The British Astronomical Association

VARIABLE STAR SECTION

CIRCULAR 54

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JUNE-JULY

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CIRCULARS

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Send payments (made out to the BAA), and material for inclusion to Storm Dunlop.

CHARTS

Charges:	Main Programme - SAE plus 20p per star (4 sheets) All other programmes - SAE plus 5p per star (1 sheet)

Requests should be sent to John Parkinson.

EDITORIAL

We must begin with an apology for the extreme delay in this issue of the Circular, which has been purely due to the editor being overwhelmed with work. It was very nearly complete at the time of the Section Meeting, but subsequently has been greatly modified. The next issue (VSSC 55) is already in preparation and will be issued as soon as possible.

It has been gratifying to find that the change in format has met with general approval. We would like to thank all those who have expressed their appreciation, but particularly those who have taken the trouble to write especially, and not least those from overseas. We have various ideas for further improvements, but shall always be pleased to receive suggestions from members. In this issue we introduce the first parts of two series, to be published at irregular intervals, describing and discussing books and atlases of relevance to variable star work. These two subjects are the source of frequent enquiries from members, so we trust that they will prove of interest.

It is also pleasant to record that renawals of subscriptions were received very promptly indeed from most members. This may have been prompted by the changes in format, but in any case it is of the greatest help to us. However, we would ask all members to please remember that payments should be made in the name of the BAA, not of individual officers, and that this applies to all Section publications, including charts.

Finally we would remind members that we are always happy to receive their contributions, and that even a few help very greatly towards the preparation of these Circulars. With the change in format and printing methods, diagrams, charts and even photographs have now become quite suitable material. Although the alteration in format has meant some additional problems in layout for the editor, he is now using a sophisticated word-processing system which should (eventually) make the preparation much simpler.

AMENDMENT TO CLASSES OF SUBSCRIPTION

It has been decided that in future there will not be a separate charge for the receipt of light-curves, and that these will be supplied to all members. (Very few members do not wish to receive these, and this alteration will greatly assist us in keeping our records up-to-date in an easy fashion. There will be NO increase in the overall charges, which therefore remain at £2 for U.K. members and £3 for overseas members.

MAILING

The address labels for this and all subsequent issues will be produced by computer. We would ask every member to please check that their address is shown correctly, and to inform us if any part of it is incorrect. (It would be a help if the label could be returned, but this is not essential.) We have been doubtful of some members' addresses in the past, partly due to the difficulty in reading some handwriting, so any corrections will be welcome.

Each label carries an identification number. These are primarily for internal administration purposes. However, please note that the digit appearing after the decimal point indicates the number of future issues of the Circular which you are entitled to receive. Although it is our intention to include some other form of reminder as well, this could be missing so please renew your subscription as soon as you receive an issue where this last digit is zero.

Those numbers begining with the digits 7 or 8 indicate complementary copies. They do not carry any indication of the number of issues which may be expected - the digit after the decimal point is always zero. (We are in the process of checking entitlement to free copies as numbers have grown very considerably in recent years. It may be necessary to ask certain recipients for subscriptions in future.) At present certain susbscriptions which are paid indirectly may be indicated as 'complementary', but this will be corrected on later issues.

We are grateful to Don Miles for his assistance in computerizing our mailing lists, which had become somewhat unwieldy. Don is also prepared to help other BAA Sections in this respect, provided his costs are reimbursed. His address is: 15 Bevan Road, Lovedean, nr Portsmouth, Hants. PO8 9QH.

1982 LIGHT-CURVES

We must apologise to members for the fact that the 1982 Light-curves seem to have been rather ill-fated. We had expected these to be displayed at the Exhibition Meeting, but most unfortunately Alan Dowdell, the Meeting Organizer, to whom they had been sent, mislaid them so that they could not be shown. (They have never been located since, so must be presumed permanently lost.) However, some of the curves were displayed at the Section Meeting in July. It was our intention to publish the curves in this issue of the Circular, but unfortunately the only copies available are not suitable for reduction to the new format without loss of detail, so we are issuing them separately with this Circular. However, we anticipate printing all future light-curves within the actual Circular.

Anyone preparing light-curves of any sort is asked to remember that they must either be drawn at a sufficiently large scale (on A4 paper) for them to be reduced to the A5 size and remain legible, or else they may be prepared for same-size reproduction on A4 paper provided only that a suitable 'gutter' is left in the centre of the sheet to allow for layout for printing, and for the necessary folding and stitching. To make everone's life easier, it is worth bearing in mind that light-curves may be drawn to run horizontally or vertically on the printed page. If in doubt ask the editor!

BINOCULAR PROGRAMME - 1982

Activity among observers was encouraging with a 59% increase in the number of observers and a 24% increase in the number of estimates for 1981. A total of 11 681 estimates were reported from 51 observers, the most prolific being: Allen (851), Fraser (992), Middlemist (2054), Nartowicz (1217), Saville (954), Taylor (1030), and Worraker (532). The following observers

