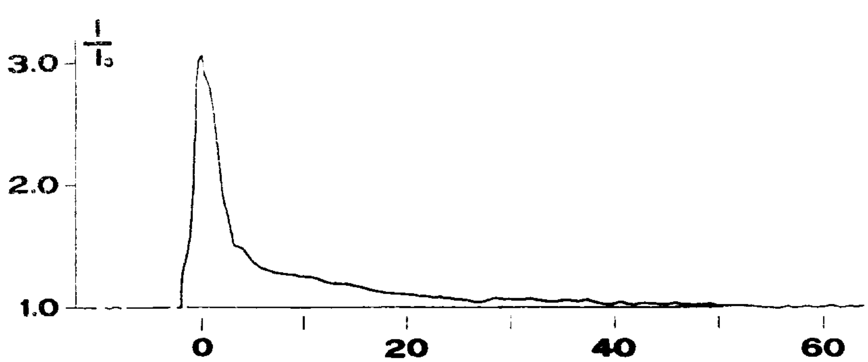
Andrews A.D., Chugainov P.F., Gershberg R.E., Oskanian V.S., 1969, IBVS, No.326.

Table I. Monitoring of AD Leo and EV Lac

Date 1971		Coverage U.T.	F	σ_m	Δm_{lim}
		AD Leo			
Apr.	14	1940-2027, 2033-2136, 2140-2201	V	0.028	+2.8
	16	1900-1917, 1922-2041, 2045-2135	V	0.012	+3.7
	18	1905-1925, 1930-1950, 2000-2100	V	0.021	+3.1
		EV Lac			
Sep.	18	2138-2158	V	–	–
	21	2317-2323, 2422-2540,	V	0.021	+3.1
		2328-2422	B	0.026	+2.8
	22	2113-2147, 2200-2252, 2319-2404,	V	0.014	+3.5
		2416-2452, 2503-2513			
	23	2111-2220, 2244-2358, 2443-2517	V	0.011	+3.8

Table II. Flare data for EV Lac (Date 1971 Sep.23.)

U.T. of max.	F	Δt_1	Δt_2	Δm_f	σ_m	P	X
21^h13^m0	V	2^m0	52^m	1.22	0.011	11.28	1.000



COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 628

Konkoly Observatory
Budapest
1972 February 16

PHOTOELECTRIC OBSERVATIONS OF 32 Cyg NEAR MINIMUM IN 1971

The observations were taken up after the suggestion of Dr. K.O.Wright (1971), the co-ordinator of the International Programme on Zeta Aur Stars. Our observations were made at the 20 cm refractor using a photoelectric photometer of Cracow Observatory. A brief description of the telescope and photometric system (much like the BV system of Johnson-Morgan) is given by Winiarski (1971).

Table 1 contains the results of observations in the blue and yellow colours. The successive columns contain: The heliocentric time of observations, the differences in stellar magnitudes between 32 Cyg and the comparison star HD 195774 in the instrumental system taking into account the differential extinction), the brightness of 32 Cyg in the BV system and remarks.

Unfortunately, the comparison star HD 195774 turned out to be suspected of variability (CSV 101996 = Zi 1919). Our observations do not confirm its variability. The star HD 186532 was used as a check star. From independent observations the brightness of HD 195774 in the BV system was obtained as: B = 6.98 $\pm$ 0.009, V = 5.43 $\pm$ 0.005. The star 26 Cyg recommended as a comparison star was not used by reason of its optical duplicity.

The relatively large dispersion in the observations results from the unfavourable weather conditions.

Astronomical Observatory
of the Jagellonian University
Cracow, February 1972

J.M. KREINER
M. WINIARSKI

References:

Winiarski,M., 1971, Acta Astr. 21, No 4,5,7.
Wright,K.O., 1971, Preliminary Bull. Concerning Coordination of Obs. Zeta Aur Stars Nos.1-4.

<u>Table 1</u>

J.D. hel.	32 Cyg-HD 195774 Blue	Yellow	B	V	Rem.
2441242.322	-1.53	-1.42	5.44	4.02	
330	-1.54	-1.44	5.44	4.00	
332	-1.51	-1.44	5.47	4.00	
339	-1.53	-1.42	5.45	4.02	
351	-1.53	-1.46	5.45	3.98	
377	-1.54	-1.44	5.43	4.00	
379	-1.54	-1.44	5.44	4.00	
384	-1.52	-1.44	5.46	4.00	
387	-1.54	-1.43	5.44	4.01	
395	-1.56	-1.46	5.42	3.98	
396	-1.54	-1.45	5.44	3.99	
413	-1.51	-1.45	5.44	3.99	
415	-1.52	-1.45	5.46	3.99	
2441244.275	-1.58	-1.44	5.40	4.01	
233	-1.53	-1.42	5.45	4.03	un
312	-1.55	-1.41	5.42	4.04	
318	-1.54	-1.40	5.44	4.04	
319	-1.54	-1.42	5.43	4.03	
326	-1.52	-1.45	5.46	3.99	
350	-1.52	-1.44	5.46	4.00	
351	-1.53	-1.42	5.44	4.03	
418	-1.54	-1.43	5.43	4.01	un
424	-1.55	-1.43	5.43	4.01	un
426	-1.54	-1.42	5.44	4.03	un
2441260.425	-1.39	-1.36	5.59	4.08	
437	-1.41	-1.38	5.57	4.06	
443	-1.43	-1.39	5.54	4.05	
456	-1.40	-1.38	5.58	4.06	un
2441261.260	-1.44	-1.42	5.54	4.01	
298	-1.43	-1.41	5.55	4.02	
300	-1.42	-1.41	5.56	4.02	
387	-1.41	-1.35	5.57	4.10	
392	-1.43	-1.38	5.55	4.05	
393	-1.44	-1.36	5.54	4.09	
445	-1.45	-1.38	5.54	4.06	
451	-1.45	-1.38	5.54	4.06	
453	-1.44	-1.38	5.54	4.06	
458	-1.40	-1.41	5.58	4.02	
2441264.246	-1.44	-1.39	5.54	4.05	
252	-1.46	-1.41	5.52	4.02	
254	-1.47	-1.38	5.51	4.06	
2441277.240	-1.53	-1.46	5.45	3.98	
246	-1.53	-1.45	5.45	3.99	
248	-1.49	-1.46	5.49	3.98	
258	-1.53	-1.42	5.45	4.02	
264	-1.52	-1.44	5.45	4.00	
266	-1.52	-1.44	5.45	4.00	
298	-1.54	-1.45	5.44	3.99	
301	-1.54	-1.46	5.44	3.98	

un = uncertain

COMMISSION 27 OF THE I. A. U.
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NUMBER 629

Konkoly Observatory
Budapest
1972 February 17

ON THE SPECTRAL TYPE OF DI PEGASI

For the past 35 years the eclipsing binary DI Pegasi ($+14^{\circ}5006$=114.1934 Peg) has been generally assigned a spectral type of K0, the object being considered to be identical with HD 220619 (Morgenroth Astr.Nachr.252,389, 1934). However, these stars are clearly not the same: HD 220619 is in fact BD $+4^{\circ}5006$ rather than $+14^{\circ}5006$. Thus there is no basis for the assumed spectral type. In the AGK2 the type of DI Pegasi is listed as F5, but unfortunately the source of this type and its reliability are not known to the writer.

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COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 630

Konkoly Observatory
Budapest
1972 February 19

TESTS OF TWO SUSPECTED δ SCUTI - VARIABLES.

Frolov (1970) has listed 45 bright stars as suspected members of the δ Scuti-class of variables and Breger (1969) determined the boundaries of the appropriate instability strip in the M_v - (b-y) plane. Observations of two of Frolov's stars are described here.

HR 5062 (HD 116842) was observed photoelectrically for 20 hours during 3 nights of March & May, 1971. The 38-cm siderostat refractor fed the Pierce-Blitzstein dual-channel photometer so that HR 5062 and the comparison star, BD + 55° 1602 were monitored simultaneously. Intermediate band filters with peak wavelengths at 4861 Å and 4995 Å were used. During the observing periods, the star failed to reveal any clear variation above a scatter of slightly less than $0^m.03$. Even if one assumes that the large scatter is due to possible beat phenomenon, an unambiguous light maximum should have been detected within the 20 hours of observation.

HR 2123 (HD 40873) has also been suspected as a light variable by Danziger & Dickens (1967). This star was observed for 2 nights during November, 1971 for a total of 9 hours with the refractor and photometer described above. The Johnson & Morgan (1951) V filter was used.

BD + 51° 1150 and BD + 51° 1151 were used as comparison stars on different nights. HR 2123 failed to reveal any light variability in excess of $0^m.01$.

These results imply that either these stars are not really pulsating or, even if they do pulsate, that the amplitudes of their luminosity variations are not yet large enough to establish them as members of δ Scuti-class.

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University of Pennsylvania
Philadelphia, Pa., U.S.A.

REFERENCES

1) Breger, M. 1969, Ap. J. Supp. 19, 100.

2) Danziger, I. J. & Dickens, R. J. 1967, Ap. J. 149, 55.

3) Frolov, M. S. 1970, Infor. Bull. Variable stars No. 427.

4) Johnson, H. L. & Morgan, W. W. 1951, Ap. J. 114, 522.

COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
Number 631

Konkoly Observatory
Budapest
1972 February 21

MINIMA OF ECLIPSING VARIABLES

Some eclipsing variables were observed in order to obtain precise timings of minima. Except for one case, namely AI Dra, all observations were carried out with a photoelectric photometer attached to the 12" Clark-refractor of the University Observatory of Vienna. Measures were made in the yellow spectral region. I am very indebted to Prof. Hermann Haupt, who made the use of this instrument possible.

AI Dra however was observed by a photographic method introduced by K. Schwarzschild in Publ. v. Kuffner'sche Sternwarte, Bd. V. This procedure makes use of extrafocal star images and is considerably more accurate than the usual photographic-photometric methods based on focal exposures. The photographic observations were carried out at Kuffner Observatory. Panchromatic plates were used.

The times of minima were then determined with the aid of Pogsons curve (S. Table, the O-C values are according to the elements in SAC 1969.)

Star	Min.hel 2440000 +	m.e. $\pm 0^d.0001$	O-C	Type of min.	n
SV Cam	528,3615	4	$+0^d.0025$	P	81
VW Cep	511,3453	9		S	31
VW Cep	512,3255	10	-0,0114	P	68
VW Cep	544,3294	10	-0,0140	P	49
VW Cep	547,2478	7		S	69
AI Dra	082,4064	8	+0,0095	P	25
SW Lac	542,3457	4		S	58

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

Number 632

Konkoly Observatory
Budapest
1972 February 25

PHOTOELECTRIC OBSERVATIONS OF YZ CMi

The flare star YZ CMi was monitored photoelectrically in the period of co-operative observations 9-23 January, 1972. The observations were carried out in the B-band with the 64-cm meniscus telescope. The observational results are given in Table 1,2 and figures.

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

Table 1

Date, 1972	Coverage (U.T.)
Jan.9	18 00-18 28,19 00-19 08,20 39-20 45,20 47-20 48
14	18 04-19 03,19 04-19 44,19 48-21 41,21 45-22 33, 22 37-23 38,23 39-24 00
15	00 00-01 10,01 12-01 30
16	17 12-18 16,18 22-18 38
17	17 15-17 38,17 39-18 12,18 13-19 33,19 38-19 47, 19 50-20 58,21 02-21 33,21 34-22 41,22 43-24 00
18	00 00-00 33,00 37-01 41,01 43-01 50,17 05-17 15, 17 18-17 54,17 56-19 45
22	17 17-18 12,18 13-19 58,20 00-21 53,21 55-22 22, 22 26-23 16,23 21-23 43,23 48-24 00
23	00 00-00 14,00 19-01 04,01 10-01 31,17 26-19 54, 19 59-21 51,21 55-23 30,23 37-24 00
24	00 00-00 02,00 09-00 35,00 37-01 30

Table 2

Date 1972	U.T. maximum	t_b	t_a	$(I_f-I_o)/I_o$ maximum	σ/I_o	P_B minutes	Notes
		minutes					
Jan.14	18 54.8	0.8	4.0	0.58	0.048	0.85	
	21 29.4	2.0	11.6	0.46	0.034	1.60	
	23 32.6	0.6	8.4	0.21	0.030	0.76	
	23 43.0	1.0	24.0	0.66	0.030	2.60	
15	00 55.8	5.2	> 35	1.15	0.034	14.2	
17	17 34.6	0.1	0.2	0.32	0.059	0.05	(1)
	18 03.2	1.0	16.0	2.36	0.049	5.61	(2)
	20 14.6	0.3	17.0	2.22	0.029	5.35	(3)
	21 28.2	0.8	4.0	0.36	0.024	0.69	
	22 16.0	0.3	15	0.27	0.018	1.27	(4)
	23 00.5	0.5	5.3	0.23	0.037	0.42	
22	18 59.4	1.0	4.2	0.69	0.035	1.14	
	20 03.5	0.9	10.3	0.42	0.021	2.28	
	21 25.7	2.0	55.3	5.64	0.027	29.5	
	23 00.0	0.4	24.8	8.17	0.030	10.8	
23	21 03.8	0.2	1.4	0.55	0.037	0.20	
24	00 21.5	0.2	1.5	0.59	0.030	0.17	

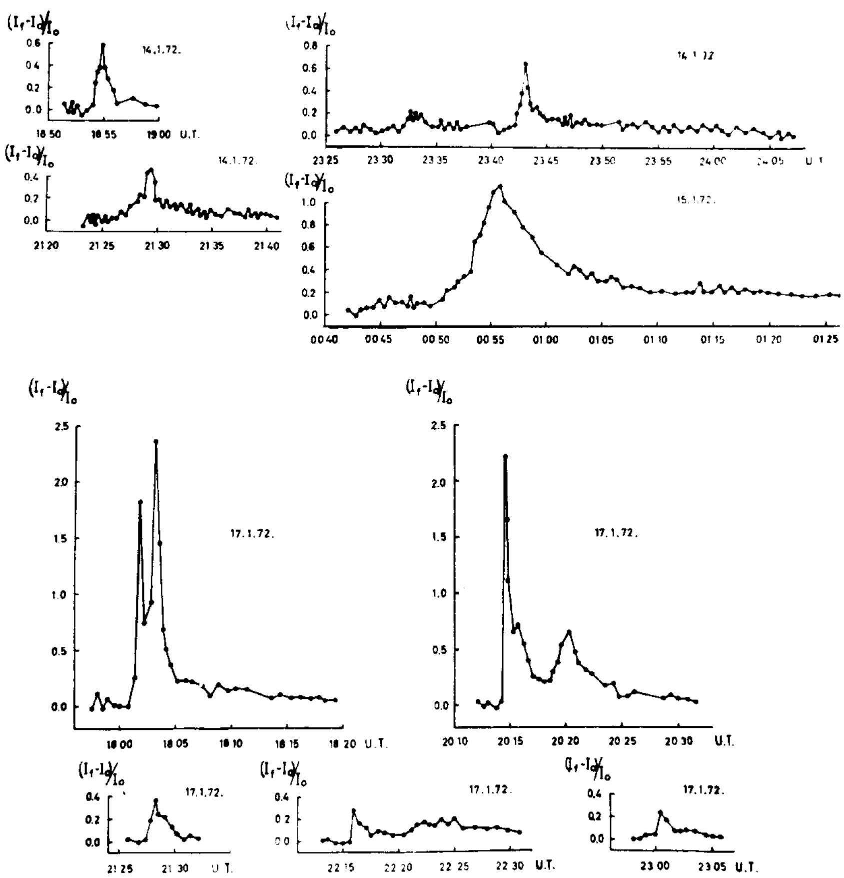
1 Isolated peak; light curve is not presented.
2 Secondary maximum at 18 01.8.
3 Secondary maximum at 20 20.3.
4 Secondary maximum at 22 14.

Errata

Please add to the Tables "Coverage" published in IBVS No. 615 and 616 respectively, the following (read in the Coverage-Table of No. 616 Sept. instead of Oct.):

Coverage

Sept.	16	(17 [illegible]-19 14,19 18-20 57,21 06-21 12,21 17-22 04,
		[illegible]-22 19,22 24-23 01,23 05-23 34,23 37-24 00)
	17	(00 [illegible]-00 03,00 09-00 32,00 40-01 06,01 25-01 46)
Oct.	15	[illegible]-19 08,19 09-19 36,19 42-20 40,20 42-21 41,
		[illegible]-21 58,22 00-22 09,22 11-22 40,22 42-23 21,
		[illegible]-23 44,23 46-24 00
	16	[illegible]-00 02,00 03-00 23,00 24-00 [illegible]



$(I_f - I_o)/I_o$
14.1.72.
18 50
18 55
19 00
U.T.
14.1.72.
23 25
23 30
23 35
23 40
23 45
23 50
23 55
24 00
14.1.72.
21 20
21 25
21 30
21 35
21 40
15.1.72.
00 40
00 45
00 50
00 55
01 00
01 05
01 10
01 15
01 20
01 25
17.1.72.
18 00
18 05
18 10
18 15
18 20
U.T.
17.1.72.
20 10
20 15
20 20
20 25
20 30
U.T.
17.1.72.
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U.T.
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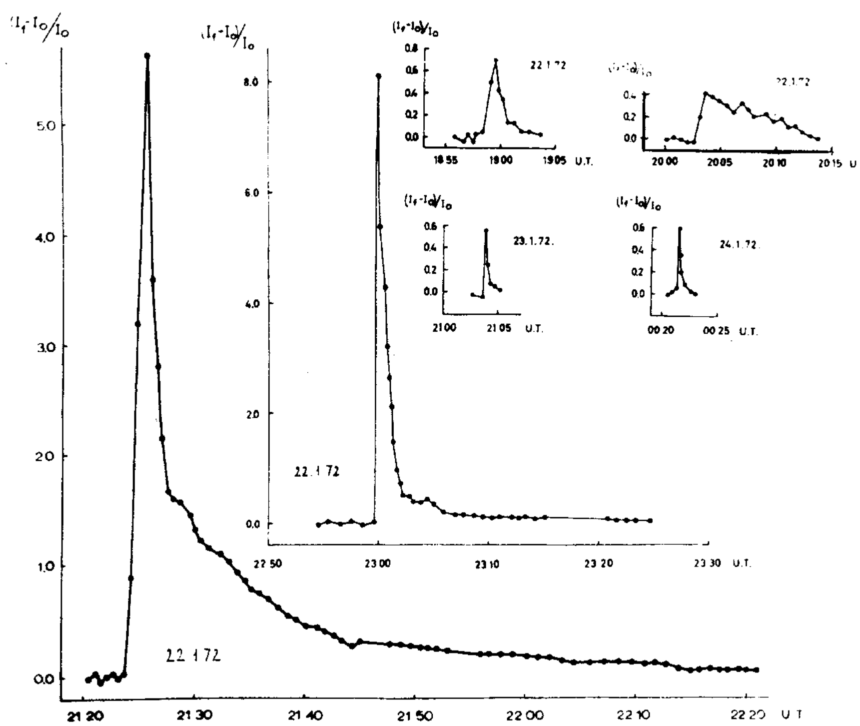


22.1.72
22.1.72
22.1.72
22.1.72
23.1.72.
24.1.72.
U.T.

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

NUMBER 633

Konkoly Observatory
Budapest
1972 February 25

THE PERIOD OF EQ TAURI

From estimates of 392 exposures with the 25.4 cm reflector, the light elements

Min. = JD (Hel) 2436646.569+0^{d}341351 E (A)

have been determined. The 12 observed minima are listed in Table I, in which the numbers of observations used to determine the values of O are listed under n. For the three minima with n = 24, 21 and 21, both descending and ascending branches were completely covered.

The elements (A) give a much better light curve from the 44 visual observations by Tsesevich than the ones he published. A normal minimum: 2430651.325, with O - C = =-0^{d}096 for E = -17563, has been derived from his observations.

Magalashvili and Kumsishvili have attempted to fit two seasons of photoelectric observations with a slight revision of the period, 0^{d}41350, of Tsesevich. Their light curves show several discontinuities which do not appear in plots using the period (A). Results from the reduction of their observations are given in Table II, in which the subscripts I, B and V refer to observations in integral, blue and visual light.

From the residuals in Table II alone, the elements

Min. = JD (Hel) 2440213.328+0^{d}341346 E (B)

have been derived. The mean O - C from the 21 times of minima, using elements (B), is 0.0009, which is one-tenth of the mean from the 5 minima in their Table 3. Primary minima in B and V have few observations.

Since the residuals, computed with elements (A), of the earliest and latest observations are much too large for errors of observations, the period must be considered to be variable.

BALFOUR S. WHITNEY

University of Oklahoma Observatory

References:

Tsesevich,V.P., Odessa Publication IV, Part III, 1954.
Magalashvili,N.L. and J.I.Kumsishvili, Abastumani Bull. 40, 2, 1971.

Table I. Minima (Oklahoma)

0	n	E	0-C
2436646.568	6	0	$-0^d.001$
6905.653	3	759	- .001
6910.602	12	773.5	- .002
6946.616	24	879	- .001
7257.584	9	1790	- .003
7267.658	3	1819.5	+ .001
7295.651	21	1901.5	+ .003
7355.554	29	2077	- .001
7357.607	21	2083	+ .004
7367.676	6	2112.5	- .003
7371.596	6	2124	- .003
7706.633	6	3105.5	- .002

Table II. Minima (Abastumani)

C	E	0_I-C	0_B-C	0_V-C
2440212.492	+10446.5	$-0^d.019$		
213.346	10449	- .019		
229.218	10495.5	- .016		
504.518	11302	- .024	$-0^d.021$	$-0^d.023$
508.444	11313.5	- .023	- .021	- .023
509.468	11316.5	- .022	- .022	- .022
510.492	11319.5	- .023	- .020	- .022
511.516	11322.5	- .020	- .021	- .022
512.540	11325.5	- .023	- .023	- .022

COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
Number 634

Konkoly Observatory
Budapest
1972 February 25

A NEW VARIABLE STAR NEAR THE NEBULA K3+50

A new interesting irregular variable has been found near the nebula NGC 6857. The star (GR 232 : AR = $19^h59^m53^s$, D = + 33°20',1950) is an infrared object probably related with the nebula K3-50. It has measured on 158 films Kodak 103a - 0 taken with the Shmidt telescope 40/50/100 cm of the Asiago Astrophysical Observatory. The range of variation is from 13.9 to 14.8 mpg. Finding chart and light curve are shown in Figs 1 (10' x 10', north in the top) and 2.

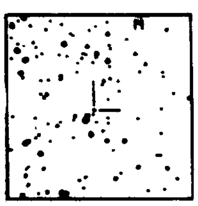


Figure 1

G.ROMANO
Istituto di Astronomia dell'Università
di Padova

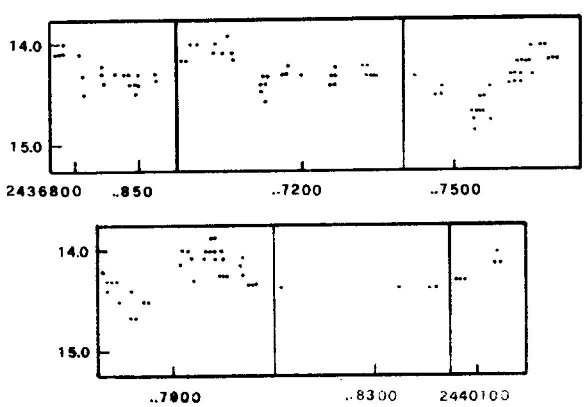


Figure 2

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

NUMBER 635

Konkoly Observatory
Budapest
1972 February 28

YZ CMi

The photoelectric monitoring of the flare star YZ CMi was carried out at the Okayama Station during the period of 9 to 22 January 1972. The observations were made with the simultaneous three-colour photometer attached to the 91 cm reflector.

The observational results are summarized in the Table.

Date 1972	Time of Monitoring (UT)	Filter	Flares: Time of max (UT)	max. Δm	P min.	Duration	σ
Jan 16	11^h50^m - 19^h38^m	U	$12^h09^m.3$	2.53	10.0	6.5	
		B		1.18	2.3	6.5	
		U	12 55.9	0.75	1.0	4.0	U 0.20^{mag}
		B		0.23	0.2	4.0	B 0.04
		U	16 07.8	0.73	0.8	1.5	
		B		0.14	0.1	1.5	
17	11 43 - 18 37	U	14 36.9	>2.33	>41.2	11.5	
		B		>0.96	> 8.4	11.5	
		V		>0.48	> 2.0	11.5	
		U	16 36.0	0.61	0.3	1.3	
		B		0.16	0.1	1.3	
		V		-	-	-	
		U	16 58.7	0.87	0.5	2.0	U 0.16
		B		0.16	0.2	2.0	B 0.05
		V		-	-	-	V 0.03
		U	17 34.5	1.02	1.2	0.7	
		B		0.16	0.1	0.7	
		V		-	-	-	
		U	18 01.9	2.15			
		B		0.97	U13.3	7.7	
		V		0.46	B 3.1	7.7	
		U	18 03.4	2.29			
		B		1.13	V 0.9	5.8	
		V		0.53			
18	11 04 - 18 44	U	15 51.2	1.03	0.4	0.6	0.20
		B		0.37	0.1	0.4	0.04
		V		-	-	-	0.03

Date 1972	Time of Monitoring (UT)	Filter	Time of max (UT)	max. Δm	P min.	Duration	σ
Jan 20	11^h20^m - 17^h34^m	U	$12^h54^m.9$	0.73	1.5	5.5	
		B		0.22	0.5	6.0	
		V		-	-	-	
		U	14 51.7	1.72	2.1	4.5	U 0.13
		B		0.64	0.7	4.5	B 0.05
		V		0.14	0.1	1.5	V 0.04
		U	15 38.6	1.99	6.9	10.5	
		B		0.74	1.6	10.5	
		V		0.25	0.6	9.0	
		U	16 23.1	1.07	1.6	4.5	
		B		0.28	0.5	4.5	
		V		-	-	-	
21	13 00 - 16 46	U	16 24.7	0.75	1.2	3.0	0.19
		B		0.21	0.3	3.0	0.03
		V		0.06	0.1	2.0	0.02
22	10 57 - 14 26	U	14 00.6	0.83	2.0	6.0	U 0.20
		B		0.21	0.7	6.0	B 0.06
		V		-	-	-	V 0.03
		U	18 59.5	1.38	3.4	5.5	
		B		0.57	1.5	5.5	
		V		0.19	0.4	5.5	

Tokyo Astronomical Observatory
15 February 1972.

K.OSAWA, K.ICHIMURA,
Y.SHIMIZU, E.WATANABE,
T.OKADA, M.YUTANI,
H.KOYANO, K.OKIDA.

COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 636

Konkoly Observatory
Budapest
1972 February 29

REMARK ON THE PERIOD OF RW CORONAE BOREALIS

From the photoelectric observations published by E.F. Milone and A.J. Wesselink (IBVS 611, 1972) I have determined the following two minima

Minimum	Julian Date	O–C	E
primary	2440748.8251 ± $0^d.0006$	$-0^d.0039$	28011
secondary	2440749.1920 ± 0.0010	−0.0002	28011.5

The O–C values are computed with the linear ephemerides

$$\text{Min.I.hel.} = \text{JD } 2420401.3193 + 0^d.7264114\ E$$

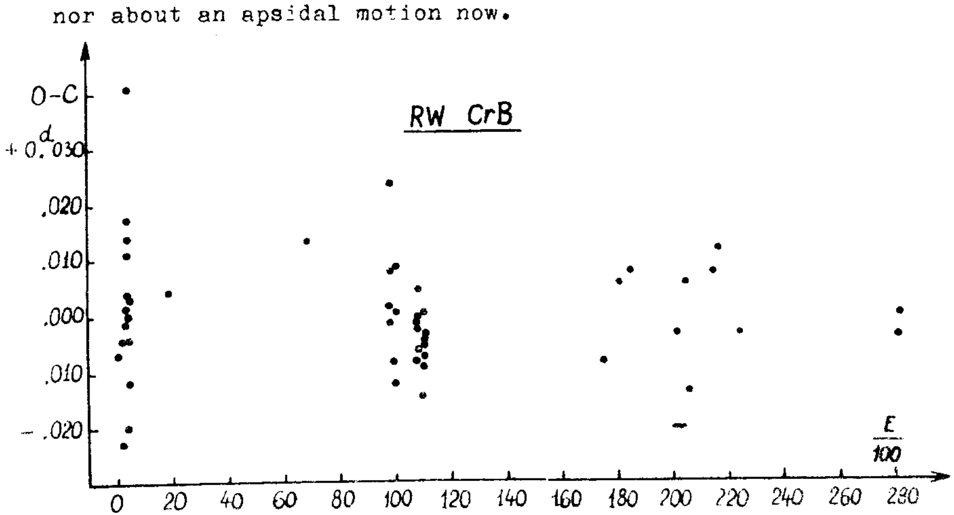
Hence we have

$$T_2 - T_1 - P/2 = +0^d.0037 \pm 0^d.0010$$

From Lause's visual observations (AN 254,373, 1935) it may be possible to obtain

$$T_2 - T_1 - P/2 < 0$$

but this value is not significantly different from its accuracy. The differences O–C for all observed minima that I had at my disposal are shown in figure 1. It is very easy to see that we can speak neither about a period variation nor about an apsidal motion now.



For an accurate determination of the orbital eccentricity and for the study of an eventual apsidal motion we need new photoelectric observations for both primary and secondary minima. The next months of this year could be suitable for a new set of such observations.

Astronomical Observatory
Cluj IOAN TODORAN

ON THE VARIABILITY OF NGC 404

The magnitudes of NGC 404 were estimated on 15 plates (1906-1912) taken with the Steinheil lens (f/6.7 = 96 mm) and 5 plates (1948-1962) taken with the Zeiss astrograph (f/4 = 400 mm). All the plates taken with given instrument have roughly the same exposures. The magnitudes of the comparison stars were adopted according to E.H. Geyer (IBVS 614, 1972). On all the plates the object has non-stellar image. The results are given in the following Table.

Date	m_{pg}	Date	m_{pg}	Date	m_{pg}
1906 Dec. 9	$11^m.9$	1908 Dec.15	$12^m.1$	1912 Oct.13	$11^m.6$
1907 Nov.21	12.0	1908 Dec.16	11.9	1948 Sep.25	11.8
1908 Sep.25	12.1	1909 Aug.19	12.1	1951 Sep. 5	11.8
1908 Oct.20	12.1	1909 Aug.22	12.2	1951 Sep.27	11.8
1908 Oct.22	11.9	1909 Oct.18	11.6	1962 Oct.25	12.0
1908 Oct.23	12.0	1910 Sep. 6	11.6	1962 Oct.25	11.9
1908 Nov.17	12.0	1911 Aug. 4	12.1		

It is clear that the brightness of NGC 404 shows no variability on our plates. The variability discovered by E.H. Geyer is perhaps the result of the photographic effects caused by specific distribution of surface brightness of NGC 404 and differences of the instruments, exposures, plates etc.

The precise photoelectric photometry is extremely desirable.

February 20, 1972

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Sternberg State Astronomical Institute,
Moscow, 117234.

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

NUMBER 637

Konkoly Observatory
Budapest
1972 March 3

MINIMA OF ECLIPSING VARIABLES

The writer observed visually following minima of eclipsing variables in Fort Skała Observatory near Cracow.

The heliocentric moments of minima and limits of errors were determined by the tracing-paper method. "n" behind moments of minima denotes normal minima and column "N" denotes number of observations. Column O-C was computed with elements given in "Rocznik Astronomiczny Obserwatorium Krakowskiego 1972". "In" denotes instrument (E - Expedition Refractor O=203 mm, f=227 cm, B - binocular and A - naked eye).

Star	J.D. hel. 244 0000+		O - C	N	In	Remarks
WZ And	1368.288	$\pm0\overset{d}{.}008$	$-0\overset{d}{.}012$	10	E	
TT Aur	1350.556 n	0.007	+0.020	16	E	
SV Cam	1353.325	0.004	+0.004	18	E	
	1357.482	0.005	+0.010	13	E	
S Cnc	1357.421	0.005	+0.033	14	E	
RZ Cas	1353.645	0.002	-0.009	19	B	
ZZ Cas	1357.530 n	0.010	-0.005	17	E	
AB Cas	1365.367	0.004	+0.028	8	E	
U Cep	1350.484	0.005	+0.018	16	E	
ZZ Cep	1357.541	0.003	+0.004	9	E	
Z Dra	1353.613	0.002	-0.003	18	E	
	1368.546	0.001	-0.002	11	E	
RZ Dra	1365.348 n	0.003	-0.003	14	E	
TW Dra	1357.520	0.003	+0.012	11	E	
DE Hya	1367.470	0.015	+0.021	5	E	
UV Leo	1367.350 n	0.005	+0.017	13	E	
EW Lyr	1368.588	0.003	+0.045	10	E	
β Lyr	1177.48 n	0.03	+0.08	15	A	primary
	1183.90 n	0.04		17	A	secondary

Star	J.D. hel. 244 0000+		O – C	N	In	Remarks
U Oph	1368.638	±0.005	−0.002	9	B	
ET Ori	1353.424	0.004	+0.008	13	E	
FR Ori	1368.366	0.003	+0.006	8	E	
OS Ori	1353.437	0.003	+0.007	14	E	
ST Per	1353.417	0.003	+0.014	17	E	
XZ Per	1357.383	0.004	+0.007	11	E	
β Per	0999.343 n	0.002	+0.011	22	A	moment was given with error in IBVS 573
X Tri	1357.289	0.002	−0.021	10	E	
XZ UMa	1351.299 n	0.008	−0.058	9	E	

Cracow, February 1972

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Astronomical Observatory of
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COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 638

Konkoly Observatory
Budapest
1972 March 14

REMARK CONCERNING NGC 404

The extragalactic nebula NGC 404 was suspected of being variable by Geyer (IAUC 2380, see also IAUC 2382 and IBVS 614). I have estimated the object on about 200 Sonneberg Sky Patrol plates (Tessar 1: 3.5, f=250 mm) of the years 1961 to 1971, taken by Huth. On this short focus material, which is photographically completely homogeneous, the nebula appears nearly starlike. No variability could be detected.

This statement is confirmed by observations on 50 astrographic plates (1 : 4, f=1600 mm) of 1965 to 1971, which also show no sign of variability of the object.

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Sternwarte Sonneberg, DDR

IMPROVED ELEMENTS OF 3 RR-LYRAE VARIABLES IN AQUILA

The stars V 691 Aql = 451.1936
V 709 Aql = 456.1936
V 717 Aql = 460.1936

are poorly known variables. The elements in GCVS 1969 are inexact. On 90 plates of Sonneberg Observatory (JD 2429110 - 31673; 2438289 - 40837) we examined these variables and determined improved elements.

V 691 Aql. The variable was discovered by Hoffmeister. He announced the star as a shortperiod variable ($14^{m}.5$-16^{m}phg, Astr. Nachr. 259.37.1936). Preliminary elements were derived by Ahnert (Veröff. Sternw. Sonneberg, Band 1 Nr. 3. 1949). Our improved elements are:

Max.hel. = J.D. 2430932.412 + $0^{d}.552162$ E

RRab, $13^{m}.9$ - $15^{m}.5$ phg, M - m = $0^{P}.20$

Observed maxima:

J.D.hel.24...	Epoch	O - C	J.D.hel.24...	Epoch	O - C
30932.412	0	$0^d.000$	40469.349	17272	$-\ ^d.005$
933.529	2	+ .013	470.468	17274	+ .010
31673.448	1342	+ .035	803.438	17877	+ .026
40444.483	17227	- .024			

V 709 Aql. Hoffmeister announced this star as a short-period variable between $14^m.5$ - 15^mphg (Astr. Nachr. 259.37. 1936). Ahnert gave preliminary elements (Veröff. Sternw. Sonneberg, Band 1 Nr. 3. 1949). We found the improved elements:

Max.hel. = J.D. 2430932.496 + $0^d.607783$ E

RRab, $14^m.2$ - $15^m.5$ phg, M - m = $0^P.16$

Observed maxima:

J.D.hel.24...	Epoch	O - C
30932.496	0	$0^d.000$
40470.445	15693	+ .010
780.428	16203	+ .028

V 717 Aql. Hoffmeister found shortperiodic light variations between 15^m - 16^mphg (Astr. Nachr. 259,37.1936). The first elements were published by Ahnert (Veröff. Sternw. Sonneberg, Band 1 Nr. 3. 1949).

The new elements found by the authors are:

Max.hel. = J.D. 2430930.454 + $0^d.486594$ E

RRab, $13^m.6$ - $15^m.5$ phg, M - m = $0^P.17$

Observed maxima:

J.D.hel.24...	Epoch	O - C	J.D.hel.24...	Epoch	O - C
30930.454	0	$0^d.000$	40781.519	20245	$-\ ^d.022$
931.448	2	+ .021	803.438	20290	.000
932.412	4	+ .012	824.378	20333	+ .016
31673.490	1527	+ .008			

Light curves and comparison stars will be published in "Mitteilungen der Bruno H.Bürgel - Sternwarte Hartha, Heft 4".

Bruno-H.-Bürgel-Sternwarte Hartha
DDR

H. BUSCH and K. HÄUSSLER

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

NUMBER 639

Konkoly Observatory
Budapest
1972 March 14

NOTES ON FOUR VARIABLES

V 379 Cas. Strohmeier discovered this variable(=BV 223) and supposed that it is an eclipsing variable between $9^m.20$ and $10^m.15$ phg. (Kleine Veröff. Remeis-Sternwarte Bamberg Nr.24.1958.) According to Nikulina the star is an irregular variable.(Astr.Cirk.No.207.16.1959).

I examined this star on our sky patrol plates (n=120, JD 2436985 - 40483) and on 62 short-exposure photos (1971 July 26, July 27, Oct. 24, Oct. 26) and confirmed the irregular light variability. V 379 Cas probably belongs to the type Isb.

ET Hya. Hoffmeister, who discovered the variable, found short-periodic light variations (Astr. Nachr. 242.131.1931). Preliminary elements were given by(Tsesevich Astr. Cirk.32. 1944):

Max.hel. = J.D. 2431164.14 + $0^d.408$. E (RR)

A light curve is not yet published.

I examined the star on 387 sky patrol plates of Sonneberg Observatory (JD 35786 - 40531) and confirmed the RR Lyr-type. 22 maxima were obtained and yielded the preliminary elements:

Max.hel. = J.D. 2435921.386 + $0^d.685519$. E

RRab, $10^m.9$ - $12^m.00$ phg, M - m = $0^P.12$

Observed maxima:

J.D.hel.24...	Epoch	O - C	J.D.hel.24...	Epoch	O - C
35860.390	- 89	$+0^d.015$	38753.356	+ 4277	$+0^d.005$
5875.469	- 67	+ .013	9055.585	4572	+ .006
5899.404	- 32	- .045	9057.667	4575	+ .032
5921.381	0	- .005	9070.647	4594	- .013
7375.351	+ 2121	- .021	9180.381	4754	+ .038
7651.626	2524	- .010	9500.493	5221	+ .012
8318.626	3497	- .020	9592.378	5355	+ .038
8388.565	3599	- .004	9945.381	5870	- .002
8406.415	3625	+ .023	40149.659	6168	- .008
8410.500	3631	- .005	0204.491	6248	- .018
8739.552	4111	- .003	0513.660	6699	- .018

EU Hya = 71.1931 = P 566 = BD $-6^{\circ}2694$ is an eclipsing binary, discovered by Hoffmeister (Astr.Nachr.242.131.1931). Elements were published by Kordylewski (Roczn. astr. Obs. Krakov 18.1947 and 24.1953). Further observations were obtained by Kordylewski (Roczn.astr.Obs. Krakov 29.1958; IBVS Nr.46) Diethelm and Locher (Orion 14.112.81; 113.109.1969).

From 474 observations on Sonneberg sky patrol plates (JD 2435787 - 40531) I obtained 12 minima and the improved elements:

$$\text{Min.hel.} = \text{J.D. } 2438359.786 + 0^{d}.778212 \cdot E$$

$$\text{EA, } 10^{m}.15 - 10^{m}.80/10^{m}.25 \text{ phg, } D=0^{P}.14$$

Observed minima:

J.D.hel.24...	Epoch	O - C	Obs.	J.D.hel.24...	Epoch	O - C	Obs.
30470.310	-10138	+0.037	K.	39507.640ph	+1475	- .009	B.
34126.336	5440	+ .023	K.	39536.458ph	1512	+ .015	B.
35862.497ph	3209	- .007	B.	39915.424ph	1999	- .008	B.
35876.525ph	3191	+ .013	K.	40290.514v	2481	- .016	D.
37403.351ph	1229	- .012	B.	40319.313v	2518	- .011	D.
37669.503ph	887	- .009	B.	.322v	2518	- .002	L.
38321.666ph	49	+ .012	B.	.343ph	2518	+ .019	B.
38449.285v +	115	+ .005	K.	40322.412v	2522	- .025	L.
38473.383ph	146	- .022	B.	.426v	2522	- .011	D.
38852.398ph	633	- .006		40326.335ph	2527	+ .007	B.

B=Busch, D=Diethelm, K=Kordylewski, L=Locher

Details will be published in "Mitteilungen der Bruno-H.-Bürgel-Sternwarte Hartha, Heft 4".

Bruno-H.-Bürgel-Sternwarte
DDR

H. BUSCH

EX Vul = GR 34 was discovered by Romano. It is an eclipsing binary ($11^{m}.3 - 14^{m}.0$ phg). The elements given by the discoverer (Coelum Vol. XXVI.11-12.1958) are:

$$\text{Min.} = \text{J.D. } 2436096.34 + 8^{d}.0684 \cdot E$$

Elements and light curve are not yet published.

I examined this star on 342 plates of Sonneberg Observatory (JD 2427543 - 40477). It turned out that the period should be doubled.

The improved elements are:

Min. = J.D. 2427931.768 + $16^{d}.135211$. E

EA, $11^{m}.59$ - $14^{m}.20$ phg, D=$0^{P}.10$; d=$0^{P}.03$

Observed minima:

J.D.hel.24...	Epoch	O - C	J.D.hel.24...	Epoch	O - C
27931.528	0	- $0^{d}.240$	36757.513	547	- $0^{d}.215$
28286.580	22	- .172	37871.455	616	+ .397
432.401	31	+ .442	38226.425	638	+ .392
29109.425	73	- .210	258.412	640	+ .109
30545.439	162	- .233	290.391	642	- .182
33095.465	320	+ .430	323.290	644	+ .446
36725.454	545	- .003	371.244	647	- .006

Details will be published in "Mitteilungen der Bruno-H.-Bürgel-Sternwarte Hartha, Heft 4".

Bruno-H.-Bürgel-Sternwarte Hartha
DDR

K. HÄUSSLER

COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 640

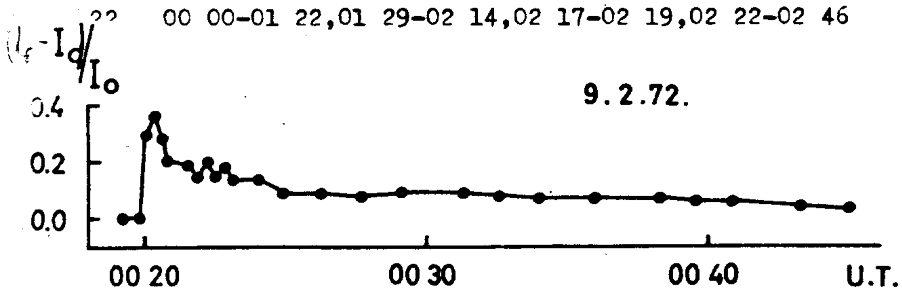
Konkoly Observatory
Budapest
1972 March 14

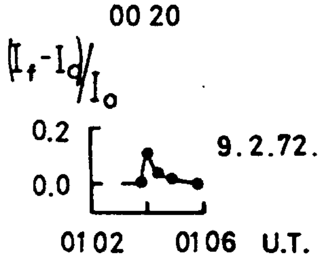
PHOTOELECTRIC OBSERVATIONS OF AD Leo

The flare star AD Leo was monitored photoelectrically in the period of cooperative observations 8-22 February 1972. The observations were carried out in the B-band with the 64-cm meniscus telescope. The observational results are given in Table 1, 2 and figures.

Table 1

Date 1972	Coverage (U.T.)
Feb. 8	18 20-18 33,18 34-19 42,19 43-23 04,23 05-23 20, 23 23-24 00
9	00 00-02 51,02 54-03 02,18 43-18 44,18 45-19 40
10	19 24-19 51,19 53-20 27
11	17 53-19 17
12	(17 40-19 35)
13	17 26-18 31
20	17 17-19 29
21	17 25-19 07,19 09-21 01,21 03-23 04,23 06-24 00
22	00 00-01 22,01 29-02 14,02 17-02 19,02 22-02 46





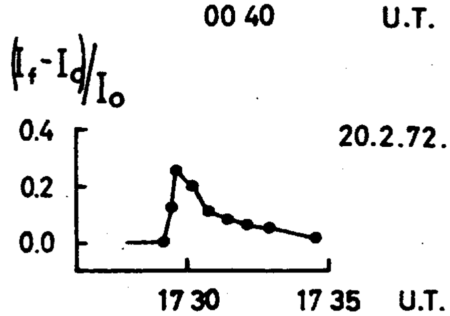


Table 2

Date 1972	U.T. maximum	t_b minutes	t_a	$(I_f-I_o)/I_o$ maximum	σ/I_o	P_B
Feb. 9	00 20.3	0.6	24.7	0.36	0.02	1.92
9	01 03.9	0.1	1.8	0.11	0.02	0.06
20	17 29.6	0.5	4.9	0.25	0.02	0.50

Crimean Astrophysical Observatory

P.F. CHUGAINOV and N.I. SHAKHOVSKAYA

The continual photoelectric monitoring of the flare star AD Leo was carried out with the 24 inch telescope at the Konkoly Observatory using an EMI 9502B photomultiplier and Schott GG 13 + BG 12 filter combination. The limiting magnitude for the nights was about $m_{lim} = 13.2$. As comparison star we used the companion star at 1!7 NE to AD Leo. The time of monitoring is given in Table 3.

Table 3

Date of obs.	Coverage UT
1972 Feb. 5	2040-2057,2059-2116,2118-2135,2137-2200, 2201-2230,2231-2344,2254-2319,2320-2332, 2333-2359,2400-2425,2427-2430,2431-2455, 2457-2459,2500-2529,2530-2559,2600-2631, 2632-2701,2702-2722,2724-2732,2733-2801, 2802-2830.
Feb.18	2036-2055,2056-2110,2111-2131,2132-2151, 2152-2211,2212-2231,2232-2251,2252-2311, 2312-2331,2332-2351,2352-2411,2412-2431, 2432-2451,2452-2501.
Feb.20	2042-2101,2102-2121,2122-2141,2142-2201, 2202-2221,2222-2241,2242-2301,2302-2321, 2322-2341,2342-2401,2402-2421,2422-2441, 2442-2443.2445-2501,2502-2521,2522-2531.

Total coverage: 16^h00^m

No definite flare activity was noticed.

Konkoly Observatory, Budapest

K. BARLAI, L. SZABADOS, B. SZEIDL

COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 641

Konkoly Observatory
Budapest
1972 March 14

HR 3327 - AN ECLIPSING BINARY WITH ECCENTRIC ORBIT

During photoelectric observations of AS Vel on the night Feb. 3-4, 1972, the check star

HR 3327 = HD 71487 (A0)= CoD $-38^{\circ}4462$

was found to be an eclipsing binary of Algol-type. The observations were made with a four-channel photometer attached to the Copenhagen 50 cm telescope at European Southern Observatory, La Silla, Chile.Filters of the Strömgren four-colour ubvy system were employed. HR 3327 has now been observed on seven nights with the result that two primary minima and one secondary minimum were obtained (Table 1).

Table 1. Times of heliocentric minima.

Min I	JD 244 1351.7094	±0.0007
II	1353.6976	±0.0014
I	1361.7643	±0.0007

HR 3327 is the primary component of the visual binary HR 3327-8 ($m_V(A) = 6^m.68$, $m_V(B) = 7^m.28$, distance= 8".1) . Because of the small distance the combined light of both components was measured through a diaphragm with a diameter of 30". In the Figure the magnitude difference $m_b(A+B) - m_b(comp)$ is given by the scale to the left: the comparison star and check star were CoD $-38^{\circ}4561$ ($7^m.2$,B9) and CoD $-38^{\circ}4515$ ($8^m.5$,F5) respectively. The phases were computed according to the ephemeris given below. The secondary component was measured separately on nights with good seeing through a small diaphragm, and in the scale to the right the light of the secondary has been subtracted ($\Delta y(max) = 0^m.67$).

The depths of the two minima in the instrumental system, which should be very close to the standard system, are given in Table 2. The duration of primary eclipse is about four hours corresponding to a fraction of 0.13 of the preliminary period. The secondary minimum is displaced to phase 0.582 indicating an eccentric orbit.

Table 2. Depths of minima.

	u	v	b	y
Min I	$0^m.45$	$0^m.44$	$0^m.44$	$0^m.45$
II	0.06	0.09	0.12	0.12

m.e.= $0^m.01$

Five coudé-spectra of 12 A/mm taken on four different nights by Dr.J.P. Swings with the ESO 1.5 m spectrographic telescope show a single-lined spectrum of probably a main-sequence star around B9. Preliminary radial-velocities show a range of about 190 km/sec.

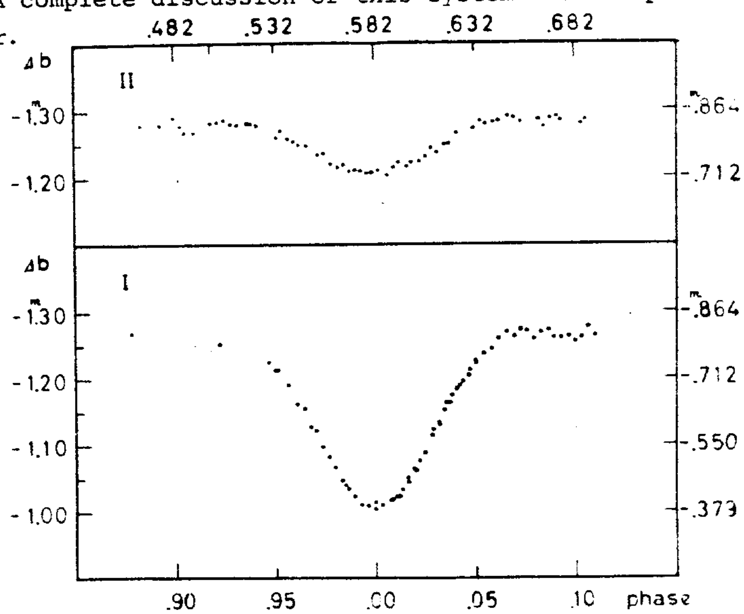
The combination of photometric and radial-velocity data gives the following ephemeris:

$$\text{Min I} \quad \text{JD } 244\ 1361.7643 + 1^d.25686 \cdot E$$
$$\pm 7 \qquad \pm 12$$

$$\text{Min II} - \text{Min I} = 0^p.582.$$

The author is greatly indebted to Dr. J.P.Swings who generously gave some of his observing time to an investigation of this object, and to Mr. E.H.Olsen, who made some of the photoelectric observations.

A complete discussion of this system will be published later.



European Southern Observatory
La Silla.
Feb. 24, 1972

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NUMBER 642

Konkoly Observatory
Budapest
1972 March 15

UBV OBSERVATIONS OF FU Ori, SU Tau AND OJ 287

One set of observations each was obtained for FU Ori, SU Tau and OJ 287 on 25 January 1972 U.T. at the No.1 36-inch reflector of Kitt Peak National Observatory during an observing session on another photometric program. A refrigerated photomultiplier (KPNO No.CT11919/5) together with standard UBV filters (V filter no. 232; B filter no. 233; and U filter no. 315) and 14 UBV standard stars chosen from the list of Johnson and Harris (1954) placed the observations on the UBV system. Standard observation and reduction procedures were followed (Landolt 1968). The external probable errors of the photometry, as defined by the UBV standard stars, were $\pm 0^m.020$ in V, $\pm 0^m.007$ in (B-V), and $\pm 0^m.013$ in (U-B).

Each of the three objects observed is quite interesting in its own way; hence, observations made from time to time are worthwhile. (a) FU Ori was observed to brighten rapidly in 1936 by some 6 magnitudes; see Herbig (1966) for a thorough discussion. The magnitude and color indices shown in Table I remain similar to those reported by Herbig (1966).

Table I

Object	JD hel. 2441000+	V	B-V	U-B
FU Ori	341.6742	9.06	+1.36	+0.92
SU Tau	341.6818	11.50	+1.48	+1.00
OJ 287	341.7544	12.51	+0.37	-0.68

(b) SU Tau is a R CrB variable which entered a minimum early in 1971 (IAU Circular Nos. 2316 and 2318). The star still seems to be 2 magnitudes fainter than its normal brightness. (c) The radio source OJ 287, an optically variable quasi - stellar object, has recently been discussed by Dyck et al. (1971) and by Kinman and Conklin (1971). The magnitude and color indices given in Table I are quite similar to those published.

I thank the Director of the Kitt Peak National Onservatory for the observing time. These observations were made during an observing program funded by National Science Foundation Grant No. GP-31504.

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References:

Dyck, H.M., Kinman, T.D., Kockwood, G.W., and Landolt, A.U. 1971, Nature Physical Sciences 234, 71.
Herbig, G.H. 1966, in Vistas in Astronomy, edited by A. Beer and K.Aa. Strand (London: Pergamon Press), 8, 109.
Johnson, H.L., and Harris, D.L., III 1954, Ap. J. 120, 196.
Kinman, T.D., and Conklin, E.K.,1971, Astrophys.Letters 9, 147.
Landolt, A.U. 1968, Astron. J. 73, 705.

COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 643

Konkoly Observatory
Budapest
1972 March 17

PHOTOVISUAL AND SPECTROPHOTOMETRIC OBSERVATIONS OF THE CARBON STAR HD 59643

Greene and Wing (1971) reported on unusual behaviour of the carbon star HD 59643 ($V=7^{m}.80$ - Blanco et al., 1968). They discovered an ultraviolet brightening of this star previously supposed to be constant and hydrogen emission lines in its spectra obtained in February 1970. Earlier studies of HD 59643 carried out by Yamashita (1967) and Utsumi (1970) indicated some peculiarities such as slight enhancement of the CH G-band, strong absorption lines of Ba II and Sr I and sudden appearance of the H_{β} absorption line on Utsumi's plates.

It seemed worth while to observe further this star exceptional among non-variable stars in showing ultraviolet brightening. Some observational material has been obtained for this star at the Toruń Observatory in 1964 - 1971 in the course of the photometric and spectrophotometric investigations of carbon stars. Photovisual measurements (m_{pv}) have been made on Kodak IIa-F plates with the aid of the 8" Draper astrograph and Ilford 108 filter. They are given in Table 1 and plotted in Fig.1.

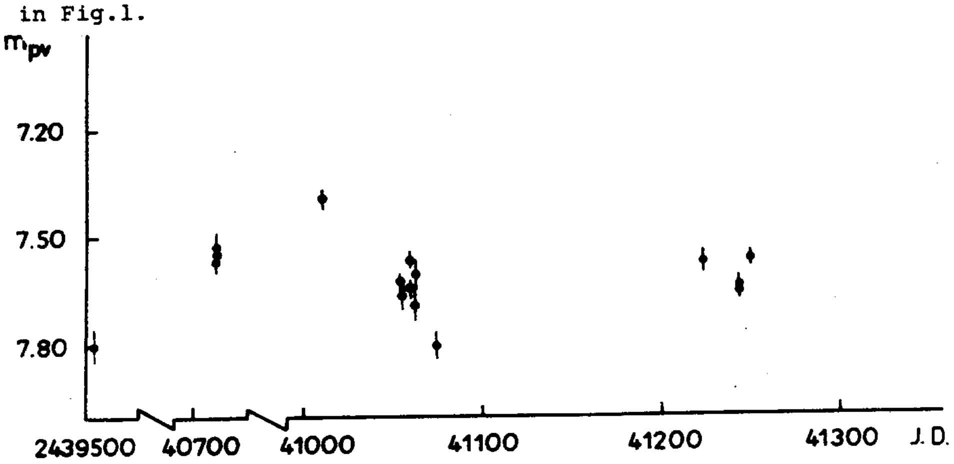

Table 1

Photovisual magnitudes of HD 59643

Date	Julian Days JD	Photovisual magnitude $m_{pv} \pm \varepsilon$	
1967 Jan.14	2439505.4	7.80	± 0.05
1970 May 6	2440713.3	7.52	.03
1970 May 6	713.4	7.56	.04
1970 May 6	713.5	7.54	.03
1971 March 1	2441011.5	7.39	.03
1971 April 13	054.5	7.62	.02
1971 April 14	055.5	7.66	.04
1971 April 19	060.4	7.64	.02
1971 April 19	060.5	7.56	.02
1971 April 21	062.4	7.69	.04
1971 April 21	062.5	7.60	.04
1971 May 3	074.6	7.80	.04
1971 Sept. 29	223.6	7.57	.03
1971 Oct. 19	243.5	7.65	.02
1971 Oct. 19	243.7	7.64	.03
1971 Oct. 26	250.5	7.56	.02

It seems probable that in the examined period of time HD 59643 brightened by about $0\overset{m}{.}3$, but since JD 2441060 it dropped to its previous brightness.

Spectrophotometric observations were made on Kodak I-N, II a-F and II a-O plates using the 60/90/180 cm Schmidt telescope and on Ilford HP3 films with the aid of the 30/35/75 cm Schmidt camera both with objective prisms giving dispersions of 250 Å/mm and 320 Å/mm at $H\gamma$, respectively. They covered the periods before the brightening (1965) and after it (1971). The central depths of some characteristic bands and the "absolute" energy distribution have been determined for both periods. No changes exceeding the observational errors have been detected. It is not surprising that there are no remarkable differences in the central depths and energy distributions for such a small amplitude of brightness. Unfortunately, there were no photometric as well as spectrophotometric observations during the most interesting interval of time reported by

Greene and Wing (1971). The mean "absolute" energy distribution of HD 59643 compared with that of HD 137613 (R2)and HD 156074 (C1,2) given by Mendoza and Johnson (1965) are shown in Figure 2.

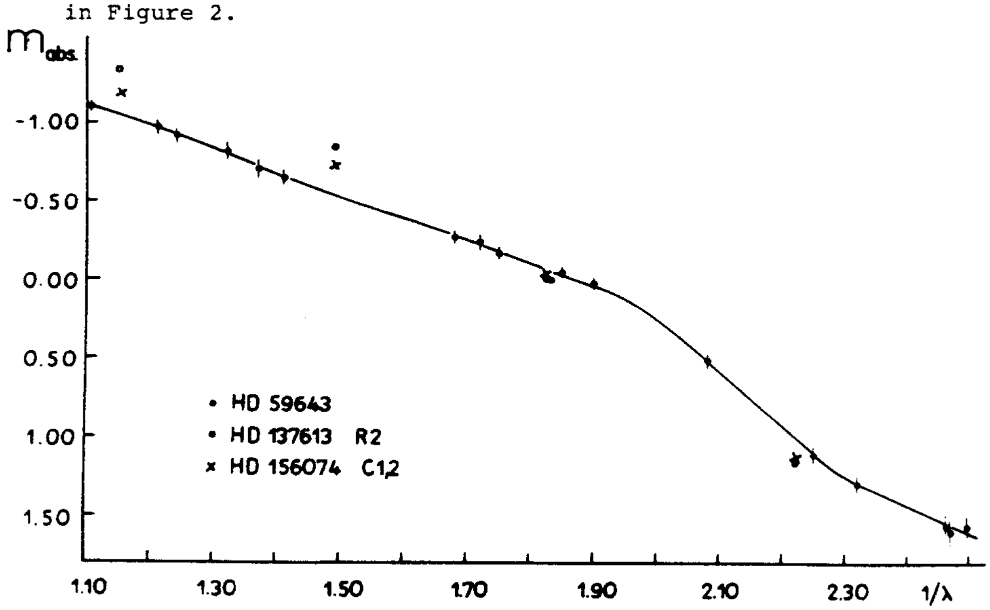

Fig.2 "Absolute" energy distribution of HD 59643 (dots), HD 137 613 (open circles) and HD 156074 (crosses) .

The spectral type estimated from this comparison about C1 or R2 is earlier than that one C6.5 received by Yamashita 1967 from lines and bands intensities.

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References:

Blanco, V.M., Demers, S., Douglass, G.G., Fitzgerald, M.P. 1968 Publ.U.S.nav.Obs., 21, 264.

Greene, A.E., Wing, R.F., 1971 Ap.J., 163, 309.

Mendoza, E.E., Johnson, H.L., 1965 Ap.J., 141, 161.

Utsumi, K., 1970 Publ.astr.Soc.Japan, 22, 93.

Yamashita, Y., 1967 Publ.Dom.Astrophys.Obs., Victoria, 13,67.

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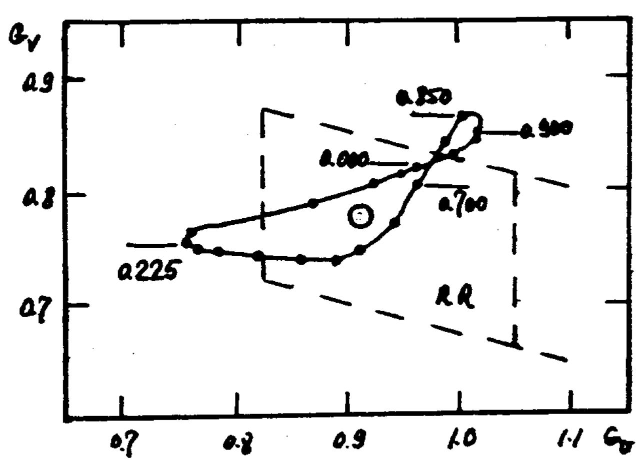
NUMBER 644

Konkoly Observatory
Budapest
1972 March 21

RADII VARIATIONS IN RZ LYRAE WITH THE BLASHKO-EFFECT

Light gradients G_U=dU/dB and G_V=dV/dB for RZ Lyrae have been determined for different phases of the Blashko-effect from observations obtained by Romanov in the system close to that of UBV (IBVS 205, 1967; AZ 612, 1971). The gradients obtained for nearly whole ascending and descending branches of the light curve of primary period proved to be similar though the instantaneous values of G_U in the middle of the ascending branch may have great variations. Thus, each phase of the Blashko-effect (Ψ) has corresponding definite values of the gradients. Mean gradients for different phases Ψ which have been selected in such a way as to allow for peculiarities of the light amplitude variations, G_U, G_V and (B-V) are given in Table 1.

The position variation of RZ Lyrae with phase Ψ in the two-gradients diagram is shown in Fig.1.



The mean position of RZ Lyrae calculated from all 527 observations is indicated by a circle at G_U=0.913±0.008 , G_V= =0.784±0.006 and the correlation coefficients r_B^U=0.980±0.017, r_B^V=0.987±0.011.

Table 1

ψ	G_U	G_V	$(B-V)_{max}$	$(B-V)_{min}$	ΔB_T
0.000	0.961	0.822	$0^m.083$	0.512	1.774
0.020	0.950	0.815	0.080	0.510	1.786
0.050	0.925	0.810	0.081	0.500	1.754
0.100	0.872	0.790	0.110	0.492	1.594
0.200	0.760	0.765	0.175	0.485	1.227
0.225	0.755	0.757	0.185	0.482	1.177
0.250	0.767	0.750	0.200	0.480	1.106
0.300	0.785	0.748	0.205	0.475	1.080
0.350	0.820	0.745	0.195	0.472	1.117
0.400	0.860	0.740	0.185	0.470	1.141
0.450	0.890	0.740	0.180	0.467	1.165
0.500	0.910	0.750	0.175	0.470	1.190
0.600	0.940	0.775	0.165	0.482	1.258
0.700	0.960	0.810	0.150	0.500	1.394
0.800	0.985	0.845	0.130	0.510	1.535
0.850	1.000	0.868	0.115	0.520	1.640
0.900	1.012	0.850	0.105	0.525	1.713
0.910	1.015	0.848	0.100	0.525	1.740
0.950	0.995	0.837	0.090	0.520	1.766

Table 2

ψ	$(R_1/R_2)_U$	$(R_1/R_2)_B$	$(R_1/R_2)_V$	ψ	$(R_1/R_2)_U$	$(R_1/R_2)_B$	$(R_1/R_2)_V$
0.000	1.157	1.214	1.164	0.450	1.134	1.136	1.147
.020	1.167	1.216	1.168	.500	1.127	1.139	1.143
.050	1.182	1.212	1.168	.600	1.120	1.148	1.139
.100	1.199	1.191	1.165	.700	1.123	1.165	1.135
.200	1.207	1.144	1.141	.800	1.121	1.183	1.128
.225	1.200	1.138	1.138	.850	1.120	1.197	1.123
.250	1.181	1.129	1.132	.900	1.117	1.206	1.141
.300	1.169	1.126	1.131	.910	1.117	1.210	1.145
.350	1.159	1.130	1.135	.950	1.133	1.213	1.156
.400	1.144	1.133	1.141				

From considering the cepheid sequence in the gradient diagram by Kolesnik it was found (Astrom.Astrph.Nos 12,13, 1971.Kiev) that light gradients may be represented by the linear relationship

$$G_V = G_V^T/G_U^T\,\frac{(1-P_2G_U)}{P_1} \qquad (1)$$

where for condition of a general zero-point of all the straight lines

$$P_1 = 0.934\ G_T^V/G_U^T$$

or for condition of parallel straight lines

$$P_2/P_1 = 0.316\ G_U^T/G_V^T$$

Here G_U^T and G_V^T are light gradients defined by the temperature variations in the star. $G_U^T = 0.912$ and $G_V^T = 0.815$ have been obtained for de C.Jager's atmosphere models with lg g=3. The conditions of general zero-point and parallel straight lines give similar results.

Therefore let us consider only the condition of a general zero-point. In this case the relationships for calculating the relative variations of effective UBV-radiation levels of the star may be represented by the expressions

$$a_U = G_U^T\ n_U\ B_T, \quad a_B = n_B\ B_T, \quad a_V = G_V^T\ n_V\ B_T, \qquad (2)$$

where

$$a_Q = 5\lg(R_1/R_2)_Q, \quad \Delta B_T = 6.75\Delta\Theta, \quad \Theta = 5040/T_e$$

and

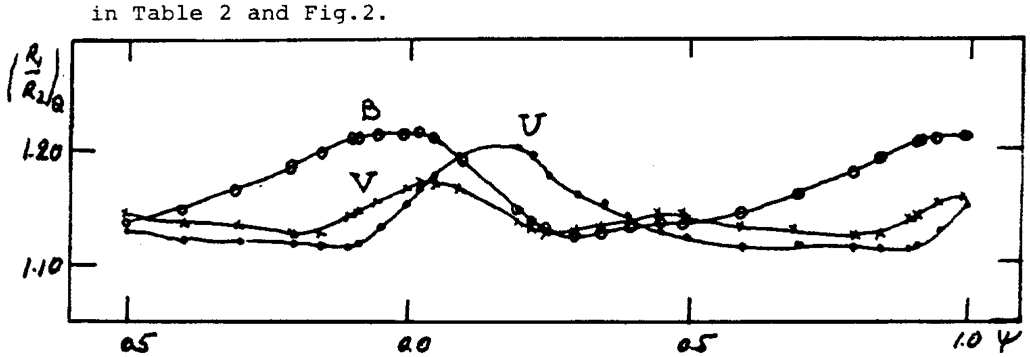
$$n_U = 1 - p_A\ G_U, \quad n_B = 1 - p_A\ G_U^T, \quad n_V = p_2\ G_U \qquad (3)$$

On the basis of known determinations of spectral types near to the light maximum (Alanija,Abastumani Bull.No.23,1958) and to our mean values of $(B-V)_{max}$ we must assume rather precisely for further calculations that (B-V) are not effected by interstellar absorption.

Then, using the Johnson calibration (Ann.Rev.Astr.Astrph. 4,193,1966) maximum(2) and minimum (1) of the light of a primary period, we could determine T_e and calculate ΔB_T given in Table 1.

To determine T_e in the light minimum we have taken (B-V) with the phase of the primary period φ=0.5.

The estimated results of radii relationships are given in Table 2 and Fig.2.



One can see that the relative radius amplitude for each range UBV is maximum near the maximum of the Blashko-effect with different phase shift. The minimum amplitude of radius variations is obtained in the V range.

A more detailed scope of information on the investigation will be published in "Astrometry and Astrophysics", No 18,Kiev, "Naukova Dumka", 1972.

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COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 645

Konkoly Observatory
Budapest
1972 March 23

NEW VARIABLE STARS IN LYRA

A survey for variable stars in the field centered in RA= 19^h04^m; D= +43° has been carried out with the Schmidt telescope 65/90/210 cm of the Asiago Astrophysical Observatory. Sixteen new variables have been discovered. This communication reports some short notices on these stars.

The following Table 1 gives coordinates (1900), approximate photographic magnitudes at maximum and minimum and probable type. In Figure 1 are given the identification charts (5' of side, north in the top). During the research the suspect variable 8152 of the Kukarkin Catalogue (Kukarkin et al. 1965) has been also examined and has shown a variation between 13.2 and <18.6 mpg. The star is probably a long period variable.

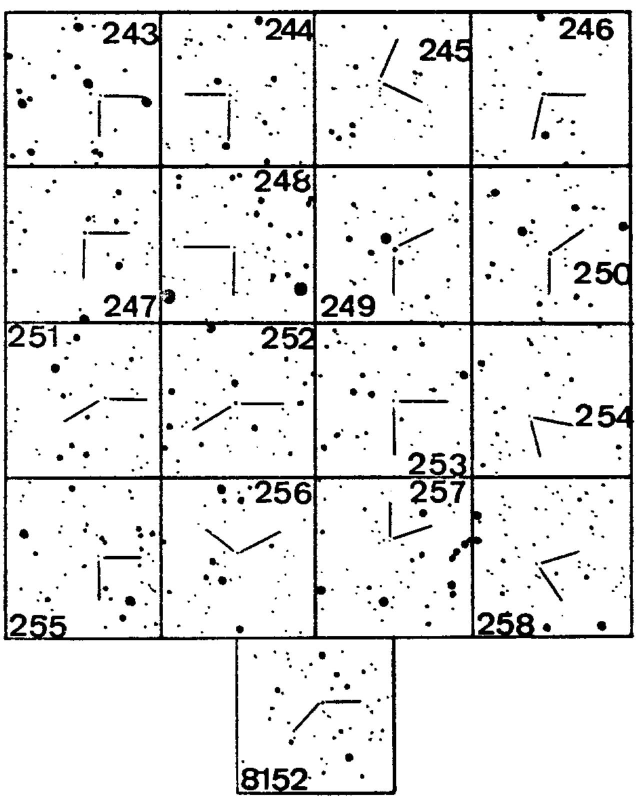
Table 1

Var.	R.A. 1900	D.	max.	min.	type
GR 243	$18^h51^m51^s$	+42°35'	16.0	17.1	C
GR 244	18 55 04	+41 27	15.3	17.3	RR
GR 245	18 55 54	+42 36	16.2	18.0	C
GR 246	18 56 34	+45 14	14.2	18.0	LP
GR 247	18 57 01	+44 18	17.2	< 18.5	UG:
GR 248	19 01 45	+41 19	16.0	17.4	SR
GR 249	19 04 22	+43 51	12.5	16.0	E
GR 250	19 06 23	+43 13	14.3	16.7	RR
GR 251	19 07 04	+45 15	16.6	18.4	RR
GR 252	19 07 09	+43 19	17.6	< 18.5	UG:
GR 253	19 08 25	+43 00	16.5	18.0	Sp
GR 254	19 09 40	+41 17	17.3	18.4	Sp
GR 255	19 12 28	+41 21	15.8	< 18.5	SR
GR 256	19 12 55	+41 45	17.1	18.1	C
GR 257	19 13 34	+43 17	17.6	< 18.5	M
GR 258	19 14 27	+42 09	17.7	< 18.5	Sp

Sp= short period.

In a forthcoming paper light curves and discussion of the new variables will be reported.

Figure 1



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References:

B.V. Kukarkin, P.N. Kholopov, Yu.N. Efremov, N.E. Kurochkin -
The Second Catalogue of Suspected Variable Stars - Moscow 1965.

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

NUMBER 646

Konkoly Observatory
Budapest
1972 March 24

HD 21242: A NEW BRIGHT VARIABLE STAR

Photoelectric observations of the bright spectroscopic binary HD 21242 = BD +28°532 have shown it to be a variable star. We plan to continue observing this binary until it sets, and then to publish all of our observations together elsewhere.

We obtained 26 three-color observations on eight nights with the Dyer Observatory 60-cm reflector using a refrigerated 1P21 photomultiplier. The observations were made differentially with respect to the comparison star 62 Ari, corrected for atmospheric extinction and transformed to the UBV system in the usual way. The constancy of the comparison star was verified to within $\pm 0^{m}.01$ by means of 6 differential observations on 4 nights with respect to the check star HR 999.

The observations were made during the 33 day interval between 2,441,356.53 and 2,441,389.54, and there is every indication that the brightness of HD 21242 is varying approximately in phase with the $6^{d}.43791$ orbital period determined spectroscopically by Carlos and Popper (1971). The amplitude of the variation, in the sense maximum minus minimum, is given approximately by $\Delta V = -0^{m}.12$, $\Delta(B-V) = +0^{m}.015$, and $\Delta(U-B) = +0^{m}.025$. If we accept the UBV magnitudes of the comparison star given by Nekrasova, et al. (1965), we find that the variable ranges between $V = 6^{m}.37$ and $6^{m}.49$ and that the mean color indices are about $B-V = 0^{m}.91$ and $U-B = 0^{m}.48$.

The light curve is roughly sinusoidal, although somewhat skewed. Minimum light occurs at $0^{p}.1$ and maximum at $0^{p}.4$, zero phase being the time of conjuction (hotter component behind) computed with the ephemeris of Carlos and Popper. Eclipses are certainly not producing the light variation.

According to Carlos and Popper, HD 21242 is a member of a class of binaries which have a giant or subgiant secondary sion. The other members of this class happen to be eclipsing binaries and many exhibit variations outside eclipse which are quite similar to these we see now in HD 21242; RS CVn is perhaps the best example. And the strange photometric behavior of the spectroscopic binary CC Eri, recently discussed by Evans (1971), also seems to be analogous to that we have found in HD 21242.

March,17, 1972

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References:

Carlos, R.C. and Popper, D.M. 1971, P.A.S.P. 83, 504.
Evans, D.S. 1971, M.N. 154, 327.
Nekrasova, S.V., Nikonov, V.B., and Rybka, E. 1965 Izv. Krymsk. Ap. Obs. 34, 69.

A PERIOD OF 60^d IN THE LIGHT FLUCTUATIONS OF FG Sge

Photoelectric observations of FG Sge in V and B colours from 36 nights in 1971 have shown that its light changes with a period of about 60^d and with amplitudes of 0.2 and 0.45 mag in V and B, respectively. Two maxima were observed in 1971, J.D. 2441162 and J.D. 2441224. On the basis of our observations it is possible to verify the existence of fluctuations with cycles of 10 to 20 days (W. Wenzel, W. Fürtig, Die Sterne 43, 24. 1967; V.P. Archipova, AZ 553, 3. 1970).

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PHOTOELECTRIC MINIMA OF ECLIPSING BINARIES

The following Table gives photoelectric minima obtained during the year 1971 at the Ege University Observatory, Izmir (Turkey) and the Nürnberg Observatory (Germany). Minima of eclipsing binaries observed at both Observatories 1960 - 1970 were published in Astr.Nachr. 288, 69(1964); 289, 191(1966); 291, 111(1968); IBVS 456 (1970) and 530 (1971).

The Table gives besides the heliocentric minima three different O-C's: the abbreviations of the names of the observers and the type of the instruments used (Izmir: 48 cm Cassegrain, Nürnberg: 34 cm Cassegrain, both with phototube 1P21

Abbreviations of the observers' names: Bz = S. Bozkurt, Izmir; Dn = H. Dönmez, Izmir; En = C. Endres, Nürnberg; Gd = = N. Güdür, Izmir; Gl = O. Gülmen, Izmir; Gö = G. Görz, Nürnberg; Gp = G. Grampp, Nürnberg; Gr = R. Gröbel, Nürnberg; Hl= = H. Sengonca, Izmir; Hö = D. Hölzl, Nürnberg; Hk = W. Huck; Hs = H. Karacan, Izmir; Hu = R. Hufnagl; Ib = C. Ibanoğlu, Izmir; Ki = A. Kizilirmak, Izmir; Me = M. Meier, Nürnberg;Od= = O. Demircan, Izmir; Pl = E. Pohl, Nürnberg; Ra = K. Raschzok, Nürnberg; Rk = R. Akinci, Izmir; Ro = B. Roth, Nürnberg; Sc = = H. Schöppner, Nürnberg;Wg = G. Weigelt, Nürnberg; Wu = J. Wunner, Nürnberg; Zk = Z. Hasan, Izmir.

Remarks: 1) B filter, 2) V filter, 3) Min II, 4) O - C calculated with elements from SAC 43 (Ibanoğlu). O-C (I): GCVS, Moscow 1969/70, O-C (II): SAC 42, Krakow 1971, O-C(III): new elements:

KP Aql IBVS 502 (1970) Ibanoğlu and Gülmen = SAC 43
i Boo IBVS 209 (1967) Pohl
VZ CVn AJ 73 (1968) Harris
RZ Cas Scientific Reports of the Faculty of Science, Ege
University No. 120, Astronomy No. 12(1971) A.Kizilirmak
PV Cas IBVS 386 (1969) Pohl = SAC 43
VW Cep IBVS 369 (1969) Ibanoğlu and Kurutaç = SAC 43
AK Her IBVS 369 (1969) Ibanoğlu and Kurutaç

The (O-C)'s for secondary minima were calculated on the supposition that they are symmetric between primary minima (if not special data are given). The sign = between O-C (I) and O-C (II) indicates, that the elements (I) and (II) are equal. The sign: means that the time of minimum is uncertain.

Star	Min (hel.) 244...	O-C (I)	O-C (II)	O-C (III)	Obs.	Inst. cm	Remarks
RT And	1300.3803:	-0.0017:	-0.0056:		Hk/Hu	34	
AB And	233.3337	+0.0186	+0.0034		Rk/Zk	48	
BX And	186.4006	+0.0024 =	+0.0024		Hl/Rk	"	
KO Aql	148.560	+0.071	+0.099		Hö/Hk/Me	34	
KP Aql	125.549	+0.036 =	+0.036	0.000	Gl/Ib	48	1)
	.548	+0.035 =	+0.035	-0.001	Gl/Ib	"	2)
	.157.536	+0.032 =	+0.032	-0.004	Hs/Rk	"	1)
	.536	+0.032 =	+0.032	-0.004	Hs/Rk	"	2)
	238.359	+0.036 =	+0.036	0.000	Hs/Rk	"	3)
OO Aql	161.3518	-0.0230	+0.0021		Gd/Rk	"	
	179.3457	-0.0203	+0.0050		Hl/Hs	"	
	182.3845	-0.0223	+0.0031		Hl/Rk	"	
	187.4531	-0.0216	+0.0038		Hl	"	
V[illegible] Aql	168.401	-0.015 =	-0.015		Gd/Hl	"	
V[illegible] Aql	159.4178	-0.0082	-0.0086		Hö/Pl	34	
	210.3100	-0.0088	-0.0092		Hs/Rk	48	
W[illegible]	024.3382	+0.0015	+0.0011		En/Hu	34	2) 3)
i Boo	138.406	+0.010	+0.011	+0.007	Gr/Hk/Hu	"	2) 3)
	139.345	+0.011	+0.012	+0.009	Gl	48	
	141.4886:	+0.0125:	+0.0135:	+0.0103:	Me/Wu	34	2)
	047.3915	-0.0217		-0.0014	Gd/Ki	48	
	090.3582	-0.0206		-0.0003	Hs/Ib	"	1)
	.3584	-0.0204		-0.0001	Hs/Ib	"	2)
	103.4156	-0.0214		-0.0011	Gd/Ib	"	1) 3)
	.4159	-0.0211		-0.0008	Gd/Ib	"	2) 3)
	111.420	-0.020		0.0000	Hs/Ib	"	1)
	.421	-0.019		+0.001	Hs/Ib	"	2)
	116.4719	-0.0233		-0.0029	Hs/Ib	"	1)
	.4733	-0.0219		-0.0015	Hs/Ib	"	2)
	119.4225	-0.0213		-0.0009	Hs/Ib	"	1) 3)
	.4225	-0.0213		-0.0009	Hs/Ib	"	2) 3)
	125.318	-0.023		-0.003	Gl/Ib	"	1) 3)
	.320	-0.021		-0.001	Gl/Ib	"	2) 3)
R CMa	0964.466	+0.009	-0.003		Hu/Me/Ro	34	2)
RZ Cas	1162.406	-0.004	-0.007	+0.003	Bz/Ib	48	
	199.4583	-0.0040	-0.0079	-0.0030	Hl/Rk	"	
TV Cas	0899.3175	-0.0049	+0.0020		Hs/Od	"	
TW Cas	904.2934	-0.0111	-0.0129		Hs/Rk	"	
	964.282	-0.012	-0.014		Me/Ro	34	
	1201.3842	-0.0121	-0.0143		Hö/Hu/Wg	"	
DO Cas	200.3499	+0.0015 =	+0.0015		Hl/Rk	48	
PV Cas	152.4924	+0.0274	-0.0360	-0.0107	Dn/Gd	"	1) 3)
	.4924	+0.0274	-0.0360	-0.0002	Gd/Ib	"	2) 3) 4)
	181.4102	+0.0626	-0.0010	-0.0037	Dn/Rk	"	
	195.4140	+0.0627	-0.0009	-0.0037	Dn/Rk	"	
U Cep	203.3925	+0.0186	+0.0344		Rk	"	
VW Cep	0903.3557	-0.0675	-0.0166	+0.0004	Gl/Hs	"	2) 3)
	1140.4822:	-0.0678:	-0.0162:	+0.0034:	Gp/Hu/Me	34	
	207.277:	-0.069:	-0.017:	+0.003:	Hl/Hs	48	
	217.298:	-0.068:	-0.016:	+0.004:	Rk	"	
	248.328	-0.070	-0.018	+0.003	Gp/Hö/Hu	34	3)
ZZ Cep	173.342	0.000	0.000		Gd/Hl	48	

Star	Min (hel.) 244...	O-C (I)	O-C (II)	O-Ĉ (III)	Obs.	Inst. cm	Re-marks
Y Cyg	1160.4962:	-0.0079:	+0.0287:		Hk/Hu	34	
	169.4850	-0.0083	+0.0286		Gd/Hl	48	
	253.388:	-0.005:	+0.035:		Hö/Hu	34	
KR Cyg	174.3323	-0.0089	+0.0085		Gd/Hl	48	
V548 Cyg	176.3699	-0.0524	-0.0130		Hl/Rk	"	
	223.3051	-0.0539	-0.0145		Bz/Ib	"	
TY Del	127.4965	+0.0020	+0.0179		Bz/Gl	"	
TZ Dra	131.3522	+0.0054	+0.0057		Gd/Hs	"	
Ai Dra	137.3594	+0.0058	+0.0066		Rk	"	
S Equ	222.3021	-0.0031	-0.0019		Gd/Hs	"	
RX Her	202.4311	+0.0001	-0.0005		Gr/Hk/Wg	34	
TT Her	163.3664	-0.0090 =	-0.0090		Ib/Hs	48	
UX Her	097.321:	-0.037:	-0.002:		Hs/Ib	"	
AK Her	126.3280	-0.0174 =	-0.0174	+0.0001	Gd/Rk	"	
	188.292	-0.018 =	-0.018	0.000	Hl/Ib	"	
	246.253	-0.016 =	-0.016	+0.002	Ib/Rk	"	3)
EZ Hya	0981.5289	-0.0464 =	-0.0464		Hs/Ib	"	1)
	.5297	-0.0456 =	-0.0456		Hs/Ib	"	2)
SW Lac	1167.4277	-0.0256	-0.0280		Hl/Rk	"	3)
	172.4009	-0.0237	-0.0261		Hl/Rk	"	2)
	172.4013	-0.0233	-0.0257		Hl/Rk	"	1)
	249.3737	-0.0257	-0.0280		En/Hu	34	
UV Leo	060.395	-0.006	+0.005		Hö/Sc	"	3)
AM Leo	0977.342:	-0.023: =	-0.023:		Gd/Ki	48	3)
TZ Lyr	1126.5167	+0.0168	+0.0052		Gd/Rk	"	
	135.5070	+0.0171	+0.0055		Hs/Ib	"	
U Oph	135.4868:	-0.0087:	-0.0025:		En/Gr/Hk	34	2)
	204.258	-0.009	-0.002		Gl/Hl	48	
V566 Oph	136.3852	-0.0013 =	-0.0013		Hs/Rk	"	3)
	139.4564	-0.0025 =	-0.0025		Gl	"	
U Peg	185.3804	-0.0063	-0.0063		Hl/Rk	"	3)
	198.311	-0.006 =	-0.006		Bz/Ib	"	
β Per	260.256	-0.040	-0.001		Hu/Pl	34	2)
UV Psc	163.4933	+0.0141 =	+0.0141		Hs/Ib	48	
V505 Sgr	155.4669	-0.0290	-0.0027		Gl/Ib	"	1)
	.4669	-0.0290	-0.0027		Gl/Ib	"	2)
RS Sct	156.5006	+0.0156	+0.0207		Gd/Ib	"	
	188.382	+0.014	+0.019		Hl/Ib	"	
X Tri	0981.3066	-0.0203 =	-0.0203		Hö/Hu	34	
W UMa	1055.4444	-0.0593	-0.0017		En/Gö/Hu	"	
	079.468	-0.058	0.000		Hs/Rk	48	
	133.3481	-0.0621	-0.0026		Rk	"	3)
TX UMa	0985.3034:	-0.0038	-0.0035:		Me/Ra	34	
AH Vir	1059.366	+0.005 =	+0.005		Hu/Me	"	
DR Vul	124.459	+0.016	-0.010		Gd/Hs	48	
	177.4097	+0.0551	+0.0464		Gd/Hs	"	3)
	240.434:	+0.056:	+0.047:		En/Gö/Hu	34	3)

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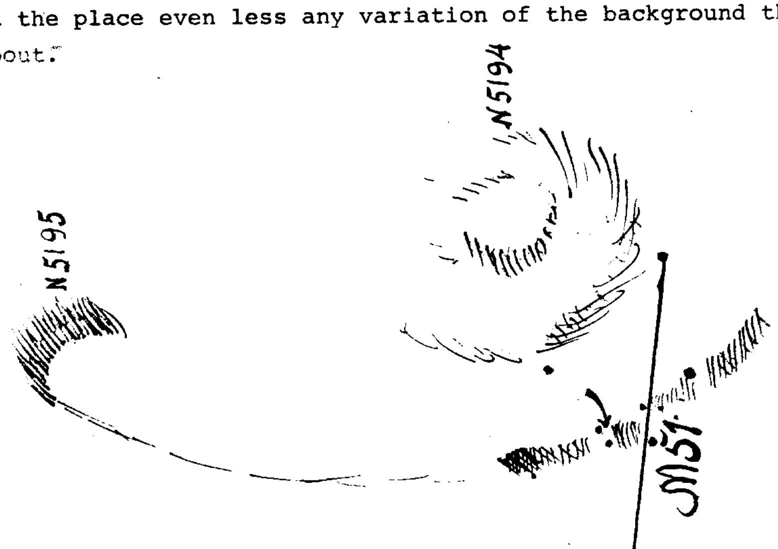
NOTE ON THE GALAXY M51 AND THE GALAXY NGC 404 (ALSO M33)

A propos of the paper "Is NGC 404 a Variable Object?" in No 614 of this Journal I give my observations on some photographic plates of the Harvard College Observatory Collection picking at random but about the same time in general as it was given in the abovementioned number. All of them show that the variability if any of the nebula 404 was spurious and I must add that the appearance of it was always elliptical sometimes just very little but never stellar so that using a "witness" terminology all changes in appearance of brightness of the Nebula NGC 404 should be "stricken out". In this connection (very superficial) one may profit astronomically if one investigates the stars on or (in) the not too distantely situated spiral nebula M33.

On the little sketch of M51 I'm indicating a place where Professor Oort asked us to look for a star with possibly "exorbitant" characteristics. Most of the plates I investigated did not go faint enough but two MC plates were excellent and I could see down to the $18^{m}.0$. However, no star I could see at the place even less any variation of the background thereabout.



Observations of NGC 404

Oc.13.1930	$11^m.9-12^m.4$	Oc.19.1931	$11^m.8-12^m.3$	De.11.1934	$11^m.7-12^m.0$
" 26 "	12.0-12.4	Au. 9.1932	11.7-12.1	De. 4.1940	11.8-12.0
De.10 "	11.8-12.3	Oc.19. "	11.9-12.1	Oc.23.1951	11.7-12.2
Au.15.1931	11.7-12.3	Oc.25.1932	11.7-12.1	Au. 2.1962	11.8-12.2
" 17. "	12.0-12.2	De.22. "	11.7-12.1	Magnitudes are ap-	
Oc. 5. "	11.8-12.3	Oc.21.1933	11.9-12.2	proximately on the	
" 11. "	11.8-12.3	De. 2. "	11.7-12.2	scale given in the	
				No 614.	

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VISUAL OBSERVATIONS OF AD LEONIS

The flare star, AD Leo, was observed visually for a total of 7.5 hours during the February 1972 international programme by members of the Variable Star Section of the British Astronomical Association. One suspected flare of 0.2 mag. was observed on Feb. 13, at 20^h33^m U.T. (by A.Forno), and two further suspected flares, amplitude 0.2 mag., durations about 20 seconds, on Feb.14 at $21^h21^m.7$ and $21^h24^m.3$ U.T. (by W.Pennell), but the latter were unconfirmed during simultaneous observations (by J.Isles). Hours of coverage are given in the Table, where parentheses indicate poor to moderate sky conditions.

1972	U.T.	Observers
Feb. 10	(2242-2251),2252-2341,(2342-2400)	Is, Fo
11	0000-0016,(2129-2146),2244-2304	Fo, Pe
13	(0230-0304),2004-2132	Is,Fo,Bi
14	0049-0135, 1942-2056, 2109-2226	Is,Fo,Pe,Is

Total coverage 7^h28^m over 4 nights.

J.BINGHAM, A.FORNO, J.ISLES, W.PENNELL.

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UBV PHOTOMETRY OF TWO ECLIPSING VARIABLES IN THE VICINITY OF M67

The discovery of several short-period variable stars in the vicinity of M67 was reported by Kurochkin (1960), who suggested that the new variables were likely to be either RR Lyrae stars or dwarf cepheids. Efremov, et al. (1964) argued that two of the stars, AH Cnc (SVS 1284) and AD Cnc (SVS 1277), were more probably W Ursae Majoris stars because of their locations in the H-R diagram; they are located on the main sequence at spectral types GO and KO, respectively. In the case of AH Cnc, the latter hypothesis has been confirmed by Kurochkin (1965) and Eggen (1970).

Additional observations of AH Cnc and AD Cnc have been obtained with the 72-inch Perkins reflector of the Ohio State and Ohio Wesleyan Universities at the Lowell Observatory. The resulting light and color curves on the UBV system are shown in Figures 1 and 2. The light curves for both stars are characteristic of W Ursae Majoris stars.