1982 Observational Totals - Binocular Programme

STAR TOTALS

RS	And	45	V393	Cas	88	RY	Dra	291	X	Oph	57
SU	And	22	V465	Cas	272	TX	Dra	222	V2048	Oph	23
TZ	And	41	CSV171	Cas	74	UW	Dra	35	W	Ori	76
AQ	And	26	+49°4329	Cas	13	UX	Dra	41	BL	Ori	22
BZ	And	38	Wr162	Cas	120	VW	Dra	66	BQ	Ori	92
V	Aql	53	W	Cep	122	AH	Dra	97	CK	Ori	52
V450	Aql	65	RU	Cep	46	AT	Dra	73	+14°1247	Ori	27
V1293	Aql	58	RW	Cep	135	FL69	Dra	13	AG	Peg	69
CSV101849	Aql	51	RX	Cep	61	TU	Gem	32	GO	Peg	27
V	Ari	7	SS	Cep	144	TV	Gem	92	X	Per	194
UU	Aur	197	AR	Cep	135	WY	Gem	88	SU	Per	27
AB	Aur	126	DM	Cep	35	BN	Gem	97	AD	Per	34
AE	Aur	221	FZ	Cep	13	BQ	Gem	26	KK	Per	7
CO	Aur	65	Mu	Cep	65	BU	Gem	100	PR	Per	22
NO	Aur	38	CSV927	Cep	41	DW	Gem	14	Z	Psc	59
Psi 1	Aur	70	+59°2383	Cep	89	IS	Gem	45	TX	Psc	42
+31°1048	Aur	62	+60°2217	Cep	88	NQ	Gem	20	TV	Psc	53
W	Boo	26	+84°0536	Cep	62	X	Her	261	S	Sct	27
RV	Boo	43	Fl 33	Cet	24	ST	Her	20	Y	Tau	109
RW	Boo	44	RR	CrB	39	SX	Her	7	TT	Tau	37
RX	Boo	97	SW	CrB	39	UW	Her	54	BU	Tau	128
UV	Boo	70	T	Cyg	88	IQ	Her	30	CE	Tau	63
U	Cam	51	RU	Cyg	32	OP	Her	112	CSV6048	Tau	35
RY	Cam	36	RV	Cyg	65	V566	Her	70	+22°0743	Tau	20
ST	Cam	109	TT	Cyg	40	g	Her	174	W	Tri	30
UV	Cam	35	AF	Cyg	208	U	Hya	10	Z	UMa	218
VZ	Cam	67	CH	Cyg	301	SX	Lac	26	RY	UMa	205
ZZ	Cam	47	V460	Cyg	111	CSV8775	Lac	111	ST	UMa	111
+61°0668	Cam	20	V973	Cyg	89	CSV102195	Lac	95	TV	UMa	34
X	Cnc	72	V1351	Cyg	9	RX	Lep		VW	UMa	108
RS	Cnc	118	P	Cyg	151	Y	Lyn	175	VY	UMa	109
RT	Cnc	26	Fl 28	Cyg	49	SV	Lyn	35	V	UMi	33
V	CVn	247	CSV8232	Cyg	12	CSV100869	Lyn	30	RR	UMi	71
Y	CVn	182	CSV8307	Cyg	29	R	Lyr	107	RW	Vir	6
TU	CVn	170	CSV8683	Cyg	27	XY	Lyr	115	RX	Vir	5
W	CMa	16	+47°2801	Cyg	41	Delta 2	Lyr	60	SS	Vir	17
WZ	Cas	127	U	Del	189	S	Mon	38	SW	Vir	20
V377	Cas	132	EU	Del	224	RV	Mon	35	BK	Vir	4
V391	Cas	55	+19°4450	Del	71	SX	Mon	28	TOTAL		11 681

OBSERVER TOTALS

C. ALLEN	851	T. MARKHAM	288
S. ALLMAND	160	I. MIDDLEMIST	2054
L. BAKER	102	I. NARTOWICZ	1217
M. BELL	275	J. PARKINSON	201
N. BONE	237	R. PICKARD	23
C. BRIDEN	27	T. SAVILLE	954
E. COLLINSON	166	D. SAW	176
R. DRYDEN	58	J. SHANKLIN	180
B. ESPEY	34	H. SMITH	20
S. EVANS	57	E. SPOONER	222
R. FRASER	992	C. SRINIVASANI	208
A. GARDNER	83	R. STEELE	45
M. HAPGOOD	91	M. TAYLOR	1030
P. HEPPENSTALL	40	A. THOMSON	26
A. HORTON	39	J. TOONE	472
S. HOSTE	62	E. WEST	27
M. HOUCHEN	50	W. WORRAKER	532
G. HURST	126	D. YOUNG	70
B. KEENAN	72	others	118
I. KENNEDY	147		
J. LASHLEY	121	TOTAL	11 681
B. M^{C}INNERNY	28		

provided good coverage of particular variables: Allmand, Baker, Bell, Bone, Collinson, Espey, Hapgood, Hurst, Keenan, Lashley, Markham, Parkinson, Saw, Shanklin, Spooner, Srinivasan, and Toone. Our binocular observers are to be congratulated on their contribution during 1982. A large number of the observations are of an excellent standard.

CH Cygni, the Z And type star which has been extremely bright (approx. 5.7 mv), was extensively observed during the year and 301 estimates are on file. Other stars for which coverage is very good are: UU Aur, AE Aur, V CVn, V465 Cas, AF Cyg, RY Dra, TX Dra, X Her, Z UMa and RY UMa. In the main, binocular stars on the 'priority list' are now adequately followed, but it is important that this level of continuity is maintained. However out of the 155 stars, there are 26 which are severely under-observed.

The 'paperwork' and 'back-room' aspects of dealing with the programme is mainly handled by the Secretary, but the assistance

of others needs acknowledgement and these persons are Messrs Collinson, Hapgood, Henley, Hurst, Hollis, McNaught, Parkinson and West.

NEW BINOCULAR CHART

103867 VY UMa, 105270 VW UMa 125266 RY Dra

A single, new chart for these bright variables has been produced from the old charts which contained a few positional errors. The major revision is an integration of the sequences, which remain unchanged since visual reviews have revealed few criticisms, except for VY UMa. Several observers have assisted in these aspects of chart reviewing: Tristram Brelstaff, David Rothery, John Toone and Bill Worraker, in particular. Some non-programme stars have now been identified on this chart, including the position and relationship to known comparison stars, of the cataclysmic variable with the designation 3A1148 +719 (Draconis). Robert McNaught of the R.G.O. writes about this object in 'The Astronomer' for 1983 April. It has a catalogued range of 10.6 to 15.0 pg, (spectrum M3V+e) and McNaught remarks about it being bright in 1968 and 1975. Owners of large (80 mm) binoculars may have an opportunity to provide both negative and positive observations to Mr McNaught.