Comparison of the observations of AH Cnc in Figure 1 with those by Eggen reveals a difference of about 0.15 mag. in the mean V brightness of the star and approximately 0.04 mag. in the B-V color. The differences are in the sense that the present observations show the star to be fainter and redder than in 1965 when observed by Eggen. It is certain that these differences do not result from errors in transforming the present observations to the UBV system. Very probably the differences are due to a real change in the brightness and color of this eclipsing system. Additional photometric observations would seem to be warranted.

Although nothing unusual is present in the light curve of AD Cnc, it is interesting to note that the color variation is somewhat greater than usual for W Ursae Majoris stars.

It is a pleasure to thank Dr. G. H. Herbig for providing a finder chart for AD Cnc.

Lowell Observatory
Flagstaff, 7 March 1972

ROBERT L. MILLIS

References:

Efremov, Y.N., Kholopov, P.N., Kukarkin, B.V., and Sharov, A.S. 1964. Comm.27 I.A.U., Inf.Bull.Var.Stars, No.75.

Eggen, O.J. 1970, Mem. R.A.S. 70, 111.

Kurochkin, N.E. 1960, Astr.Circ. U.S.S.R., No.212., 1965, Comm. 27 I.A.U., Inf.Bull.Var.Stars, No. 79.

Figure 1. Light and color curves of AH Cnc observed on December 15, 1969.

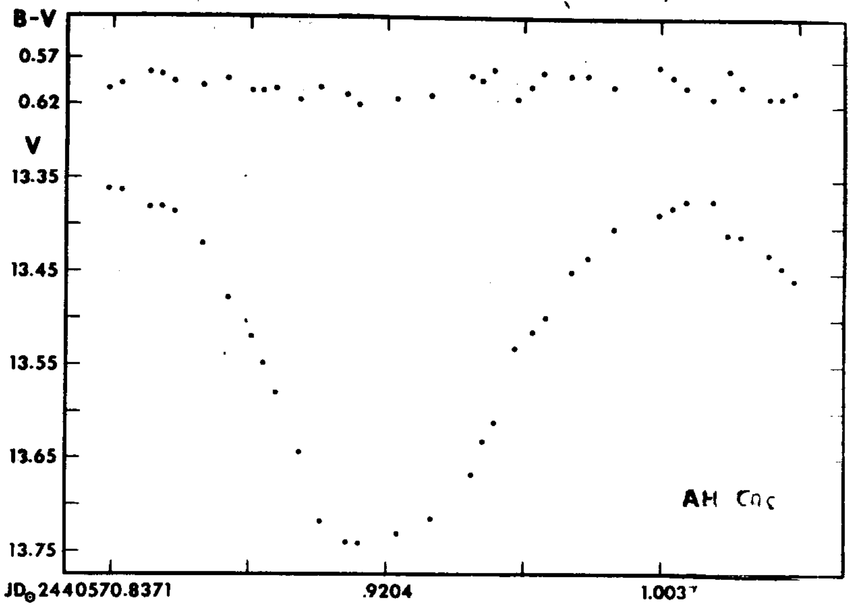
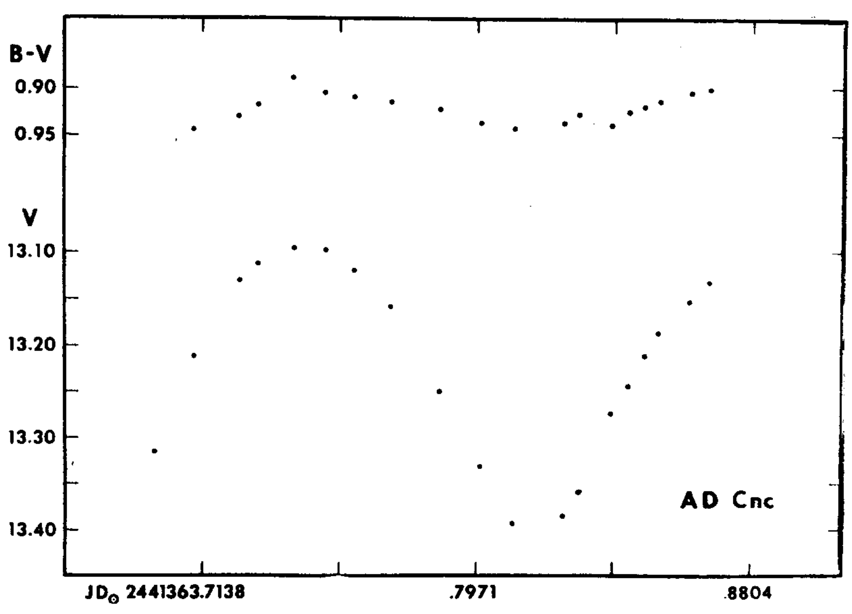


Figure 2. Light and color curves of AD Cnc observed on February 16, 1972



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NUMBER 650

Konkoly Observatory
Budapest
1972 March 31

INTERMEDIATE-BAND AND H-BETA PHOTOMETRY OF SHORT-PERIOD VARIABLE STARS

On seven nights in August, 1969, observations were made at Cerro Tololo Inter-American Observatory in Chile on the following 13 stars, all of which are either known short-period variables or are suspected of short-period variability.The ubvy filters were of the standard type for use in Strömgren intermediate - band photometry. The H-beta filters differed somewhat from those used by Crawford,but the H-beta index has been standardized to that given by Crawford et al. As comparison objects, a number of standard stars were chosen from the lists of D.L. Crawford and J.V. Barnes and from the catalogue of B. Strömgren and C. Perry.

In the following table, n refers to the number of separate occasions on which each star was observed.For stars with appreciable amplitudes,the data refer to the mean of the light curve.

Star		b-y	m_1	c_1	β	n
HR 242	ρ Phe	0.222	0.208	0.771	2.730	4
HR 431		0.210	0.151	0.773	2.713	4
HR 515		0.176	0.167	0.966	2.776	6
HR 5005		0.202	0.165	0.803	2.718	6
HR 6581	σ Ser	0.055	0.174	1.090	2.891	4
HR 7020	δ Sct	0.207	0.206	0.831	2.714	4
HR 7340	ρ Sgr	0.128	0.196	0.962	2.860	4
HR 7928	δ Del	0.195	0.163	0.835	2.758	4
HR 8006		0.180	0.174	0.811	2.781	4
BS Aqr		0.220	0.148	0.834	2.732	10
HD 9133		0.151	0.182	0.940	2.793	4
HD 116994		0.184	0.152	0.863	2.768	10
HD 199757		0.155	0.169	0.860	2.778	10

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COMMISSION 27 OF THE I. A. U.
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PHOTOELECTRIC OBSERVATIONS OF ZETA AURIGAE NEAR MINIMUM 1971-72.

The star Zeta Aur was observed with a photoelectric photometer attached to the 20cm Grubb refractor of Cracow Observatory. The observations were reduced to the BV system of Johnson-Morgan. Lambda Aur: $V=4^m\!.70$; $B=5^m\!.32$ and 2 Aur: $V=4^m\!.80$; $B=6^m\!.25$ were used as comparison stars. The table contains the results of the observations (taking into account the differential extinction).

The relatively large dispersion in the observations is due to bad air conditions.

J.D. 2441000+	Comp. star	V	B	J.D. 2441000+	Comp. star	V	B
283.3688	L	3.80	5.14	313.3799	2	3.96	5.68
3743	L	3.84	5.13	3826	2	3.95	5.70
3764	L	3.83	5.17	3886	2	3.94	5.64
3819	L	3.83	5.15	3903	L	3.92	5.68
3840	2	3.79:	5.14:	3962	L	3.91	5.65
3900	2	3.82	5.19	320.2090	2	3.97	5.66
3914	2	3.82	5.22	2132	2	3.97	5.66
3968	2	3.84	5.23	2146	2	3.91	5.63
4046	L	3.81	5.16	2194	2	3.93	5.65
4062	L	3.80:	5.25:	2215	2	3.94	5.69
4934	L	3.85	5.22	2285	L	3.90	5.65
5014	L	3.80	5.17	2340	L	3.89	5.60
5111	L	3.83	5.22	2354	L	3.89	5.61
284.3431	2	3.90	5.65	2410	L	3.97	5.64
3482	2	3.93	5.63	2424	2	3.97	5.67
3500	2	3.93	5.62	2465	2	3.94	5.72
3546	2	3.94	5.67	2479	L	3.92	5.60
313.3326	L	3.91	5.67	3465	L	3.92	5.60
3417	L	3.92	5.67	3514	L	3.92	5.64
3438	L	3.92	5.71	3559	L	3.94	5.62
3500	L	3.91	5.66	3629	2	3.96	5.68
3556	2	3.93	5.74	3951	L	3.94	5.68
3618	2	3.94	5.71	4000	L	3.95	5.65
3636	2	3.93	5.74	4014	L	3.92	5.66
3704	2	3.94	5.75	4062	L	3.95	5.65
3729	2	3.94	5.72				

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COMMISSION 27 OF THE I. A. U.
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NUMBER 652
Konkoly Observatory
Budapest
1972 April 5

A SEARCH FOR ECLIPSES OF HD 27149.

HD 27149 ($7^m_.5$,G5) is a double-lined spectroscopic binary in the Hyades cluster.In the "Second Report of the Joint Working Group of I.A.U. Commissions 30 and 42" Batten and Wallerstein suggest a search for eclipses based on the ephemerides J.D.2440 916.56 + $75^d_.665$E and 2440 944.82 + $75^d_.665$E.

The binary was observed regularly during a photometric ubvy program of field stars. The observations were made with a simultaneous four-channel photometer attached to the Danish 50 cm reflector at the European Southern Observatory in Chile. The four-colour standard HR1373 ($3^m_.76$,KOIII) was used as comparison star. The results are given in the table. The differences - HD 27149-HR 1373 - are given in the instrumental system, which is close to the standard system. Differential extinction corrections have been applied using mean extinction coefficients.

No evidence of eclipses was found. However, any eclipse could easily have been overlooked, because the expected duration of a total eclipse for two solar-type stars with this period is only about 12 hours.

Four-colour indices on the standard system will be published elsewhere.

1972, March 13

B.G.JØRGENSEN and E.H.OLSEN
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Brorfelde, Denmark.

			Δu	Δv	Δb	Δy	Notes
1971	Dec.	$23^{d}.122$	$2^{m}.863$	$3^{m}.259$	$3^{m}.623$	$3^{m}.788$	
1972	Jan.	4.099	2.842	3.246	3.612	3.777	
		5.090	2.839	3.245	3.614	3.776	
		6.087	2.841	3.247	3.617	3.773	
		6.150	2.848	3.248	3.619	3.779	
		7.085	2.843	3.251	3.605	3.777	
		8.085	2.857	3.243	3.608	3.779	1
		9.076	2.840	3.232	3.606	3.769	
		11.066	2.861	3.255	3.614	3.780	1
		12.067	2.863	3.257	3.621	3.783	1
		13.064	2.854	3.231	3.600	3.766	
		15.048	2.834	3.237	3.611	3.779	
		17.044	2.837	3.241	3.607	3.776	
		19.041	2.812	3.214	3.584	3.754	1
		20.044	2.827	3.230	3.600	3.772	
		21.054	2.859	3.248	3.616	3.781	1
		22.047	2.858	3.253	3.620	3.788	1
		23.055	2.848	3.243	3.609	3.772	
		24.051	2.834	3.234	3.601	3.773	
		25.045	2.832	3.245	3.615	3.774	1
		26.047	2.858	3.273	3.645	3.810	1,2
		27.039	2.850	3.247	3.625	3.787	
		28.040	2.821	3.231	3.606	3.779	
		29.040	2.825	3.225	3.602	3.761	
		30.031	2.837	3.240	3.610	3.777	
	Jan.	31.035	2.856	3.256	3.616	3.778	1
	Feb.	1.038	2.857	3.253	3.621	3.786	
		2.042	2.845	3.243	3.605	3.771	
		3.049	2.844	3.228	3.595	3.760	1
		4.031	2.826	3.230	3.605	3.770	1
		5.035	2.867	3.244	3.610	3.780	1
		6.031	2.856	3.249	3.615	3.778	1
		7.031	2.837	3.238	3.608	3.782	1
		8.031	2.864	3.238	3.608	3.774	1
		10.029	2.848	3.236	3.605	3.761	1
		12.031	2.854	3.244	3.608	3.769	
		13.035	2.839	3.239	3.611	3.776	
		14.038	2.832	3.234	3.610	3.776	
		16.024	2.840	3.239	3.604	3.781	
		17.031	2.846	3.245	3.615	3.797	
		18.026	2.855	3.250	3.618	3.787	
		19.032	2.856	3.254	3.622	3.788	1
		20.025	2.866	3.245	3.610	3.784	
		21.024	2.853	3.243	3.609	3.776	
		22.026	2.853	3.245	3.610	3.776	2
		23.018	2.838	3.229	3.604	3.761	1
		24.024	2.848	3.238	3.601	3.775	
		24.063	2.859	3.246	3.616	3.787	
		25.027	2.863	3.255	3.619	3.785	
		26.026	2.853	3.239	3.605	3.774	
		27.024	2.843	3.242	3.605	3.771	
		28.022	2.840	3.238	3.600	3.766	
	Feb.	29.024	2.859	3.236	3.606	3.761	1
	Mar.	1.025	2.846	3.235	3.604	3.774	
		mean	$2^{m}.847$	$3^{m}.242$	$3^{m}.610$	$3^{m}.777$	
		scatter	$0^{m}.012$	$0^{m}.010$	$0^{m}.009$	$0^{m}.010$	

Notes: 1 Extinction larger than mean

.2 About 8° from the moon

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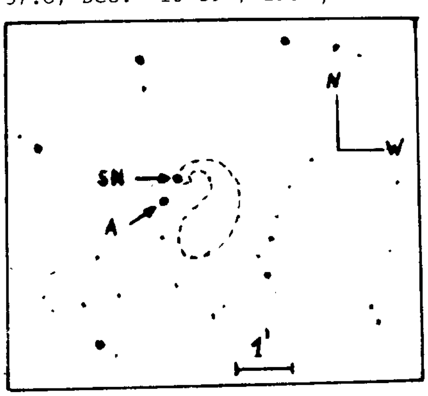
NUMBER 653

Konkoly Observatory
Budapest
1972 April 2

SUPERNOVA 1954 IN THE SBp GALAXY NGC 4027

Photographic plates with the centre R.A.=$11^h56^m.5$; Dec.= =$-18^\circ48'$ taken with the 90/60/180 cm Schmidt-telescope of the Konkoly Observatory on Piszkéstető on March 17, 1972 were compared with the Palomar Sky Survey blue and red prints No.1030, April 2/3, 1954. On the Palomar prints the knot at the end of the northern spiral arm of the SBp galaxy NGC 4027 R.A.=11^h $57^m.0$; Dec.=$-18^\circ59'$; 1950, has the same brightness like the star A on the sketch. On our photographic plates this knot is about three magnitudes fainter, it is of about 17mag. We find the same situation in the photograph published by W.W. Morgan in P.A.S.P., 70, 364, 1958.



It seems most likely that a supernova appeared in the above mentioned part of the galaxy NGC 4027 in 1954 when the Palomar Sky Survey plate was obtained. The position of the supernova is marked on the sketch. Its distance from the centre of the bar is 31".2 E and 48".0 N, its magnitude is about 14.

March 23, 1972

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INFORMATION BULLETIN ON VARIABLE STARS

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PHOTOELECTRIC OBSERVATIONS OF THE FLARE STAR UV CET

Continuous photoelectric monitoring of the flare star UV Ceti has been carried out at the Stephanion Astronomical Station ($\lambda=-22^{\circ}49'44''$ $\varphi=+37^{\circ}45'15''$) during the period of co-operative optical observations of this star proposed by the IAU Working Group on Flare Stars i.e. October 11-27, 1971 (Andrews et al. 1971) using the 30-inch Cassegrain reflector of the Department of Geodetic Astronomy, University of Thessaloniki. Observations have been made with a Johnson dual channel photoelectric photometer in the B color of the international UBV system. The telescope and photometer will be described elsewhere. Here we mention only that the transformation of our instrumental ubv system to the international UBV system is given by the following equations:

$V=v+2.094+0.022(b-v), B-V=0.837+1.005(b-v), U-B=-1.179+0.993(u-b).$

The monitoring intervals in UT as well as the total monitoring time for each night are given in Table 1. Any interruption of more than one minute has been noted.

During the 29,6 hours of monitoring time 6 flares were observed the characteristics of which are given in Table 2. For each flare following characteristics (Andrews et al. 1971) are given: a) the date and universal time of flare maximum, b) the duration before and after maximum (t_b and t_a respectively) as well as the total duration of the flare, c) the value of the ratio $(I_f - I_o)/I_o$ corresponding to flare maximum, where I_o is the intensity deflection less sky background of the quiet star and I_f is the total intensity deflection less sky background of the star plus flare, d) the integrated intensity of the flare over its total duration, including pre-flares, if present, $P=\int (I_f - I_o)/I_o dt$, e) the increase of the apparent magnitude of the star at flare maximum $\Delta m(b)=2.5 \log(I_f/I_o)$, where b is the blue magnitude of the star in our instrumental system, f) the standard deviation of random noise fluctuation σ mag = $=2.5 \log(I_o+\sigma)/I_o$ and g) the air mass. The light curves of the observed flares in the b color are shown in Figs. 1-6.

TABLE 1

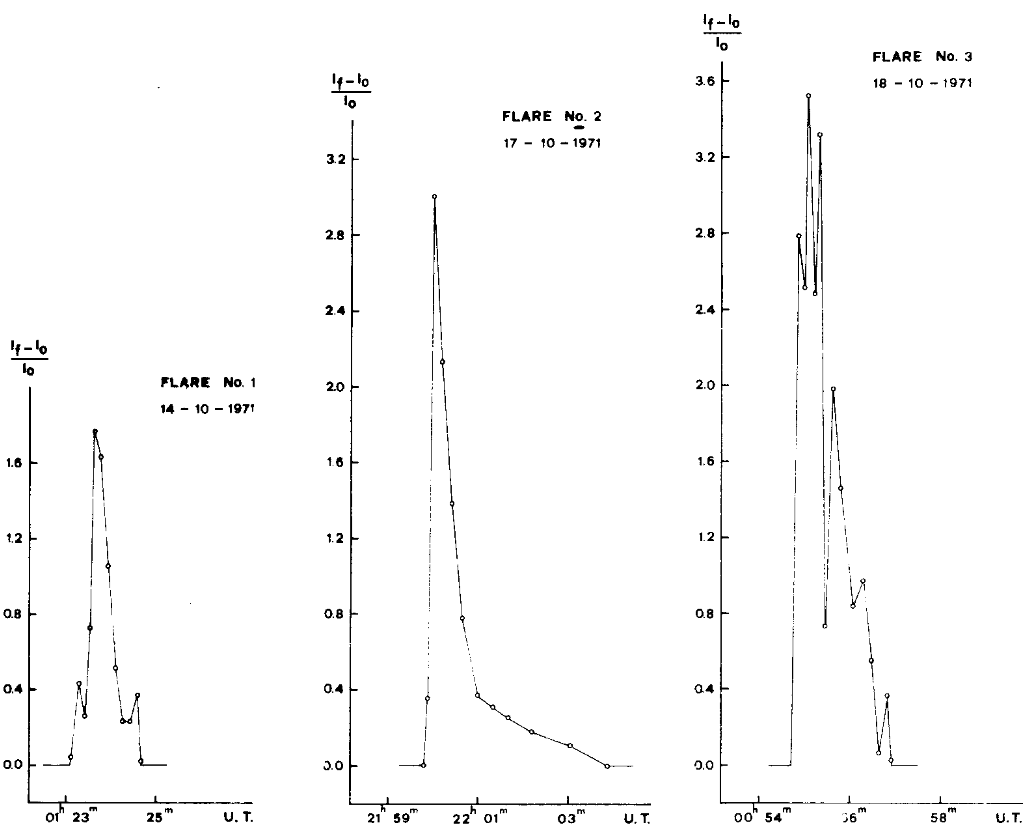
Monitoring intervals (UT)

Date 1971 Oct.	Monitoring intervals	Total Monitoring Time
11 - 12	22^h11^m-22^h20^m, 2224-2235, 2243-2255, 2258-2309, 2314-2326, 0011-0025, 0033-0037.	1^h13^m
13 - 14	2055-2106, 2109-2119, 2123-2134, 2145-2157, 2200-2210, 2214-2223, 2326-2333, 2347-2358, 0004-0016, 0019-0030, 0039-0044, 0050-0101, 0103-0115, 0118-0127, 0129-0135, 0139-0151, 0154-0209, 0211-0240.	3^h23^m
15 - 16	2119-2139, 2143-2157, 2159-2220, 2225-2231, 2232-2242, 2244-2301, 2303-2315, 2318-2321, 2328-2341, 2350-0010, 0014-0024.	2^h26^m
17 - 18	2113-2130, 2132-2152, 2155-2216, 2221-2239, 2242-2300, 2311-2326, 2331-2345, 2351-0008, 0012-0016, 0047-0103, 0111-0120.	2^h49^m
19	2215-2234, 2239-2250.	30^m
20	2226-2228.	02^m
21 - 22	2042-2100, 2103-2119, 2124-2130, 2147-2205, 2211-2229, 2233-2252, 2258-2315, 2319-2340, 2344-2350, 0016-0034, 0037-0050, 0102-0120, 0125-0145, 0149-0210, 0213-0232.	4^h02^m
22 - 23	2047-2105, 2109-2132, 2149-2200, 2214-2225, 2229-2254, 2258-2320, 2327-2339, 2342-2346, 2355-0007.	2^h18^m
23 - 24	2122-2130, 2136-2156, 2158-2219, 2221-2245, 2249-2311, 2313-2332, 2336-2355, 0008-0023, 0026-0042, 0048-0111, 0125-0127.	3^h09^m
25 - 26	2036-2100, 2102-2122, 2124-2144, 2154-2215, 2217-2237, 2240-2331, 2337-0000, 0002-0018, 0023-0042, 0047-0107, 0110-0130, 0132-0153, 0157-0220.	4^h58^m
26 - 27	2016-2037, 2041-2101, 2105-2124, 2129-2151, 2153-2216, 2218-2240, 2246-2310, 2311-2335, 2337-0000, 0004-0049, 0051-0137, 0138-0145.	4^h46^m
	Total	29^h36^m

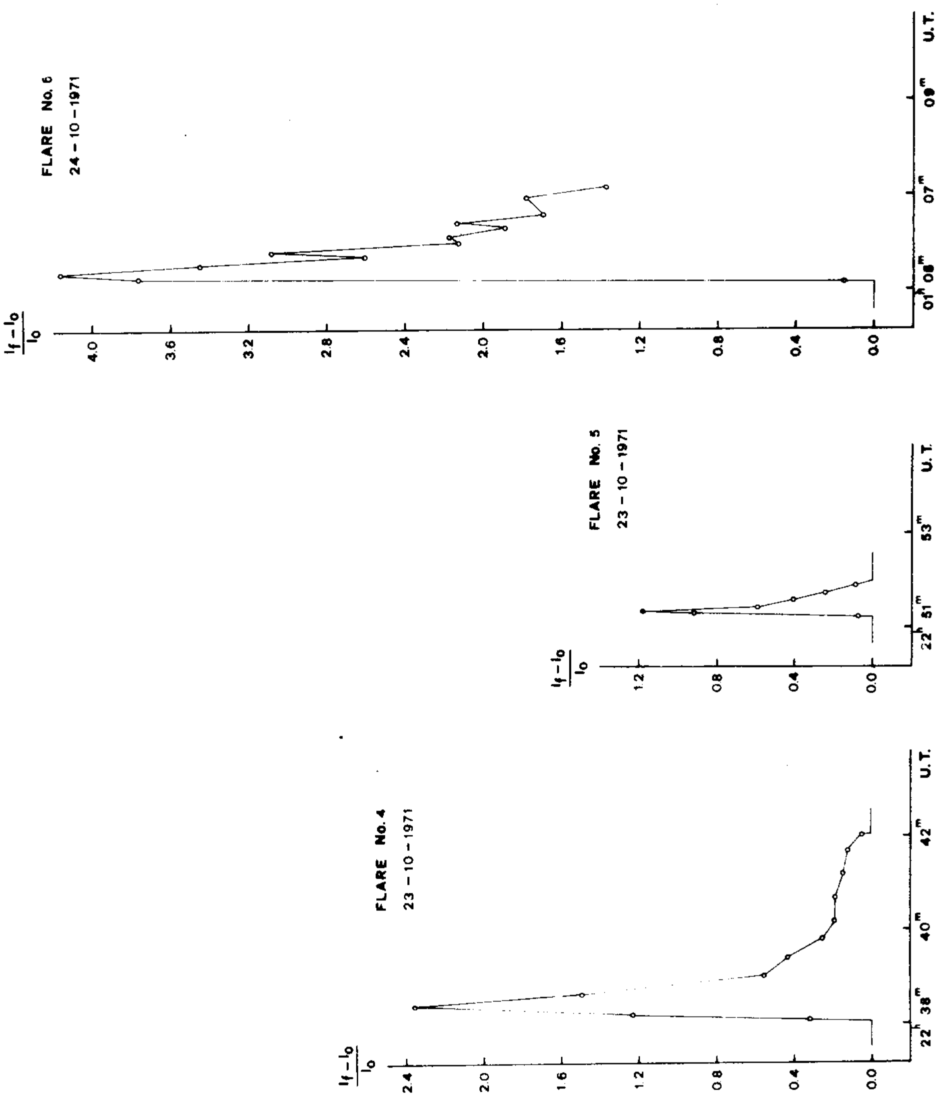
TABLE 2

Characteristics of the flares observed

Flare No.	Date 1971 Oct.	U.T. maximum	t_b min.	t_a min.	Duration min.	$(I_f-I_o)/I_c$ maximum	P min.	Δm mag.	σ mag.	Air mass
1	14	$01^h23^m.6$	0.6	1.0	1.6	1.78	0.85	1.11	0.14	2.65
2	17	22 00.0	0.2	3.7	3.9	3.00	1.94	1.50	0.18	1.79
3	18	00 55.1	0.4	1.8	2.2	3.51	4.15	1.64	0.15	2.48
4	23	22 38.4	0.3	3.6	3.9	2.36	1.63	1.31	0.07	1.81
5	23	22 51.3	0.1	0.6	0.7	1.19	0.35	0.85	0.11	1.84
6	24	01 05.4	0.2	?	?	4.17	?	1.78	0.07	3.04



FLARE No. 1
14 - 10 - 1971
FLARE No. 2
17 - 10 - 1971
FLARE No. 3
18 - 10 - 1971
U. T.



Department of Geodetic Astronomy
University of Thessaloniki, Greece
March 27, 1972

G. ASTERIADIS,
L.N. MAVRIDIS.

References:

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

Andrews, A.D.,Chugainov, P.F.,Kellogg, E.M.,and Oskanian,V.S.: 1971, Comm.27 IAU,Inf.Bull.Var.Stars No.516.

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NUMBER 655

Konkoly Observatory
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1972 April 6

THE SUPERNOVA SERVICE OF THE BYURAKAN ASTROPHYSICAL OBSERVATORY

The supernova service at the Byurakan Observatory was commenced in 1966. The observations are carried out with the 21" Schmidt telescope having a field of 25 square degrees. ORWO ZU-2 films were used with standard exposure time of 30 minutes reaching magnitude 18.0.

In the Table overleaf the following data are given for 26 patrolling areas: the coordinates RA, D(1950) of the centres of the areas (columns 2 and 3) ; n - number of observational nights, t - net exposure time in hours and minutes for each year separately (4-15); n - number of observational nights, t-net exposure time for all years together (16-17); the net exposure time expressed in fractions of a day (18).

It is necessary to stress that the telescope has been used for the supernova program not regularly because of its employment for other programs.

R.G. MNATSAKANIAN
Byurakan Astrophysical Observatory

No	RA 1950	D 1950	1966		1967		1968		1969		1970		1971				
			n	t	n	t	n	t	n	t	n	t	n	t	n	t	t
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	1^h18^m	$+0^{\circ}57'$	2	1^h00^m	1	0^h40^m	2	0^h40^m	1	0^h30^m	2	1^h00^m	-		8	3^h50^m	0.1597
2	2 22	+32 06	1	0 30	1	0 50	1	0 20	5	2 00	1	0 30	-		9	4 10	0.1736
3	2 35	+ 0 15	4	2 10	-		-		3	1 40	-		-		7	3 50	0.1597
4	2 35	- 8 46	1	0 30	1	0 28	-		3	1 10	-		-		5	2 08	0.0889
5	2 40	+37 06	-		-		-		3	0 31	6	2 45	-		9	3 16	0.1361
6	3 02	+42 30	1	0 30	2	1 19	-		1	0 10	1	0 30	-		5	2 20	0.0972
7	3 42	+68 00	-		2	1 00	-		7	3 10	1	0 30	-		10	3 40	0.1528
8	5 14	+68 00	-		2	1 00	-		5	2 20	2	1 00	-		9	4 20	0.1806
9	7 11	+86 00	-		-		-		5	2 40	3	1 30	-		8	4 10	0.1736
10	7 30	+79 53	-		-		-		4	2 17	-		-		4	2 17	0.0951
11	7 37	+66 00	-		-		-		4	2 12	-		-		4	2 12	0.0917
12	9 17	+50 22	-		3	2 04	1	0 30	2	1 00	1	0 30	-		7	4 04	0.1694
13	10 16	+43 45	-		-		-		1	0 30	1	0 30	3	1 25	5	2 27	0.1021
14	11 27	+54 45	1	0 30	2	1 00	-		3	0 50	-		2	1 00	8	3 20	0.1389
15	11 56	+43 00	-		1	0 30	-		2	1 00	3	1 30	-		6	3 00	0.1250
16	11 56	+53 06	-		-		-		2	0 53	4	1 29	2	1 00	8	3 22	0.1403
17	12 00	+52 30	5	3 00	3	1 30	-		3	1 11	-		-		11	5 41	0.2368
18	12 14	+40 00	-		-		-		2	1 00	1	0 30	4	1 47	7	3 17	0.1368
19	12 23	+14 49	-		1	0 06	-		-		4	1 56	1	0 40	6	2 42	0.1125
20	12 25	+04 44	-		-		-		-		2	1 00	1	0 30	3	1 30	0.0625
21	13 10	+37 05	-		-		-		2	1 00	2	1 00	6	3 08	10	5 08	0.2539
22	13 34	+12 00	-		-		-		-		2	1 00	-		2	1 00	0.0417
23	14 03	+54 30	2	1 00	3	1 45	-		6	2 45	9	1 28	4	1 50	24	8 48	0.3667
24	14 31	+54 30	2	1 00	3	1 45	-		5	3 00	4	1 53	6	3 00	15	8 53	0.3701
25	15 06	+55 00	1	0 30	-		-		7	4 00	6	2 54	4	2 00	18	9 24	0.3917
26	23 00	+14 00	-		1	0 40	-		5	2 30	4	2 00	1	0 30	11	5 40	0.2361

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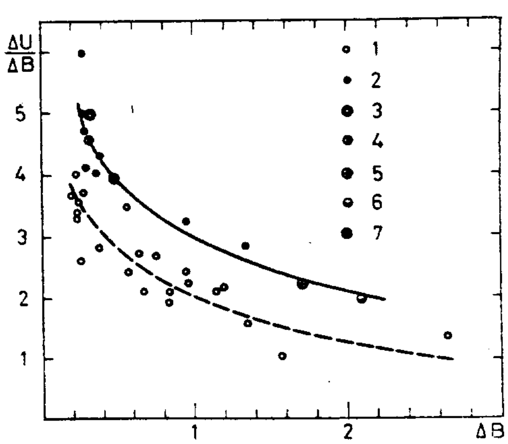
REMARKS ON THE OBSERVATIONS OF FLARE STARS BY JAPANESE ASTRONOMERS

Recently the first results of three-canal synchronous electrophotometric observations made by Japanese astronomers in UBV rays of flare stars were published (Osawa et al. IBVS No.608, 1971; No.635, 1972). They have obtained, in particular, amplitudes of brightness intensification ΔU, ΔB and ΔV during six flares of UV Cet, three flares of EV Lac and 17 flares of YZ CMi. There is good reason to believe, however, that the Japanese observers have witnessed a systematic reduction of the amplitude values in U for the flares they have recorded. One can get convinced of this fact when one compares the values of the ratios $\Delta U/\Delta B$ obtained by the Japanese observers with the results of other observers, the value of ΔB being the same. For greater evidence such a comparison is made graphically in Fig.1 in the form of empirical dependence of $\Delta U/\Delta B$ on ΔB. To reduce measurement errors data relating to $\Delta B \geq 0{,}20$ have been used in plotting the curve.

In the Figure the upper curve depicts the empirical dependence $(\Delta U/\Delta B) \sim B$, resulting from the observations of 13 flares of six various flare stars. A similar dependence, based, on the results of the Japanese observers (the broken curve), passes considerably lower than the first curve, On the other hand, both curves are nearly parallel to each other. The upper curve in the Figure is plotted according to the results of the observations of seven independent groups of astronomers, (1. Japanese observations of YZ CMi, UV Cet and EV Lac, Osawa et al.IBVS No.608,1971; No.635,1972. 2. EV Lac:Chugainov,Izv. Krymsk.obs.,40,33,1969; Cristaldi, Rodono, IBVS No.525,600, 1971. 3. AD Leo: Abell, PASP,71,517, 1959. 4.EQ Peg: Andrews, private commun. 5. HII 1306: Johnson, Mitchell, Ap.J.,127,510, 1958. 6. S 5114: Mumford, PASP, 81,890, 1969. 7. BD +55°1823: Cristaldi, Rodono, Private commun.) and its weight coefficient is therefore equal to seven. The weight coefficient for the homogeneous group of Japanese observations, on which the lower curve is based, is equal to one. We come therefore to the conclusion that the above discrepancy must be due to a regular reduction of the value of ΔU by the Japanese observers. This reduction is rather appreciable - 50-60 %. In other words, all the values of ΔU, found out by the Japanese astronomers, should be multiplied by 1,5 - 1,6, in this case a complete inner harmony will be achieved with the results of other observations. An alternative assumption, that the above discrepancy might result from an overestimation of ΔB, seems unlikely since in that case the inner harmony between ΔB and ΔV would strongly be disturbed.

A certain disagreement is notable also in the measurements of ΔV, although the high relative errors in the measurement of V-rays(due to small values of ΔV) do not lead to unambiguous conclusions. Generally, one gets the impression that the energy calibration of the three-canal electrophotometer of the Japanese astronomers needs reconsideration.



22 March, 1972

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COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 657

Konkoly Observatory
Budapest
1972 April 10

THE ECLIPSING BINARY BD+16°516

We have observed the eclipsing binary, BD+16°516, of which one component is a white dwarf, during the 1970-71 and 1971-72 seasons, and present here our solution for the heliocentric light elements:

$$\text{Min.} = \text{JD } 2440896.715678 + 0\overset{d}{.}52118372 \cdot E$$
$$\pm 26 \qquad\qquad \pm 5 \text{ (s.e.)}$$

These elements are based upon 16 primary minima for which both the beginning and the end of each eclipse were observed. The observations were made with the 40 cm reflector at the Morgan-Monroe station of the Goethe Link Observatory, near Bloomington, Indiana, and with the similar telescope at the Joseph R. Grundy Observatory in Lancaster, Pennsylvania. The star was always observed through a filter similar to the V filter of Johnson's UBV system; the eclipse phases were measured on stripchart recordings with time marks obtained from radio time signals. We define the time of minimum as $\frac{1}{2}(t_1 + t_2)$, where t_1 is that time between first and second contact when the brightness is midway between the brightnesses before and after the partial phase; similarly t_2 is the time of mid-brightness occurring between third and fourth contact. We estimate that the times of minimum determined in this way are accurate to 5^s for most minima. The time interval $t_2 - t_1$ appears to be practically constant at $48^m08^s \pm 7^s$. On the other hand, the duration and slope of the partial phases definitely seem to be variable; we expect to study this variation further.

As can be seen in the following table, the residuals are mostly consistent with the accuracy estimate quoted above, and we conclude that no period changes are indicated by the present material. We note, however, that these elements disagree somewhat with those of Nelson and Young (PASP 82, 699, 1970); the discrepancy amounts to 51^s at their zero epoch.

E	O–C sec	Remarks	E	O–C sec	Remarks
0	2	B	689	-4	B
4	0	B	752	0	L
21	2	B	769	-14	L
29	-4	B	773	6	L
228	-3	B	783	8	B 1
253	6	B	817	2	L
276	-10	B 1	823	2	L
278	-1	B 1	842	-10	L 1
599	9	B	888	3	L
614	13	B 1	894	2	B 1
618	2	B	917	-3	B 1
645	1	B			

Remarks:

B observed at Bloomington

L observed at Lancaster

1 only one partial phase observed, minimum time calculated assuming $t_2 - t_1 = 48^m08^s$. Not included in the solution for the elements.

We thank Dr. Martin S. Burkhead and Mr. Anthony J. Distasio for assistance in obtaining several of the minima.

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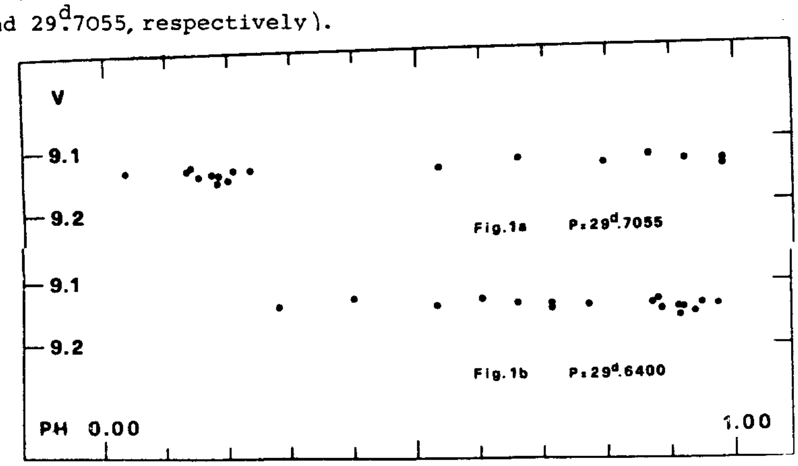
ON THE BINARY SYSTEM CV Ser

CV Ser is a binary system involving a carbon Wolf-Rayet and an early type star. After the discovery as a spectroscopic binary by Hiltner (ApJ 102, 492,1945), Gaposchkin (Per.Zv.7, 36, 1949) found the star to be an eclipsing binary. In 1963 the photoelectric observations of Hjellming and Hiltner (ApJ 137, 1080,1963) showed a $0^m.5$ deep minimum during at least 10 days, with a period $P=29^d.640$ (T_o=2437887.76). From that time no eclipse has been observed (Stepien Ac.Astr.20,13,1970; Kuhi and Schweizer, ApJ 160,185L,1970) in either narrow bands(λ>5500 Å) or in UBV photometry, except for the eclipses found by Tcherepaschuk (1969,AZ 509) in the strong CIII - CIV blend at λ4652 (primary eclipse of $0^m.2$, secondary eclipse $\sim 0^m.05$), but not in the nearby continuum. On the other hand, Cowley and Hiltner (Astr.Aph.11,407,1971) give a new period $P=29^d.7055$ (T_o=2440784.00) that may explain the lack of eclipses in the observations of 1967-68-69.

In order to check the existence of the primary eclipse, photoelectric observations of CV Ser have been made from May to August 1971 with the 40 cm refractor of the Teramo Observatory. The observations were concentrated, whenever possible, in the phase range corresponding to the foreseen primary eclipse computed with both the old and the new period ($29^d.640$ and $29^d.7055$, respectively).



The measures have been made by comparison with BD-11°4592, whose V magnitude has been obtained by means of standard stars. BD-11°4590 has been used as check star. In the following table are listed the date (JD), the phase (either with the old and the new period) and the V magnitude of CV Ser.

Date	Phase	Phase	V+
2441	(P=29^d.640)	(P=29^d.7055)	
080.527	0.718	0.982	9.135
.548	.719	.983	.142
085.609	.890	.153	.144
086.491	.919	.183	.153
.552	.921	.185	.141
108.473	.661	.923	.133
130.404	.401	.661	.128
134.400	.536	.796	.138
136.538	.608	.868	.127
141.430	.773	.033	.138
144.433	.874	.134	.133
146.406	.941	.200	.150
147.483	.977	.236	.137
156.426	.280	.537	.139
174.336	.883	.140	.129
175.337	.917	.174	.140
176.373	.952	.209	.136

+Each V magnitude is a mean value of some integrations.

With the period P=29^d.7055 the curve is filled enough by the observations (Fig. 1a), whose average results $\bar{V}$=9.138 ± 0.007 (m.e.). The lack of eclipses, evident at first glance on the light curve, is emphasized by the smallness of the error. Considering a minimum lasting at least 10 days (Hiltner 1963), the average of the points which fall in the corresponding phase range is $\bar{V}_{min}=9^m.135$, quite brighter than the average of the points out of this range ($\bar{V}_{max}=9^m.140$). With the period P=29^d.640 half light curve (Fig.1b) is covered by the observations, but again no eclipse is evident.

An attempt has been made using both half and double value of the period, but the light curves, which appear sufficiently filled by the observations, do not show any type of eclipse. Therefore, the disappearance of the eclipses is confirmed also in 1971 for the principal one; the disappearance of the secondary minimum can be considered almost certain.

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W UMa

PHOTOELECTRIC MINIMA AND A NEW PERIOD VARIATION

The period of W UMa was retained constant since 1951 and the light elements were:

$$\text{Min I} = \text{J.D.}2435918.4154 + 0.33363808 \quad E.$$

The figure shows the residuals referred to these elements, starting only from 1961. Between the end of 1963 and 1964 a delay of about 7 minutes occurred in the epochs of minimum without change of period: the observations till 1969 were well represented by only adding a constant term of +0.00525 to the zero epoch. A trend to a slightly shorter period was suspected after the observations of 1969 (Cester 1969, 1971) but the correction to the period amounted to only -7.10^{-8}. The observations of 1971 and 1972 confirm the suspicion and now the period is decidedly shorter. The new provisional elements deduced from the observations from 1970 to 1972 should be

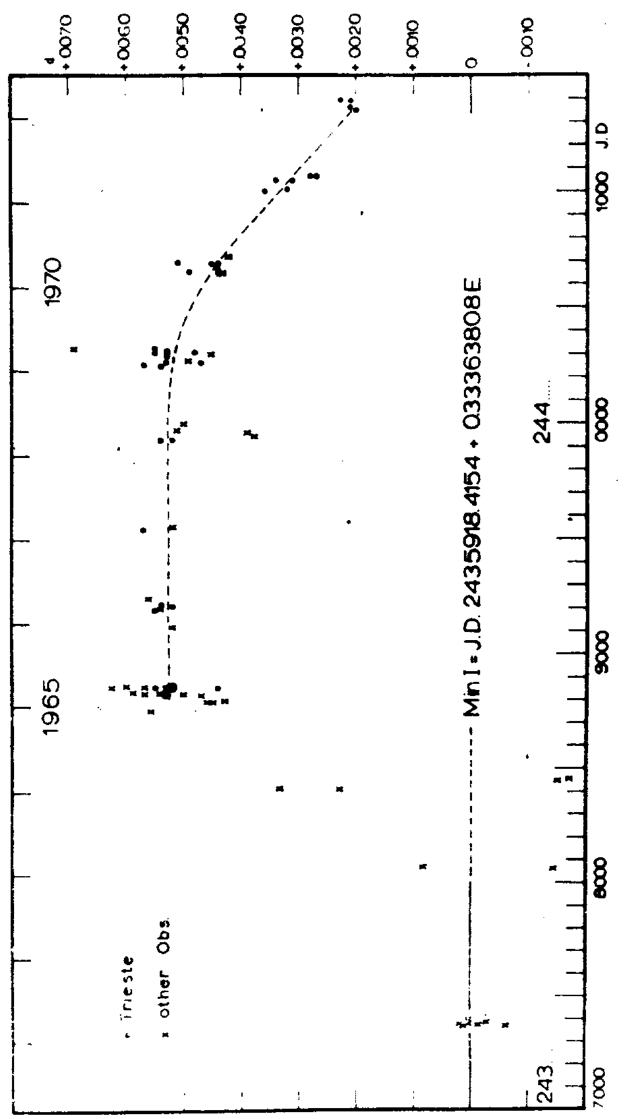
$$\text{Min I} = \text{J.D.}2440652.4107 + 0.3336369 \quad E.$$

i.e. the period variation begun after 1968-69 is of the order of 10^{-6} days.

The unpublished recent photoelectric minima obtained at Trieste are collected in the table: $(O-C)_1$ refers to the first light elements and $(O-C)_2$ to the latter ones.

Hel.J.D. 2441000 +	m.e.	$(O-C)_1$	$(O-C)_2$
004.3979	±0.0003	+0.0036	+0.0003
008.40114	0.00006	+0.0032	-0.0001
048.4376	0.0014	+0.0032	-0.0001
057.44612	0.00005	+0.0034	+0.0002
061.4492	0.0002	+0.0028	-0.0003
061.4491	0.0001	+0.0027	-0.0004
351.3799	0.0008	+0.0020	-0.0001
363.3910	0.0001	+0.0021	+0.0001
392.4175	0.0010	+0.0021	+0.0002
396.421313	0.00004	+0.0023	+0.0003

Ref.: B. Cester, 1969 Mem SAIt 40,489
B. Cester, 1971 Mem SAIt 42, 61.



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Number 660

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New and Suspected Variable Stars in VSF 193

Abstract. - Identification charts and tables are given for 275 variable or suspected variable stars in Sagittarius, together with a summary of the work thus far accomplished in VSF 193.

Nearly forty years ago at Harvard College Observatory I discovered or re-discovered over 500 variable stars in VSF 193, centered at 18^h23^m -23°.3 in Sagittarius. The positive-negative superposition method for discovery was used. Each of eleven plates of the MF series (ten-inch Metcalf refractor, f.l. 45 in.) was compared with one of four positives, and five plates of the A series (24-inch Bruce refractor, f.l. 135 in.) with one positive. Before the examination of the variable stars had progressed far, Dr. Shapley discontinued the project, and my brief resumé of what had been accomplished was incorporated into the Shapley and Swope (1934) report on variable stars in low galactic latitudes. Many years then elapsed before the work was resumed, mainly during the summers since 1957 at the Maria Mitchell Observatory with the help of young women college undergraduates whose trainee program was supported largely by successive grants from the National Science Foundation. Results to date on periods or types of variability have been published in the following sources:

Year	Reference				Number of Variables
1932	Bull. No. 890, Harvard Col. Obs., p. 13				1 nova
1934	Annals, Harvard Col. Obs., Vol. 90, p. 187				18
1955	Astron. J. Vol. 60, p. 259 (Dishong & Hoffleit)				1 nova
1957		62	120		65
1958		63	78		20
1958		63	511	(Andersen)	1 nova
1959		64	241		6
1959		64	417		41
1960		65	100		20
1961		66	188		45
1962		67	228		12
1963		68	207		27
1963		68	253	(Houk)	1
1964		69	301		15
1965		70	307		24
1966		71	130		11
1967		72	711		12
1968	I.A.U. Info. Bull. on Variable Stars No. 254				1
1968				277	10
1968				312	8
1969				387	12

Year	Reference		Number of Variables
1969	I.A.U. Info. Bull. on Variable Stars No.	395(Akyuz)	1
1970		474	1
1971		592	3
1972		617	6

In addition, in 1967 in Information Bulletins 228 and 231 Dr. Nancy Houk has given spectral classes of 137 of the previously published red variable stars.

The total number of variable stars already published in this survey is 360. All of the remaining variables or suspected variables found in VSF 193 are listed in Table I.* Finder charts are given for all of these. Included are stars from the above references published since 1964, and a few other variable stars that happen to occur on the same charts as the new variables. The charts were traced by Ruthe Seifart from the enlarged projections of MF plates. The original scale of the plates is 167"/mm while the charts represent areas approximately 10' x 10'. In all cases South is at the top and East to the right.

In Table I the first column gives the number of the chart. If more than one variable is marked on a chart, the letters a, b, etc., are assigned in order of increasing right ascension. The magnitudes given depend in most cases upon 200 to 500 plates, although in a few instances only some 20 plates of the A series were usable for stars

* See p. 18 ff.

with bothersome optical companions, very faint stars, or stars close to the edges of the field.

The late-type spectral classes were estimated on infra-red objective prism plates of the Warner and Swasey Observatory (Case-Western Reserve). Those underlined were estimated by myself; the others by Nancy Houk who classified all of the red stars with maxima 14.5 mag. pg. or brighter in a selected 20 square degree area. In a few instances these late spectral types may refer to a companion star instead of the variable. For five of the variables subsequently determined to be RR Lyrae type, spectral class M had orginally been assigned. In two of these instances the Bruce plates revealed the faint red companion.

Three suspected variables of small amplitude were at the time of discovery supposed to be red stars by virtue of their somewhat more fuzzy appearance than the images of the comparison stars on blue-sensitive plates. Eventually a check on the objective prism plates for the Henry Draper Extension revealed that all three are planetary nebulae. On re-examination of the direct plates, I would still suspect these stars of slight variability, but this may be a spurious photographic effect. The only similar instance found in the General Catalogue of Variable Stars is for V567 Sgr, found by Swope (1938) on similar Harvard plates. While she found a variation of about one magnitude, the General Catalogue indicates that the object is non-variable (cst). Herbig (1950) found no evidence for either spectral, radial velocity or light variation and therefore inferred that the Harvard observations may represent only instrumental effects. Liller and Shao at Harvard are obtaining UBV magnitudes of nuclear stars of planetary nebulae, a few of which are being especially watched because they have been suspected of variability.

Among the stars in Table I unclassified as to types of variability, 83 appear to have M-type spectra. The majority of these have small amplitudes which may, however, be affected by companions. Since a high percentage of stars with late type spectra is expected to be variable (Houk 1967), these merit further investigation with higher resolution.

The next to last column in Table I gives one of three types of entries: the final designation of already named variables; the reference to a previous publication for published variables not yet listed in either the General Catalogue, or the Catalogue of Suspected Variable Stars; or, for the heretofore unpublished variable stars, code letters indicating the observers who estimated the magnitudes. Footnotes to the Table identify the observers and give the years in which they participated in the project, and the colleges from which the summer student assistants came.

In the final column, an asterisk refers to a separate footnote, while the letter c indicates that the star appears to have an optical companion which might affect the magnitude estimates. Close companions are prevalent in this crowded field. Among the more than 500 variable stars examined, 168, or nearly a third, have companions noted either on the limited number of available Bruce plates, which have the more open scale of 60"/mm, or they were inferred from the small amplitudes and flat apparent minima of the light curves found for Mira-type stars. Undoubtedly 33% is only a lower limit to the percentage of variables somewhat affected by unresolved companions.

The distribution of the variable stars according to the type of variability and apparent magnitude at maximum is shown in Table II. The stars of undetermined type are separated into two categories: those known to have late spectral classes, and all others. Both groups are then sorted according to amplitude of apparent variation. Table II includes five variables discovered in this survey but not included in Table I because they have meanwhile been independently discovered and published elsewhere (V 1176, 1182, 1187, and 1601 Sgr).

In the groups with apparent amplitudes less than 0.5 mag. the variability has, of course, in every case been questioned. In all such cases more than one observer has conceded the probality of variation on the plates examined.

Table II indicates that the maximum frequency of the variables of all types is close to magnitude 14.0 at maximum light. This is more indicative of the optimum magnitudes for discovery on the MF plates, than of cosmical significance.

For other than the long period variables and high-amplitude semi-regular stars, the numbers discovered in each category have been too few to warrant analyses for the completeness of discovery.

Table II. Distribution by Type and Magnitude at Maximum

Magnitude:	10	11	12	13	14	15		Total
Type Var.								
M			3	19	99	70	12	203
SR			2	6	28	32	5	73
RV				3	3	3		9
L			1	3	9	1		14
C	4	1	1	5	3	4		18
RR			1	4	14	21	5	45
UV				1				1
UG			1	0	1	4		6
RCB		1	1	1	1			4
I				7	10	13		30
N	6	3						9
E	5	1	4	7	14	13		44
Total Classified	15	6	14	56	182	161	22	456
Unclassified:								
M-Type Spectrum								
AMPLITUDE								
< 0.5					5			5
0.5 - 1.0			3	6	17	24	3	53
1.0 - 1.5			1	1	6	5		13
1.5 - 2.0				1	1			2
> 2.0					2			2
Total			4	8	31	29	3	75
Not M-Type Sp.								
0.5 - 1.0			1	2	11	9	4	27
1.0 - 1.5				1	2	9		12
1.5 - 2.0					1	2	2	5
> 2.0					3	1		4
Total			1	3	17	21	6	48
GRAND TOTAL	15	6	19	66	230	210	31	579

Even for these the estimates are not very meaningful except for indicating the feasibility of continuing the search on the available plate material. For the discovery of the long period variables, only three pairs of the MF plates used can be considered both as "independent" and with time intervals sufficiently long for the detection of variables of these types (Table III).

Table III. Independent Pairs for the Detection of Long Period Variables.

Pair	Date of positive	Date of Negative	Interval
1	5 September 1925	21 August 1928	3 years
2	25 August 1924	28 April 1930	6
3	30 August 1929	10 June 1931	2

The numbers of long period variables found once, twice and three times among these three pairs are given as a_i in Table IV, where A represents the total number of such variables found on the three pairs of plates, w is the probability of discovering a variable once, and N is the total number of variables inferred from these data. These values are based upon the method published by van Gent (1933). Under "MF" are the numbers actually found on all of the MF plates intercompared (11 interdependent pairs) and under "All" the total numbers found on both MF and A plates. The A-plates, however, cover only about half of the area of the MF. The values N are ostensibly the number one would expect to find from an exhaustive search of the particular type of MF plate material used. The MF plates actually searched would thus appear to have revealed about three-fourths the expected numbers. But with the better Bruce A-plates considerably more are discernable. The discovery probabilities appear to decrease with fainter magnitudes. This is to be expected from the greater uncertainty in identifying faint blended images in crowded regions as those of long period variables.

Table IV. Discovery of Long Period Variables.

Mag. at Maximum	A	a_1	a_2	a_3	w	N	MF	All	%MF
12-13	14	8	4	2	0.24	25	17	24	68
13-14	38	33	4	1	.14	105	87	121	83
14-15	19	18	1	0	.07	95	67	88	70
Total	71	59	9	3	-	225	167	233	74

That there is no obvious correlation between period and magnitude at maximum for the long period variable stars found in this region is shown in Figure 1. The maximum concentration appears to be near a period of 240 days and magnitude 13.8. If there were no obscuration and the Wilson-Merrill (1942) period-luminosity relation were to hold, this would indicate a maximum concentration of these stars at about 7 kpc - an upper limit to their mean distance since many of the magnitudes must be appreciably affected by obscuration.

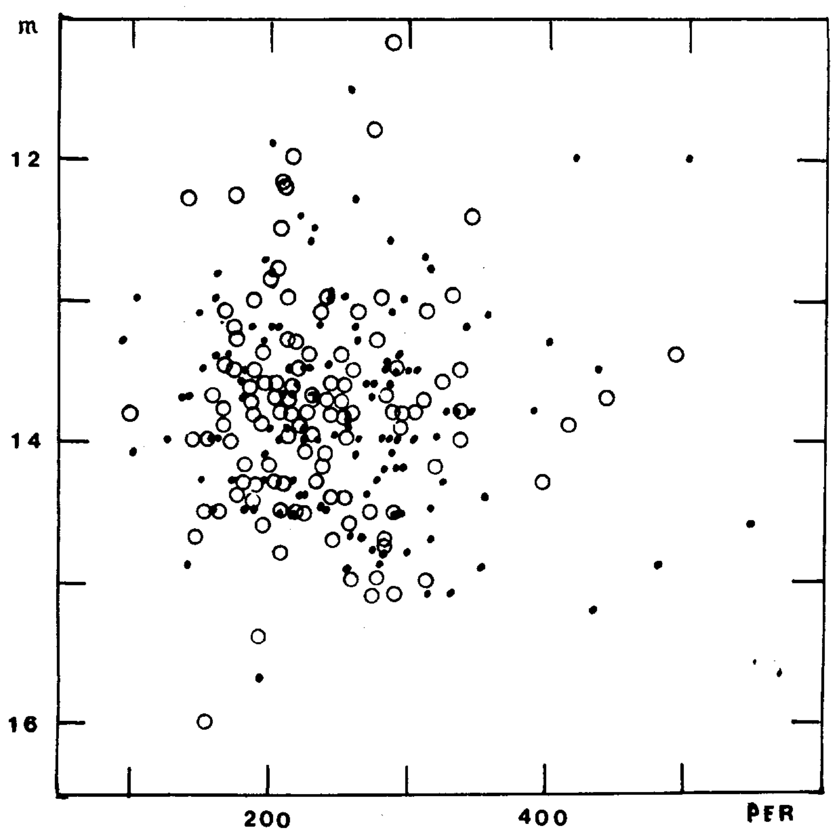


FIGURE 1

(Open circles for stars in the less obscured regions)

The distributions by period and uncorrected distance are shown in Table V. Here the zigzag line indicates the approximate limiting distances for detecting variables 14.5 mag. at maximum. On the Nantucket plates this is effectively the limiting magnitude for the recognition of variables as belonging to the Mira type. At the mean galactic latitude of the region, -7°.5, the stars in the more transparent regions and having periods less than 200 days can be seen to distances beyond the galactic center. On the other hand, very few long period variables have been found out to be 3 kpc, the practical limit for the discovery of the less luminous stars with periods of 400 days or more.

The long period variables have been sorted into two categories according to the relative overall appearance of obscuring matter in their immediate surroundings. If the variables were uniformly distributed in space we would expect for each period an approximately three-fold increase in their numbers with increasing magnitude. The small numbers of stars for magnitudes brighter than 13, compared with those 13-14 mag. (Table VI) confirm that the density is not constant but increases appreciably as we approach the galactic center. Already at 14-15 mag., however, the numbers level off, mainly because of observational selection effects. The faint limiting magnitude of this survey is still too bright for extinction effects to be clearly indicated (as in Wolf-diagrams) by differences in magnitude-frequency distributions between the obscured and relatively clear regions.

Table V. Frequencies of Periods and Distances.

kpc		200	250	300	350	400	450	500^d	Total
1									
	0	0	2	1	0	1	1	1	6
2									
	1	0	3	4	2	3	0	0	13
3									
	0	6	8	8	2	1	1	1	27
4									
	0	7	16	7	1	1			32
5									
	2	9	16	3					30
6									
	3	15	10	4					32
7									
	7	14	5	1					27
8									
	6	9	4						19
9									
	8	6	3						17
10									
	5	5							10
11									
	5	3							8
12									
	6	0							6
13									
	4	1							5
14									
	2								2
15									
	1								1
16									
Total	50	75	67	28	5	6	2	2	235

Table VI. Period-Magnitude Distributions.

Period	*	Mag: 12	13	14	15	16	Total
150-200	C	0	1	16	10	1	28
	O	0	2	11	9	1	23
200-250	C	0	6	20	15	0	41
	O	1	4	16	13	0	34
250-300	C	2	0	17	7	4	30
	O	1	2	17	17	1	38
300-350	C	0	1	7	2	1	11
	O	0	2	6	6	2	16
> 350	C	0	0	3	1	0	4
	O	0	2	3	6	1	12
Totals	C	2	8	63	35	6	114
	O	2	12	53	51	5	123
	O+C	4	20	116	86	11	237

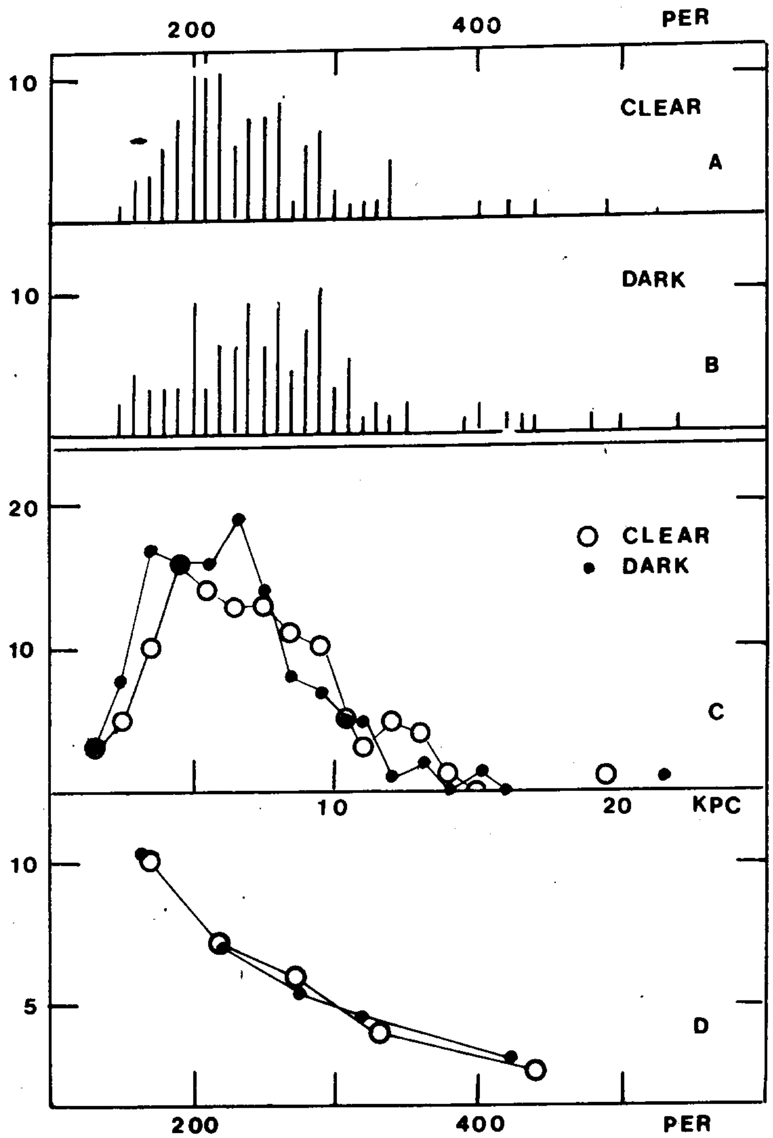
*O, obscured; C, clear

Table VII compares the average apparent magnitudes, periods and distances in three magnitude groups. Here $\overline{\text{kpc}}$ refers to the average of the distances whereas kpc($\bar{P}$) is the distance corresponding to the average period. The discordance between these values is an indicator for the dispersion in the distances, which range from 2 to 15 kpc. The difference between the mean distances of the obscured and relatively clear regions reflect mainly the differences in average period-length.

Table VII. Average Parameters in Three Magnitude-Intervals.

Mag. Interval:	12-13		13-14		14-15	
	Clear	Obscured	Clear	Obscured	Clear	Obscured
n	8	12	64	58	37	54
$\bar{m}$	12.4	12.5	13.5	13.5	14.3	14.3
$\bar{P}$	222	278	246	241	227	259
$\overline{kpc}$	4.2	3.8	6.0	5.6	9.4	7.6
kpc($\bar{P}$)	3.8	2.7	5.3	5.4	8.9	7.1

The frequency distributions by period are shown in Figures 2a (clear regions) and 2b (more obscured), while Figure 2c shows the frequencies of the uncorrected distances. The stars in the same line of sight as the dark nebulosities have an apparent average distance of 6.2 $\pm$ 2.0 kpc, not significantly different from the average of 7.1 $\pm$ 2.1 for the stars in the more transparent looking regions. Two compensating effects may account for this coincidence. In the more obscured regions one would expect the distances uncorrected for absorption to appear greater than in transparent regions. On the other hand, many of the actually more distant stars in the dark regions are too much obscured to be seen at all; whence the average distances in the obscured regions refer to a group of stars more nearby than those in the clear regions. Moreover, the separation of the two groups may not be sufficiently definitive. Although approximately equal numbers of stars are represented, it is



200
400
PER
10
CLEAR
A
10
DARK
B
20
10
CLEAR
DARK
C
10
20
KPC
10
5
D
200
400
PER

FIGURE 2

significant that the relatively transparent areas occupy less than one-third of the total area of the field. The variables ascribed to obscured regions frequent mainly the dimmed boundaries between the clear regions and the lanes of densest obscuration, generally avoiding the darkest parts of the lanes altogether. The entire field is very complex in appearance.

When the stars are sorted by period (Table VIII and Figure 2d) the average distances in the two groups again show no significant differences. The relatively nearby stars of longer period dubiously suggest that the obscured average more distant by 0.5 kpc, corresponding to an extinction of 0.3 mag. The stars at these distances are on the order of half a kiloparsec below the galactic plane. The more distant stars are farther below the plane (Z in Table VIII) and would therefore be affected by little additional absorption; but they would be expected to confirm at least the absorption found at shorter distances, if real.

Table VIII. Average Parameters for Equal Intervals in Period.

	Relatively Clear					More Obscured				
Interval days	n	$\bar{P}$	$\bar{m}$	$\overline{kpc}$	Z	n	$\bar{P}$	$\bar{m}$	$\overline{kpc}$	Z
150-200	28	181	**13.8**	10.2±.5	1.3	23	176	13.8	10.4±.5	1.4
200-250	41	223	13.7	7.2±.2	0.9	34	224	13.6	7.1±.2	0.9
250-300	30	272	13.9	5.8±.3	0.8	38	276	13.8	5.2±.2	0.7
300-350	11	330	13.8	3.9±.3	0.5	16	319	14.0	4.5±.3	0.6
>350	4	438	13.8	2.6±.2	0.3	12	422	13.9	3.1±.3	0.4

Future work in this region should stress the importance of obtaining accurate magnitudes of the variable stars in different colors, for the purpose of evaluating extinction.

My associates and I have been deeply indebted to the U.S. National Science Foundation under whose support the major part of this investigation has been accomplished. I wish also to express thanks to Ruthe Seifart for her meticulous preparation of the identification charts.

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April 1972

References

Herbig, G. 1950, P.A.S.P. 62, 211.

Houk, N. 1967, Astron. J. 73, S99.

Liller, W., Shao, C. 1970, Astron. J. 73, S103.

1971, Bull. Amer. Astron. Soc. 2, 205.

Shapley, S., Swope, H. H. 1934, Ann. Harvard Coll. Obs. 90, 197.

Swope, H. H. 1938, Ann. Harvard Coll. Obs. 90, 207, H.V. 7117.

Wilson, R. E., Merrill, P. W. 1942, Ap. J. 95, 248.

Table I. Variables and Suspected Variables in VSF 193.

Var.	R.A. (1900)			Dec.		Max.	Min.	Type	Sp.	Obs.# Ident.	R*
1	18^h	7^m	4^s	-26°	33'.8	11.9	12.4		M5	A,Ro	
2		7	50	-27	2.0	12.5	13.7	I?	M5:	Ku,T	
3		8	30	-23	59.8	13.3	14.2		M5:	A,Le	
4		8	46	-18	56.7	13.4	14.4	SR?	M7	A,H,W,	*
5		9	30	-19	41.4	13.7	15.8	RV?		A,BC	
6		10	14	-27	39.0	14.6	15.5		M2:	Ho	*
7		10	23	-27	3.5	13.8	15.0		M3:	Ho	
8		10	24	-18	54.2	14.8	15.4			BC	
9		10	45	-21	24.8	15.2	15.9			Sa	c
10		11	0	-24	0.0	14.5	16.2	SRa		V2331	
11		11	9	-21	30.2	14.3	14.8			A,H	
12		11	21	-26	29.6	14.0	14.8		M5	Ro	
13		11	22	-25	57.0	13.5	15.5	SR	M:	T	*
14		11	29	-27	51.7	11.1	12.1	SRa	M2	V2513	
15		11	48	-26	34.9	15.0	15.8		M:	A,W	
16		12	36	-23	58.8	14.8	16.2			A,Ki	*
17		12	52	-27	34.8	14.5	16.2	M	M5	V2520	c
18		12	59	-24	39.7	14.2	15.5		M7	T,P	*
19		13	7	-25	44.4	13.5:	14.0:		M8:	T,P	*
20		13	24	-26	19.0	14.7	15.8		M4:	P	
21		13	25	-24	56.2	12.7	13.5		M4	P,Do	
22		13	34	-23	49.9	14.0	14.5		M6	A,T	
23		13	37	-23	19.0	12.6	13.3	I	M5	V2333	
24		13	46	-23	56.9	14.5	16.0	SR	M8:	V2524	
25		13	48	-26	43.5	14.0	15.4	RR		P,W	*
26		13	49	-23	31.5	14.5	15.2	E?	M:	H	
27		13	50	-18	57.2	13.6	14.3	RR		BC	
28a		13	55	-22	15.4	13.8	16.0	EA		V2525	
28b		13	56	-22	10.0	12.4	13.0	E?	M6:	Jo,Se	
29		13	56	-23	53.6	14.3	15.4	I?	M5:	A,L	
30		14	2	-22	58.2	13.6	[15.0	EA		V2527	
31		14	8	-23	23.1	12.8	13.8	I?	M7	Z	
32		14	8	-27	19.4	14.3	15.0			A,Se	
33		14	16	-28	5.6	14.3	14.9			A,Se	c
34		14	18	-23	59.4	14.9	[15.6		M	A,Ki	
35		15	9	-23	8.4	14.3	16.3	SRa	M:	V2534	*
36		15	23	-23	56.2	14.7	15.7		M7	A,Ki	
37		15	27	-22	22.8	13.3	13.9		M5	A,We	
38		15	50	-22	31.2	15.6	16.4		M6	A,We	
39		15	56	-23	36.2	13.5	14.7		M7	R	
40		15	55	-23	57.1	13.7	14.3		M:	Ki	
41		16	1	-24	25.1	14.2	15.4	SR?	M5	T	
42		16	16	-23	18.8	14.3	[16.2	E		vS,H	*
43a		16	19	-27	34.3	13.7	14.6		M1:	A,Se	c

Var.	R.A. (1900)			Dec.	Max.	Min.	Type	Sp.	Obs.# Ident.	R*
44	18^h	16^m	22^s	−25°10'.3	14.2	15.4	RV?	M5	H,De	
45		16	23	−22 40.0	13.5	14.3	EW?		R,We	*
46		16	46	−23 40.0	12.2	12.9		M2:	Z	
43b		16	49	−27 28.4	12.2	[16.5	M	M:	WW Sgr	
47		16	59	−23 52.0	14.2	14.8		M4	R	
48		17	2	−24 24.6	13.8	14.7		M2	P,H	
49a		17	4	−24 41.1	14.7	15.2		M	H,De	
50		17	5	−25 29.6	14.9	15.7		M	vS	
49b		17	6	−24 40.2	13.3	15.1	M	M6	V1868	
51		17	18	−22 25.6	13.5	14.2	EW?		We	
52		17	28	−21 56.0	14.6	16.0	I?		A,We	
53		17	35	−23 32.1	15.0	16.2	M?	M5:	G	
54a		17	37	−23 23.3	14.5	[16.3	M	M6	V2332	*
55		17	38	−25 29.0	13.8	15.5	EA		V2338	
56		17	40	−21 33.6	14.3	15.2			A,As	
57		17	54	−27 22.8	13.8	15.1	I?	M6	Ro	
58a		17	57	−25 57.1	14.1	15.2	I?	M	H	
54b		18	3	−23 21.7	14.0	16.3	M	M2	V2339	
58b		18	8	−25 56.4	15.4	16.4	SR?	M4	V514	
59		18	17	−21 43.2	13.0	14.0		M2	Jo	
60		18	18	−22 54.0	14.0	16.3	M	M7	V2340	
61		18	23	−22 21.3	14.0	15.5	SRa	M	V2542	
62		18	25	−23 50.0	13.5	14.6	SRa	M4	V2341	
63a		18	26	−24 56.2	12.8	14.8	RV	M:	V2342	
63b		18	34	−24 55.8	15.4	16.6	RRa		IBV387	*
64		18	37	−23 22.9	14.0	[16.0	M	M7	V2343	
63c		18	42	−24 58.9	15.6	16.6	RR		IBV 312	*
65a		18	47	−26 32.4	13.7	[14.5	M	M7:	V2543	
66		18	50	−26 39.0	15.0	[16.0	M	M:	V2544	*
67		18	54	−24 26.6	14.9	15.8:		M6:	P	
65b		18	56	−26 29.6	14.0	15.4	SRa	M4	IBV 387	
68a		18	57	−23 11.3	13.0	16 :	M?	M:	vS,Z	*
65c		18	58	−26 29.4	13.6	16.0:	M	M7:	V1656	
68b		18	59	−23 9.2	13.7	[16.3	M	M2	V1657	
69		19	13	−21 47.9	13.6:	14.5			L	*
70		19	13	−22 17.6	14.3	15.0		M7	A,Gu	
71		19	24	−22 14.4	13.1	13.7			A,Gu	
72		19	38	−23 15.4	11.8	12.4		Pd	vS,L	*
73		19	46	−24 25.0	15.0	16.0	RR?		P,Wh	*
74		19	58	−23 3.7	14.4	16.3	C		V2546	
75a		20	8	−22 10.1	12.8	13.9		M2	Co	
75b		20	10	−22 9.1	14.0	14.5		M:	A,Gu	
76		20	12	−23 13.5	13.1	14.0	I?	M3	Z	*
77		20	13	−21 16.8	12.5	14.3	RR		B	*
78		20	15	−24 17.5	13.5	14.8	C?		L	*

Var.	R.A. (1900)	Dec.	Max.	Min.	Type	Sp.	Obs# Ident.	R*
79	18h 20m 17s	-22°16'.4	14.4	15.1		M7	A,Gu	
80	20 20	-23 18.0	14.7:	15.7:			R	*
81	20 21	-24 52.7	13.1	13.6			P,H	
75c	20 23	-22 7.8	13.7	14.6	EA		A,H	
82	20 27	-22 5.7	14.5	16.4	M	M3	V2548	
83a	20 27	-22 49.6	13.8	14.6	I?	M5	vS,H	*
84	20 28	-27 58.3	13.0:	14.0:		M2:	St	
85a	20 40	-24 14.6	14.8	16.0	E?		P	
85b	20 41	-24 17.8	13.6	14.1			P,H	*
83b	20 45	-22 49.5	14.5	[16.3	M	M8	V2345	
86	20 45	-23 28.9	13.4	14.8:	RR		V2344	*
87	20 47	-21 29.4	14.8	15.9			A,As	
88	20 48	-21 10.9	12.1	13.0	SRb	M6	V2346	
89	20 49	-24 21.7	13.6	14.3	RR?		Co,P	
90	20 54	-26 12.3	13.6	15.0	I?	M6	H	*
91a	20 54	-24 46.1	15.2	16.0		M2	P,Wh	
92	20 56	-21 46.4	13.8	14.4		M3	A,Le	
93	20 56	-24 59.7	14.2	14.7		M6	Sa	*
94a	20 59	-22 21.1	15.0	[16.0	M		V2549	
95	21 3	-23 39.7	14.7	16.1	SR?	M:	G	
96	21 3	-26 3.1	14.0	14.8		M:	H	
91b	21 8	-24 38.8	14.9	15.7	Ib?	M8	P,Wh	
97	21 14	-23 26.7	14.5	15.5	E?	M2	G	
98a	21 19	-22 6.5	13.6	14.1		M3:	A,We	
94b	21 19	-22 18.3	14.6	15.9			A,H	*
99	21 21	-24 46.6	14.3	15.2	RR		V2552	*
98b	21 27	-22 3.8	14.3	15.0		M6	A,We	
100	21 31	-23 19.6	14.4	[16.	M	M:	V2553	*
98c	21 33	-22 4.6	13.8	[16.5	M		V1662	
101	21 39	-23 53.4	13.5	14.5		M6	R	
102a	21 41	-27 41.0	12.7	14.0	Ne?		V1998	
102b	21 43	-27 42.6	13.9	15.0	I?		A,H	
102c	21 44	-27 43.9	13.8	[16.0	M		LP Sgr	
103	21 53	-26 28.0	13.0	14.1		M6	H,St	*
104a	22 2	-24 52.7	15.0	16.5			P	
105a	22 3	-25 15.4	13.8	16.0		M4	P	*
105b	22 7	-25 17.6	13.9	14.2		M3	P	
106	22 14	-21 11.8	13.9	14.3		M5	A,Le	
107a	22 16	-23 21.0	14.5	15.8	RV?	M3	A,H	c
104b	22 20	-24 55.8	13.6	16.5	M	M3:	V1664	
108	22 21	-22 10.2	14.2	[16.1	M	M8	V2557	
109	22 22	-24 28.0	13.3	13.8		M5	P,H	
110	22 23	-22 17.0	14.0	15.5	SR	M3-6	V2558	*
107b	22 27	-23 16.6	14.1	[15.5	M	M4	V2348	
111	22 29	-22 23.4	14.4	15.2		M7	A,We	
112	22 34	-23 4.4	15.9	16.5			A,We	*

Var.	R.A. (1900)	Dec.	Max.	Min	Type	Sp	Obs.# Ident.	R*
113	$18^h22^m40^s$	-23°35'.4	14.4	15.0	I?	M7	A,Se	
114	22 45	-22 30.0	14.3	15.0		M5	A,Do	
115	22 45	-25 51.6	13.8	15.5	I	M6	V2350	
116a	22 47	-22 5.4	14.8	15.3			A,Gu	
116b	22 50	-22 3.6	15.6	16.2			A,Gu	
116c	22 51	-22 3.4	15.4	16.2	RR		A,Gu	*
117a	22 53	-24 40.5	13.4	14.6	I?	C	St,Le	c
118	22 53	-26 41.7	14.2	15.6	I?	M0:	Gu	
119	22 57	-22 51.4	14.0	[16.0	M	M8	V2562	*
116d	22 58	-22 10.2	13.8:	14.2:		M:	A,Gu	*
120	23 4	-25 25.7	13.7	14.7	SR?	M3-7	P,Le	*
121	23 6	-23 53.4	13.3	13.9		M:	A,H	
122	23 7	-23 1.2	14.3	15.0		M4	A,H	
117b	23 10	-24 37.6	14.2	[16.0	M	M8	IBV 617	
117c	23 11	-24 36.4	13.5	[15.5	M	M:	V2565	*
116e	23 12	-22 6.3	13.5	15.4	M	M7	V2352	
123	23 13	-20 52.6	12.0	12.6		M5	B	
124	23 15	-22 36.8	14.3	15.2	RR?		Bo	
125	23 16	-24 49.7	13.7	14.1		M3	P,H	
126	23 20	-24 27.9	13.6	14.1	Ib	M5	V2353	
127	23 24	-20 44.4	13.6	14.3		M:	A,Le	*
128	23 38	-24 41.9	14.9	15.9			P	
129	23 39	-22 26.8	14.3	15.1		M7	A,H	
130	23 49	-22 10.7	14.6	15.7		M:	A,Wo	
131a	23 54	-23 14.8	14.6	15.5	I?	M8	Wo	*
132	23 58	-25 38.0	14.1	15.3	RR		V2569	
131b	24 2	-23 19.3	14.7	15.8	M	M6	IBV 617	*
133	24 2	-24 56.3	12.4	13.2	UV?	M5	V2354	
131c	24 9	-23 14.4	14.6	16.2	RR		V2570	
134a	24 10	-24 3.3	14.9	16.1	I	M7	A,Wo	
135	24 26	-22 27.6	13.9	16.6	M	M3	V2357	
134b	24 35	-24 2.0	14.5	16.0	RR?	M2?	A,Wo	*
136	24 35	-25 13.5	13.2	13.7			St	
137a	24 38	-23 42.5	13.9	14.5	I	M5	V2358	*
137b	24 43	-23 42.8	14.3	15.5	RR		Di,A	*
138a	24 43	-24 54.5	14.3	15.0		M5	P,La	
139	24 45	-23 9.7	14.5	15.9	M	M7	V2571	
140	24 46	-26 33.4	13.8	14.9	EA		A,Se	
138b	24 50	-25 0.2	14.0	14.8	E?		P,La	
141	25 15	-21 51.5	14.3	16.2	M	M5:	V2573	*
142a	25 24	-24 51.9	13.3	16.5	M	M7	IK Sgr	
142b	25 28	-24 51.9	13.8	14.1		M5	P,H	
143	25 36	-26 22.8	14.1	[15.5	SRa	M2:	V2576	
144a	25 40	-25 17.0	14.1	15.5	RR		P,J	
145a	25 47	-23 31.9	14.5	16.0	M	M:	V2578	*

Var.	R.A. (1900)	Dec.	Max.	Min.	Type	Sp.	Obs.# Ident.	R*
146a	$18^h25^m50^s$	-24°25!0	13.5	14.1		M5:	P,H	
145b	25 51	-23 33.6	14.9	16.0			A,H	*
144b	25 53	-25 17.6	11.8	15.9:	M	M9	IM Sgr	
147	25 54	-25 6.5	14.1	15.2			P,La	*
146b	25 59	-24 27.0	13.4	14.1		M:	P,H	
148	26 0	-23 58.8	13.9	15.3	RR		V2580	
149	26 1	-23 27.0	13.9	14.4			A,Di	
150a	26 11	-22 7.2	14.0	16.4	M?	M9	Hi	*
152a	26 22	-23 20.5	14.1	[16.5	M	M4	V1680	
151	26 26	-22 37.0	15.0	15.5			A,H	
152b	26 31	-23 18.6	13.9	14.9	Ib?	M7	V2363	
150b	26 37	-22 10.9	14.1	14.7		M6	Do,H	
153	26 51	-26 26.7	12.9	13.5		M6	A,St	
154a	26 54	-25 15.8	14.2	15.9	RR		V2584	
154b	27 5	-25 10.4	13.3	15.9	M	M7	V1684	
155	27 6	-23 9.0	11.2	11.8		M5	Z	
156	27 16	-23 42.0	12.4	12.9			A,Z	*
157	27 22	-22 20.2	14.7	16.3	RR?		A,Sw	
158	27 22	-21 52.6	15.1	[16.0	M	M:	V2585	
159a	27 25	-22 56.1	14.4	15.5			A,Ap	*
159b	27 32	-22 52.7	14.7	15.5		M	A	
160	27 32	-23 21.9	14.3	[16.0	M	M5	V2586	
161a	27 36	-25 8.5	13.8	14.3		M6	H	
162	27 42	-23 49.0	13.9	14.6	I?	M6	A,Bo	*
163	27 43	-24 32.8	14.2	14.8	E?		P,Gr	*
164	27 46	-26 59.8	13.3	13.8			A,Se	
165	27 51	-22 43.4	12.5	13.2		Pd	A,Z	*
161b	27 51	-25 10.2	14.1	[16.5	M		V1686	
166	27 59	-21 2.4	14.3	16.4	M	M9:	V2588	
167	28 1	-23 37.0	14.1	14.9	I?	M7	A,Bo	*
168	28 2	-24 29.9	12.7	13.7	Ib	M7	V2364	
169	28 4	-23 24.2	14.7	16.0	I?		A,H	*
170b	28 10	-24 34.0	14.6	15.5		M7	P	*
171	28 25	-23 6.1	14.5	15.7	RV		V2589	
172a	28 36	-22 0.6	14.7	16:	M	M6:	V2365	
172b	28 41	-22 1.6	14.7	15.6	RR		V2366	
173a	28 45	-23 57.6	12.9	14.2	SRb	M7	V2367	
174	28 49	-25 23.0	14.2	15.0	RR?		Di	
175	28 53	-23 43.8	14.2	14.8		M5	H	
176	28 57	-25 7.4	14.5	16.2	RR?		P	
173b	28 58	-23 55.6	13.7	14.8	RR		AJ 69	*
177	28 59	-21 38.7	14.9	[15.9	M		V2591	
178	29 8	-21 24.7	15.7	[16.4	M	M7	V2368	
179	29 15	-23 29.4	13.7	14.7	I?	M2	A,Se	

Var.	R.A. (1900)	Dec.	Max.	Min.	Type	Sp.	Obs.# Ident.	R*
181a	$18^h29^m21^s$	-23°52!2	14.8	[16.5	SRa	M6:	V2007	*
180	29 24	-22 27.5	15.0	16.4	M	M9	V2369	
181b	29 24	-23 50.0	13.6	14.3	RRc		V2592	
182	29 25	-20 58.8	12.0	12.6		M6	B	
183	29 38	-24 35.0	14.2	14.9	short?		H	
184a	29 58	-22 42.4	14.6	15.2			A,H	
184b	30 2	-22 44.3	14.5	16.3	M		V1698	
185	30 2	-24 10.7	12.3	13.1	I?	M:	Z,Au,H	
186	30 2	-25 12.0	14.2	14.8:		M2	P,Gr	
187a	30 9	-23 52.0	13.3	14.2	RR		H,Au	*
188	30 14	-20 48.6	12.8	14.8	SRb?	M5	V2370	
189	30 21	-21 36.4	13.8	15.6		M0	De	
187b	30 24	-23 45.8	14.0	14.6			H,Au	
190	30 33	-22 52.0	14.8	16.1	M	M6:	V2598	*
191	30 33	-24 3.3	12.0	13.0:			H,Z,Au	*
192	30 48	-22 13.9	13.2	14.1		M6	A,H	
193	30 50	-22 20.6	14.8	15.6	RR?		Sa	*
194a	30 46	-26 56.9	13.4	14.3			H	
194b	30 52	-26 57.4	13.4	14.2		M3	A,H	
195	31 11	-24 47.2	13.9	14.9	Ib?	M8	P,Gr	
196	31 11	-25 24.2	13.4	14.3			A,H	
197	31 19	-21 34.2	14.3	15.6	SR	M3	V2600	
198	31 34	-22 39.0	14.8	16.2	I?		A,He	
199	31 35	-22 17.6	14.4	16.2	M	M7	V2372	
200	31 54	-27 46.2	13.8	15.1	RR		V2374	
201	31 55	-22 5.7	14.5:	15.5			A.He	*
202	31 59	-22 46.7	14.3	15.3		M6e	V2601	*
203	32 14	-25 38.2	13.0	13.9	SR	M6	V2376	
204	32 16	-27 47.0	11.8	12.6	RR?		Ro	
205	32 18	-21 29.7	14.7	16.0	I?	M2	A,We	
206	32 41	-23 10.7	12.0	12.6	I?	M5	AJ 70	
207	32 41	-26 53.6	13.3	14.6	EA		Cr	
208	32 44	-22 46.2	13.8	15.4	RR?		A,Ja	
209	33 1	-19 56.4	12.8	14.5		M5	B	
210	33 3	-20 33.4	14.6	15.5			A,De	*
211	33 7	-21 14.2	12.5	15.2	RRab		IBV 474	
212	33 45	-24 3.1	13.2	13.8			A,Co	
213	34 6	-24 36.6	11.7	12.5	EW		A,Tw	*
214	34 7	-21 28.1	13.5	14.5	EA		V2606	
215	34 7	-18 44.2	13.7	[15.5	M	M9	V2378	
216	34 38	-26 52.8	12.7	13.4	I?	M5:	Se	
217	34 39	-25 19.6	13.2	13.8		M3	Al	
218	34 45	-26 10.8	11.9	13.1	SRa	M3	V2608	

Var.	R.A. (1900)	Dec.	Max.	Min.	Type	Sp.	Obs.# Ident.	R*
219	$18^h34^m48^s$	-24°49!3	13.6	14.2			A1	
220	35 7	-23 22.2	15.0	16.3:	RR?		Ja,A	
221	35 16	-25 49.2	13.8	14.9	I	M5	V2380	
222	35 36	-21 28.1	12.5	13.0		M3:	B	
223	36 9	-19 52.1	11.8	12.4	E?		A,B	*
224	36 43	-26 8.3	11.9	13.2		M2:	Cr	
225	36 56	-19 7.0	14.6	[16.1	UG		V2383	
226a	37 26	-21 18.8	13.9	16.2	M		V1710	
226b	37 30	-21 17.7	14.2	15.8	M		AJ 72	
227	37 33	-23 2.2	14.0	15.0	RR?		Ja,A	
228	38 2	-21 48.2	11.5	12.1		M:	B	
229	38 6	-23 0.3	14.2	15.4	E		A,H	
230	38 24	-20 22.2	14.2	15.5	RRab		IBV 592	
231	38 38	-24 7.6	14.0	14.8	short		Sa	
232a	38 42	-19 29.4	9.8	10.5	EA	AO	YY Sgr	*
232b	38 48	-19 29.0	14.8	16.0	I?		A,Le	

Observers

A Jean Hales Andersen, Harvard 1955, 1958

Al Laura Alford, Randolph-Macon 1963

Ap Karen Alper, Case Western Reserve 1968

As Mary Ashman, Mt. Holyoke 1967

Au Doris Austin, Wellesley 1963

B Meredith Baldwin, Wellesley 1960

BC Jennifer Bagster-Collins, Mt. Holyoke 1959

Bo Linda Bothwell, Goucher 1966

Co Sharon Cox, Arizona 1961

Cr Sandra Crino, Wellesley 1961

De Linda Deery, Whitman 1968

Di Elizabeth Dippel, Mt. Holyoke 1963

Do Catherine Doremus, Indiana 1965

G Nahide Gokkaya, Wesleyan 1965

Gr Nancy Gregg, Colorado 1969

Gu Judith Guthrow, Randolph-Macon 1967

H D. Hoffleit

He Susan Hess, St. Johns 1966

Hi Alice Hine, Vassar 1966

Ho Nancy Houk, Michigan 1962

J Jean Jackman, Vassar 1968

Ja Judith Jacobs, Smith 1964

Jo Lorella Jones, Radcliffe 1962

Ki Bonnie Kime, Wellesley 1964

Ku Andrea Kundsin, Wellesley 1957

L Gretchen Luft, Mt. Holyoke 1961

La Joann Lawless, Wellesley 1969

Le Wendy Levins, Vassar 1967

P Zora Prochazka, Harvard 1955

R Diana Reeve, Wellesley 1963

Ro Judith Robinson, Vassar 1961

Sa Martha Safford, Wellesley 1962

Se Sandra Servaas, Wellesley 1967

St Ilona Strockis, Wellesley 1960

Sw Marilyn Swim, Pomona 1965

T Jane Turner, Wellesley 1965

Tw Marilyn Twomey, Wellesley 1968

vS Gunilla von Schwerin, Harvard 1955

W Jean Warren, Swarthmore 1965

We Diana Welch, Park College 1967

Wh Janice White, Whitman 1969

Wo Katharine Wood, Vassar 1966

Z Catherine Zastrow, Mt. Holyoke 1960

* Remarks

c	Indicates images affected by companion
Var. No.	
4	Indications of cycles of about one month
6	Three companions
13	Cycles about 60 days; resembles UU Her
16	Period about 10 days?
18	Usually blended with 15 mag. companion
19	Fuzzy blended images resolved on only a few plates
25	Blended with three companions one of which has M-type spectrum
35	Overlapping spectra
42	Only one deep minimum observed, J.D. 2426591.361
45	Period about 0.78 day?
54a	An error in position in Astron. J., Vol. 71, p. 130, Var. No. 1, is carried over into I.B.V.S. No. 311, 1968, and the General Catalogue of Variable Stars: for 11 minutes of R.A. read 17 minutes
63b	Near globular cluster M28
63c	S.I. Bailey Var No. 8 in cluster M28; c.f. Ann. Harvard Coll. Obs. 38, Plate XI
66	Suspect companions
68a	Blended images. One companion, seen only on J.D. 2424431, may be a 13 mag. asteroid
69	Only one maximum, J.D. 2425854
72	HD 169460, NGC6629, planetary neb.