NOTES ON PROGRAMME STARS

V1294 Aquilae - a Gamma Cas type star

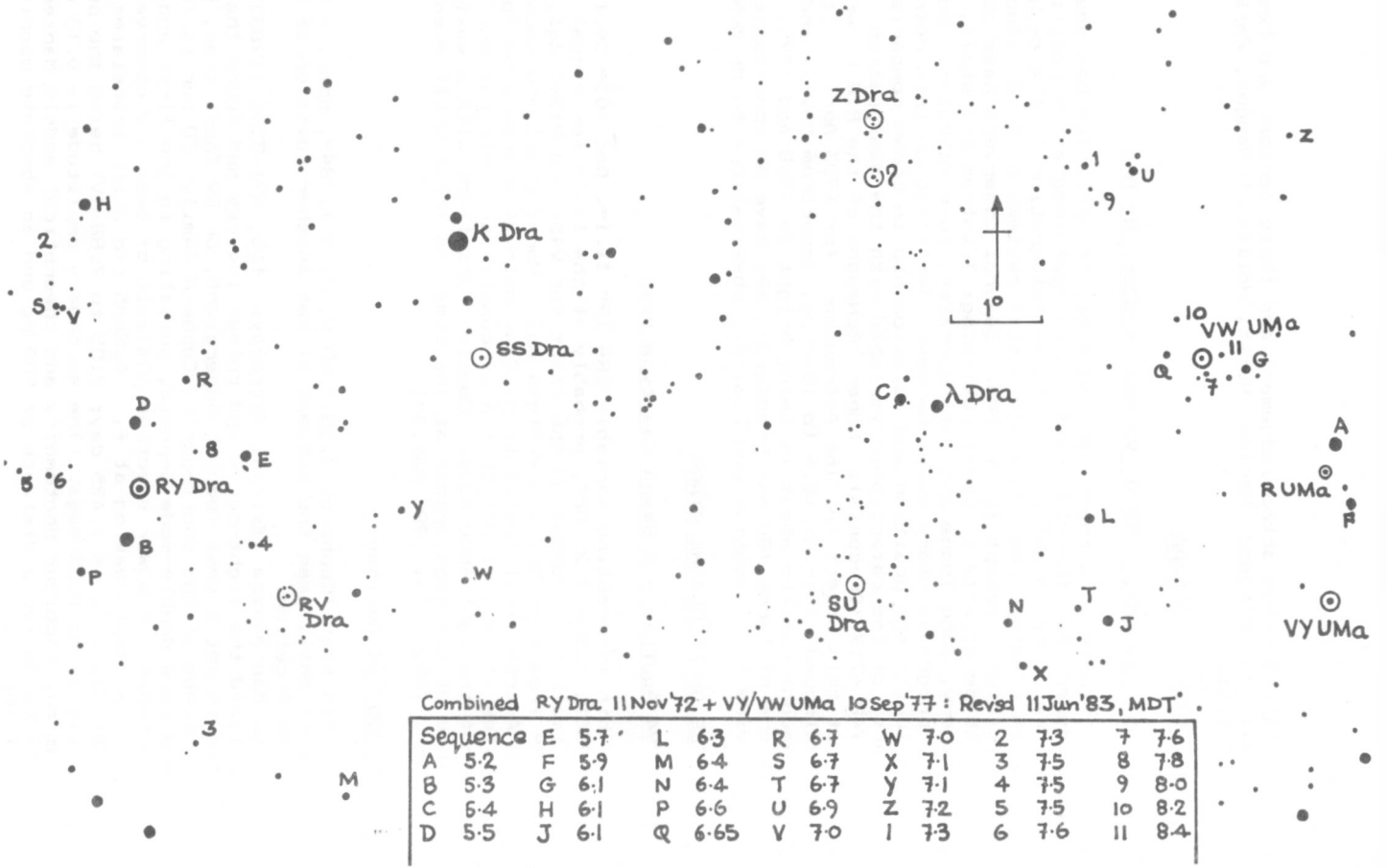
This interesting variable [RA 19^h 31.1^m, Dec $+03^o$ 39.1' (1950), 6.8 - 7.2, Be], probably at the limit for visual estimators, is shown on the chart for V450 and V1293 Aql, about 2.3^o from both Delta and Sigma Aql. Horn, Hudec and Koubsky of the Astronomical Institute of Czechoslovakia show from Sonneberg plates (1929 to 1980) that a circumstellar shell has existed for about the last 4000 days. Complex variations with a maximum range of 0.4 mags appear at the times of these shell events. (Ref. IBVS 2034, 1983 Mar.30)

055335 CO Aurigae

This star (Cepheid, 7.55-7.88 V, P_1 = 1.784^d, spec. = F5II) has recently been the subject of yet another revision of its classification.

L. Mantegazza (*Astron. Astrophys.* 118, 321-324, [1983]) has analyzed the light-curve and colour indices and found that the star is not a semi-regular supergiant, or RV Tauri star, but a sub-class of the short-period Cepheid family. CO Aur is found to be a rare double-mode Cepheid, pulsating in the first and second overtones. A power spectrum analysis of Smak's V observations gives a phase peaking at f_1 = 0.5605 c/d which translates to P_1 = 1.784 days; P_2 is 1.425 day; 7.55 to 7.88 (V) being the primary amplitude of 0.33 mags. The secondary amplitude is 0.13 mags. From multi-colour photometry and theoretical models Mantegazza is able to derive a distance of 980 pc and an absolute magnitude of -3.1 (V).

103867	VY Ursae Majoris	5.9 - 6.5	Lb C6	Z Dra 10.8-14.1p EA	SS Dra 8.4-10.4V SR
105270	VW Ursae Majoris	6.9 - 7.7	SRb 125^d M2	?=3A 1148+719 d.n.	RV Dra 9.2-13.7V Mira
125266	RY Draconis	6.5 - 8.0	SRb C3 172.5^d	SU Dra 9.3-10.2V RR	R UMa 6.7-13.4v Mira



Combined RY Dra 11 Nov '72 + VY/VW UMa 10 Sep '77 : Revised 11 Jun '83, MDT

Sequence													
A	5.2	E	5.7	L	6.3	R	6.7	W	7.0	2	7.3	7	7.6
B	5.3	F	5.9	M	6.4	S	6.7	X	7.1	3	7.5	8	7.8
C	5.4	G	6.1	N	6.4	T	6.7	y	7.1	4	7.5	9	8.0
D	5.5	H	6.1	P	6.6	U	6.9	Z	7.2	5	7.5	10	8.2
		J	6.1	Q	6.65	V	7.0	1	7.3	6	7.6	11	8.4

The star is on the binocular programme, and has been known as a difficult variable both to observe and analyse. These results add weight to the opinions of several observers that the star be dropped from the visual programme.
It is anticipated that this will happen next year, and work on our observations of CO Aur over the years would prove an interesting chance to determine whether such small variation and period(s) may be detectable from binocular estimates.

R Coronae Borealis

As most members will know this star began a decline in late August, dropping fairly rapidly to below 7.5 by the end of the month. The fade is still in progress, and the Secretaries will be pleased to recieve recent observations. It should be noted that the last major fade of this star was in 1977.

T Coronae Borealis

In IBVS 2349 (1983 June 13), Oskanian presents a small number of observations which seem to show that between about the beginning of 1982 June and 1983 January (when the observations ended) the ultraviolet variation of this object, previously detectable and with an amplitude of between 0.4 and 0.65 mag., has ceased. At the same time the overall brightness in all three bands (ubv) has decreased (by 0.7, 0.56 and 0.47 mag. respectively), which also implies that the star has reddened. The overall brightness appeared to be increasing again in the 1983 observation. T CrB is noted for its constant activity and flickering, so this apparent cessation is unusual.

CI Cygni

In IBVS 2355, IBVS 2356 and *Acta Astr.* Mikolajewska, Mikolajewski and Krelowski (in various combinations) discuss this symbiotic system in the light of recent results from IUE and from the 1980 and 1982 eclipses. Their conclusions support the model of the system originally proposed by Bath and Pringle. In this one component is surrounded by a disk at the edge of which is a 'hot' spot at about 4000 K which acts as a blackbody source, and which is periodically eclipsed. The eclipsing object is a star of spectral class M4III-II, filling its Roche lobe. In addition evidence suggests the presence of a partially eclipsed ionized gas cloud with an effective temperature of 3×10^4 K.

In IBVS 2355 Mikolajewska presents her results on the 1982 eclipse. From the ephemeris (published elsewhere) of:

JD Min. = 2 444 396 + 855.25 E

and the spectral observations, she is able to derive relative sizes for the eclipsing star and the He II emission region. This latter appears to have been rather larger during the 1982 eclipse than in that of 1980 (by about 25%), but there are no observable changes in the shape of the eclipse light-curves.

In IBVS 2356 Mikolajewska, Mikolajewski & Krelowski discuss the significance of IUE observations of the behaviour of helium and hydrogen UV emission lines during eclipse. Eclipses in the UV region 200 nm are approximately twice as long as those in the optical region, the first and fourth contacts in HeII 4686, for

example, being very close to the second and third contacts in HeII 1640. Moreover the eclipse is about twice as deep in the former wavelength as compared with that in the UV. As these wavelengths should be produced in the same region, if the source were optically thick the UV wavelengths would be expected to suffer the greater extinction, rather than the reverse. The only apparent explanation is that dust must be present in the system - which is not particularly unexpected, especially in view of the strong infrared excess observed by others. These grains must be of such a size that they are only optically active in the UV. They are presumably located between the two components in the region of the Lagrangian L_1 point.

200536 28 Cyg, 201437a P Cyg & 204334 T Cyg

VSS observations during 1982 of these three stars may be summarized as follows:

star	mean range	no. obs.
28 Cyg	4.92 - 5.04	47
P Cyg	4.8 - 5.04	151
T Cyg	5.07 - 5.29	88

Observers were: Allen, Bell, Evans, Fraser, Gardner, Hurst, McInnerny, Nartowicz, Saville, and Shanklin.

28 Cyg (= V1624 Cyg = HR 7708 = SAO 069518)

Spear, Mills and Snedden in Publ. Astr. Soc. Pacific 93, 460-3, 1981 discuss their p.e. observations made over 4 nights in 1978 July. They find an amplitude of 0.07 mag., V = 4.91, B-V = -0.14 mag., P = 0.70^d ($\pm 0.04^d$). The spectrum of 28 Cyg is B3Ve. The nature of the short-period variability of Be stars (O, B or A spectral classes with hydrogen emission lines) may derive from eclipses, pulsations, mass transfer, or photospheric or rotational causes. The authors infer that a combination of all, or a few, of these 'mechanisms' could operate in 28 Cyg, but they suggest that the variability of the shell Be stars: V923 Aql, EW Lac, and Omicron And may be related to the rotation of their photospheres. Fl 28 Cyg does not show shell absorption features in its spectrum. The long-term nature of its variability is not discussed.

N.B. 29 Cyg = comparision 50 on the chart for the above stars dated 1972 July 29 = V1644 Cyg. V1644 Cyg is a Lamda Bootis star with amplitude 0.03 (approx. V) with a period of 45 minutes. The star remains as a useful comparison star on the above chart.

AG Pegasi

In MVS 9, pages 92-7, L. Meininger (Sonneberg) discusses results for this symbiotic variable, particularly in the light of his photoelectric observations during the year 1973-79, and Sonneberg photographic observations over the whole period 1928-1981. This system - being a binary like all symbiotics - has a spectrum of WN6 + M3 III and earlier radial-velocity measurements

have indicated an orbital period of the order of 790-840 days. Meininger obtains a good determination, with little scatter, of 827 days, the fluctuations satisfying the elements:

Min. = JD 2 428 250 + 827^{d}·E

The star shows a long-term decline in the magnitude of its maximum brightness from about 7 to 9 (pg) over the period of the coverage. Meininger suggests that other observations should be reconsidered in the light of this newly-determined period.