73 16 mag. companion

76 Usually near maximum

77 Two companions

78 Period 13-15 days?

80 Blended images

83a Only 5 observed, widely separated maxima

85b Spectrum overlapped by M-type star

86 Has companion with M-type spectrum

90 Light curve resembles R Cor Bor but with small amplitude

93 Blended images

94b Probably short period. Double images resolved on only 33 Bruce plates; preceding of two stars; companion 15.6 mag.

99 15.7 mag. companion, spectral class M7

100 Blended with two companions

103 Companion rarely resolved

105a Images blended except on Harvard Bruce plates

110 Conspicuous change in spectrum

112 Flanked by red stars

116c Probable RR Lyrae type. Blended images resolved only on Harvard Bruce plates

116d Magnitudes refer to blended images. The variable may be the fainter component, about 14.7 mag.

117c The variable is a faint star closely following the 12.5 mag. star marked on the chart. Seldom resolved.

119 At minimum a 16 mag. companion revealed. Variable is N of close pair.

120 Normally at maximum. Part of the observations indicate period of 53 days.

127 Overlapping spectra

131a 15.8 mag. companion rarely resolved

131b Variable is faint star N of brighter star with early M-type spectrum.

134b Appears to be RR Lyr type; if so, M2 may refer to overlapping spectrum.

137a Near cluster NGC 6642

137b Near cluster NGC 6642

141 Overlapping spectra

145a 1' N of NGC 6642. Companion

145b S of cluster NGC 6642. Estimates useful only on Harvard Bruce plates, on which companion is resolved.

147 Short period? Affected by companion on all but Bruce plates

150a Only three maxima observed: J.D. 2423948-9, 24765, 26557-594. Except on Bruce plates generally blended with nearby brighter star to S.

156 Suspect companion

159a 15.4 mag. companion, resolved on 66 Harvard Bruce plates. Only one well defined maximum, J.D. 2426557-569.

162 Probable companion. Amplitude small, but good correlation between the observers

163 Same as 170a

165 HD 171131, IC 4732, planetary nebula.

167 Small amplitude but good correlation between observers

169 Appears to be slowly varying

170a Same as 163.

170b Preceding variable on chart, 170a, is same as No. 163.

173b Member of globular cluster M22

181a Probable member of M22

187a H.S. Hogg Var. No. 15, Pub. David Dunlap Obs., Vol. 1, 297, 1944. Companion appears to have M type spectrum

190 15.8 mag. companion rarely resolved except on Bruce plates

191 Companion. Very bright object in lower left corner of chart represents globular cluster M22

193 Blended with 15 mag. companion

201 15 mag. companion rarely resolved

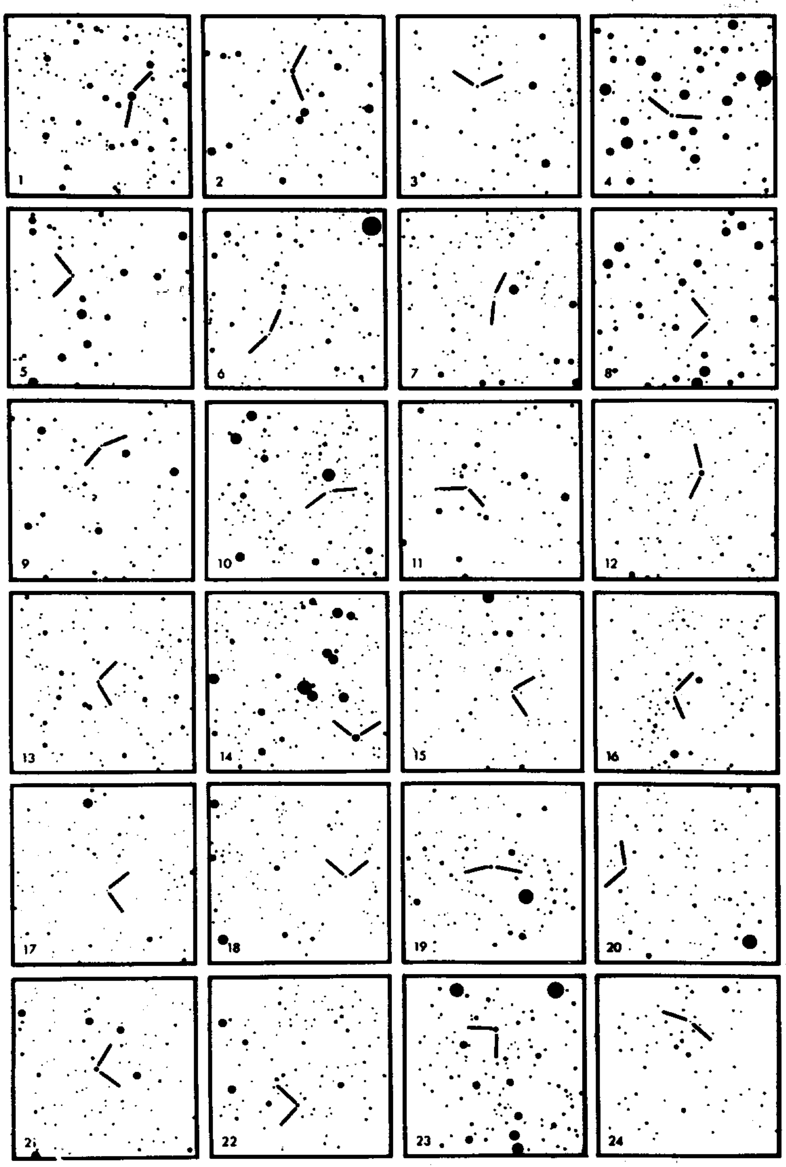
202 MHα 208-51. Preceding of pair separated by 0!3.

210 Usually blended image of two stars; var. is the Sf

213 Provisional period by Marilyn Twomey, 0.364913 day. A spectral class, M2, found by Miss Houk presumably refers to a close preceding unresolved companion seen on the red Palomar charts of this region but not on the blue.

223 Variable Suspect No. 4299.

232a Not examined in this survey: too bright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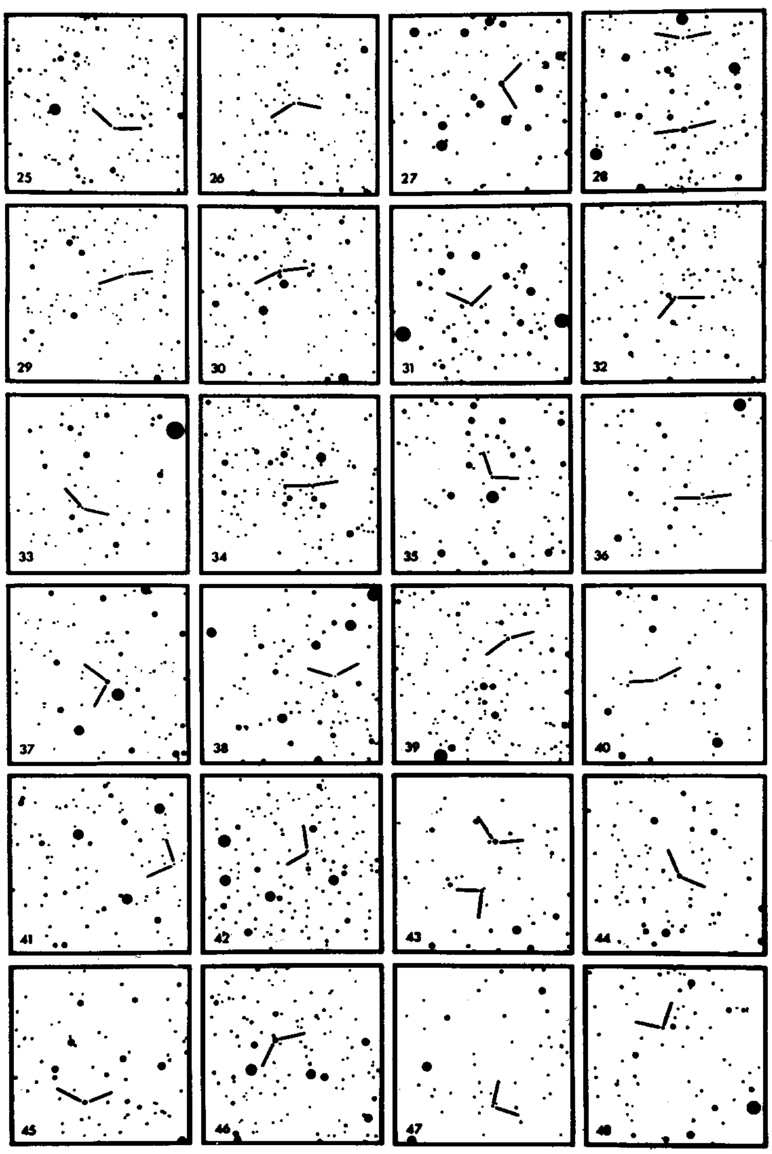
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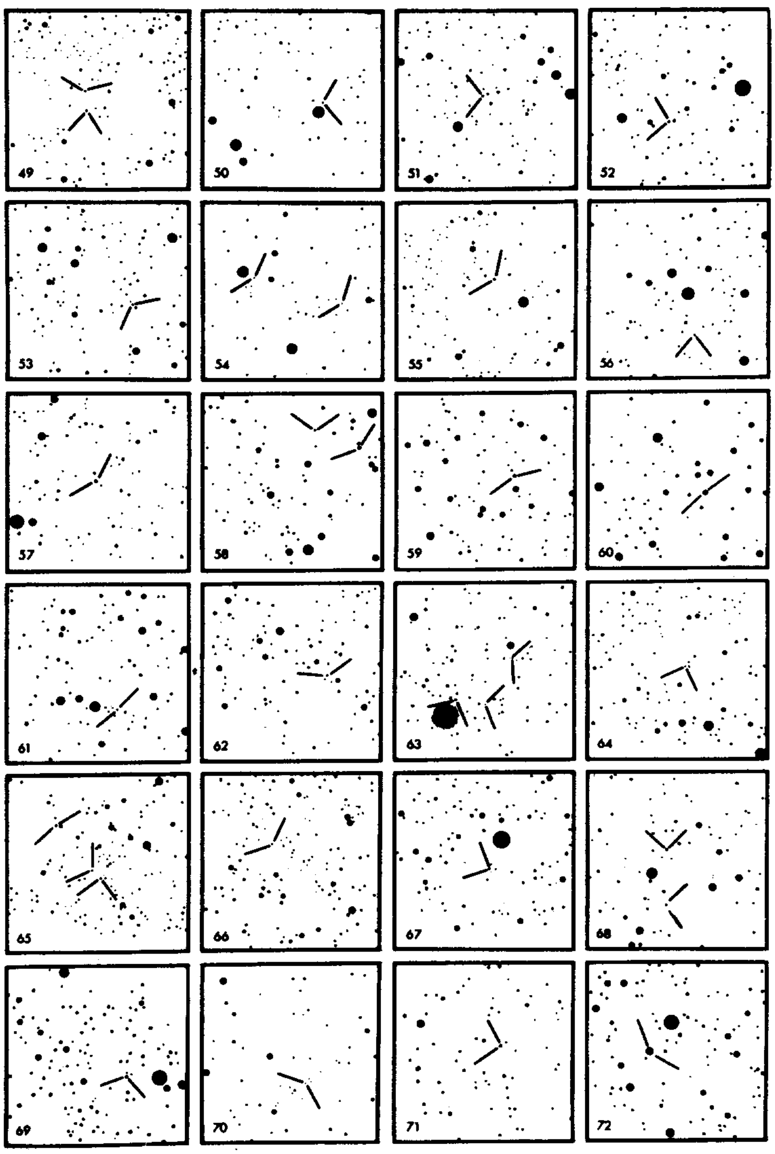
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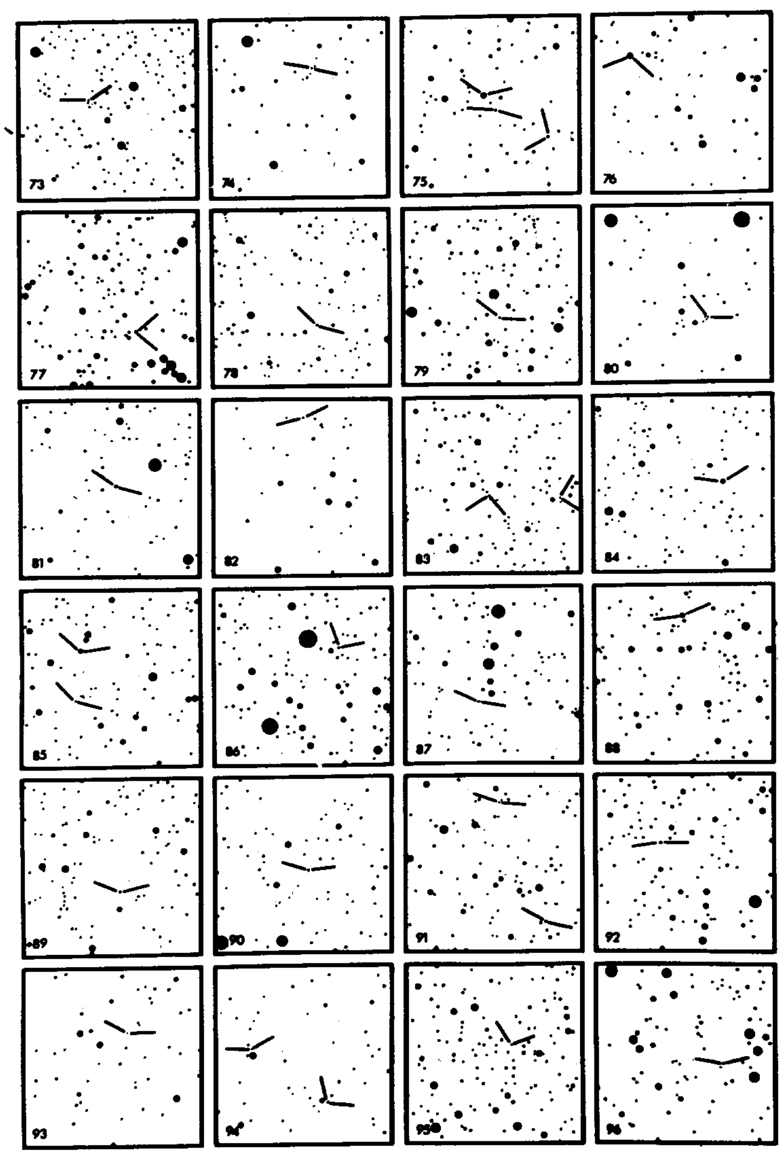
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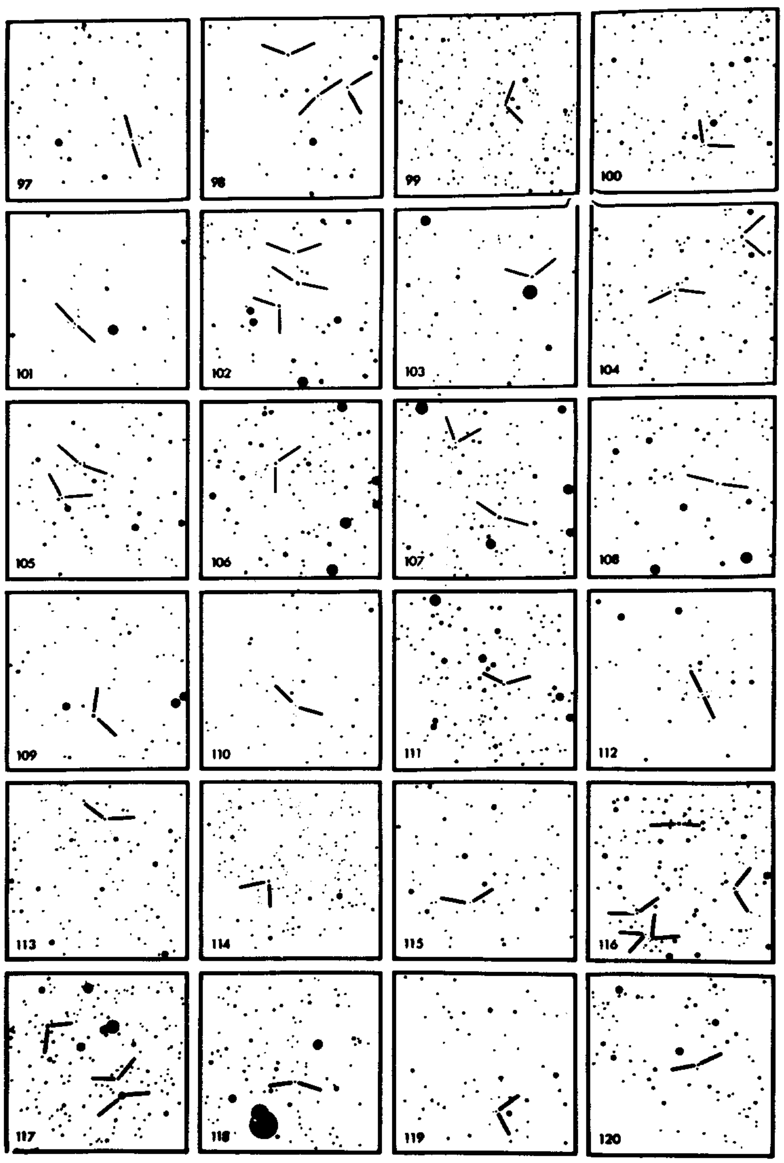
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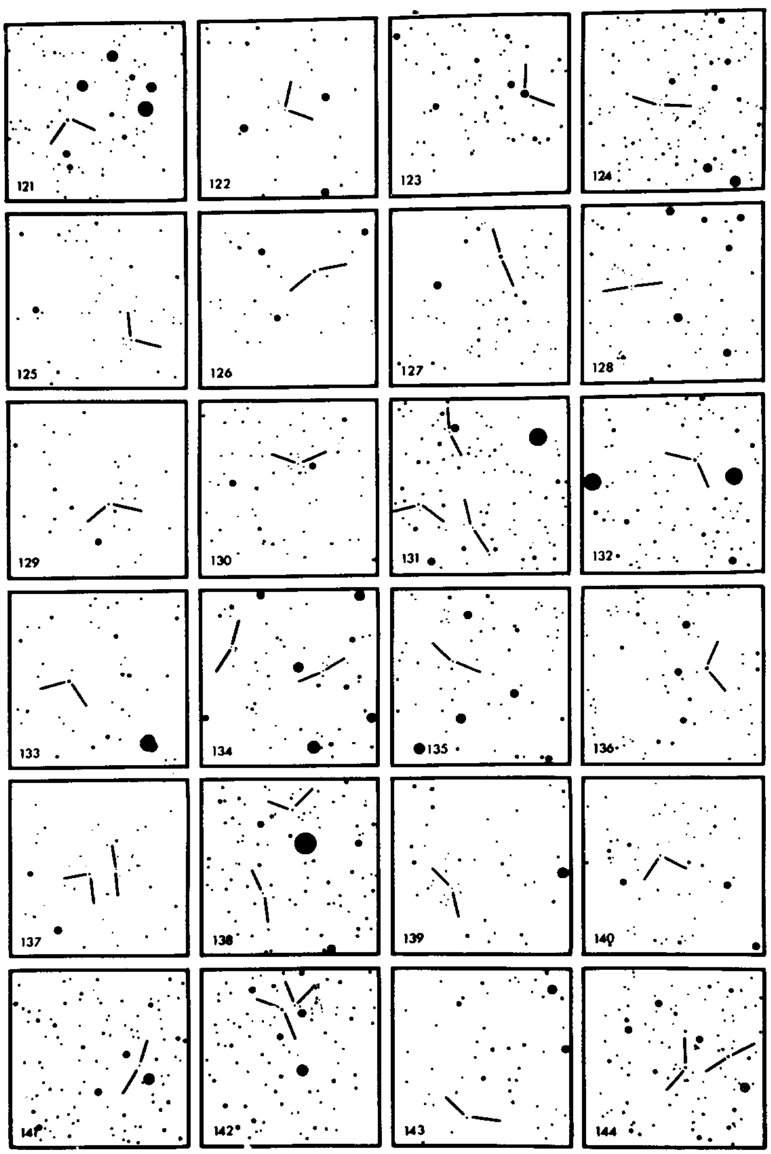
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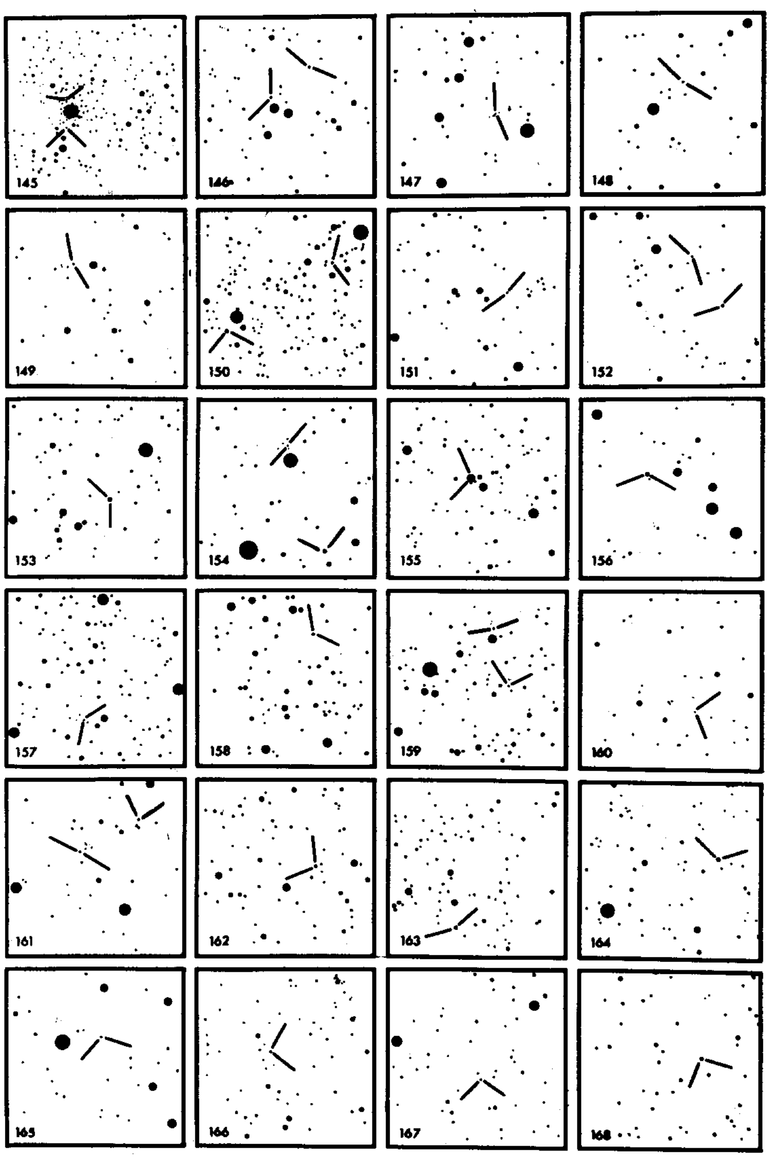
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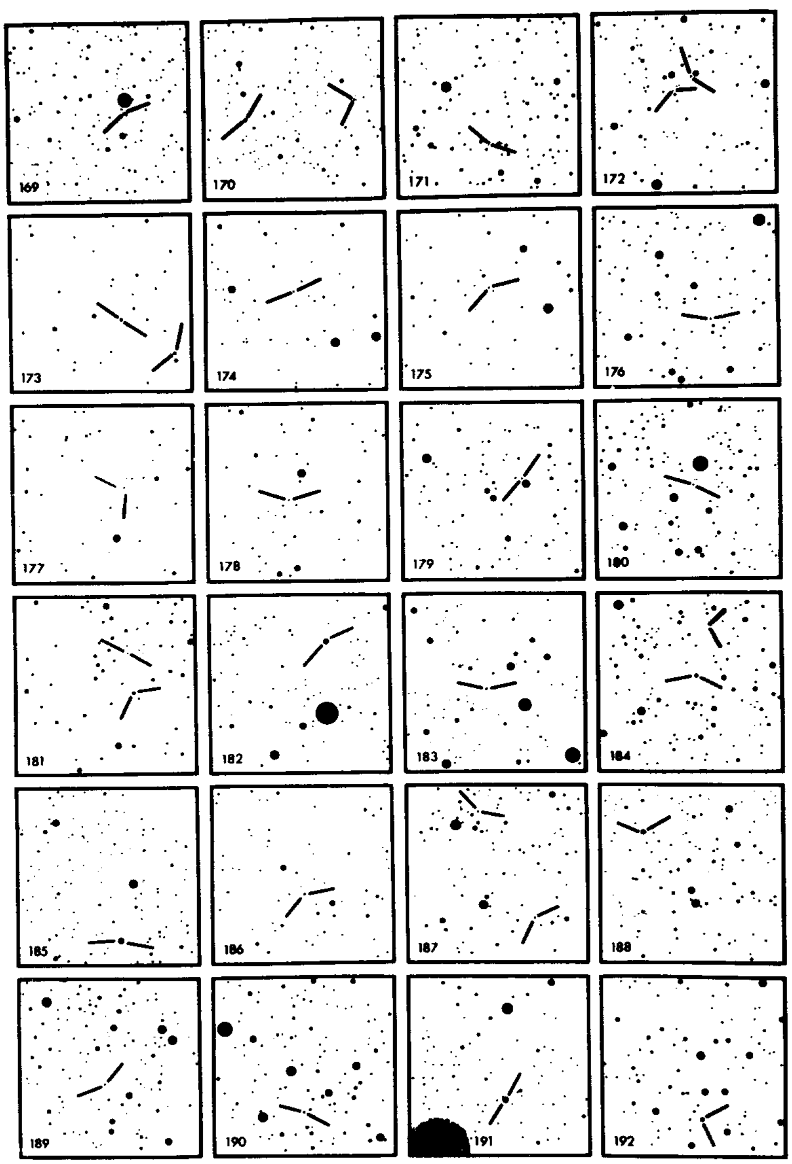
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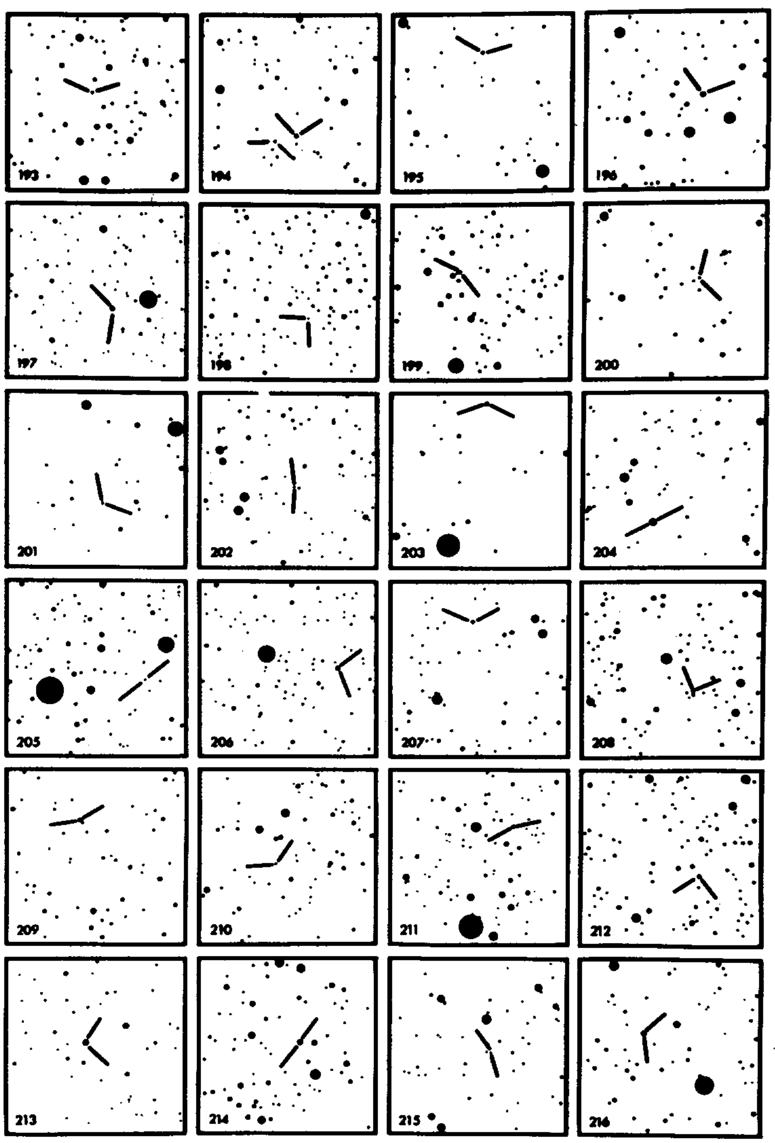
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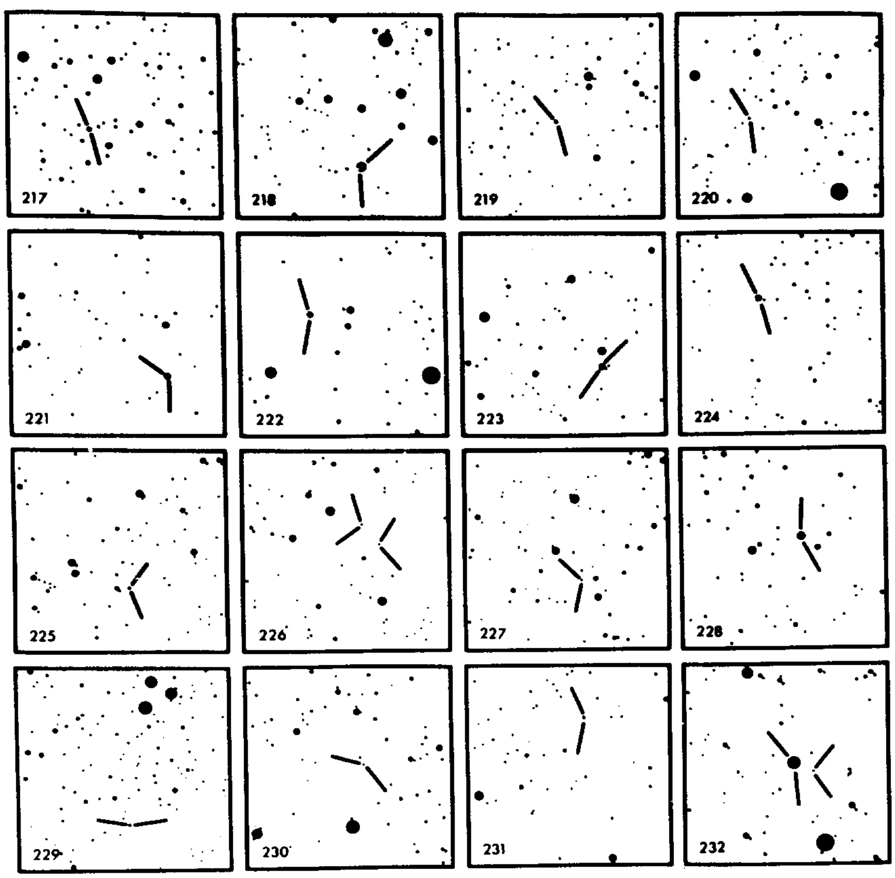
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COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 661

Konkoly Observatory
Budapest
1972 April 14

OBSERVATIONS OF NOVAE

Three colour photoelectric observations of three novae have been made by B. Marino and W.S.G. Walker with the 50 cm Zeiss reflector at the Auckland Observatory. Standardisation with the Johnson UBV system are discussed in Circ. 184, VSS, RASNZ (1972).

Nova Sct 1970

HD 175731 and HD 173764, measured at Cape, were used to derive following values for the comparison stars:

HD 173612	V	8.80	B-V	+0.08	U-B	-0.23
173456		8.18		+1.14		+1.20

Nova Ser 1970

74 Oph was used as a standard with values of V 4.86;B-V +0.90.

Nova Sgr 1969

An additional observations to those published in IBVS 475 was made.

Observations:

		V	B-V	U-B
Nova Sct 1970	2,440,806.98	8.31	+0.42	-0.27
	814.79	8.87	+0.37	-0.37
	821.80	9.50	+0.33	-0.36
	838.92	10.31	+0.36	-0.43
	840.86	10.64	+0.27	-0.47
	851.87	11.49	+0.42	-0.01
Nova Ser 1970	666.19	5.99	+0.66	...
Nova Sgr 1969	878.88	14.09	+0.74	+0.50

1972 January 6

FRANK M. BATESON

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18 Pooles Road,
Greerton, TAURANGA.
NEW ZEALAND.

R CrB VARIABLE UW Cen

Observations from 2,435,106 to 2,440,832 of UW Cen are published in Circular 185, VSS, RASNZ. This variable is a typical R CrB type variable with the intervals between deep minima distributed entirely at random.

UW Cen, during the 16 years, covered by the observations had a semi-regular variation of about half a magnitude with a mean period of 42 days in between the deep minima. This fluctuation persists at all phases of the light curve, except during the sudden falls to deep minima. The fluctuations tend to be largest when the star is recovering from minimum. The semi-regular period has a mean value of 40.6 days from secondary maxima and 43 days from secondary minima.

Other R CrB variables with a similar semi-regular variation of this nature are RY Sgr and S Aps.

1972 March 31

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COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 662

Konkoly Observatory
Budapest
1972 April 14

OBSERVATIONS OF VARIABLE STARS IN NGC 1261

In announcing 7 new variables in NGC 1261 (1) the authors did not take into account the catalogue of Fourcade, Laborde and Albarracin (2). Vars. no. 7,9,12 of Bartolini et al.(1) are the same as vars. no.10,8,11 of Fourcade et al.(2); Bartolini's variables no. 8,10,11,13 are new and we are proposing to assign them numbers 12,13,14,15.

Owing to small discrepancies between our values and those of Fourcade we measured the coordinates of all the variables obtaining:

Var. No.	*X*	*Y*	*Var. No.*	*X*	*Y*
1	- 29.8	- 28.4	9	+ 37.9	- 38.8
2	- 39.8	+ 34.9	10	+ 52.3	+ 70.6
3	+ 49.6	- 54.6	11	- 89.0	+ 89.5
4	+ 31.8	- 36.1	12	+ 87.1	- 10.5
5	- 34.5	- 5.0	13	- 77.1	- 96.0
6	+ 78.[illegible]	- 12.3	14	- 53.5	- 70.7
7	-149.3	+140.2	15	-114.5	+129.1
8	-133.7	-139.0			

From August 14 to September 11,1970, 11B plates (IIa - o + + GG 13) were taken with the 40 inch (f/8) telescope of Siding Spring Observatory; the exposure time was 35 minutes for every plate.

Using the photoelectric sequence of Alcaino and Contreras (3), we determined the magnitudes reported in Table I; magnitudes of the vars.no. 2,5,7,9 and 14 were visually estimated, the others were obtained with a II Zeiss fixed aperture photometer.

Magnitudes of the vars. no. 3 and 5 are affected by blending of the variable with another close star.

On the basis of the RR Lyrae stars we were able to classify, the ratio n_c/n_{ab} is 0.25 and NGC 1261 seems to be an A type globular cluster according to the classification of Castellani et al. (4).

The var. no. 15, which is included among the standards of Alcaino and Contreras, is slowly varying and in B is more than $1^m.3$ broghter than the RR Lyrae variables. As it is very red (B-V = +1.67) (3), in V the difference of magnitude with the RR Lyrae increases to about $2^m.6$, and from its position in H-R Diagram (3) we are led to believe that it is an irregular or long period variable star.

Osservatorio Astronomico dell'Universita di Bologna
6, April 1972

C. BARTOLINI
F. GRILLI
F. MORISI

TABLE I

J. D. - 2440000	2	3	5	6	7	8	9	10	11	12	13	14	15
813.203	17.2	16.30	16.4	17.15	17.15	16.13	16.9	16.22	16.85	16.68	17.05	16.22	15.20
814.180	17.1	16.67	16.25	16.77	17.3	17.48	16.95	17.43	17.29	17.42	17.35	17.23	15.21
837.072	17.0	16.29	16.8	17.19	16.9	17.24	16.85	16.60	16.91	16.94	17.15	17.05	15.82
.100	16.9	16.43	16.75	17.32	17.05	17.36	16.85	16.17	16.98	17.02	17.24	17.0	15.76
.173	16.1	16.50	16.75	17.04	17.2	17.38	17.15	16.62	17.08	17.25	17.19	17.0	15.79
.207	16.05	16.50	16.6	16.50	17.3	17.39	17.15	16.77	17.13	17.29	16.91	17.0	15.77
.233	16.15	16.48	16.35	16.32	17.15	17.42	17.15	16.87	17.13	17.28	16.85	16.95	15.86
.258	16.25	16.45	16.1	16.46	16.9	17.44	16.65	16.99	17.24	17.41	16.79	16.7	15.81
841.219		15.88	16.8	16.54	17.1	16.55	17.05	16.41	17.21	16.35	17.19	17.05	15.78
.244		15.99	16.85	16.58	16.9	16.75	17.1	16.49	17.23	16.39	17.23	17.15	15.75
.270		16.10	17.0	16.75	16.85	16.85	17.1	16.70	17.19	16.59	16.90	16.85	15.82
Prob. RR type	ab	ab	ab	ab	c	ab		ab		ab	c	ab	

1) Bartolini C., Grilli F., Robertson J.W. - I.B.V.S.594 (1971)
2) Fourcade C.R., Laborde J.R., Albarracin J. - Atlas Y Catalogo de Estrellas Variables en Cumulos Globulares al sur de - 29° (Cordoba, 1966).
3) Alcaino G., Contreras C. - Astron. and Astrophys., 11,14 (1971).
4) Castellani V., Giannone P., Renzini A. - Astrophys. and Space Sci., 9, 418 (1970).

COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 663

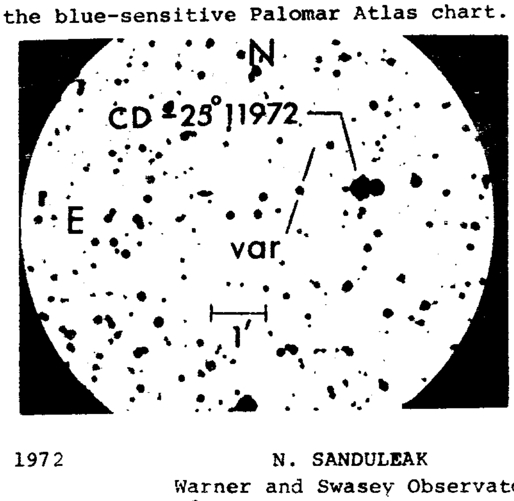
Konkoly Observatory
Budapest
1972 April 24

A NEW SPECTRUM VARIABLE STAR IN OPHIUCHUS

On objective-prism plates taken a number of years ago with the Curtis Schmidt telescope at Cerro Tololo, we have found a star showing definite spectrum and light variations. The approximate 1900 coordinates are R.A. $17^h02^m.2$ and Dec. $-25^\circ40'$ which places the variable about one minute of arc due east of the 9th magnitude star CD $-25^\circ11972$.

There is no evidence of this star on moderately deep plates taken July 7, 12, 14 and 30, 1967. However, on similar plates obtained Aug. 3 and 5, 1967, a strong emission-line spectrum appears containing the Balmer series, HeI 4471, a broad feature in the λ4640-86 region and perhaps [OIII]4363. From the weak continuum present we can estimate that the star was near the 14th magnitude on these nights.

Using differential measurements relative to CD -25° 11792 we have a reliable identification of the star on the Palomar Atlas where we estimate B~16.5 mag. and R~16.0 mag. These spectral and photometric data would seem to dismiss the possibility of a nova and suggest an eruptive variable perhaps of the U Gem type. Our identification chart was copied from the blue-sensitive Palomar Atlas chart.



April 12, 1972

N. SANDULEAK
Warner and Swasey Observatory
of Case Western Reserve University
East Cleveland, OHIO 44112, U.S.A.

COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 664

Konkoly Observatory
Budapest
1972 April 24

Veröffentlichungen der Remeis-Sternwarte Bamberg
Astronomisches Institut der Universität Erlangen-Nürnberg
Band X,Nr.101

NEW FAINT SOUTHERN VARIABLE STARS

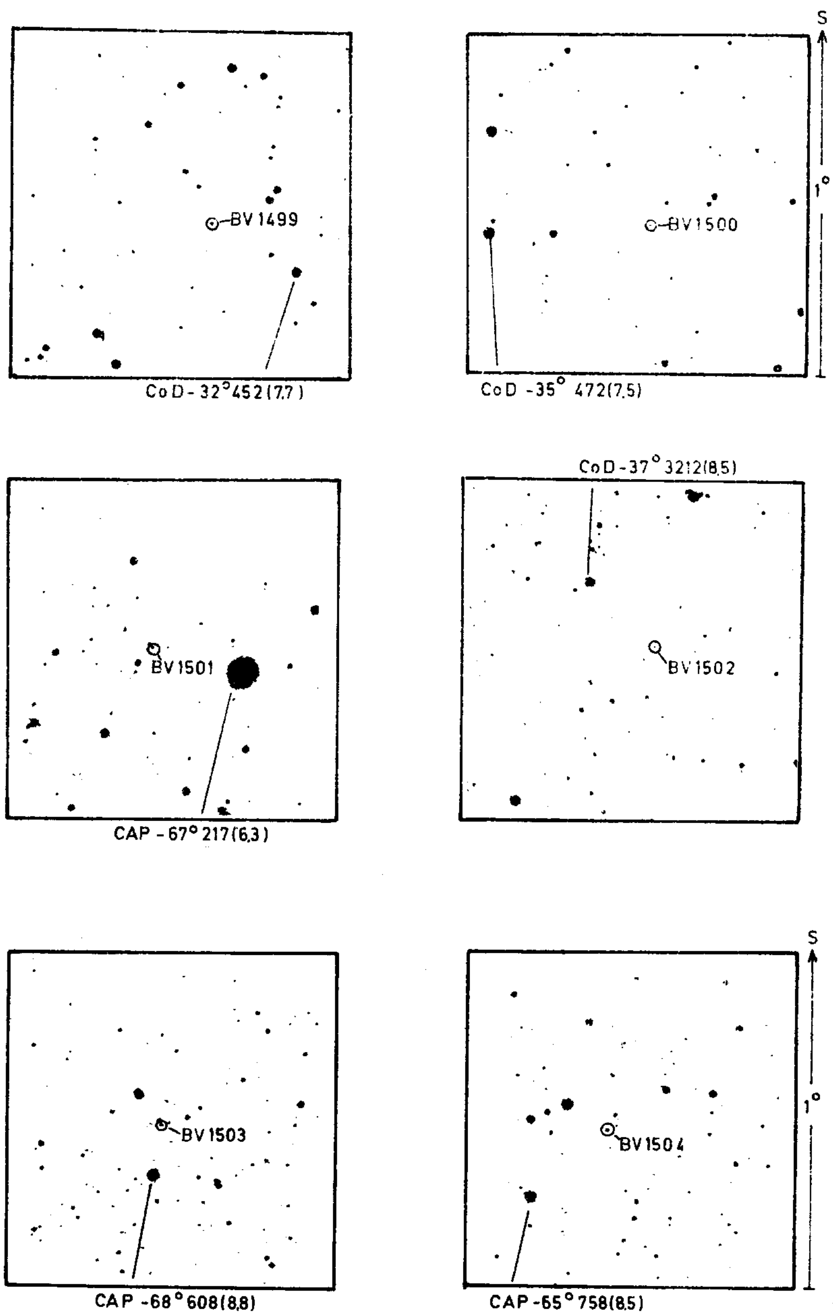
On sky patrol plates taken at the Southern Station of the Dr.-Remeis-Sternwarte Bamberg, at the Boyden-Observatory, Bloemfontein, South Africa, further 12 faint stars were found to be variable (11 new stars and 1 confirmation of an already mentioned Sonneberg-Star in the Catalogue of Suspected Variable Stars).

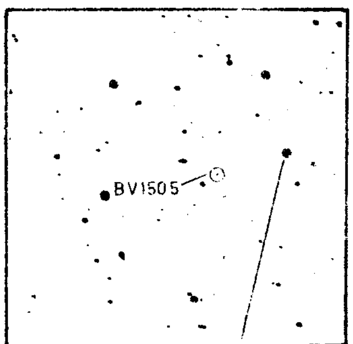
The brightness of these stars were obtained from the Harvard-Groningen-Atlas, Selected Areas (edition 1965 by A. BRUN and H. VEHRENBERG).

Finder-charts are 1° in declination. South is up.

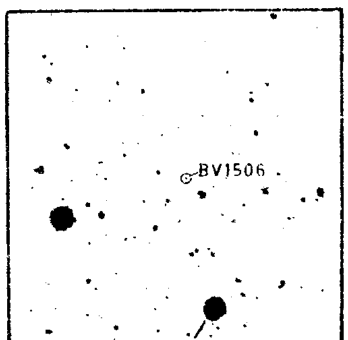
BV-Nr.	RA	Decl.	max. brightness	Ampl.	Type	Remarks
	1900.0		pg	pg		
BV 1499 Scl	$1^h02^m42^s$	$-32°51'.2$	$11^m.8$	$0^m.6$	RR?	1
=CSV	123 = S	4796				
BV 1500 Scl	1 20 24	-35 10.6	12.4	0.4	C	2
BV 1501 Hor	3 13 53	-67 18.5	11.8	0.3	C?	3
BV 1502 Pup	6 56 32	-37 24.2	12.1	0.3	RR?	4
BV 1503 Vol	7 11 57	-68 49.6	10.9	0.2	?	5
BV 1504 Vol	7 27 30	-65 18.6	10.4	0.4	EA?	6
BV 1505 Car	8 30 00	-56 41.7	10.9	2.7^x	M	
BV 1506 Car	10 13 26	-61 13.9	11.1	2.0^x	?	7
BV 1507 Vel	10 50 57	-40 51.4	11.9	1.1^x	M?	8
BV 1508 Hya	12 04 41	-31 54.7	11.9	1.0	EA	9
BV 1509 Cen	14 06 14	-63 32.4	10.8	0.7	EA?	
BV 1510 Ara	16 51 19	-53 30.5	10.9	1.3^x	M?	10

^{x}= Amplitude till plate limit.