GK Persei

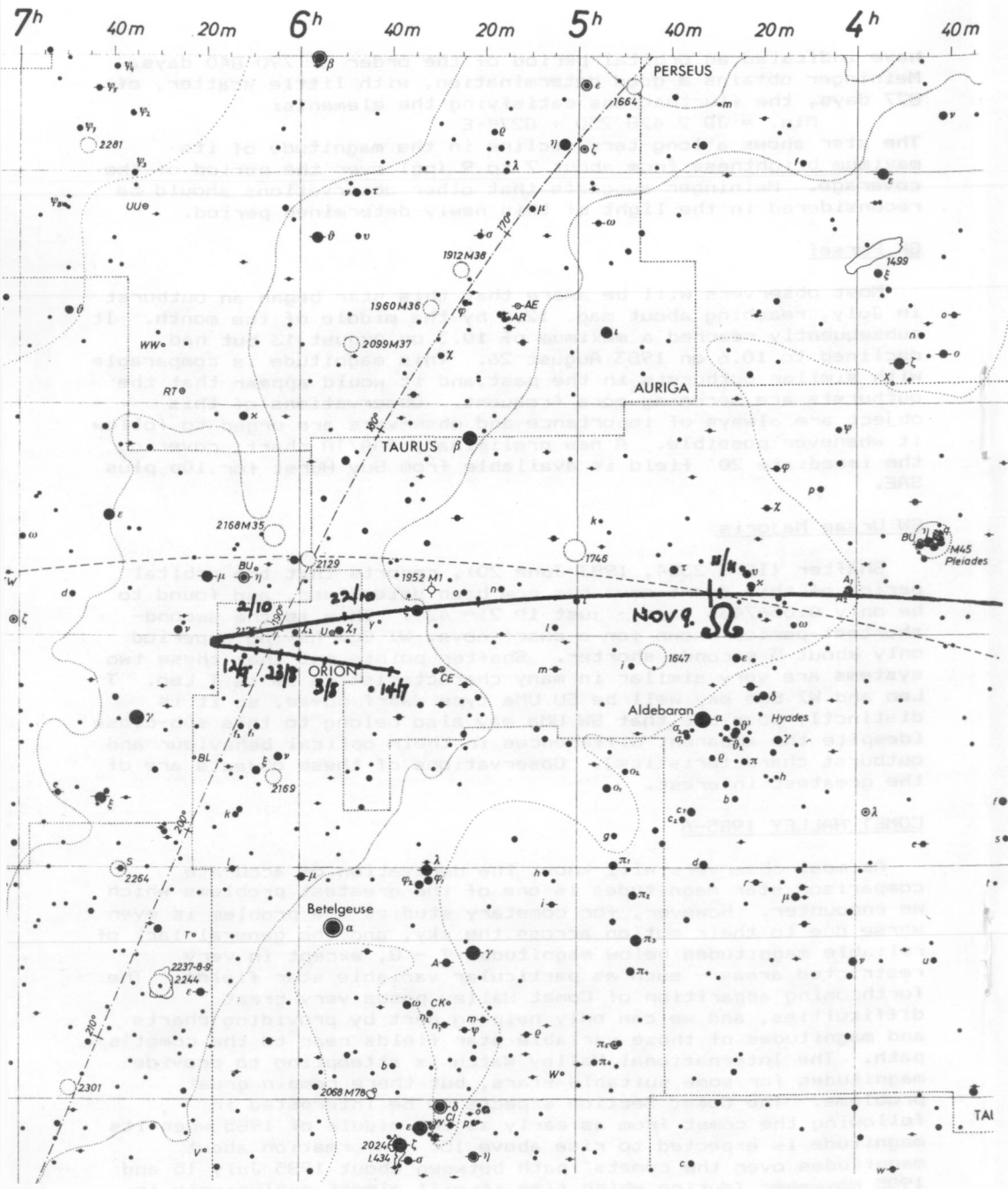
Most observers will be aware that this star began an outburst in July, reaching about mag. 12.0 by the middle of the month. It subsequently reached a maximum of 10.3 on August 13 but had declined to 10.6 on 1983 August 26. This magnitude is comparable with similar outbursts in the past,and it would appear that the outbursts are becoming more frequent. Observations of this object are always of importance and observers are urged to follow it whenever possible. A new preliminary BAA/TA chart, covering the immediate 20′ field is available from Guy Hurst for 10p plus SAE.