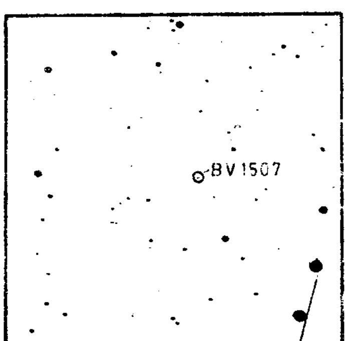

BV 1499
CoD-32°452(7.7)
S
1°
BV 1500
CoD -35° 472(7.5)
CoD-37° 3212(8.5)
BV 1501
CAP -67° 217(6.3)
BV 1502
S
1°
BV 1503
CAP -68° 608(8.8)
BV 1504
CAP -65° 758(8.5)



CAP-56° 1714(8,4)

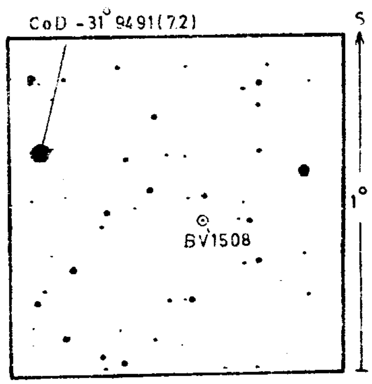


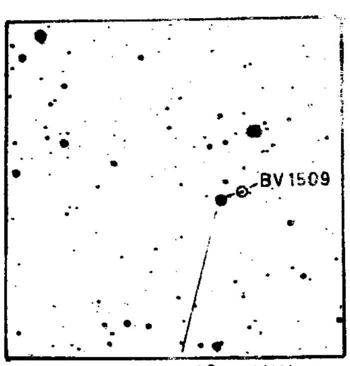
CAP-60° 1817(6,1)



CoD -40° 6409(7,5)

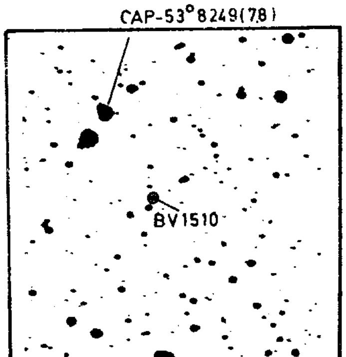
CoD -31° 9491(7,2)





CAP-63° 3166(8,1)

CAP-53° 8249(7,8)



Remarks:

1 few short, bright maxima
2 few maxima, rapid variation
3 few maxima, rather difficult, maybe even RR-type
4 few good maxima
5 many maxima and minima, but more maxima, variable of an irregular type
6 few minima, not enough for a period
7 only one bright maximum, many slight, but real variations
8 bright maxima, M or SR-type
9 see notes below for BV 1508
10 probably an M-type variable

BV 1508 1900.0: $12^h04^m41^s$ $-31^\circ54'.7$

Min. = JD 243 8796.562 + $1^d.7821 \cdot E$

Minima	E	O - C	Minima	E	O - C
243 8796.562	0	0.000	243 9240.322	249	+0.017
8855.367	33	-0.004	9265.268	263	+0.014
8880.322	47	+0.001	9566.433	432	+0.004
8905.262	61	-0.008	244 0355.899	875	-0.001
8914.208	66	+0.027	0632.126	1030	+0.001
9181.471	216	-0.025			

Amplitude $1^m.0$, without a secondary minimum, EA-type.

Bamberg, April 1972

F.M. SOSNA

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

NUMBER 665

Konkoly Observatory
Budapest
1972 April 24

Veröffentlichungen der Remeis-Sternwarte Bamberg
Astronomisches Institut der Universität Erlangen-Nürnberg
Band X, Nr.102

THREE NEW BRIGHT ECLIPSING BINARIES

On sky patrol plates taken at the Southern Stations of the Remeis-Sternwarte Bamberg, 3 new bright variable stars were found to be eclipsing binaries.

BV 1511 = CAP $-62^{\circ}4477$ $8^{m}.2$ = HD 136828 B8

$$\text{Min.} = \text{JD } 243\ 8196.250 + 2^{d}.75815 \cdot E$$

Minima	E	O - C
243 8196.330	0	+0.080
8204.327	3	-0.197
8589.251	142.5	+0.010
.296	142.5	-0.035
8855.507	239	+0.059
.555	239	+0.107
8935.267	268	-0.167
.314	268	-0.120
8963.226	278	+0.210
9287.307	395.5	+0.209
.353(1/2)	395.5	+0.255
9975.042	645	-0.215
244 0299.153	762.5	-0.186
0357.018	783.5	-0.242
.062	783.5	-0.198
0417.840	805.5	-0.100
0439.823	813	+0.197
0709.031	911	+0.106
.075	911	+0.150
0734.981	920.5	-0.146
0763.899	931	-0.189
.947	931	-0.141
1066.034	1040.5	-0.071
.094	1040.5	-0.011

Amplitude $0^{m}.40$, EA or EB, with a deep secondary minimum

BV 1512 = CAP −59°5885 (9.2) = HD 135432 (AO)

Min. = JD 243 8233.250 + $6^{d}.7125$.E

Minima	E	O − C
243 8233.215	0	−0.035
.262	0	+0.012
8525.427	43.5	+0.183
8562.290	49	+0.128
.334	49	+0.172
8582.245	52	−0.055
.290	52	−0.010
8588.251	53	+0.239
8592.247	53.5	−0.122
244 0028.933	267.5	+0.089
0720.067	370.5	−0.264
0763.899	377	+0.037
1066.035	422	+0.110
.094	422	+0.169

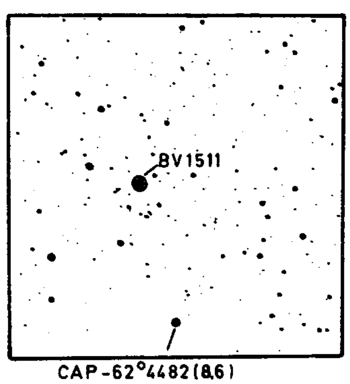
Amplitude $0^{m}.35$, EA of EB, with a deep secondary minimum, perhaps a half of this period.

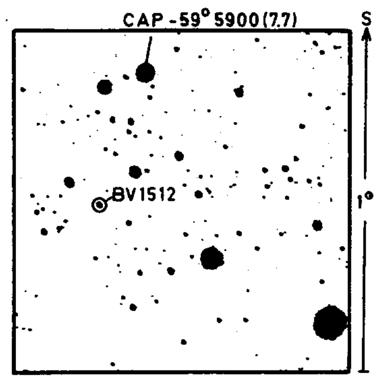
BV 1513 = CAP −46°120 (8.2) = HD 6980 (GO)

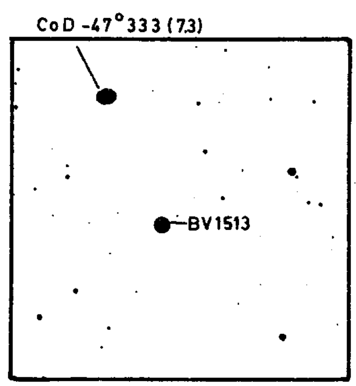
Amplitude $0^{m}.8$, EA, with a period of probably several days.

Bamberg, April 1972

W. STROHMEIER


BV1511
CAP -62°4482 (8,6)


CAP -59° 5900 (7,7)
S
BV1512
1°


CoD -47° 333 (7,3)
BV1513

COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 666

Konkoly Observatory
Budapest
1972 April 26

AD Leo

The photoelectric monitoring of the flare star AD Leo was carried out at the Okayama Station during the period of 18 to 28 February 1972. The observations were made with the simultaneous three-colour photometer attached to the 91 cm reflector.

The observational results are summarized in the Table.

Date 1972	Time of Monitoring (UT)	Filter	Flares: Time of max. (UT)	Flares: max. Δm	Flares: p	Flares: Duration	σ
Feb.19^d	11^h16^m - 12^h16^m	U		0.71^{mag}	1.8^{min}	5.0^{min}	
		B	$11^h21^m.8$	0.22	0.3	5.0	
		V	-	-	-	-	U 0.11^{mag}
							B 0.02
		U	11 40.5	0.48	0.6	4.5	V 0.02
		B		0.09	0.1	4.5	
		V	-	-	-	-	
	14 14 - 17 00	U	14 15.7	2.70	>8.0	>10	
		B		0.92	>0.9	>10	
		V		0.31	>0.3	> 6	
		U	15 31.0	2.56	7.0	15	
		B		0.88	0.8	15	
		V		0.29	0.3	15	U 0.16
							B 0.03
		U	16 45.5	1.98			V 0.03
		[illegible]	16 45.5	0.57			
		[illegible]	16 45.7	0.18	U>21.4	>22	
					B> 3.2	>22	
		[illegible]	16 46.1	1.90	V> 1.2	>22	
		[illegible]	16 46.1	0.58			
		[illegible]	16 46.2	0.20			
20	10 39 - 12 00						
	12 26 - 13 0[illegible]						
	13 38 - 1[illegible] 05						
	15 06 - 15 34						
	17 07 - 17 36	U		0.92	1.7	4.0	0.16
		B	17 29.7	0.20	0.3	4.0	0.05
		V		0.05	0.1	1.8	0.02

(continued)

Feb.23^d	11^h07^m - 17^h11^m	U		1.47		8.3	15.0	0.20
		B	$11^h33^m.7$	0.41		1.1	15.0	0.03
		V		0.15		0.5	14.0	0.02
		U	13 47.6	0.62		1.0	7.0	0.16
		B		0.10		0.2	5.7	0.03
		V		0.04		0.1	0.6	0.02
		U }	14 59.8	1.27				
		B }		0.22				
		V	14 59.9	0.08				
		U	15 00.4	1.25	U	5.7	13.0	0.23
		B		0.22	B	0.4	12.0	0.03
		V	-	-	V	0.1	4.0	0.02
		U	15 00.8	1.13				
		B		0.21				
		V	-	-				
28	11 01 - 12 14							
	13 00 - 18 23							

Tokyo Astronomical Observatory
31 March 1972.

K. OSAWA, K. ICHIMURA,
Y. SHIMIZU, E. WATANABE,
T. OKADA, M. YUTANI,
H. KOYANO, K. OKIDA

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Budapest
1972 April 27

PHOTOGRAPHIC B, V PHOTOMETRY OF Sco X-1

77 blue and 72 yellow, mostly simultaneous exposures were made with the 20-20 inch Yale-Columbia double astrograph at El Leoncito, San Juan, Argentina, of Sco X-1.

The blue exposures, on Kodak 103 aO emulsion, were made without the usual filter normally used to eliminate undesirable ultraviolet from the Johnson B band. However, we may be sure that most of this light was absorbed by the four glass components of the Ross-objective lens system. The yellow observations, on Kodak 103 aD, were all made through a Schott GG14 filter.

In addition to these south American observations, we obtained 71 blue exposures of Sco X-1 during the same period, with the Yale 40 inch Ritchey-Chretien reflector at Bethany, Connecticut, U.S.A. This series, on Kodak 103 aO emulsion, used a Schott GG13 filter to eliminate undesirable ultraviolet light from the Johnson B band.

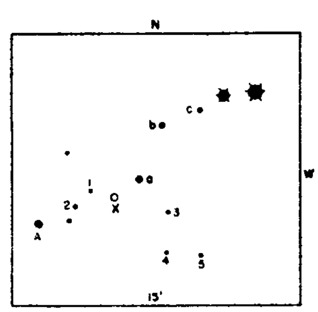
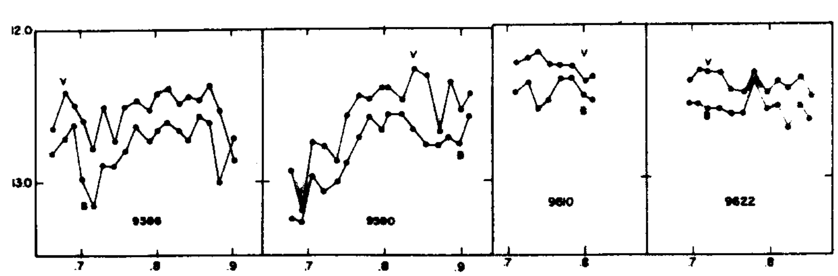


Figure 1. Field of Sco X-1 with comparison stars.

Figure 1 shows Sco X-1 and its surroundings. The two bright stars are BD-15°4300 and -15°4301. The stars 1, 2,...5 were measured by A. Sandage et. al. The stars A, a, b and c were used as comparison stars for the present photometry. The U, B, V photometry of these was done by Dr. R. McClure at our request, at the Interamerican Observatory at Tololo. Table 1 gives the U, B, V results as obtained by McClure and Sandage et. al.

Sco X-1 and the comparison stars A, a, b and c were measured on all the available plates with the Yale iris photometer. In the reduction of the blue exposures we used the colour equation B' = B + 0.05 (B-V) whereas the yellow exposures were reduced without a colour equation on V. For each exposure a separate reduction curve was used. The individual South American and North American results are given in Table 2 and Table 3 respectively. Altough the northern and southern observations cover approximately the same period, there is only one night (243 9610) with data from both hemispheres. The two series agree within the observational error. The standard error of a single apparent magnitude as given in Tables 2 and 3 is $\pm$ 0^m.06. Only the South American observations from nights with more than 7 exposures have been represented graphically (Figures 2 and 3).



Figures 2 and 3. Brightness of Sco X-1 in both B and V.

It is seen that the brighness varies considerably during a single night, whilst there is no evidence of periodicity. There is a marginal indication from all observations that the star is slightly bluer when bright. The mean colour index, using all the data, is found to be B-V = + 0.20 + 0.01 in good accord with the photoelectric measures by Sandage et. al.

We are indebted to Dr. R.D. McClure for his U, B, V photometry of the comparison stars. We thank Mr J. Stordy for the Bethany plates. We gratefully acknowledge the assistance from Mrs. K. DeVorkin with the measurements and the reduction. The work was partly supported by a grant from the NSF.

A.J. WESSELINK and C. CESCO
Yale University Observatory

Reference:

A. Sandage et. a., Ap.J. 146, 316 (1966).

Table 1

Star	V	B-V	U-B
-15°4300	8.5	+0.25	+0.22
15 4301	9.88	+0.33	+0.27
1	14.97	+0.94	+0.41
2	16.25	+1.05	+0.43
3	14.17	+1.16	+0.87
4	14.47	+0.84	+0.33
5	14.46	+0.83	+0.26
A	11.34	+0.69	+0.15
a	11.49	+1.32	+1.23
b	12.37	+0.84	+0.35
c	13.36	+0.77	+0.24

Table 2 El Leoncito, San Juan, Argentina

J.D. hel. 2430000+	B	V	J.D. hel. 2430000+	B	V
9527.846	13.16	-	9590.838	12.68	12.27
9527.[illegible]	13.28	-	90.856	12.78	12.32
9533.867	12.63	-	90.869	12.79	12.70
9537.[illegible]	13.42	-	90.883	12.73	12.36
9538.868	12.49	-	90.897	12.78	12.55
9555.827	12.72	-	90.911	12.60	12.44
9556.859	12.60	-	9591.829	12.32	-
9557.842	13.16	-	91.843	12.32	-
9567.794	12.89	-	91.856	12.30	-
9586.662	12.83	12.68	91.870	12.28	-
86.676	12.73	12.41	91.884	12.40	-
86.690	12.64	12.51	9610.712	12.44	12.26
86.704	13.00	12.61	10.726	12.38	12.21
86.717	13.18	12.80	10.740	12.56	12.19
86.731	12.91	12.52	10.754	12.49	12.26
86.745	12.91	12.75	10.771	12.36	12.28
86.759	12.81	12.51	10.785	12.35	12.28
86.773	12.67	12.49	10.799	12.47	12.38
86.787	12.76	12.54	10.812	12.49	12.33
86.800	12.68	12.42	9616.864	12.76	-
86.814	12.62	12.40	16.880	12.81	-
86.829	12.68	12.50	16.897	12.59	-
86.842	12.74	12.45	16.914	12.65	-
86.856	12.58	12.48	9617.856	12.93	12.70
86.870	12.63	12.39	17.873	13.02	12.76
86.884	13.03	12.55	17.891	12.91	12.76
86.904	12.72	12.89	17.908	13.08	12.89
9590.679	13.27	12.94	9620.869	-	12.42
90.693	13.29	13.21	20.882	-	12.37
90.707	12.99	12.76	20.896	-	12.28
90.720	13.09	12.79	20.910	-	12.27
90.738	13.03	12.89	9622.694	12.52	12.38
90.752	12.90	12.59	22.707	12.52	12.30
90.766	12.73	12.45	22.721	12.56	12.31
90.779	12.60	12.49	22.735	12.56	12.31
90.797	12.68	12.40	22.752	12.59	12.43
90.804	12.59	12.40	22.766	12.59	12.45
90.824	12.59	12.49	22.780	12.38	12.31
			22.794	12.56	12.45
			22.811	12.52	12.39
			22.825	12.69	12.41
			22.839	12.52	12.35
			22.853	12.62	12.47

Table 3 Bethany, Connecticut, U.S.A.

J.D. hel. 2430000+	B	J.D. hel. 2430000+	B
9584.891	12.64	9641.750	13.24
9589.849	13.53	41.755	13.23
9592.850	12.45	41.761	13.46:
9593.813	13.06	41.766	13.08
9609.772	12.27	9642.726	13.02
09.791	12.23	42.732	13.11
9610.804	12.41	42.737	13.09
10.814	12.47	42.743	13.12
10.823	12.53	9644.711	12.34
10.831	12.62	44.717	12.34
9611.829	12.63	44.722	12.34
11.840	12.63	44.728	12.31
11.848	12.44	44.734	12.45
11.857	12.59	9645.727	13.27
11.865	12.57	45.732	13.25
9614.764	12.31	45.737	13.23
14.770	12.44	45.743	13.23
14.775	12.48	45.761	13.18
14.780	12.41	9648.674	12.98
14.820	12.35	48.680	12.99
14.826	12.40	48.686	12.94
14.830	12.3[illegible]	9698.624	12.89
14.835	12.5[illegible]	9910.910	13.02
9624.762	12.7[illegible]	10.924	13.04
24.773	12.70	10.929	13.07
24.782	12.76	9913.926	12.58
24.788	12.72	13.932	12.62
9627.801	12.67	9945.892	12.56
27.808	12.68	45.898	12.93
27.814	12.7[illegible]	45.902	12.53
27.820	12.77	9948.892	12.77
9628.750	12.73	48.898	12.85
28.755	12.[illegible]9	9966.860	12.57
28.761	12.70	10013.712	12.54
28.767	12.77	13.718	12.55
		13.722	12.52

COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 668

Konkoly Observatory
Budapest
1972 April 29

TIMES OF MINIMA OF ECLIPSING BINARIES

During the summer and fall of 1971, the writer observed several eclipsing binaries photoelectrically with the 12-inch Clark refractor at Mt. Hamilton. A 1P21 photomultiplier, refrigerated with dry ice, and a yellow filter (Corning No.3385) were used in the photometer. Using magnitude differences with respect to nearby comparison stars, times of eclipse minimum were obtained for eight binaries. The individual times of minimum are listed in the following table. These are primary eclipse minima, unless noted otherwise. The O - C values were computed using the elements listed in the 1969 <u>General Catalogue of Variable Stars</u>, except for MR Cyg (see remarks).

star	J.D. Min. hel. 2441000 +	estim. error	O - C
BX And	210.805	±0.001 day	+0.003 day
	213.858	0.001	+0.004
	276.697	0.001	+0.002
XX Cep	214.61	0.01	-0.01
CQ Cep	193.861[x]	0.002	+0.009
	207.820	0.002	+0.018
	216.854[x]	0.002	+0.025
	222.598	0.005	+0.024
TV Cet	275.962	0.001	+0.042
MR Cyg	172.810	0.005	-0.003
	209.707	0.002	-0.001
	214.735	0.005	-0.004
S Equ	218.866	0.005	+0.004
SW Lac	192.76[illegible][x]	0.0002	-0.0254
	192.92[illegible]	0.0005	-0.0248
U Sge	203.802	0.001	+0.007

[x] secondary eclipse

XX Cephei: An O-C curve has been published by J.M.Kreiner (1971), based on different elements. The observed minimum, with an O-C of -0.05 day from those elements, seems to be consistent with an interpretation in terms of a cyclic period variation.

TV Ceti: The present observations indicate primary eclipse is partial, with a depth of $0^m.72$, and a duration of 7.4 hours. The large O-C indicates that revision of the elements is desirable. Using the epoch of the G.C.V.S. elements, and the observed minimum, the elements derived are:Hel. J.D. Min.= 2441275.962+9.1032884 E.

MR Cygni: The elements used to compute the O-C values are those given by J.C. and R.H. Koch (1962):

Hel. J.D. Min.= 2427013.6177+1.6770337 E

SW Lacertae: A light curve was assembled from the observations, which included photometry from five nights. This indicated that the visual magnitude difference between primary minimum (phase 0.0) and phase 0.25 was $0^m.81$.

April 10, 1972

ALLAN MEYER

Board of Studies in
Astronomy and Astrophysics
University of California,
Santa Cruz

References:

J.M. Kreiner, Acta Astronomica 21, no.3, p.365 (1971)

J.C. Koch, R.H. Koch, Astronomical Journal 67, 462 (1962)

COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 669

Konkoly Observatory
Budapest
1972 May 1

PHOTOELECTRIC OBSERVATIONS OF THE FLARE STAR EV LAC

Continous photoelectric monitoring of the flare star EV Lac has been carried out at the Stephanion Astronomical Station ($\alpha=-22^{\circ}$ 49'44" $\phi=+37^{\circ}45'15"$) during the period of cooperative optical observations of this star proposed by the IAU Working Group on Flare Stars i.e. September 11-27, 1971(Andrews et.al. 1971) using the 30-inch Cassegrain reflector of the Department of Geodetic Astronomy, University od Thessaloniki. Observations have been made with a Johnson dual channel photoelectric photometer in the B color of the international UBV system. The telescope and photometer will be described elsewhere. Here we mention only that the transformation of our instrumental ubv system to the international UBV system is given by the following equations:

$$V=v+2.094+0.022(b-v),$$
$$(B-V)=0.837+1.005(b-v),$$
$$(U-B)=-1.179+0.993(u-b),$$

The monitoring intervals in UT as well as the total monitoring time for each night are given in Table 1. Any interruption of more than one minute has been noted.

During the 5.9 hours of monitoring time 2 flares were observed the characteristics of which are given in Table 2. For each flare following characteristics(Andrews <u>et.al</u>.1969)are given: a) the date and universal time of flare maximum, b) the duration before and after maximum (t_b and t_a respectively) as well as the total duration of the flare,c) the value of the ratio $(I_f-I_o)/I_o$ corresponding to flare maximum, where I_o is the intensity deflection less sky background of the quiet star and I_f is the total intensity deflection less sky background of the star plus flare, d) the integrated intensity of the flare over its total duration, including pre-flares, if present, $P=\int(I_f-I_o)/I_o\, dt$, e) the increase of the apparent magnitude of the star at flare maximum $\Delta m(b) = 2,5 \log(I_f/I_o)$, where b is the blue magnitude of the star in our instrumental system, f the standard deviation of random noice fluctuation $\sigma(mag) = 2.5 \log(I_o+\sigma)/I_o$ and g) the air mass. The light curves of the observed flares in the b color are shown in Figs. 1-2.

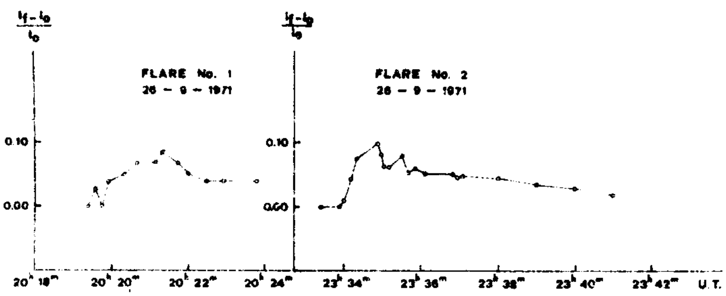


Table 1

Date 1971 Sep.	Monitoring intervals (UT)	Total monitoring time
26-27	$19^h44^m-20^h25^m$, 2026-2048, 2058-2118, 2119-2200, 2208-2228, 2230-2250, 2251-2312, 2320-2341, 2342-2400, 0000-0023, 0032-0052, 0053-0113, 0114-0133	5^h6^m
27	1852-1912, 1913-1934, 1935-1942	48^m
	Total	5^h54^m

Table 2

Characteristics of the flares observed

Flare No.	Date 1971 Sep.	U.T. max.	t_b min.	t_a min.	Duration min.	$\frac{I_f-I_o}{I_o}$ max.	P min.	Δm mag.	σ mag.	Air mass
1.	26	$20^h21^m.3$	1.6	?	?	0.08	?	0.09	0.011	1.03
2	26	23 34.8	0.9	5.5	6.4	0.10	0.30	0.10	0.014	1.09

Department of Geodetic Astronomy
University of Thessaloniki, Greece
April 18, 1972

M.E. CONTADAKIS
L.N. MAVRIDIS

References

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

Andrew, A.D., Chugainov, P.F., Kellog, E.M., and Oskanian V.S.: Comm.27 IAU, Inf.Bull.Var. Stars No. 516.

COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 670

Konkoly Observatory
Budapest
1972 May 3

NEW FLARE STARS IN ORION

In the course of a program on searching flares in Orion 22 flare stars were discovered. Only 3 of them are listed in [1]. The observations were made on Kodak OaO emulsion (without filter) with the 70 cm Meniscus-type telescope of the Abastumani Astrophysical Observatory. 62 plates each with five successive exposures of six minutes were obtained in the period 15 Nov. 1969 - 8 Jan. 1970.

The plates obtained have been measured by means of the photometer MF-6 using NPS and Andrew's standards [2] for calibration curves.

Table 1 gives coordinates, pg magnitudes at minimum, pg amplitude and date of the flares and Tonantzintla Catalogue number from [1]. If the star was unvisible before the flare (because of its weakness), the magnitude in minimum was measured on the plate obtained with 30 min exposure, or was estimated on Palomar Atlas. These magnitudes are given in parentheses.

The majority of the discovered flare stars have a time of decline not longer than 20-30 minutes exept of 2 stars (No 13 and 21 of Table 1), having a time of decline of several hours.

The details of observations will be published later.

Abastumani Astrophysical Observatory,
Georgia, USSR.
April, 1972

R.I. KILADZE

References:

1. Haro, G., 1969, Bol.Obs. Tonantzintla y Tacubaya, 32, 59.
2. Andrews, A.D., 1970, Bol.Obs. Tonantzintla y Tacubaya, 34, 195.

Table 1

No.	1900 RA	D	Magn. pg	m_{pg}	Date		Ident,
1	$5^h25^m16^s$	$-7^{\circ}02'.8$	17.7	1.2	5 Dec.	1969	
2	29 29	-4 49.2	(18.1)	2.3	5 Dec.		
3	28 52	-4 56.2	16.6	0.6	6 Dec.		200
4	28 43	-5 57.0	15.6	0.9	8 Dec.		
5	27 08	-4 33.6	16.1	0.8	8 Dec.		
6	28 16	-5 03.7	17.0	1.1	1 Jan.	1970	15
7	30 46	-7 12.9	16.7	1.3	1 Jan.		
8	26 30	-5 09.7	17.3	0.8	5 Jan.		
9	22 20	-4 16.9	(18.1)	1.2	5 Jan.		
10	24 08	-5 44.3	16.8	0.8	5 Jan.		
11	26 58	-4 27.2	17.9	3.3	5 Jan.		
12	29 08	-5 01.4	(21.0)	5.3	5 Jan.		
13	29 04	-5 29.0	15.3	1.6	5 Jan.		
14	29 58	-6 30.8	17.9	0.9	6 Jan.		46
15	27 45	-4 02.2	17.0	1.0	6 Jan.		
16	30 55	-6 33.0	17.1	2.5	6 Jan.		
17	31 34	-6 30.2	16.9	0.7	6 Jan.		
18	33 35	-7 03.3	18.0	1.8	6 Jan.		
19	29 41	-4 21.8	17.9	1.8	6 Jan.		
20	29 01	-6 21.9	(18.9)	3.4	7 Jan.		
21	30 57	-6 44.9	17.7	3.2	7 Jan.		
22	26 08	-4 08.9	16.8	0.7	7 Jan.		

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NUMBER 671

Konkoly Observatory
Budapest
1972 May 5

NOTE ON THE SUSPECTED SUPERNOVA ANNOUNCED IN IBVS 653

An old supernova of 1954 in NGC 4027 (Bulletin Variable Stars, No. 653) was announced. I am afraid that Dr. Lovas did not realize that many luminous patches on the original Palomar plates become very black on the paper prints. I compared the actual survey plates No. 1030 of April 2/3, 1954 with my newer E and O plates PS 4639, 4640 of April 13/14, 1969 and there is no difference to be seen from the 1954 plates. Actually on the latter Dr. Lovas' SN is several magnitudes fainter than the Star A. His SN therefore was not a supernova but only a badly overexposed spot on the paper prints.

April 21, 1972

F. ZWICKY
California Institute of Technology
Pasadena, California 91109. U.S.A.

A NOTE ON HR6773 = HD165814

In a recent paper (Hube 1971, P.A.S.P.83, 805.) spectroscopic evidence was presented which suggests that the light variations of HR6773 discovered by Corben (1971 Sky and Telescope 42, 53.) are due to stellar eclipses. Since then, W.P.Bidelman has privately informed the writer that the variability of this system had been discovered previously by Strohmeier, Knigge and Ott (1964 IBVS 74) who indicated a photographic range of 0.4 magnitude in agreement with the range found by Corben.

Further study of the published radial velocities indicates that they can be satisfied by a period of approximately 2.248 days.

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INFORMATION BULLETIN ON VARIABLE STARS
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Konkoly Observatory
Budapest
1972 May 8

PHOTOELECTRIC OBSERVATIONS OF THE FLARE STAR EV Lac

Photoelectric monitoring of the flare star EV Lac has been carried out at the Prairie Observatory of the University Illinois in the period of the international patrol, September 11-27, 1971, as well as on dates outside of this period. The observations were made with the 102-cm reflector and a single channel photoelectric photometer. The photocell was an EMI 6256B, cooled to -20°C. The filter employed was a Corning No. 5030 cemented to a Schott GG13 of 2mm. thickness, corresponding to the photometric system B. The observations were recorded on a Keithley chart recorder, model 360. Total monitoring time was 27hr 12m, and two flares were observed. Stars BD +43°4303 and BD +43°4304 were monitored as comparison stars. All observations of EV Lac included its close optical companion and thus the observed increase in brightness during the flares refers to the combined light of EV Lac and its companion.

Table 1 gives the times of coverage and the standard deviation of the random noise, σ , in magnitudes. Interruptions of less than one minute are not noted. The sampling time used in the calculation of the noise levels was one minute.

Table 2 gives the photometric data for the observed flares. All quantities listed are those of IBVS No. 326. It should be noted that the random noise levels listed in Table 2 are applicable just before the flares and do not necessarily correspond to the typical values for the night.

The light curves of the two flares, in relative intensity units, are also presented.

We owe a large debt to Dr. Edward C. Olson and Dr. Kenneth M. Yoss for their many efforts on behalf of the flare star program. Miss Grace Nothdurft has given her valuable assistance in obtaining the observations.

Table 1

Dates and Times of Coverage

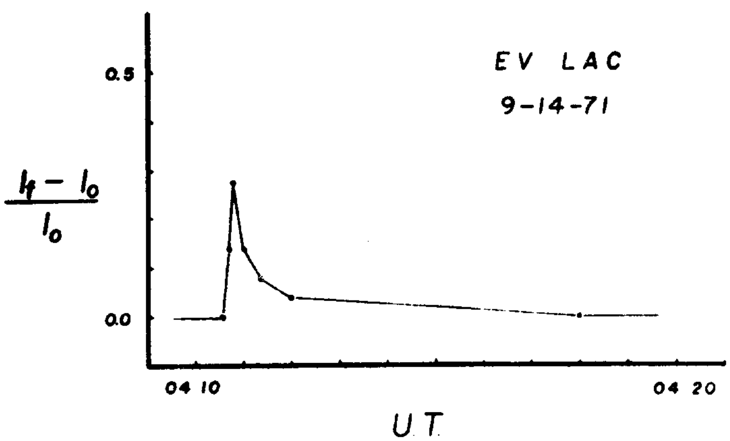
Date UT 1971	Monitoring UT	σ
Sept. 11	$04^h47^m.0$-$06^h00^m.4$,06 11.0-07 03.1,07 14.1-07 40.4	.05
Sept. 12	03 18.0-04 10.3,04 20.9-05 13.5,05 19.7-06 00.7, 06 09.3-07 15.5,07 22.6-07 24.7,07 26.7-08 16.5, 08 26.0-08 30.0,	.03
Sept. 13	03 01.0-03 59.6,04 10.2-05 02.1,05 04.3-06 02.3, 06 18.8-06 56.0,06 57.2-07 10.4,07 15.8-07 52.0, 07 54.3-08 00.0	.04
Sept. 14	03 45.0-04 27.8,04 31.1-05 30.1,05 31.7-06 15.2	.03
Sept. 27	01 14.0-01 24.4,01 27.4-01 41.5,01 43.4-02 31.3, 02 51.1-02 59.4,03 00.4-03 19.9,03 21.7-03 46.3, 03 48.0-04 40.0,04 06.2-04 57.6,04 59.3-05 29.2, 05 31.0-06 18.4,06 21.3-06 47.3,06 48.3-06 52.2, 06 57.3-07 04.1,07 07.4-07 15.8	.03
Sept. 28	01 03.0-01 49.6,01 51.5-02 45.5,02 47.7-03 28.3, 03 29.4-04 10.2,04 11.2-04 34.3,04 37.3-05 42.8, 05 44.3-06 36.8,06 38.4-07 13.0	.04
Oct. 19	05 28.0-05 34.8,05 36,7-06 15.2,06 16.8-06 30.9, 06 32.1-06 41.2,06 42.3-06 50.0	.04
Nov. 13	03 38.0-03 43.7,03 45.5-04 01.8,04 03.4-04 13.3, 04 15.1-04 26.4,04 29.1-04 38.0	.03

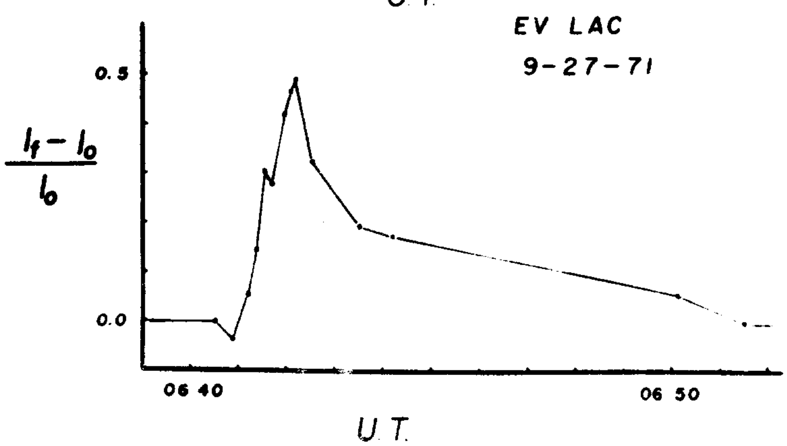
Total monitoring time = 27hours 12minutes

Table 2

Photometric Data for Flares Observed

Date	UT maximum	Duration before max. (min.)	Duration after max. (min.)	$\frac{I_f - I_o}{I_o}$	σ (magn.)	P_b (min.)	air mass
9-14-71	$04^h10^m.8$	0.25	7.45	0.27	.03	0.27	1.04
9-27-71	06 42.2	1.30	9.30	0.49	.03	1.47	1.15





Urbana, Illinois
April 25, 1972

DRAKE DEMING
University of Illinois
Observatory

J. C. WEBBER
Vermilion River Observatory,
University of Illinoins

COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 673

Konkoly Observatory
Budapest
1972 May 9

BAV - Mitteilungen Nr.24

ELEMENTS FOR IQ PERSEI

The GCVS II (1970) gives no elements for this probable Algol-type variable, only the time for one minimum is published. Observations of BAV-members lead to the following elements:

$$\text{Min I} = \text{JD } 24\ 33546.5036 + 1^{d}.743\ 563\ 7 \cdot E.$$

The following minima were available for the calculations:

Time of Minimum (JD 24...)	Observer	n	O - C
33 243.13 :	(GCVS)	1	+0.006:
513.396:	K.Dorke	8	+0.020:
546.500	K.Domke	11	-0.003
900.449	A.Jahn	10	+0.003
41 040.332:	W.Bischof	8	-0.008:
230.389	W.Bischof	15	±0.000
244.338:	W.Bischof	15	+0.001:
249.567	W.Bischof	18	±0.000

n is the number of individual estimates used for timing the respective minimum, : means that the time of minimum is uncertain. Only the 4 accurate minima were used to calculate the above elements.

The type of variability is Algol. The visual observations did not lead to a secondary minimum of observable depth. The "D" of primary minimum is $0^{d}.2$, the "d" may be $0^{h}.0$ to $1^{h}.0$. The visual amplitude is about $0^{m}.6-0^{m}.7$. A complete description of the observations with lightcurve shall be published in BAV-Rundbrief no. 3/1972.

Berliner Arbeitsgemeinschaft für Veränderliche Sterne (BAV)
D-1000 Berlin 19 Reichsstrasse [illegible]5

W. BISCHOF

COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 674

Konkoly Observatory
Budapest
1972 May 11

VARIABLE STARS AND X-RAY SOURCES

The positions of the X-ray sources given by Giacconi, et al.(1971 "The Uhuru Catalogue of X-ray Sources"ASE-2855 preprint Ap.J., in press) in the Uhuru Catalogue have been compared to known variable stars (Kukarkin, et al. GCVS 1969) since the few stellar identifications for X-ray sources have all been with stars which are variable in light.

In Table I we present all of the known variable stars (with the exception of those already known as X-ray stars) found within the 90% certainly boxes given in the Uhuru Catalogue or a box 10% larger (as noted) ; the sizes of the boxes in square degrees are given in column 2. We list all of the variables found, but some are unlikely sources for the X-rays.

In view of the binary nature of Cyg X-1 and probably Cen X-3, we consider V506 Sco and V845 Oph potentially interesting possibilities. Further, the interesting irregular nebular variable RX Ori could be the X-ray source. X Per+ is nearly centrally placed in the error box, and its variable spectrum,emission characteristics, and irregular light variations are well known. The RR Lyrae star and the semi-ragular variables seem to us unlikely identifications but have been included for completeness. The character of the variation of 100215 and 7831 is unknown. Unfortunately little is known about the spectral characteristics of all of these stars.

The probability of finding some variable stars within the error boxes is large, so that further investigation is necessary to show if any of these might be the source of the X-rays.

D.J. MacCONNELL and A.P. COWLEY
The University of Michigan

+The possibility that X Per might be the Xray source has recently been pointed out by Braes and Miley (1972 Nature 235, 273) and Van den Bergh (1972 Nature 235, 273).

Table I

Variable Stars within or very near the Error Boxes in the Uhuru Catalogue

X-ray Source	Sq. Deg.	Variable Star	Magnitude	Type of Variable	Remarks	Likelihood of Identification
2ASE 0240+44	0.45	CSVS 100215	13.9	?		?
0352+30	.023	X Per	6.0- 6.6	Irreg.	BOnne; spec. var.; V/R em. var.; nearly central in box	good
0440+7	0.59	BZ Tau	13.7-15.8	Semi-reg.	late type	unlikely
0525-6	2.30	RX Ori	13.7-(17.2	Irreg.	in diffuse nebula	fair
1440-39	0.90	V544 Cen	14.9-15.9	Eclipsing	$p = 3.10^d$; 0.1° out of box	fair
1718-39	.14	V506 Sco	13.3-16.0	Eclipsing	$p = 2.14^d$	good
1735-28	.045	V845 Oph	13.8-14.5	Eclipsing	$p = 3.83^d$	good
1757-33	.14	V1720 Sgr	14.3-15.1	Semi-reg.?		unlikely
1822+0	.073	CSVS 7831	15.0-16.8	?		?
1822-37	.26	V593 CrA	12.6-14.3	RR Lyrae	$p = 0.39^d$; nearly central in box	unlikely
2130+47	0.07:	V628 Cyg	12.6-13.0	W UMa	$p = 0.65^d$; just outside box	?

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Konkoly Observatory
Budapest
1972 May 16

MINIMA OF R CMa

The eclipsing binary, R CMa, was observed photo-electrically in blue light (Johnson's B Filter) with a 1P21 Photomultiplier attached to the 15-inch refractor of the Nizamiah Observatory, Hyderabad, India, during the year 1971. BD - 15°1734 and BD - 15°1732 were used as primary and secondary comparison stars, respectively. The helio-centric times of minimum light, obtained by using Kwee and Van Woerden's method, (B.A.N.12,327, 1956) are given below:

Minimum (Primary)	O - C
J.D. 2440971.487	+ $0^{d}.004$
2440979.439	0.004
2440995.139	0.006
2440996.271	0.002

These (O-C)'s are calculated using the ephemeris given by K. Sato (Pub.Ast.Soc.Jap. 23,335, 1971):

Min. J.D. 2439140.1448 + $1^{d}.13593876$ E

G.K. Charyulu (Inf.Bull.Var.Stars No.390) had reported large negative residuals of $-0^{d}.196$ and $-0^{d}.192$ from similar observations made at the Nizamiah Observatory. These residuals were derived from the unpublished ephemeris of E.F. Guinan:

Min. J.D. 2420213.1393 + $1^{d}.13594988$ E

By using the ephemeris given by Sato, these large negative residuals will reduce to $-0^{d}.001$ and $+0^{d}.006$ respectively. This suggests that the ephemeris of E.F. Guinan used by Charyulu does not satisfy the observations made during the period 1967-1971.

M.B.K. SARMA

Nizamiah and Rangapur Observatories
and Department of Astronomy
Osmania University
Hyderabad-7
India

COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 676

Konkoly Observatory
Budapest
1972 May 17

PHOTOELECTRIC OBSERVATIONS OF THE ECLIPSING VARIABLE Z VULPECULAE

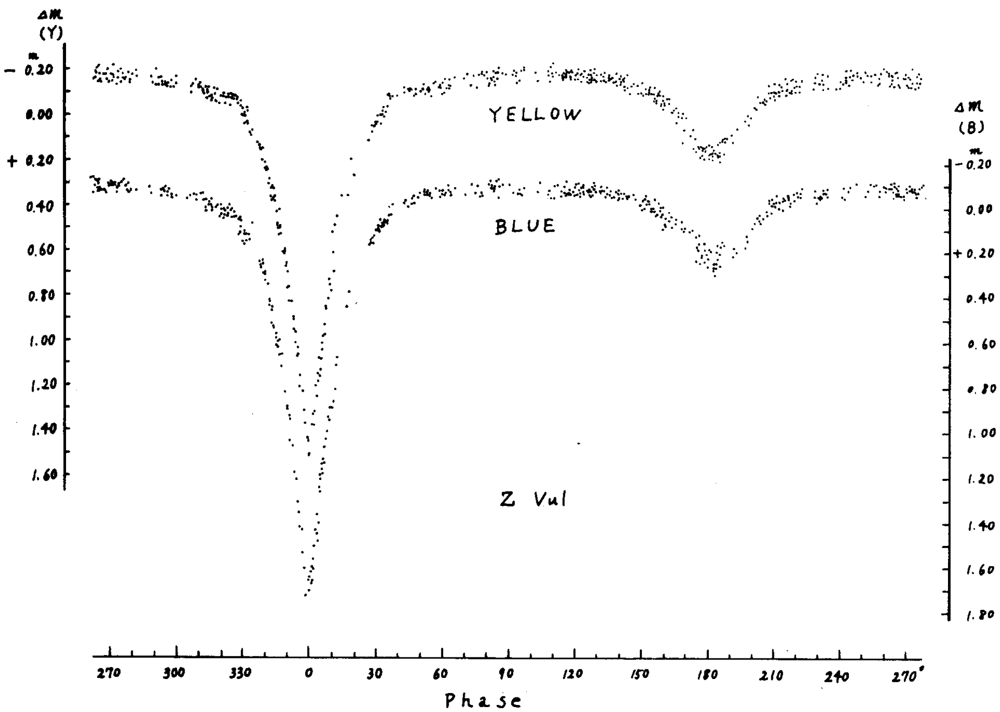
Photoelectric observations of Z Vulpeculae in blue and yellow colours were carried out with the 8-inch refractor at the Education Centre of Kanagawa Prefecture (longitude=$9^h17^m55^s.3$, latitude=$+35^\circ21'23''.2$) during forty-eight nights from July 8 to December 18, 1971. The photometer was furnished with a 1P21 photomultiplier tube and two colour filters (Schott BG12+GG13 for blue and Schott GG41 for yellow). BD+25°3802 was used as the comparison star throughout the course of these observations. This comparison star was the same one as previously used by Broglia (1964, Jd.Obs. 47, 100).

As the variable star and the comparison star have close positions and similar colours, there is little concern about making any correction for differential extinction. Thus, all the observations given in $\Delta m = m_{var} - m_{comp}$ are individually plotted in the following figure.