SW Ursae Majoris

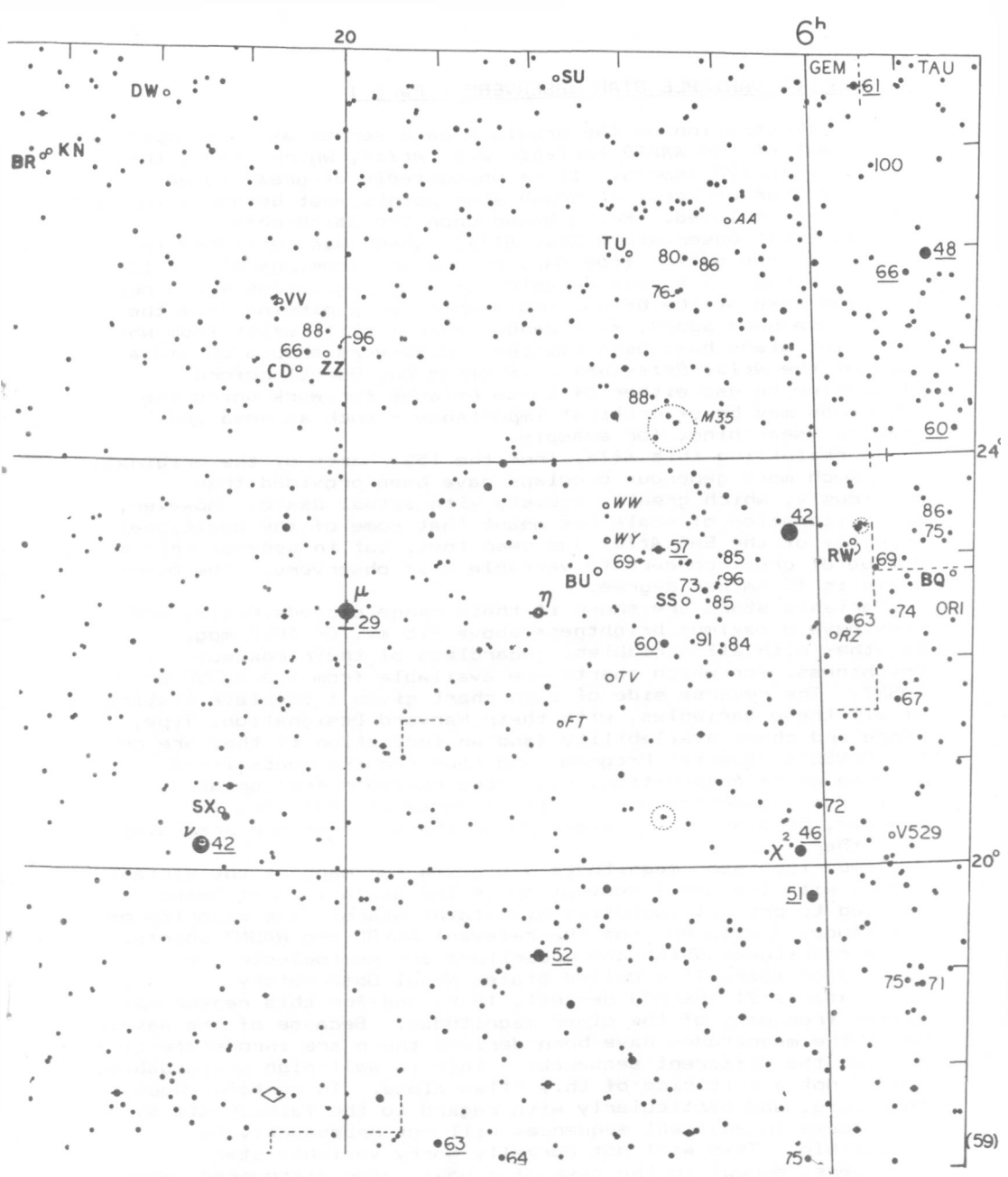
Shafter (IBVS 2354, 1983 June 20), reports that the orbital period of this dwarf nova has now been determined, and found to be only 0.0567433 days - just 1^{h} 21^{m} 42^{s}. This is the second-shortest period known for a dwarf nova, WZ Sge having a period only about 5 seconds shorter. Shafter points out that these two systems are very similar in many characteristics as is T Leo. T Leo and WZ Sge may well be SU UMa type dwarf novae, so it is distinctly possible that SW UMa may also belong to this sub-class [despite the apparent differences in their optical behaviour and outburst characteristics]. Observations of these objects are of the greatest interest.

COMET HALLEY 1985-6

As most observers will know, the derivation of accurate comparison star magnitudes is one of the greatest problems which we encounter. However, for cometary studies the problem is even worse due to their motion across the sky, and the general lack of reliable magnitudes below magnitudes 7 - 8, except in very restricted areas - such as particular variable star fields. The forthcoming apparition of Comet Halley poses very great difficulties, and we can only help in part by providing charts and magnitudes of those variable star fields near to the comet's path. The International Halley Watch is attempting to provide magnitudes for some suitable stars, but there remain great problems. The Comet Section expects to be interested in following the comet from as early as the middle of 1985 when its magnitude is expected to rise above 15. Information about magnitudes over the comets' path between about 1985 July 15 and 1985 November (during which time it will almost exclusively in the top of Orion) is therefore urgently required. As it is possible that some observers might be interested in trying to help by taking photographs and/or transferring magnitudes to



stars along the track, we give here a part of the first of three charts prepared by the Comet Section Director, Mike Hendrie. If photographs are taken they should preferably be obtained with suitable filtration to give photovisual magnitudes. Full details of the ephemerides for the comet may be obtained either from Storm Dunlop or the Comet Section.



The chart above is a portion of the *AAVSO Atlas* Chart 60, and covers the region in which Comet Halley reaches its retrograde point. It may interest members to know that the BAA Star Charts and the AAVSO Atlas charts have been used by the International Halley Watch in their *Amateur Observers' Manual for Scientific Comet Studies*, commencing at a later date.

ATLASES FOR VARIABLE STAR OBSERVERS - Part 1

The illustration on the previous page serves as an example of the format of the *AAVSO Variable Star Atlas*, which covers the whole sky in 178 sheets. It is undoubtedly of great value to variable star workers, although some points must be borne in mind when it is employed. Being based upon the Smithsonian Astrophysical Observatory *Star Atlas* (which was published in 1969), it does suffer from many of the shortcomings of the latter atlas - notably the considerable number of omissions which occur. Although some of the bright stars which were missing from the SAO *Atlas* have been added, many bands (zones) still exist from which all faint stars have been omitted. Observers should obtain a copy of the *Atlas Omissions List* (from Guy Hurst) before attempting to use either of these Atlases for work where the omissions may be of critical importance - such as nova and cometary searching, for example.

In replotting this *Atlas* from the 152 charts of the original, very much more generous overlaps have been provided than previously, which greatly assists with actual usage. However, this alteration of scale has meant that some of the positional accuracy of the SAO *Atlas* has been lost, but in general this will not be of great concern to variable star observers. The overall scale is 15 mm per degree.

Variable stars are shown if their range exceeds 0.5 m, and they have a maximum brightness above 9.5 mv, or 10.5 mpg, together with all variables, regardless of their maximum brightness, for which charts are available from the AAVSO or RASNZ. The reverse side of each chart gives a complete listing of all these variables, with their Harvard Designation, Type, Range and chart availability (and an indication if they are on the AAVSO's 'Special Program' and thus require specialized techniques of observation, not being suitable for isolated individual observations. On the reverse of Chart 60, for example, 50 stars are listed, 28 of which are on one programme or the other.

Comparison star magnitudes are given for many of the variables shown, with the usual convention of the decimal point being omitted to prevent confusion with faint stars. The majority of magnitudes are taken from the relevant AAVSO and RASNZ charts. Those magnitudes which are underlined are photoelectric V magnitudes taken from United States Naval Observatory *Publications* 21 (Second Series), 1968, and for this reason may differ from many of the other magnitudes. Because of the way in which the magnitudes have been derived there are inconsistencies between the different sequences - this is well-nigh unavoidable, and is not a criticism of this atlas alone. In certain cases therefore, and particularly with regard to the fainter stars, magnitudes in adjacent sequences will not necessarily be compatible. This will not normally worry variable star observers, except in the case of a nova being discovered, when - as many have experienced for themselves - it may be necessary to use stars from adjoining sequences. It can, of course, be a very important consideration in minor planet, or cometary work.