Our observations cover the primary minimum once with the observed epoch JD 2441170.1053, which gives $+0^d.0070 \pm 0^d.0014$ (p.e.) for the O-C residual from Dugan and Wright's ephemeris (1939, Princeton Contr. 19, 55).

The observations were made under the guidance of Prof.M. Kitamura of Tokyo Astronomical Observatory, to whom we wish to express our hearty thanks.

HITOSHI OGATA and TSUYOSHY OUTI



Δm (Y)
m
− 0.20
0.00
+ 0.20
0.40
0.60
0.80
1.00
1.20
1.40
1.60
YELLOW
BLUE
Z Vul
Δm (B)
m
− 0.20
0.00
+ 0.20
0.40
0.60
0.80
1.00
1.20
1.40
1.60
1.80
270
300
330
0
30
60
90
120
150
180
210
240
270°
Phase

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

NUMBER 677

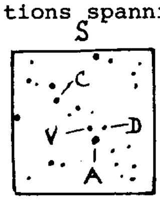
Konkoly Observatory
Budapest
1972 May 17

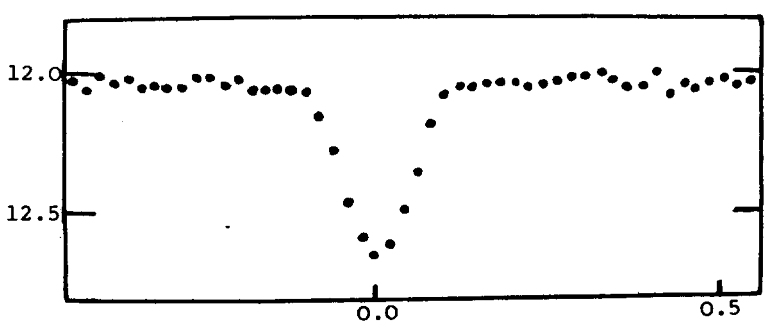
A NEW SHORT PERIOD ECLIPSING BINARY

In 1970 Marcia Keyes at the Maria Mitchell Observatory discovered an eclipsing variable at $18^h06^m47^s - 21^\circ56'.0$ (1900). The following summer step estimates of the changes in brightness were carried out by Judith Karpen who also ascertained the period and computed most of the phases:

Primary minimum = JD 2440058.752 + $0^d.9541102$ E

In all 708 plates were available, of the Harvard MF and B series and the Nantucket NA. Each point in the accompanying mean light curve represents from 8 to 24 individual observations spanning the years 1924 through 1971. The photographic magnitudes for the comparison stars A, C and D marked on the finder chart have been adopted as 12.0, 12.5 and 13.0 respectively. The range of the variable from the mean light curve is from 12.00 to 12.65 mag.





Numerous spurious periods were tested, none of which satisfied all of the observations.

We are grateful to the National Science Foundation for the support of this investigation.

9 May 1972

DORRIT HOFFLEIT
Maria Mitchell Observatory
Nantucket, Massachusetts, U.S.A.

COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 678

Konkoly Observatory
Budapest
1972 May 19

PHOTOELECTRIC OBSERVATIONS OF V645 Cen

The flare star V645 (Proxima) Cen was monitored for a total of 9 hours 44 minutes on 5 nights in the period of co-operative observations 6-21 April, 1972 using the Auckland Observatory 50cm reflector. Observations were made using the B filter of the Johnson UBV system, using an EMI 9502 photo-multiplier tube and a digital recording apparatus with the exception of the first two periods on April 10 when a V filter was used. The time of monitoring is given in Table 1.

Table 1 Coverage UT

1972 April	9	0956-1007, 1011-1043, 1051-1247, 1258-1352.
	10	1025-1037, 1041-1052, 1112-1144, 1151-1205.
	13	1022-1029, 1036-1046, 1050-1121, 1126-1157, 1203-1230.
	14	0725-0729, 0732-0818, 0902-0919, 0926-0957, 1000-1019, 1021-1029.
	21	1031-1038, 1106-1140.

No definite flare activity was recorded.

Assistants: - G. Freeth, S. Clements, B. Wilde, P. Connolly, D. Paterson and F. Williams.

Auckland Observatory B.F. MARINO and W.S.G. WALKER

THE U Gem TYPE VARIABLE Z Cha

The GCVS (1969) lists the photographic range of Z Cha as 12 - <13.5 with a mean cycle of 66 days. During the interval 2,434,875 (1954 May 10) to 2,441,103 (1971 May 31) 59 maxima have been observed from 4,500 observations.

The mean cycle from these observations is 104.1 days with a visual range of 11.5 to <14.0. Maxima magnitudes range from 11.5 to 13.0. Maxima brighter than 12.0 tend to reoccur at mean intervals of 343.5 days. The average number of maxima of all types within any interval of one thousand days is 9.6 with very little deviation.

The detailed results will appear in Memoir No 2, VSS, RASNZ.

FRANK M. BATESON

VSS, RASNZ.

VISUAL OBSERVATIONS OF YZ CMi AND V371 Ori

Visual observations of the flare stars YZ CMi and V371 Ori were carried out at the Whakatane Observatory using their 20cm refractor. Coverage is given in Table 1.

Table 1 Coverage UT

YZ CMi

1972 January	8	1149-1421, 1424-154.	
	9	1144-1400	
	10	1138-1418	Total 8^h59^m

V 371 Ori

1972 January	8	0938-1138	
	9	0926-1136	
	10	0855-1135	Total 6^h50^m

Four suspected flares of YZ CMi were observed at:- Jan. 9 $13^h09.5^m$; Jan. 10 11^h57^m; $12^h21.5^m$ and 12^h42^m. Each flare of 0.2 mag.

Suspected flares of V371 Ori were recorded at: - Jan. 8 10^h08^m(0.3mag); $11^h28.5^m$(0.2mag); Jan. 9 $10^h15.5^m$(0.2mag).

Observers:- B. Marino; J. Duthie; J. McQueen.

VSS, RASNZ.

FRANK M. BATESON

COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 679

Konkoly Observat.
Budapest
1972 May 19

WELCH'S RED VARIABLE STAR IN CRUX
AN R CENTAURI LIKE VARIABLE

This star was discovered in September, 1969, by R.G.Welch on photographic patrol plates exposed by him. In Circular 151 of the RNZAS Variable Star Section, Bateson published a chart of this star and gave its position as:

$$AR= 12^h13^m\!.5,\ D= -56^\circ01.9',\ 1950$$

Welch advised the Auckland Observatory of his discovery and we have made 100 photo-electric observations during the period 1969 October 11 to 1972 February 9. These will be published shortly in the RNZAS Variable Star Section Circulars, but copies are available from the authors upon request. These observations are presented graphically in Figure 1.

All measures were made using the Auckland Observatory 50 cm cassegrain reflector, and EMI 9502 SA photomultiplier, and standard UBV filters. Comparison stars used were CPD -55° 4940 and CPD -55°4926.

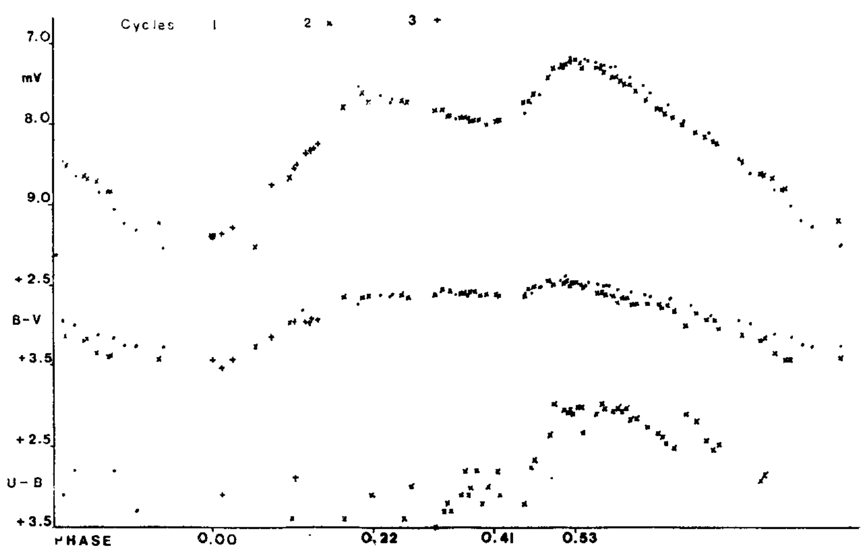


FIGURE 1 WELCH'S RED VARIABLE STAR IN CRUX UBV OBSERVATIONS

From the observations made in Auckland we have derived the following elements: JD 2440827 + $420^{d}.25$E

The light variations range from, at maximum, V=7.2, B-V=+2.5, U-B=+2.0; to minimum V$\sim$10.0, B-V=+3.5, U-B$\sim$+3.5.

Following discovery by Welch, Dr Richter of the Sonneberg Observatory has kindly supplied photographic measures from plates taken in South West Africa in 1937 and 1951. Those in 1951 watch present observations very well but in 1937 the amplitude of the light variations appeared much smaller although there were some comparison problems arising through the use of several differing types of film emulsions.

The most notable feature of this star is that its light curve is very similar to R Cen, in that it exhibits double maxima. The amplitude of the variations is smaller, but this may be attributable to the greater redness of Welch's star (+2.5 at maximum as against R Cen +1.9). In all other respects this variable is very similar to two other stars of this type, R Cen and R Nor. The phase positions of maxima and minima are very similar and the light variations, expressed as a percentage of the total light variation are similar, although the secondary minimum of this Crucis variable is rather shallower than either of the others.

This star at present has an amplitude in B of about 4 magnitudes and it is surprising that discovery was so late. We surmise, and this is confirmed by the 1937 observations, that whilst the period remains reasonably steady the amplitude may be highly variable. Further observations are continuing.

1972 February, 13

W.S.G. WALKER

BRIAN F.MARINO

Auckland Observatory, of the
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COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 680

Konkoly Observatory
Budapest
1972 May 24

PI PsA

Position 1900: AR= $22^h57^m58^s$ Dec= $-35^o17'3$
CoD -35^o 15630 (5,3) HD 217792 (FO)

La variabilité de cette étoile (=BV 620) a été annoncée par Strohmeier, Knigge et Ott (1). Il s'agit d'une céphéide de faible amplitude ($A_{pg}=0^m.3$) et de période P= 7,975j.

Or, Pi PsA figure dans le "Catalogue of Nearby stars" de Gliese (2), sous le no 886.2, avec les caractéristiques suivantes:

V = 5,10 B-V= +0,29 U-B= +1,56:
$\mu\alpha= 0^s.071$ $\mu\delta= 0''.085$
$\pi = 0''050 \pm 0''010$ soit M (V) = +3,6
binaire spectroscopique P= 356,567j (3)

D'après Gliese (4), le type spectral a été succesivement noté FOIV par Jaschek, FOIV et FOV au Mt-Stromlo. Quant à la parallaxe, elle est basée sur une seule détermination, assez imprécise.

Si le mouvement propre, assez important, et le type spectral sont confirmés, il est douteux que cette étoile soit une céphéide. Il serait donc intéressant de procéder à de nouvelles observations spectroscopiques et photométriques.

MICHEL PETIT

Réferences:

(1) W.Strohmeier, R.Knigge et H.Ott: I.B.V.S. 86, 1965.
(2) W.Gliese: Heidelberg Veröff. no22, 1969.
(3) R.Buscombe et Morris : MN 123, 183, 1961.
(4) W.Gliese: comm.privée du 30.4.72.

COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 681

Konkoly Observatory
Budapest
1972 May 25

HD 93206 (CSV 6797) AN ECLIPSING SYSTEM PRESENTING OBSERVATIONAL PROBLEMS

Discordant observations of Eta Carinae by experienced visual observers led the authors to measure several of the comparison stars during 1971. One of the stars measured, HD 93206, spectral class BO, showed evidence of variability of an unusual nature, in that on every third night the values obtained were almost identical. Other observers have experienced difficulties with this star, but apparently no-one has attempted to confirm either the variability or type.

Between 1971 March 24 and 1972 February 3, fifty one photoelectric observations were made at the Auckland Observatory using the 50cm cassegrain reflector, an EMI 9502S/A photomultiplier, and standard UBV filters. On some occasions observations were made in two colours only. The star was observed differentally in relation to HD 93131 whose values were determined as:

$$V= 6.50, \quad B-V= -0.03, \quad U-B= -0.80$$

Stars HD 93943, HD 92964, HD 93737, HD 93695, HD 92740 and HD 92741 were also observed during the programme to ensure non-variability of the main comparison star.

The observations show that HD 93206 is an eclipsing binary, possibly of Beta Lyrae type, with a period of almost exactly six days. Both eclipses may be total, although only four observations on three nights have been made near primary eclipse. The observed range in V is from 6.22 to 6.49. The B-V colour remains constant at $\sim+0.15$.

Table 1 summarises the observations which have been reduced using the ephemeris:

$$\text{JD } 2441030.06 \; +6.000 \; E$$
$$\pm 0.20 \quad \pm 0.007$$

These observations are presented graphically in Figure 1.

Table 1

Observations of HD 93206

J.D. 2441000.00	V	B-V	U-B	Phase
034.91	6.24	0.12	-0.74	0.309
078.91	6.27	0.13	-0.72	0.642
088.84	6.24	0.15	-0.73	0.297
097.76	6.22	0.15	-0.72	0.783
119.76	6.38	0.13	-0.73	0.450
123.77	6.26	0.15	-0.72	0.118
129.78	6.31	0.12	-0.72	0.121
132.77	6.27	0.14	-0.74	0.619
139.80	6.25	0.14	-0.72	0.790
139.89	6.24	0.14	-0.72	0.806
145.77	6.23	0.14	-0.71	0.785
147.78	6.31	0.14	-0.72	0.120
148.83	6.26	0.15	-0.73	0.296
150.77	6.29	0.14	-0.73	0.618
150.79	6.30	0.13	-0.72	0.622
155.84	6.41	0.14	-0.73	0.463
169.82	6.23	0.15	-0.73	0.793
171.79	6.27	0.15	-0.73	0.122
175.81	6.23	0.15	-	0.778
177.79	6.27	0.15	-	0.121
180.79	6.29	0.15	-0.72	0.621
181.90	6.26	0.15	-	0.806
182.80	6.47	0.15	-0.69	0.956
182.83	6.44	0.15	-	0.961
183.80	6.28	0.17	-0.75	0.122
183.81	6.29	0.16	-0.72	0.123
184.80	6.22	0.16	-0.72	0.290
185.79	6.39	0.14	-0.71	0.455
185.80	6.40	0.14	-	0.457
185.92	6.42	0.16	-0.70	0.477
186.79	6.30	0.12	-0.74	0.621
197.80	6.41	0.15	-0.72	0.456
198.18	6.43	0.15	-	0.520
198.81	6.28	0.16	-	0.625
209.80	6.38	0.13	-0.75	0.456
258.10	6.44	0.16	-0.71	0.507
259.03	6.29	0.16	-	0.662
264.97	6.28	0.16	-	0.651
268.06	6.29	0.14	-	0.167
269.14	6.26	0.13	-	0.347
290.96	6.49	0.15	-	0.983
296.05	6.29	0.14	-	0.831
303.05	6.47	0.15	-	0.999
341.93	6.43	0.15	-	0.479
341.95	6.44	0.15	-	0.481
342.02	6.43	0.14	-	0.493
342.09	6.42	0.16	-	0.504
342.96	6.28	0.14	-	0.651
348.94	6.25	0.14	-	0.647
349.02	6.25	0.14	-	0.660
349.96	6.27	0.16	-	0.817
350.95	6.47	0.14	-	0.982

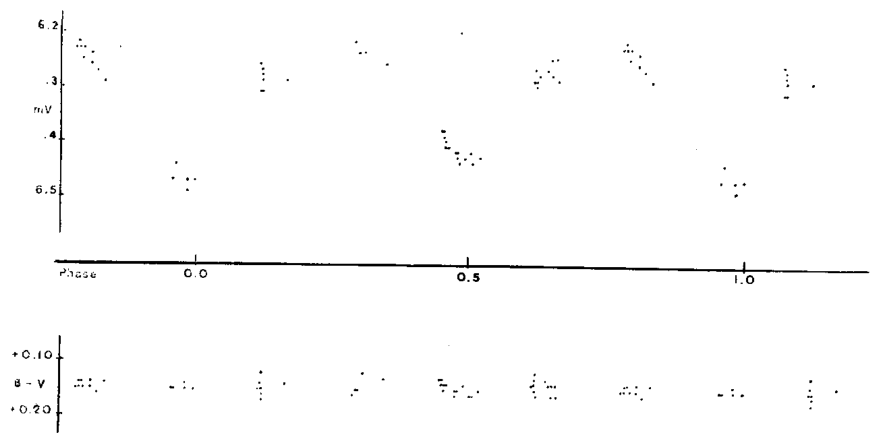

FIGURE 1 HD 93206 Photoelectric observations as listed in Table 1

Using these elements the observations do not show any significant change in phase over 300 days. Both eclipses appear to be of relatively long duration and we have not been able to observe the egress from totality, although it appears that the ingress of the secondary eclipse is being observed.

The period of this system, and the relatively small amplitude of the light variations, is such that the determination of an accurate epoch and period has proved impossible; nor has it been possible to fill the large gaps in the light curve. The solution to these problems probably lies in joint observations by several suitably located observers.

As this star is not of a type normally observed in Auckland we do not plan any further observations other than in conjuction with our study of the light variations in Eta Carinae. We are thus presenting the somewhat incomplete observations of this star in the hope that others may be encouraged to attempt observations.

1972 February, 13 (revised 1972 May)

W.S.G. WALKER

BRIAN F. MARINO

Auckland Observatory,
of the Auckland Astronomical Society,
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COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 682

Konkoly Observatory
Budapest
1972 May 25

PHOTOELECTRIC OBSERVATIONS OF THE FLARE STAR AD Leo

DURING THE 1972, FEBRUARY 9-22 INTERNATIONAL PATROL

The preliminary results of the AD Leo photoelectric observations carried out at the Catania Astrophysical Observatory during the 1972 capaign proposed by the IAU Working Group on Flare Stars (I.B.V.S. No. 605) are here reported.

The observations were performed by a symultaneous three colour photometer equipped with an EMI 6256 A (S13) photomultiplier and the Schott filter combinations: UG1/1 (U), BG12/1+GG13/2(B), GG14/2(V). The above photometric equipment was fed by a 61 cm quasi-cassegrain universal type reflector.

Adopting averaged coefficients, transformation equations from the Catania photometric system to the standard UBV were applied.

In Table 1 the intervals of effective coverage, which give a total of 4.2 patrol hours, and in Table 2 the characteristics of the observed flare are given. The flare light curve is shown in the accompanying Figure.

The explanation of symbols and additional details both on the observing equipment and the Catania photometric system can be found in Cristaldi S. and Rodonò M., Astron.and Astrophys. Suppl. (in press).

C. Lo Presti and F. Spinella have collaborated to the present work.

May 15, 1972

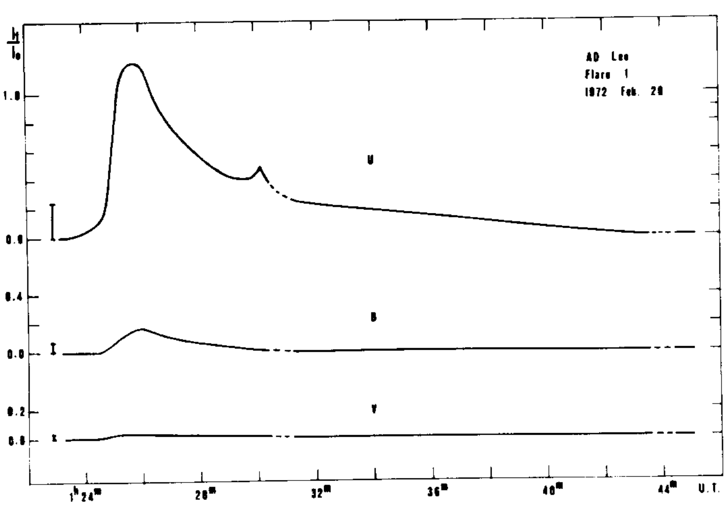
S. CRISTALDI and M. RODONO'
Catania Astrophysical Observatory
Italy

Table 1: Detailed coverage of 1972,February 19-20 observations

Light	Coverage UT	Total coverage	$3\sigma/I_o$
UBV	23^h10^m-2315;2319-2330;0010-0032; 0034-0153;0205-0301;0303-0400; 0411-0433.	$4^h.2$	.13/.03/.02

Table 2: Characteristics of the observed flare
Date: 1972 Febr. 20, Air mass: 1.19, Feature:double,Sky:clear, moonless.

Light	t_{max} UT	JD_{hel}	d_b	d_a	$3\sigma/I_o$	(I_f/I_o) max.	$P_{min.}$	Energy erg
U	$01^h25^m.8$	2441367.5652	$1^m.2$	$17^m.1$	0.12	1.22	5.88	0.38×10^{32}
B	01 25.9	1367.5653	1.3	6.0	0.03	0.17	0.49	0.22×10^{32}
V	01 25.5	1367.5650	0.9	6.0	0.02	0.03	0.14	0.14×10^{32}



COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 683

Konkoly Observatory
Budapest
1972 May 29

NEW VARIABLE STAR IN THE OPEN CLUSTER NGC 7128

The star No.5 of the Hoag etal. (1961, Publ.Naval Obs.Vol. XVII, Part VII.) catalogue located exactly in the centre of the open cluster NGC 7128 has been found as variable during photographic observations of the Nova Cephei 1971 between July 18, 1971 and April 20, 1972 with the Schmidt camera (80/120,f=240 cm) of Hamburg Observatory. This star, denoted in our list as HBV 478, RA= $21^h42^m13^s.88$, D= $+53^o29'32''.2$ (1950,Cygnus) was measured on 18 plates in the V (Kodak 103a-D + GG11) and B (Kodak IIa-O + GG13) international system, giving the following results:

JD_{hel}	V	B	JD_{hel}	V	B
244 1151.489	$12^m.57$	-	244 1207.46	12.14	12.99
1172.380	12.34	-	1240.36	12.13	13.07
1181.508	-	$12^m.98$	1266.27	12.35	13.17
1183.427	12.43	-	1331.26	12.36	13.06
1183.513	-	13.00	1394.62	12.60	13.43
1187.487	12.53	-	1428.58	12.26	12.86

Mean $\bar{V}$=12.37, $\bar{B}$=13.07

The mean deviation of one measurement, $\pm\ 0^m.17$ both in V and B, is about three times larger than the corresponding measuring errors, which strongly supports the variability of that star. The amplitude of about 0.5 mag. in both colours could be suspected. Our mean $\bar{V}$ and $\bar{B}$ values are in close agreement with those given by Hoag etal., V= 12.35, B-V= +0.78, U-B= 0.00.

The determination of the type of variability and further studies of this star could be very useful because of the fact that HBV 478 = 7128 - 5 is an early-type star (B2 V - Hoag, Applequist 1965, ApJ Suppl.No.107,215) and a physical member of the cluster.

Hamburg-Bergedorf Observatory
18 May, 1972

L. KOHOUTEK

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

NUMBER 684

Konkoly Observatory
Budapest
1972 June 20

PHOTOELECTRIC OBSERVATIONS OF YZ CMi

According to the proposition of the "working group" (IBVS 605) photoelectric monitoring of the star YZ CMi was carried out in the time interval 9 - 23 January 1972. The observations were effectuated on the 40 cm reflector of the Byurakan Observatory with a ϕJY - 79 photomultiplier and a corresponding B filter. The pulse counting technique with continuous registration on the recorder chart was applied.

The observational data (IBVS 488) are presented in the Table.

Date UT 1972	Coverage UT	UT_{max}	t_b	t_a	$X_{fM}/\bar{X}_s$	$\sigma/\bar{X}_s$	P	F(z)	Notes
18-I	1700-1744					0.031			
	1747-1800					0.031			
	1902-2140					0.031			
	2240-2400	$23^h26^m.5$	0.3	0.6	0.41	0.031	0.15	1.56	1
		23 27.5	0.2	0.9	0.19	0.031	0.08	1.56	1
19-I	1715-1800					0.035			
	1848-1930					0.035			
	1940-2033					0.035			
	2041-2141					0.035			
	2147-2224					0.035			
	2241-2400					0.035			
20-I	1716-1815					0.061			2
	1840-1930					0.061			2
	1935-2030					0.061			2
	2036-2154					0.061			2
	2156-2229					0.061			2
	2231-2300					0.061			2
	2330-2400	23 57.7	0.45	0.35	0.36	0.061	0.11	1.80	1,2
		23 58.5	0.60	0.45	0.39	0.061	0.21	1.80	1,2
		23 59.7	0.25	0.80	1.10	0.061	0.21	1.80	1,2
21-I	0000-0010	00 01.1	0.3	0.2	0.20	0.061	0.05	1.80	1,2
23-I	1859-2100					0.044			3
	2102-2400					0.040			

Total coverage 1282 minutes.

Notes:

1.-Flare of a complex structure. The division on several flares is done according to the criteria accepted in the reference(1).

2.-Very poor weather conditions.

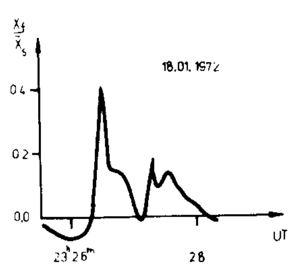
3.-Until UT $21^h 20^m$ poor weather conditions.

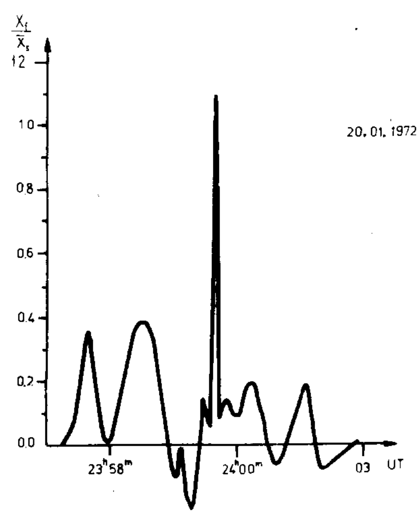
The light curves of observed flares are presented in the figures. The ordinate is given in the units of $X_f/\overline{X}_s$.

V.S. OSKANIAN and J.V. KHATCHATRIAN
Byurakan Observatory
Armenia, USSR.

Reference

1.-Oskanian V. and Terebizh V. 1971,Astrofizika vol.7, No. 1, pg 83.





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

NUMBER 685

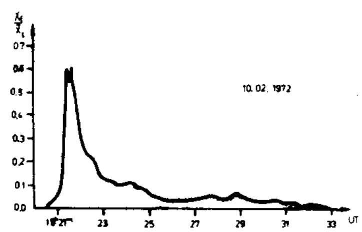
Konkoly Observatory
Budapest
1972 June 20

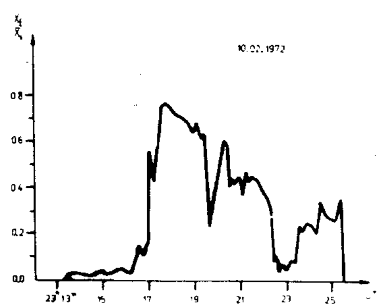
PHOTOELECTRIC OBSERVATIONS OF AD Leo

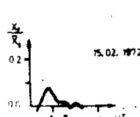
Photoelectric monitoring of the star AD Leo was carried out in the time interval 10 - 22 February 1972 (IBVS 605). The observations were effectuated on the 40 cm reflector of the Byurakan Observatory with a ФЭУ -79 photomultiplier and a corresponding B filter. The pulse counting technique with continuous registration on the recorder chart was applied.

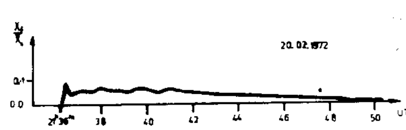
The observational data (IBVS 488) are presented in Table I.

The light curves of the observed flares are given in the figures. The ordinate is given in the units of $X_f/\overline{X}_s$.









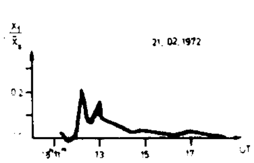


Table I

Date UT Feb. 1972	Coverage UT	UT_{max}	t_b	t_a	$\frac{XfM}{\overline{X}_s}$	$\frac{\sigma}{\overline{X}_s}$	P	F(z)	Notes
10	1730-1800					0.010			
	1802-2300	$18^h21^m.6$	0.87	10.8	0.61	0.010	1.09	1.57	
		22 17.8	1.5	7.6	0.77	0.010	3.5	1.07	
11	1800-1912					0.012			
	1920-1930					0.012			
	2015-2035					0.012			
	2104-2330					0.012			
	2332-2400					0.012			
12	0000-0100					0.012			
	1923-2052					0.023			
13	2100-2400					0.015			
14	0000-0200					0.014			
15	1733-1837					0.015			
	1933-2056	20 39.8	0.5	1.5	0.08	0.015	0.044	1.09	
	2205-2214					0.015			
19	2030-2400					0.035			1
20	0000-0031					0.025			1
	1809-2208	21 36.3	0.15	14.5	0.10	0.012	0.65	1.08	
	2212-2253					0.012			
	2256-2308					0.012			
	2348-2400					0.012			
21	0000-0032					0.012			
	1744-1855	18 12.2	0.20	6.0	0.22	0.014	0.29	1.40	
	1948-2037					0.014			
	2045-2400					0.014			
22	0000-0024					0.033			1
	1800-2005					0.032			1
	2104-2200					0.011			
	2201-2400					0.010			
23	0000-0130					0.008			

Total coverage 2495 minutes.

Notes:

1.-Poor weather conditions. Clouds.

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COMMISSION 27 OF THE I. A. U.

INFORMATION BULLETIN ON VARIABLE STARS

NUMBER 686

Konkoly Observatory
Budapest
1972 June 20

EXTRAGALACTIC CaII ABSORPTION LINES IN THE SPECTRA OF THE SUPERNOVA IN NGC 5253

The Supernova in NGC 5253 discovered by Kowal has been observed at Cerro Tololo Interamerican Observatory in Chile. We secured several spectroscopic plates with the 60 inch reflecting telescope. The grating spectrograph combination we used gives a reciprocal dispersion of 39 A/mm. Figure 1 displays a densitometric tracing of the plate C-2613 showing the continuum energy distribution (on linear intensity scale) of the supernova. It shows features of H and K CaII absorption lines of galactic origin; also a red-shifted system of H and K lines are suspected in Fig.1. Figure 2 shows a densitometric tracing of the H and K lines where the red-shifted system is clearly seen. Micrometric measurements with a Gärtner machine of these lines give the results listed in Table 1. The radial velocities obtained for the stronger pair (K_1 and H_1) of interstellar galactic origin give a radial velocity of -5 ± 3 km/s, while the red shifted pair gives +427 ± 6 km/s.

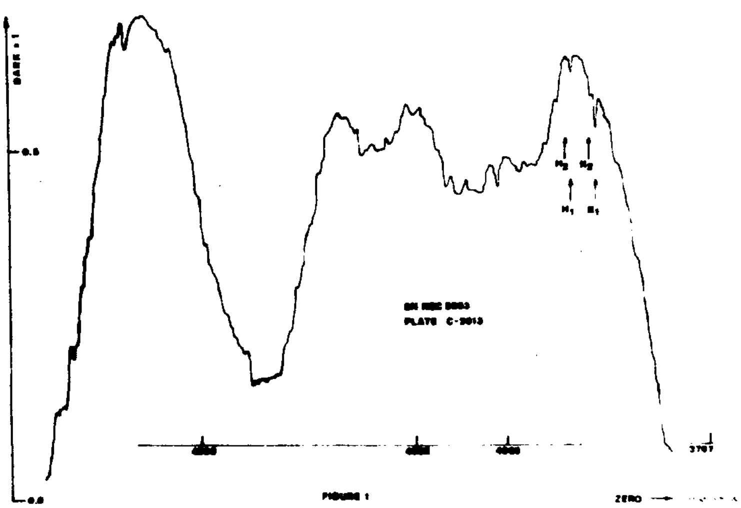


FIGURE 1

The equivalent widths of the lines were measured on the plates C-2595,, C-2613, and C-2621. Calibration plates were taken with a spot sensitometer at λ4950 A ($\Delta\lambda/2$=130). The mean values obtained are: WK_1=0.445, WK_2=0.105, WH_1=0.361, WH_2=0.078, in Angstrom units. From these values the doublet ratios (DR) are: $(DR)_1$ = 1.23 and $(DR)_2$ = 1.35. From the theoretical curves of growth of Strömgren (1948) and Münch (1957) as given by Münch (1968) we obtain:

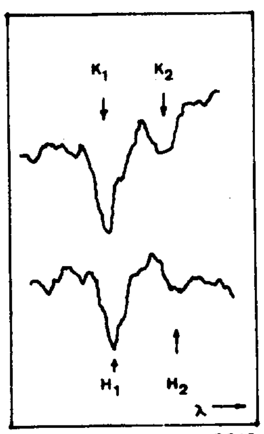


FIG.2 PLATE C-2613

$(NL)_1=1.8\times10^{13}cm^{-2}$ $(NL)_2=2.8\times10^{12}cm^{-2}$

$(LogW/b)_1=0.42$ $(LogW/b)_2=0.30$

$(Log\tau_o)_1=0.52$ $(Log\tau_o)_2=0.26$,

from Strömgren's curve, and

$(NL)_1=2.6\times10^{13}cm^{-2}$ $(NL)_2=3.1\times10^{12}cm^{-2}$

$(LogW/n)_1=0.75$ $(LogW/n)_2=0.60$

$(Log\tau_o)_1=+1.0$ $(Log\tau_o)_2=+0.61$,

from the Münch's curve of growth.

The above values indicate that the red-shifted absorption lines are formed in the interstellar gas of NGC 5253, being the amount of matter involved smaller by a factor ~10 as compared with that which forms the galactic absorption. The turbulence parameters are also smaller for NGC 5253 indicating again a thinner absorbing layer as compared with the galactic plane.

The observed red-shift in NGC 5253 at the place of the supernova is in agreement with the velocity distribution in NGC 5253 (Sérsic, 1972).

A complete study will be published elsewhere.

Table 1. Radial velocities reduced to the sun (km/s).

Plate	Date 1972 May, UT	K_1	K_2	H_1	H_2
C-2595	26, 0^h00^m	0	+427	-11	+408
2613	29, 1:45	-11	442	- 7	420
2614	29, 2:46	- 5	428	-10	417
2615	29, 3:54	- 1	448	- 5	413
2616	29, 5:07	+ 6	434	- 5	438

References:

Münch, G. 1957, Ap.J., 125, 42.

Münch, G. 1968, in Nebulae and Interstellar Matter, Ed.B.M. Middlehurst and L.Aller, Ch.8, The University Chicago Press.

Sérsic, J.L. 1972, Private comm.

Strömgren, B. 1948, Ap.J. 108, 242.

June, 1972

Observatorio Astronómico and
I.M.A.F.,Cordoba,Argentina.

R.F. SISTERÓ and M.F. CASTORE DE SISTERÓ

Visiting Astronomers at Cerro Tololo Interamerican Observatory, which is operated by AURA under contract with the N.S.F.

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

NUMBER 687

Konkoly Observatory
Budapest
1972 June 20

MULTIWAVELENGTH PROGRAM FOR THE ACTIVE SOURCES 3C 120, BL Lac AND OJ 287

Three variable radio sources which are quite active at both radio and optical wavelengths are 3C 120, BL Lac, and OJ 287 (the approximate B magnitudes are 15, 16, and 13, respectively). Their long-term variations have been actively studied at many observatories for a number of years. Very little is known, however, about their variations on a time scale of less than a day except in the case of BL Lac, which has been found by Rene Racine to have flickering on a time scale of minutes. In an attempt to search for variations on a time scale of hours or shorter, I have organized an international multiwavelength cooperative program. BL Lac and 3C 120 were observed continuously during the first and second halves, respectively, of each of five consecutive nights in November 1971 and OJ 287 was observed all night long during five nights in February 1972. Observations were made in the United States, France, England, and Israel. Optical, infrared, and radio wavelengths were monitored.

R. and K. Hackney and R. Leacock at the University of Florida's Rosemary Hill Observatory found definite evidence for intraday optical variability of BL Lac, thereby verifying the earlier results of Racine. OJ 287 data obtained by Epstein at 3.5 mm with the NRAO 36-ft antenna at Kitt Peak strongly suggest intraday variability, a suggestion partially confirmed by 9-mm results obtained by B. Gary with JPL's 18-ft antenna at Table Mountain. In addition, the team of E. Becklin, C.G. Wynn-Williams, and G. Neugebauer, working in the infrared at 2 microns with the 100-in telescope at Mt. Wilson found definite intraday variability of OJ 287.

Two "campaigns" are being organized to observe these objects continuously all night on several consecutive nights in late 1972 and in early 1973. Redundancy of data is most desirable, so widespread participation is being sought. Professional astronomers wishing to participate in these international "campaigns" should write directly to me.

June 6, 1972

EUGENE E. EPSTEIN
The Aerospace Corporation
Box 92957
Los Angeles, California 90009
U.S.A.

ERUPTIVE OBJECT IN URSA MAIOR

The eruptive object in Ursa Maior announced by B.V.Kukarkin and D.Ya.Martynov in IAU Circular 2408 was estimated on Sonneberg patrol plates (Tessar 71/250 mm):

1972 May 13.892 UT mpg = 11.1

June 7, 1972

H. HUTH
Deutsche Akademie der Wissenschaften
Zentralinstitut für Astrophysik
Sternwarte Sonneberg

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

NUMBER 688

Konkoly Observatory
Budapest
1972 June 21

NEW FLARES IN THE PLEIADES

Seven new flares were discovered in the Pleiades with the 60/90/180 Schmidt-type telescope at the mountain station of the Konkoly Observatory in the period from September 1971 to March 1972 in 26 hours of effective observational time.

The observations were made on Kodak OaO (flares No. 1-3) and 103a-O (flares No. 4-7) emulsions. The multiple exposure photographic material comprises 360 different exposures (4 minutes each). There are 8 exposures on every plate.

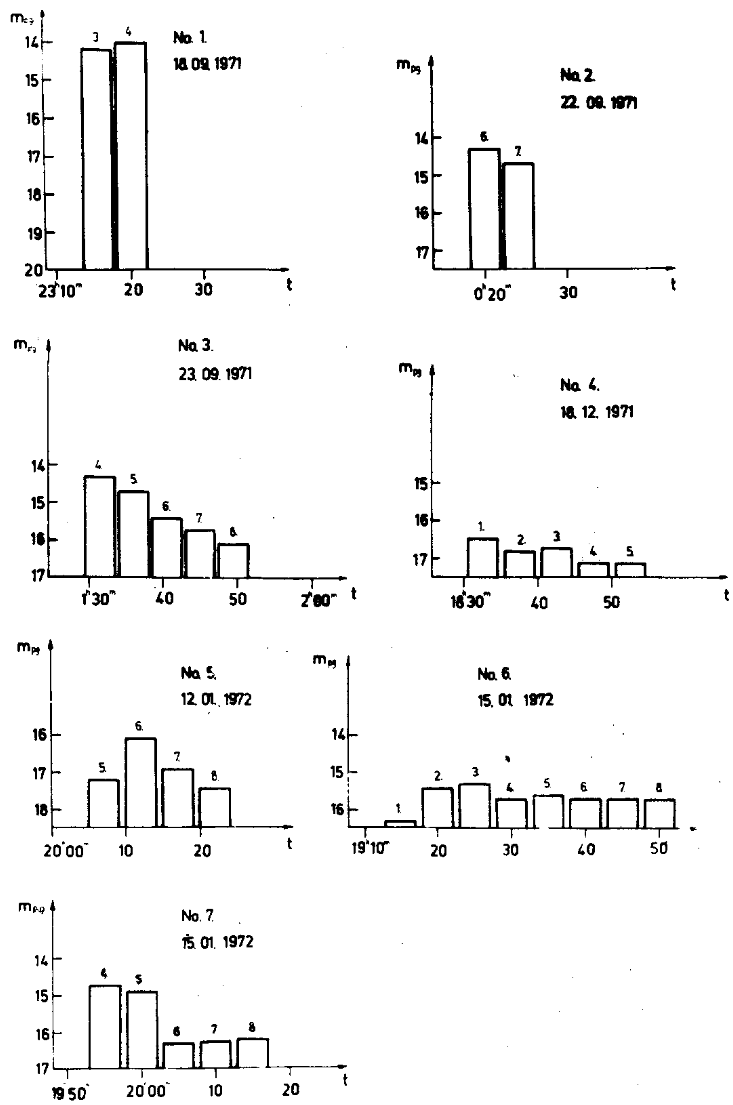
Table 1 summarizes the following data of the flares: position, brightness in minimum, amplitude and date of the flare. Figures 1-7 show the photographically measured magnitudes during the flares. (Numbers at the top of the columns are the serial numbers of the exposures on the plate.)

Table 1

No.	RA_{1950}	D_{1950}	m_{pg} min.	ampl.	Date
1.	$3^h43^m.76$	$+25^{\circ}54'.5$	>20	>5.7	18.09.1971
2.	3 40.12	+25 14.8	17.4	3.1	22.09.1971
3.	3 44.86	+22 25.8	16.7	2.4	23.09.1971
4.	3 47.93	+25 26.1	17.6	1.5	18.12.1971
5.	3 49.01	+24 51.6	18.3	2.3	12.01.1972
6.	3 45.45	+24 65.8	16.5	1.2	15.01.1972
7.	3 41.44	+24 30.9	17.1	2.4	03.02.1972

June 21, 1972
Konkoly Observatory
Budapest

L.G. BALÁZS and L. PATKÓS


No. 1.
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COMMISSION 27 OF THE I. A. U.
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NUMBER 689

Konkoly Observatory
Budapest
1972 June 27

MULTI-COLOUR PHOTOMETRY OF THE UVn-TYPE VARIABLE, NS ORIONIS, DURING AN EXCEPTIONALLY LONG-LIVED OUTBURST

The flare star, NS Ori (= Ton.157) is an H-alpha emission-line object in the Orion nebula aggregate (Haro 1953,1968)[x]. During a programme of photographic UBVR photometry (Andrews 1970) NS Ori was noted as exceptionally bright on a number of plates and the star appears to have undergone a major outburst lasting about two months. Classified by Parenago (1954) from the frequency function of random observations of magnitude the star is given as Class III (more frequently faint than bright) and the range is from m_{pg} = 15.2 to 17.6 (Rosino and Cian 1962). NS Ori is characterized by varying emission H-alpha strength and a conspicuous ultraviolet excess (Haro and Herbig 1955) and is of particular photometric interest in that it appears below the main sequence (Haro and Chavira 1969). The colorimetric behaviour of such objects is exceedingly complex (See e.g.Sincheskul 1971) and they exhibit extreme departure from theoretical pre-main sequence evolutionary tracks. Interpreted as extremely young stars less massive than the sun and in the process of gravitational contraction these objects present considerable problems, but recent work suggests that they may be surrounded by infalling circumstellar dust shells.

The light curve, two-colour and colour-magnitude diagrams for NS Ori (Fig.1) illustrates the persistent nature of the blue and ultraviolet excesses over a wide range of apparent brightness. Seven nightly measures of UBVR are available which, apart from measure No.5, show U-B = -1.4 $\pm$0.3 and B-V = 0.4 $\pm$0.1, that is, approximately constant within the photoelectric accuracies. This places NS Ori well above the normal U-B/B-V relation for

---

[x] A single flare of amplitude $1^m.5$ (p.g.) has been detected on the first of two plates taken 2 hours apart (Rosino and Pigatto 1969) on 25/2/63, an event apparently mis-quoted in the Tonantzintla lists (Haro 1968) as an ultraviolet flare of 2 magnitudes. NS Ori is also stated elsewhere as varying by greater than 2 magnitudes in 19 hours (Haro 1953).

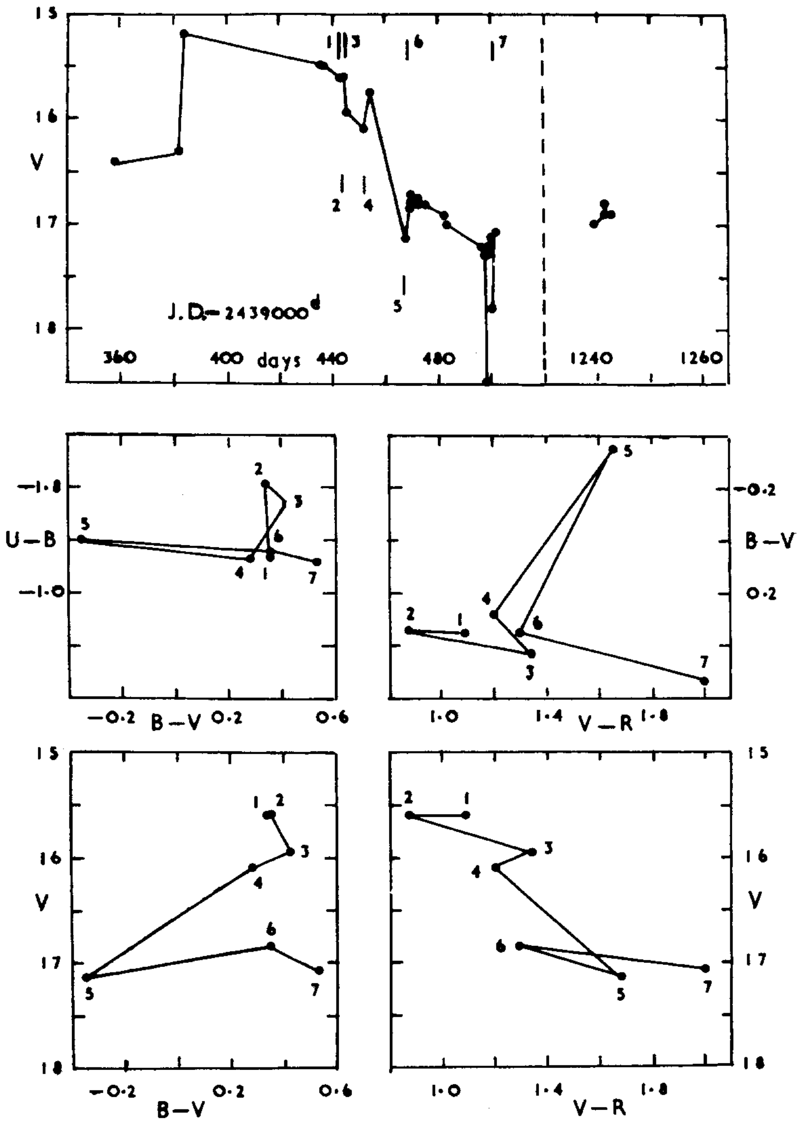

FIG. 1 Outburst of NS Ori

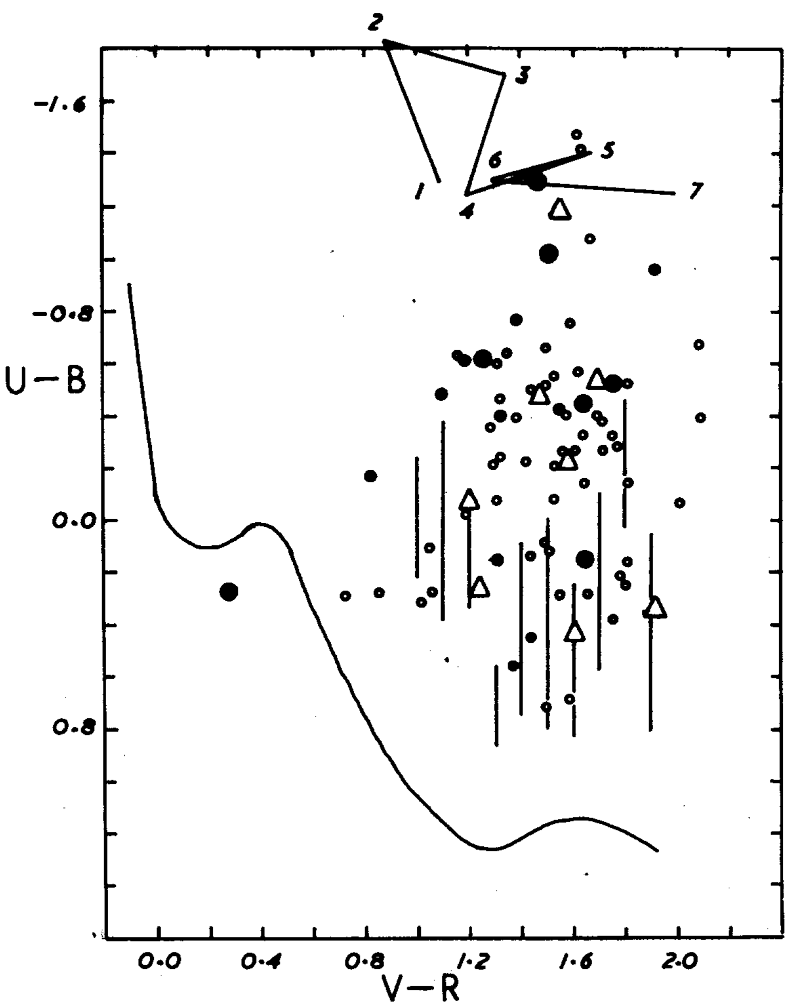

Fig. 2

EXCURSION OF NS ORI IN U-B/V-R DIAGRAM COMPARED WITH MEAN DATA FOR 278 FLARE STARS (vertical lines - See Text) AND H-ALPHA EMISSION STARS IN ORION.
Emission Strength : Permanent, strong (filled circles);Variable, strong triangles ; Temporary or weak (open circles) according to Haro (1953).

main sequence stars, and indeed, shows this star as an extreme case as regards the colour anomalies of the flare stars and emission objects of the Orion aggregate (Andrews 1972). See Fig.2 in which the track of NS Ori is shown in relation to the U-B/V-R distribution of Orion flare and emission stars. The presence of emission H-alpha is seen to be an important spectroscopic criterion in establishing which stars present the most anomalous U-B colours. In Fig.2 the emission stars are designated with symbols according to their relative emission-line strength (Haro 1953), and the flare star distribution, excluding those in which emission H-alpha has been observed, is depicted as vertical lines representing the dispersion in U-B at constant V-R (in steps of $0^{m}.1$). In the colour-magnitude diagrams NS Ori remains well below the main sequence at both maximum and minimum in B-V/V but moves redward with decreasing brightness in V-R/V remaining essentially within the band defined by other flare and emission stars, at all times elevated above the main sequence. The variable exhibits the largest change in colour in V-R (about 1 magnitude) due to its much smaller amplitude in the red spectral region. The latter result emphasizes the importance of taking into consideration the variability of emission stars in the evolutionary interpretation of the V-R/V diagram of young aggregates (See e.g. Sedyakina 1971).

Armagh Observatory
15 June 1972 A.D. ANDREWS

References:

Andrews, A.D.,1970,Bol.Obs.Tonantzintla y Tacubaya 5,No.34,p.195.
Andrews, A.D.,1972, Unpublished.
Haro, G., 1953,Ap.J. 117,p.73.
Haro, G., 1968, Stars and Stellar Systems Vol.7, Nebulae and Interstellar Matter (ed.Middlehurst,B.H. and Aller,L.H.) Univ. Chicago Press.
Haro, G. and Chavira, E., 1969, Bol.Obs. Tonantzintla y Tacubaya 5, No.32, p.59.
Haro, G.,and Herbig, G.H., 1955, Ibid, 2,No.12, p.33.
Parenago, P., 1954, Trudy Astr.Inst. Sternberg 25.
Rosino, L. and Cian, A., 1962, Contr.Oss.Astrof. Asiago N.125.
Rosino, L. and Pigatto, L., 1969, Ibid.N.231.
Sdyakina, A.N., 1971, Var.Stars Acad.Sci.U.S.S.R 18,No.2.p.213.
Sincheskul, V.N., 1971, Ibid. 18, No.2, P.201.

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NUMBER 690

Konkoly Observatory
Budapest
1972 June 27

PHOTOMETRIC OBSERVATIONS OF 13 CEPHEID VARIABLES

In the years 1965-1968 photoelectric observations were made of 13 Cepheid variables. The observations were made with the 10-inch refractor telescope of the Leiden Observatory. The sensitivity of the photometer-filter-telescope system is close to the V-band of the U.B.V.-system. All observations were made with respect to a nearby comparison star. Table I lists the variables with their comparison stars. The observations are listed in Table II. The first column of Table II gives the time of observation of the variable in Heliocentric Julian Days. The second column gives the magnitude difference variable minus comparison star. Corrections for differential extinction were only applied if Δ sec z>0.01. In those cases a standard extinction coefficient was used.

TABLE I

Variables and Comparison Stars

Variable	Comparison Star
BK Aur	BD +49°1310
RX Aur	+39°1157
SY Aur	+42°1192
RW Cam	+58° 672
RX Cam	+58° 708
SU Cas	+67° 224
W Gem	+15°1255
SV Mon	+ 6°1215
AU Peg	+17°4591
AW Per	+36° 926
SV Per	+42°1067
SW Tau	+ 3° 597
SZ Tau	+17° 750

TABLE II

THE OBSERVATIONS

BK Aur

Hel. J.D.	Δm
2439053.582	+0.42
054.610	+0.29
056.534	-0.24
080.580	-0.23
081.545	-0.15
136.534	-0.23
204.605	+0.24
507.506	+0.10
536.408	-0.27
537.525	-0.14
587.450	+0.09
594.403	-0.18

RX Aur

Hel. J.D.	Δm
2439026.627	-0.60
028.691	-0.95
031.525	-0.82
039.592	-0.77
052.601	-1.05
053.568	-0.93
054.564	-0.83
055.588	-0.74
056.518	-0.62
136.483	-0.86
205.517	-0.55
507.531	-0.85
537.313	-0.47
537.582	-0.50
543.473	-0.74
587.419	-1.02
802.492	-0.57
884.473	-0.36

SY Aur

Hel. J.D.	Δm
2439053.642	+0.43
056.547	-0.17
080.562	+0.22
136.499	-0.41
507.545	+0.15
536.423	+0.18
537.537	+0.22
594.431	-0.15

RW Cam

Hel. J.D.	Δm
2439005.547	+0.50
010.440	+0.59
018.403	+0.14
019.507	+0.27

RW Cam

Hel. J.D.	Δm
2439024.469	+0.68
025.524	+0.70
026.525	+0.60
028.551	+0.47
031.490	-0.11
038.534	+0.50
039.489	+0.60
052.477	+0.28
053.433	+0.36
054.482	+0.47
059.507	+0.67
080.378	+0.06
081.412	-0.12
802.482	-0.10
803.459	-0.07
815.455	+0.54

RX Cam

Hel. J.D.	Δm
2438984.576	+0.25
8991.516	+0.63
8996.588	+0.77
9005.526	+0.95
010.424	+0.36
018.387	+0.34
019.494	+0.64
024.449	+0.25
025.509	+0.43
026.513	+0.40
028.538	+0.80
031.473	+0.48
038.510	+0.83
039.476	+0.40
044.535	+0.86
052.453	+0.86
053.424	+0.98
054.471	+0.79
059.496	+0.72
080.361	+0.39
080.641	+0.44
081.561	+0.36
802.479	+0.60
803.449	+0.73
815.446	+0.26
884.413	+1.00
913.493	+0.66

SU Cas

Hel. J.D.	Δm
2438977.574	-0.12
8984.511	+0.16
8985.462	-0.08
8991.468	-0.01
8996.568	-0.13
9005.484	+0.14
010.406	-0.20
018.355	-0.18
018.495	-0.12
019.471	+0.17
019.614	+0.12
024.432	-0.08
025.473	+0.16
025.602	+0.04
026.493	-0.01
028.525	+0.00
031.458	+0.05
031.504	-0.00
031.591	-0.09
038.489	+0.10
039.502	-0.12
044.520	+0.15
052.538	+0.18
053.412	-0.20
053.458	-0.18
802.395	+0.02
802.461	+0.04
803.371	+0.06
815.430	-0.20
884.387	+0.05
917.448	+0.01

W Gem

Hel. J.D.	Δm
2439052.656	-0.63
053.620	-0.66
054.641	-0.39
056.607	-0.08
080.519	-0.04
136.443	-0.00
137.507	-0.28
139.524	-0.52
186.474	-0.76
205.458	-0.31
507.520	-0.11
527.472	-0.65
536.368	-0.67

W Gem

Hel. J.D.	Δm
2439537.552	-0.31
566.386	-0.78
587.403	+0.01
594.373	-0.13
913.459	-0.50
917.412	-0.37

SV Mon

Hel. J.D.	Δm
2439052.640	-0.04
053.608	-0.21
080.496	-0.20
136.424	-0.80
137.493	-0.66
138.404	-0.59
139.447	-0.43
186.440	-0.30
205.430	-0.11
507.480	-0.15
550.360	-0.51
566.371	-0.41
587.371	-0.31

AU Peg

Hel. J.D.	Δm
2439018.475	-0.15
019.447	-0.20
019.599	-0.30
022.509	-0.36
025.450	-0.25
026.456	-0.08
028.508	-0.07
030.486	-0.18
039.438	-0.36
039.513	-0.33
044.463	-0.29
051.496	-0.31
052.422	-0.05
052.496	-0.01
053.397	-0.38
053.474	-0.37
054.454	-0.18
056.440	-0.25

AW Per

Hel. J.D.	Δm
2439028.654	-0.12
052.569	-0.44
053.546	-0.31
054.538	-0.10
055.562	-0.05
056.493	-0.52
077.490	-0.64
507.493	-0.05
536.381	-0.68
537.298	-0.47
537.568	-0.55
587.385	-0.80
594.358	-0.74
884.439	-0.83
917.428	-0.72

SV Per

Hel. J.D.	Δm
2439026.604	+0.06
028.572	-0.14
031.538	-0.74
038.592	+0.08
039.573	-0.10
052.584	-0.28
053.556	-0.74
054.552	-0.58
055.575	-0.51
056.507	-0.40
077.507	-0.52
136.516	-0.11
210.318	-0.60
507.457	-0.17
536.391	-0.21
537.287	-0.05
543.458	-0.76
587.435	-0.58
884.451	+0.08

SW Tau

Hel. J.D.	Δm
2439026.650	+0.10
028.622	-0.45
038.574	-0.54
052.536	-0.56
053.519	+0.09
054.517	-0.37
054.579	-0.26
055.537	-0.41
056.464	-0.11
056.567	-0.00
077.455	+0.14
079.417	-0.56
136.404	-0.57
139.471	-0.40

SZ Tau

Hel. J.D.	Δm
2439025.574	+0.35
026.582	+0.17
028.593	+0.36
031.572	+0.32
038.545	+0.36
039.552	+0.05
052.552	+0.03
052.678	+0.05
053.533	+0.29
054.529	+0.37
054.594	+0.25
055.549	+0.04
056.479	+0.24
056.581	+0.26
077.474	+0.04
080.474	+0.08
081.526	+0.19
087.457	+0.08
139.502	+0.32

Sterrewacht
Leiden

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COMMISSION 27 OF THE I. A. U.
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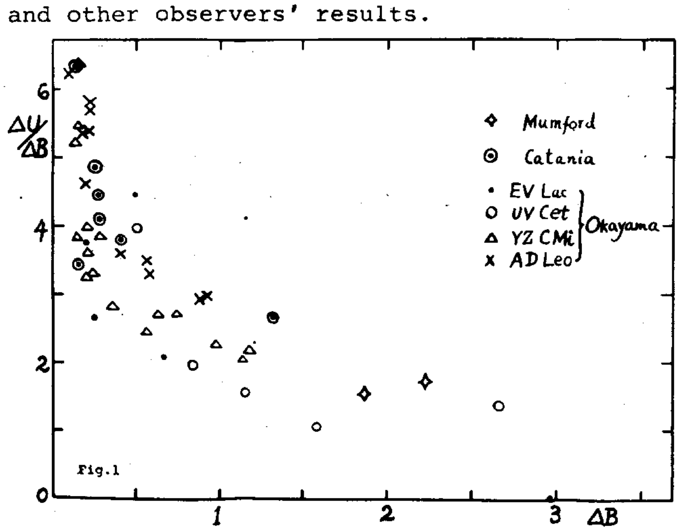
NUMBER 691

Konkoly Observatory
Budapest
1972 June 30

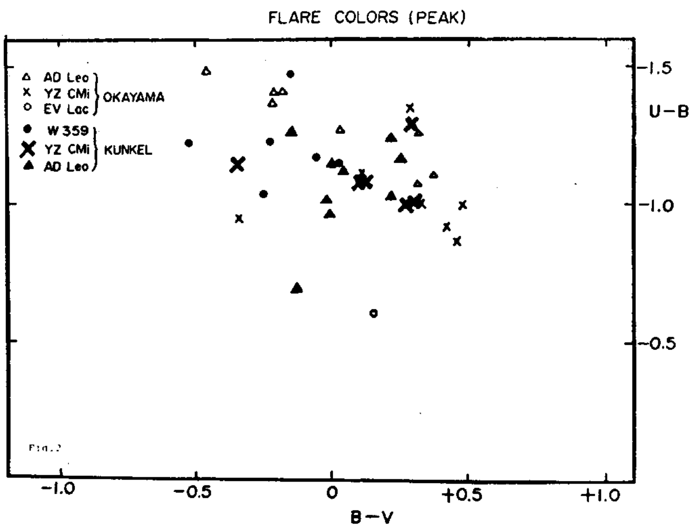
ANSWER TO IBVS NO 656

In the IBVS No. 656, an argument was presented criticizing our simultaneous three-color observations of flare stars at the Tokyo Astronomical Observatory. The present note is to answer this question.

1. The relation between ΔU/ΔB and ΔB at maximum flare activity is shown in the Fig. 1 which compares our results with those of Cristaldi and Rodono (IBVS No. 525, 600) and of Mumford (Publ.Astr.Soc. Pacific 81, 890, 1969). There seems to be no appreciable systematic difference between our results and other observers' results.



2. Another evidence supporting the correctness of our observations is the Fig.2 in which color indices of the maximum flare activity are shown. Our values again show no systematic difference compared with Kunkel's values (Ap.J., 161, 503, 1970).



3. Our three-color photometer together with its amplifier and recorder has been carefully inspected, and no departure from linearity of response was found. The linearity of the equipment is further supported by actual observations of many photometric standard stars.

4. Our phototube, EMI 6256B has a somewhat different spectral response compared with RCA 1P21.If some sort of stellar flares having an unusually strong emission in the far ultravilolet is observed, there may appear a systematic difference in ΔU in the sense that 6256B emits less photoelectrons than 1P21 does. The low altitude (370 m above sea-level) of our observing station can exaggerate this effect by blocking radiations in the far ultraviolet. The observational material used in the IBVS No. 656 might include such cases. This point may be investigated in future observations.

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NUMBER 692

Konkoly Observatory
Budapest
1972 June 30

ERUPTIVE OBJECT IN URSA MAIOR

The object quoted by KUKARKIN et al. (IAU Circ.2408) is very probably a star of U Geminorum type with long cycle. On patrol plates taken since 1953 the star was observed to undergo bright maxima at the following dates:

J.D.	m_{pg}
243 4652	10.7
5370	11.4
7783	11.1
8168	11.2
8765	10.9
9913	11.7
244 1054	11.4
1451	11.1

Occasionally the object was brighter than 12^m for as many as 6 days.

For further details see next number of MVS.

1972 June 23

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Correction: Dr. Sarma writes that in IBVS 675 two minima of R CMa were incorrectly given. The corrected Table is as follows:

Minimum (Primary)	O - C
J.D. 2440971.282	$+0^d.004$
79.234	0.004
95.139	0.006
96.271	0.002

Editors

COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 693

Konkoly Observatory
Budapest
1972 July 7

Rosemary Hill Observatory, Department of Physics and Astronomy, University of Florida, Gainesville, Florida,
Contribution No. 30

OBSERVATIONS OF AX MONOCEROTIS

Plavec and Harmanec (1972, IBVS No.613) have called attention to the shell phase of AX Monocerotis and the importance of multicolor photoelectric observations. Earlier observations by Magalasvili and Kunsisvili (1969, Bull.Abastumani No.37; 1967, IBVS No.222) had shown a decrease of about 0.4 mag in the ultraviolet with minimum occurring at about phase 0.75 based on their elements, Min = JD 243 8444+$232^{d}.5$E. Although they did not discuss it, there is a suggestion of a minimum of about 0.1 mag. in the blue at the same phase shown in their published observations.

The following observations were made on three nights with the 76 cm reflector and associated photoelectric equipment at the Rosemary Hill Observatory at phases 0.58, 0.59, and 0.70 according to the above elements. The most striking feature is the change in brightness, especially in the ultraviolet in as short an interval as three days. Similar changes are shown in the observations of Magalasvili and Kunsisvili. The comparison star used was BD + 6^{o}1309; although previously listed as a suspected variable (Zinner No.542) its variability has not been confirmed to our knowledge. Check star observations in the visual region gave a difference of magnitude between comparison and check of 0.639 mag. and 0.641 mag. on JD 244 1367 and of 0.634 mag. on JD 244 1395; the variable-comparison differences (ΔM) these nights averaged 0.823 mag. and 0.777 mag. respectively, indicating the changes are in the variable. (No check star observations were taken in JD 244 1370 because of the urgency of observations of another system).

It is impossible to generalize on the basis of so few observations - for example should the "normal" brightness of the system be that of JD 244 1367, 1370, or the average of the two? - but it does seem that the variable had lost light in the UV between phases 0.58 and 0.70 without comparable loss in the other colors in accord with the suggestion of Magalasvili and Kunsisvili. However, the only firm conclusion is that further observations are needed.

Because of the phase of light minimum Magalasvili and Kumsisvili (1969,Bull.Abastumani No.37;1967, IBVS No.222) have suggested that we are witnessing the eclipse of the hotter star by a gaseous stream. A alternative possibility is that we are witnessing the eclipse of a hot spot in the ring similar to those postulated by Smak (1971, Acta Astr. 21,15) for U Gemimorum. AX Monocerotis is of course an entirely different type of system, but the same dynamical picture of mass transfer from the cooler to the hotter system (Plavec and Harmaker) may apply. In this case, we would expect the spot to have much larger dimensions and not to show the rapid flickerings reported for WZ Sge and similar systems (Warner B.,Nather R.E.,1972,MN 156, 297,305.) . The observations on JD 244 1367 show that on at least some nights over the time scale of an hour no detectable fluctuation of brightness occurs.

The only certain conclusion is that the system merits intensive systematic observation preceding, during, and following the next predicted light minimum when be better placed for observations. According to the earlier elements, this should be about November 20, 1972.

Table I

hel JD 244	ΔM_V		ΔM_B		ΔM_{UV}
$1367^{d}.6499$	$-0^{m}.820$	$1367^{d}.6504$	$-1^{m}.077$	$1367^{d}.6533$	$-1^{m}.397$
.6523	- .826	.6531	-1.074	.6539	-1.399
.6550	- .823	.6543	-1.073	.6546	-1.397
.6652	- .824	.6556	-1.072	.6660	-1.395
.6872	- .823	.6670	-1.075	.6666	-1.395
.6894	- .823	.6890	-1.072	.6674	-1.394
				.6882	-1.404
				.6886	-1.402

1370^d.6170	-0^m.771	1370^d.6177	-1^m.012	1370^d.6184	-1^m.255
.6263	- .780	.6270	-1.015	.6277	-1.258
1395.5377	- .769	1395.5374	-1.057	1395.5371	-1.433
.5384	- .770	.5387	-1.057	.5391	-1.427
.5447	- .781	.5440	-1.066	.5452	-1.450
.5464	- .782	.5451	-1.065	.5457	-1.449
.5510	- .780	.5504	-1.061	.5520	-1.454
.5534	- .782	.5523	-1.063	.5527	-1.449

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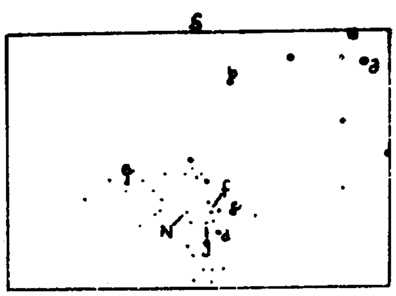
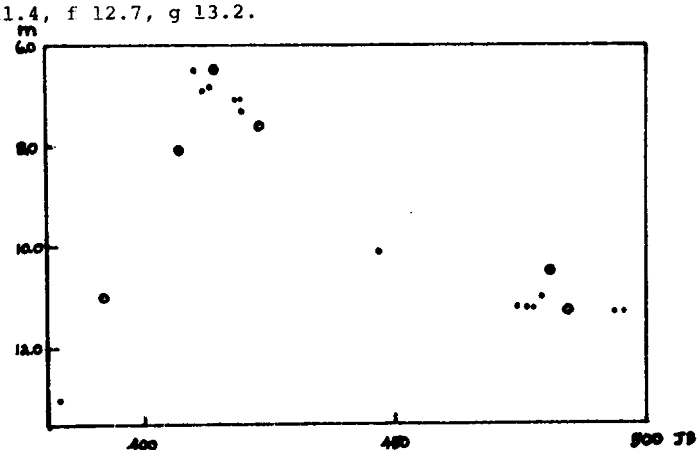
1972 July 7

BATESON'S NOVA Sgr 1969



In IBVS 389 (1969) F.M.Bateson announced the discovery of a nova in Sagittarius. Estimates of the photographic magnitude have been made on 18 Nantucket plates taken during 1969, from J.D. 40382 to 40495. About 90 plates from previous years, 1957-1968, and about 25 for 1970-1972 show the magnitude to be fairly constant at about 13 mag. All of the magnitudes for the nova in 1969 are shown in the light curve, where dots represent the Nantucket estimates, the open circles Bateson's. The finder chart shows the comparison stars used here. Their adopted magnitudes, based on S.A. 158, are as follows: a 6.4:, b 7.2:, c 9.4, d 10.4, e 11.4, f 12.7, g 13.2.



We are indebted to the National Science Foundation under whose Research Participation Program for Undergraduates this work has been carried out.

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Konkoly Observatory
Budapest
1972 July 10

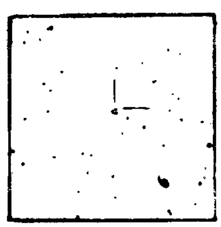
SUPERNOVA IN ANONYMOUS GALAXY

A supernova has been found by the writer while looking at some photographs taken in 1970 with the 40 cm Schmidt of the Asiago Observatory.

The supernova is visible a few seconds north of the center of an anonymous galaxy, at RA $12^h23^m47^s$; D + $28^o02'$ (1950).

The magnitudes estimated on 103a-O films taken without filter are:

1970 Feb 2 = 13.7
" Apr 1 = 14.6
" Apr 29 = 15.0
" May 27 = 16.8



A finding chart is shown in the Figure (North at the top; 30' x 30').

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Asiago Astrophysical Observatory

PI PsA

Suite à la note de l'auteur, parue dans IBVS n°680, le Dr G.M.Harvey (Cape Town Obs.) me communique:

- les observations faites avec l'astrographe de 13 inch par R.Lake (MNASSA 24.41.1965) en septembre et octobre 1964.

- les observations effectuées avec le télescope de 40 inch par Corben, Carter, Banfield et Harvey (MNASSA 31.7.1972) en septembre et octobre 1970.

Les résultats sont très cohérents; les différents auteurs obtiennent: V= 5,10; B-V = +0,29; U-B = -0,01

Cette étoile n'a montré aucune variations; le type céphéide, donné par Strohmeier et al (IBVS 86.1965) ne parait donc pas confirmé.

MICHEL PETIT

COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
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Konkoly Observatory
Budapest
1972 July 12

ROSINO'S OBJECT: EVIDENCE FOR A FOURTH OUTBURST

Rosino's object is a peculiar variable star-like object situated about 5 arc minutes from the Sb galaxy NGC 4501 (1). It has been observed at maximum only 3 times. The first maximum was discovered on November 17, 1961 (1), and was monitored by Bertola (2). A second maximum was later found by Zwicky on March 26, 1965 (3). This outburst was also monitored by Bertola (4), who has further reported (2) the object at maximum on a plate taken on April 26, 1892, in the Isaac Robert collection. According to Bertola the variable appears to be an explosive type variable of the U Geminorum type.

In an effort to bridge the gap between 1892 and 1961, a search of the plate collection of the Harvard College Observatory was undertaken. The accompanying table is the result of that search. The search was exhaustive in the RH and BM series, and in the MC and MA series the search was thorough for all plates with exposures greater than 30 minutes. In the table M.J.D. (= J.D. -2,400,000), are modified Julian days. The upper magnitude limits come from observing the faintest star visible on each plate using Bertola's comparison sequence (2).

In this search, Rosino's object was found at maximum on only 1 plate taken on June 25, 1941. Using Bertola's sequence the plate was measured on an Askania Astrophotometer. The magnitude was $m_{pg} = 13.84 \pm 0.07$, well above the plate limit of $m_{pg} \approx 17.3$. An attempt was made to find any plates in the entire Harvard collection taken of the object during the months of June and July, 1941. Three A plates taken at Bloemfontein, South Africa, were catalogued, but all three plates were lost at sea. The following series turned up no information at the suspected time of maximum: AI; AX; AM; C; EE; I; IR; MF; RB; RL; and, X.

One fact deserves special attention. An MA plate taken on May 29, 1941, shows no indication of the object. The faintest star of Bertola's sequence visible is $m_{pg} = 16.44$. The object, therefore, brightened at least 2.5 magnitudes in one month. This is the only reported estimate of a rise-time for Rosino's object.

There is very little possibility that the image is a plate defect. The plate for June 25, 1941, is an excellent plate, and the image looks exactly like the images of the other stars.

Due to the nearness of Rosino's object to the ecliptic, and the fact that only one plate was found, a normal question arises as to whether merely an asteroid was observed. A quick calculation using results obtained by Kiang (5) shows that the probability of this is about 1 in 10^4. Furthermore, the plate exposure is 90 minutes which should be long enough to have trailed an asteroid at any point except possibly at a stationary point. The probability of having observed an asteroid in the exact position of Rosino's object and at a stationary point in its orbit is far less than 10^{-4}.

This work was supported in part by a grant from the National Science Foundation. It is a pleasure to thank the staff of the Harvard College Observatory for the hospitality they extended while this work was being done.

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References

1. Rosino, L. 1961, I.A.U. Circular, No. 1782.

2. Bertola, F. 1964, Ann. d' Ap., 27, 298.

3. Zwicky, F. 1965. I.A.U. Circular, No. 1902.

4. Bertola, F. 1965, Comm. 27 I.A.U., Inf. Bull. Var. Stars, No. 103.

5. Kiang, T. 1939, M.N., 123, 509.

Plate	M.J.D.	m_{pg}	Plate	M.J.D.	m_{pg}
MC 21795	24199	>15.15	BM 855	29022	>15.15
RH 4860	27104	>15.15	BM 1136	29289	>15.15
RH 5026	27183	>14.28	BM 1180	29311	>15.15
RH 5760	27478	>16.44	MA 7521	29318	>17.50
MC 27128	27511	>18.43(a)	MA 7523	29319	>17.30
RH 5823	27512	>15.15	BM 1209	29319	>15.15
RH 5830	27515	>15.15	BM 1250	29333	>14.28
RH 5978	27574	>14.28	BM 1268	29339	>15.15
RH 5980	27574	>15.02	MA 7574	29344	>17.30
RH 6013	27595	>12.63	BM 1298	29361	>14.28
RH 6023	27596	>14.28	RH 8805	29377	>15.15
RH 6392	27808	>16.44	BM 1317	29396	>15.15
RH 6396	27813	>16.44	BM 1327	29397	>15.15
RH 6424	27832	>16.44	BM 1949	29638	>14.28
BM 364	27834	>14.28	BM 2124	29671	>15.15
RH 6445	27840	>17.23	BM 2204	29698	>15.15
RH 7087	28554	>15.15	RH 9641	29708	>14.28
RH 7131	28293	>14.28	RH 9665	29726	>17.23
RH 7580	28600	>16.44	MA 8242	29726	>17.30
BM 499	28624	>12.63	BM 2304	29730	>14.28
BM 510	28636	>15.15	BM 2322	29734	>14.28
RH 7646	28653	>16.44	BM 2337	29748	>14.28
RH 8006	28898	>16.44	BM 2370	29760	>15.15
RH 8013	28904	>16.44	BM 3120	30002	>15.15
BM 804	28982	>15.15	BM 3172	30018	>14.28
RH 8234	28993	>15.15	RH 10182	30020	>16.44
BM 825	28993	>15.02	BM 3209	30030	>14.28
BM 845	29013	>14.28	MA 8753	30049	>17.50
RH 8272	29016	>15.15	MA 8783	30105	>16.44
RH 8281	29020	>15.15	MA 8811	30134	>16.44

Plate	M.J.D.	m_{pg}	Plate	M.J.D.	m_{pg}
MA 8819	30144	>16.44	RH 15253	33301	>16.44
MA 8853	30171	13.84(c)	MC 36778	33388	>16.44
RH 11005	30438	>15.15	RH 15635	33768	>15.15
MC 33435	31176	>16.44	MC 37233	34045	>18.43(a)
RH 12922	31523	>15.15	MC 37919	34834	>17.50
MC 34483	31859	>17.50	MC 37921	34834	>18.05
MC 34535	31907	>18.43	MC 37924	34836	>18.43(b)
RH 13841	31911	>16.44	MC 37926	34836	>18.05
MC 34544	31930	>18.43	MC 37933	34837	>18.43(a)
MC 34576	31976	>18.43	MC 37935	34837	>18.05(a)
MC 35259	32213	>16.44	MC 37939	34854	>17.50
MC 35328	32264	>18.43	MC 37941	34855	>17.50
MC 35354	32285	>18.43(a)	MC 37942	34855	>18.43(b)
MC 35362	32293	>18.43	MC 37943	34855	>16.44
MC 35941	32623	>18.43	MC 37944	34857	>16.44
MC 35948	32628	>17.50(b)	MC 37946	34857	>16.44
MC 35962	32645	>18.43(b)	MC 37956	34862	>17.50
MC 35968	32648	>17.50	MC 38158	35163	>17.50
MC 35985	32668	>18.43(a)	MC 38166	35181	>17.50
MC 36287	32955	>18.43(b)	MC 38176	35186	>17.50
MC 36307	32969	>17.50	MC 38178	35186	>17.50
RH 14936	32979	>16.44	MC 38189	35195	>17.50
MC 36338	32996	>18.43(a)	MC 38196	35214	>17.50
MC 36359	33028	>17.50	MC 38199	35216	>17.50
MC 36702	33036	>18.05	MC 38200	35216	>17.50
			MC 38201	35216	>17.50

Notes

a. Rosino's object is possibly barely visible by eye.

b. Rosino's object is barely visible by eye. Probably on the order of $m_{pg} \approx 18.5$ as a star with $m_{pg} \approx 18.5$ was not observed.

c. See text.

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Konkoly Observatory
Budapest
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RADIAL VELOCITY OF RR LYRAE VARIABLE - RW Ari

RW Ari is a well known RR Lyrae type variable star. On the basis of photoelectric observations, Wisniewski (1971 A.A. 21.3.307) suggested that the star is a component of an eclipsing system, with a primary minima depth of 0.8 mag. after correction for the pulsation effect. To test that hypothesis, we have undertaken a spectroscopic study of this star.

Two spectrograms were obtained with the Kitt Peak Cassegrain spectrograph of the 84-inch (210 cm) telescope. Since at the pulsation maximum the stellar brightness is 12.1 mag., the dispersion of 103 Å/mm and the projected slit width of 15μ were used. The spectrograms were measured with a Grant comparator using five lines of HI and Ca II, and the digitized output was reduced on the observatory's CDC 6400 computer. Below we give the individual velocities and their internal probable errors:

Helio. J.D. 2400000 +	Radial velocity $Km.s^{-1}$	Internal p.e.
41348.678	-46.5	±1.9
41375.619	-11.7	3.5

Both observations were obtained at the same pulsational phase (0.03 phase apart) of decreasing light when radial velocities are expected to change slowly, particularly for Baily type "c" variables. Despite that, our observed radial velocities differ by 35 km/sec! If the radial velocity variation is caused by pulsation only, the observed difference should be a few km/sec. We belive, therefore, that such a large observed difference in radial velocity is due to orbital motion. Additional spectroscopic and photoelectric observations are planned.

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Budapest
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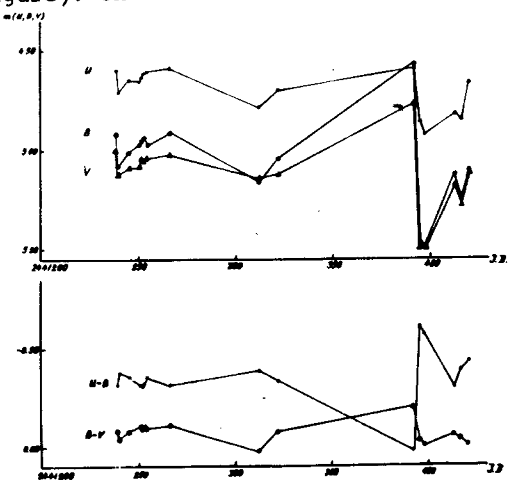
PLEIONE
OCTOBER 1971-APRIL 1972

During the period from October 1971 to April 1972 photoelectric UBV observations of the variable star Pleione (BU Tau) were obtained at the Crimea Station of the Sternberg Astronomical Institute, The star showed considerable brightness variations (s. Figure). On March 18-20 its brightness decreased to



B=5^m.5,below the minimum of 1938. On March 15 an increase of brightness of about 0^m.5 was observed. The brightness variations were accompanied with color variations. During the decrease of brightness the color B-V became more positive and the color U-B more negative. Apparently variations in the star's envelope are in progress again, therefore photometric and especially spectral observations are very desirable.
The results of our observations will be published in detail in the Soviet Bulletin "The Variable Stars".

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Konkoly Observatory
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NOTE ON THE PERIOD OF OO AQUILAE

OO Aquilae is a W UMa system with unusual deep eclipses; it has been recommended for observations in a supplement to Dr.Plavec's wellknown list ("Sudden period changes?"). To-day, the variable is far from being a neglected object, since observers of the Nürnberg-Izmir group obtained a valuable set of photoelectric minima and a short discussion of some recent observations in IBVS No. 391 already led to the conclusion of a "rapidly shortening" period (Pohl). Comparing recent elements with earlier ones is, however, a method usually much less suited for a detailed study of period changes than a discussion of the O - C curve. This we attempt here, based on the entire available material.

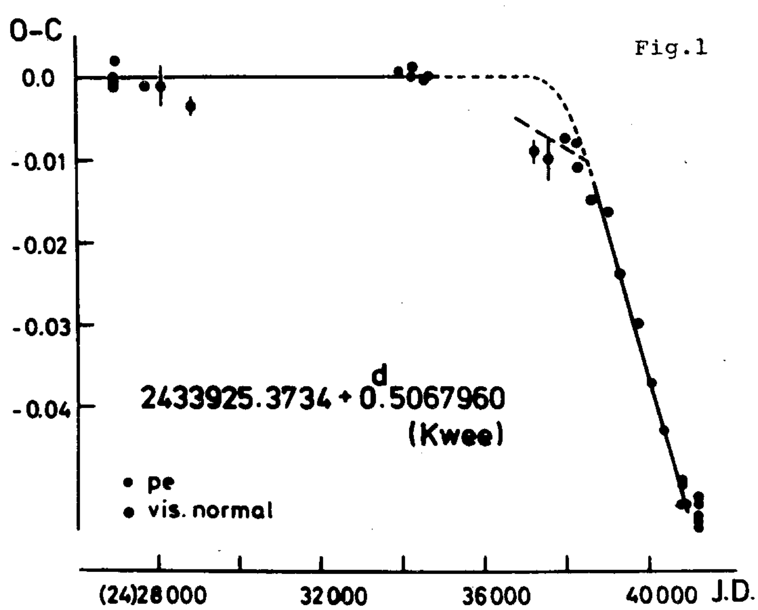

Fig.1

New elements in IBVS No. 391, especially Pohl (IV), seem to represent recent minima up to 1970 very well. Yet a comparison weth Kwee's early photoelectric observations (1951-53) indicates, by very high residuals amounting to nearly P/2,a confusion of primary and secondary minimum. (A quick estimate shows that the observed shortening of the period cannot be responsible for a phase-shift of about 0.4.) Therefore, in all cases of OO Aquilae minima mentioned in IBVS Nos. 391, 456, 530 and 687, it should be read primary minimum instead of secondary minimum and vice versa. The zero-epoch JD 2439300.682 itself, used in formula (IV), belongs to a secondary minimum as indicated in IBVS No. 154 by E=10012.5. A corresponding change in the ephemeris formula gives then

Min. I = JD 2440858.291 + $0^{d}_{.}5067868$. E Pohl (IV^{x})

In Fig. 1 we present the complete O-C diagram, based on Kwee's elements, representing all available minima since the discovery of the variability. Visual observations are always combined to normal minima. No distinction between primary and secondary minimum has been made. There was, obviously, a substantial decrease of the period some time after Kwee's observations; it took place between two longer sections of apparently constant eclipsing period. These values of P, before and after the decrease, are well established by Kwee and by Pohl,respectively,

In order to obtain a closer insight into this shortening of the period we modified somewhat the first visual normal point mentioned by Pohl and supplied five additional visual normals:

JD 2437200.534 ± 0.0016 (sec.),Ashbrook (n=13)
37533.751 ± 0.0024 (pr.) Ashbrook, ST,BAV (n=9)
37946.2854± 0.0008 (pr.) BAV (n=11)
38238.450 ± 0.0017 (sec.) ST, PK (n=6)
38611.4476± 0.0008 (sec.) ST (n=9)
JD 2438972.7916± 0.0009 (sec.) IBVS Nos.111,114,119 (n=25)

(Here ST stands for "Sky and Telescope", PK for Pohl and Kizilirmak and BAV for the Berlin observers.)

A close-up of the star's recent behaviour is given in Fig.2. The essential constancy of the period between 1965 and 1970 is clearly demonstrated. Minima observed in 1971 yield systematically positive O-C values again. On the other hand, the regrettable gap of almost 15 years between the earliest timings of minima (by Florja, Martynov, Soloviev, Lause, Bodokia) and the observations at Leiden prevents us from getting a definite picture of the period changes. The longest series of observations is due to Martinov (1932-37). Forming two "last normals" from his times of minima we obtain the residuals: O-C= $=-0\overset{d}{.}001$ resp. $-0\overset{d}{.}003(5)$, according to Kwee's formula (see Fig.1) This may perhaps indicate the possibility of smaller oscillations but does not suggest major changes in the period. It is worth noting that Martinov's discussion results in a period almost identical to the value given much later by Kwee (P_M-$-P_K$=-0.09 sec.) Since its discovery the period decreased by

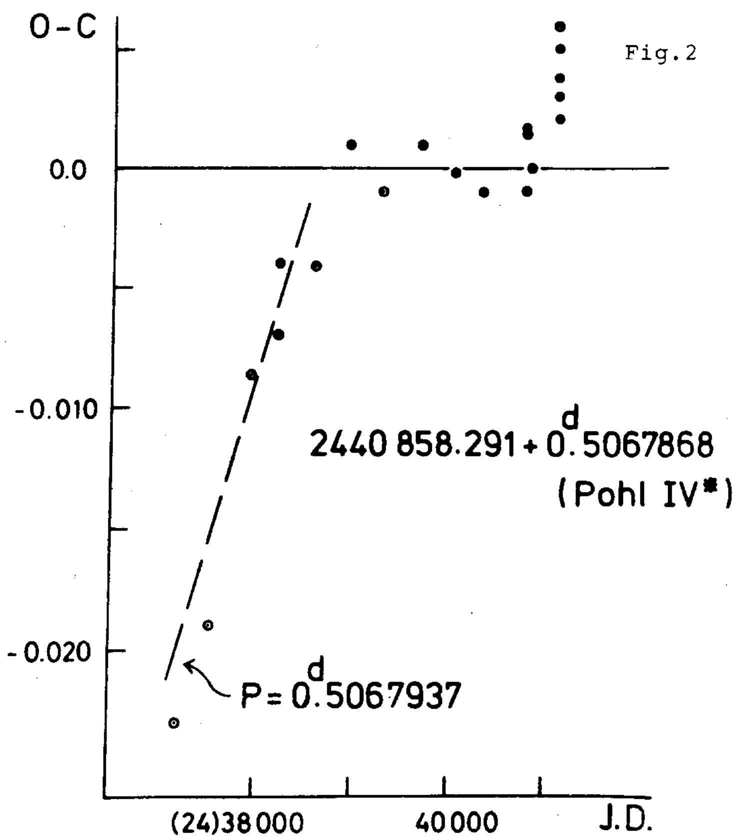

Fig.2

about 0.8 sec, all the change having taken place between 1953 and 1965. A steady, linear decerase of the period over this entire time interval would lead to more than twice as high O-C values as observed. A span of only 1600 days could suffice for this transition to the later period, as tentatively indicated in Fig.1 around JD 2438000. This possibility is certainly supported by Pohl's first photoelectric epoch of minimum and it can be reconciled with many visual timings, too. It is, however, flatly contradicting to the first two of the visual minima listed above, in particular to Ashbrook's series of observations from 1960.

The reliability of these epochs of minimum (2437200 and 2437533) is an intriguing question. The second, not very accurate, normal combines the timings of several observers, with O-C values ranging from $+0^{d}.001$ to $-0^{d}.024$. Among those, the 3 minima by Ashbrook represent systematically the smaller (more negative) values, their mean differing from the mean of the other 6 determinations by $-0^{d}.011$. This is, however, hardly a significant statistics; moreover 1952 observations by Ashbrook are in almost perfect agreement with photoelectrically derived epochs of minimum by Kwee and Fitch. It would be difficult to motivate the rejection of these two normals while accepting them as they are renders the "continuous transition" of Fig.1 untenable. In this case a sudden decrease of the period becomes a serious possibility as shown in both figures by the straight line corresponding to $P = 0^{d}.5067937$.

Still rather fragmentary, the following picture of the period changes of OO Aquilae emerges:

The period was constant or nearly constant between 1932 and 1953 with possible small fluctuations of probably less than 0.1 sec. Between 1953 and 1965 the period shortened considerably. It is not possible to reconstruct the exact circumstances of this decrease any more: it may have occurred continuously as well as in a succession of abrupt changes.

After 1965 the period remained virtually constant again, till quite recently a sudden increase by nearly 0,4 sec seems to be indicated. Further photoelectric observations are urgently requested.

References

For a list of individual studies or series of observations see: Finding List for Observers of Eclipsing Variables,Harvard Annals Vol 111, more recently issues of the IBVS and some of the Reports of Commission 42 of the IAU (esp.in IAU Transactions XIII A).

The period has been discussed by

Miczaika, Astron.Nachrichten 261, 301 (1937),
Martynov, Publ. Engelhardt Obs. No. 20 (1938),
Kwee, BAN Vol. 15, No. 485 (1958),
Pohl, IBVS No. 391 (1969).

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SUPERNOVA IN NGC 5253

The following observations of the supernova in NGC 5253 have been made with the UBV photometer on the 18-inch reflector. Linear transformations have been used to reduce the instrumental values to the standard system.

J.D. 2441455.33	V= 8.68:	B-V= +0.16	U-B= -0.10
457.22	8.80	+0.20	-0.06
458.21	8.86	+0.22	-0.04
459.41	8.92	+0.26	0.00
460.24	8.96	+0.28	+0.02
471.27	9.46	+0.90	+0.24
475.24	9.68	+1.03	+0.23

1972 July 11

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