**********O**********

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VARIABLE STAR SECTION

CIRCULAR 54

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The British Astronomical Association

VARIABLE STAR SECTION

LIGHT CURVES

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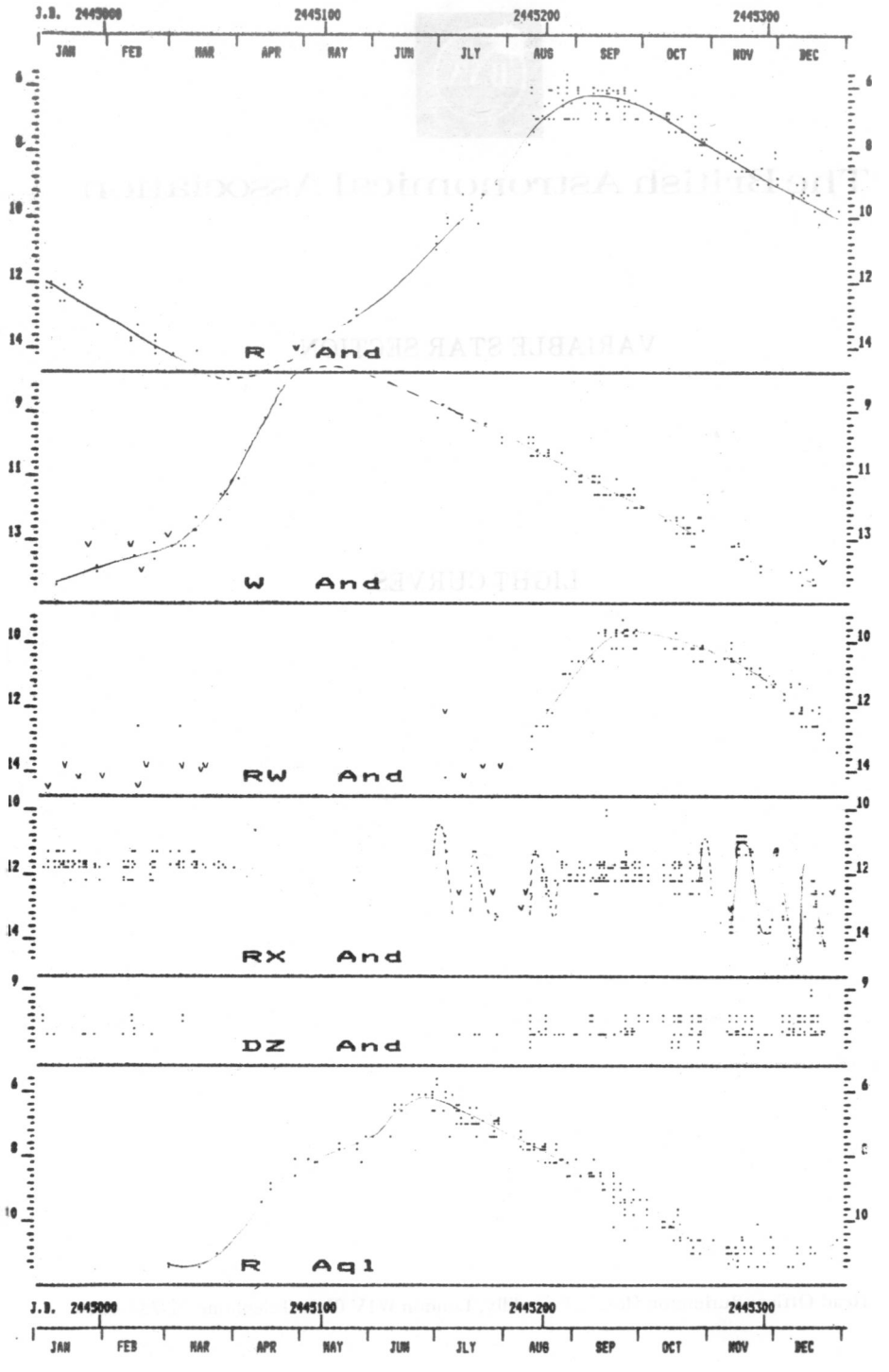
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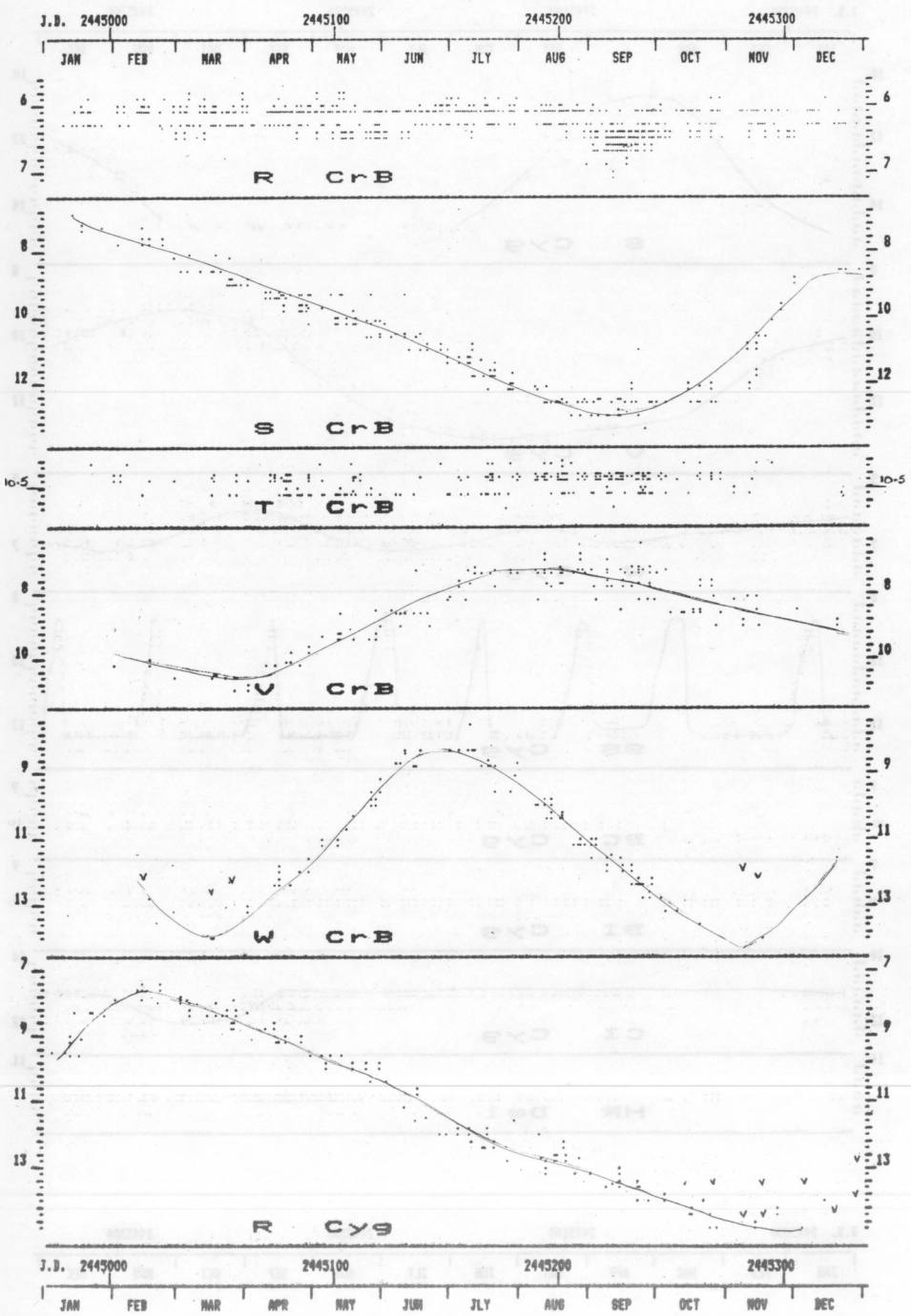
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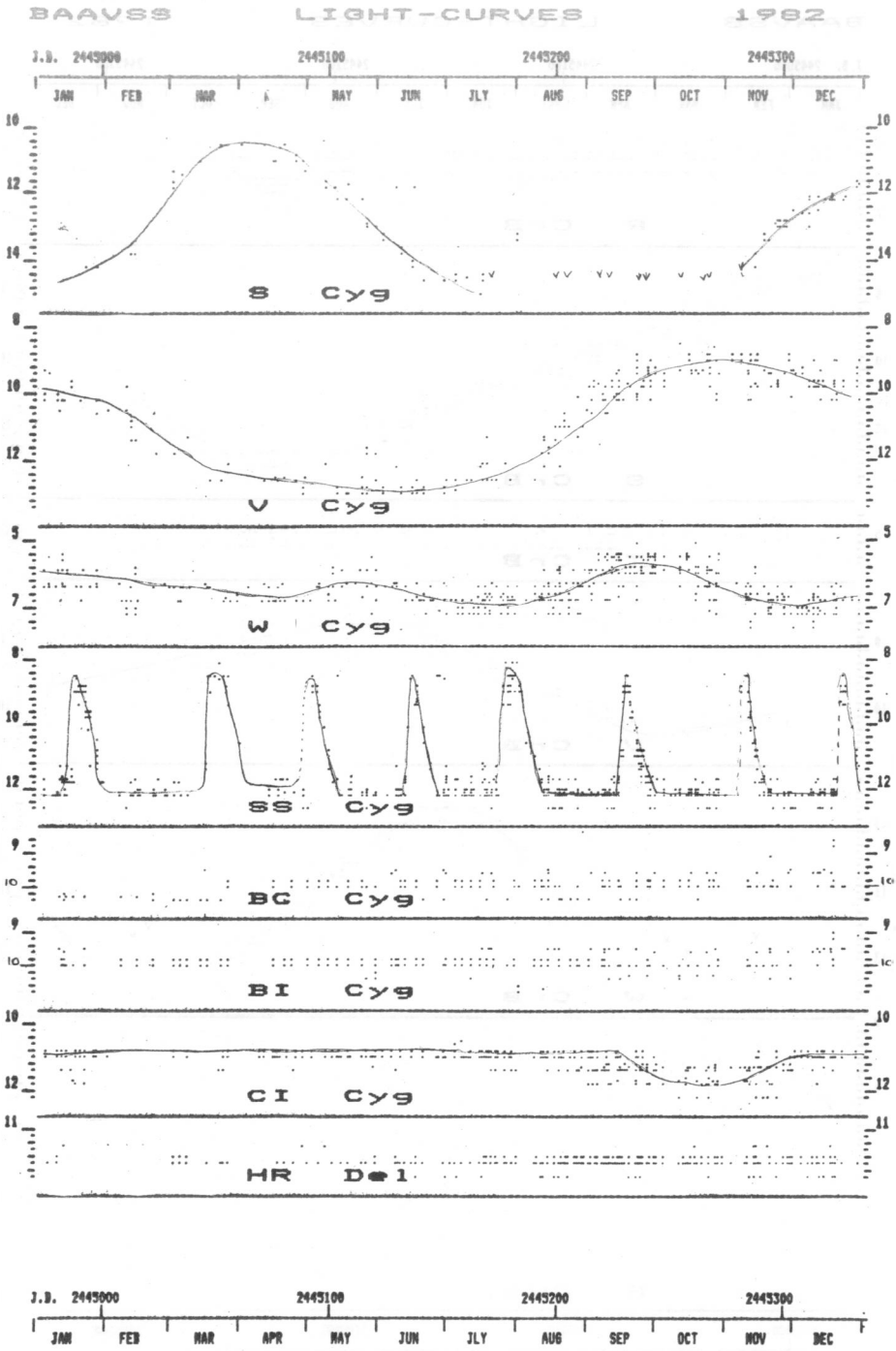
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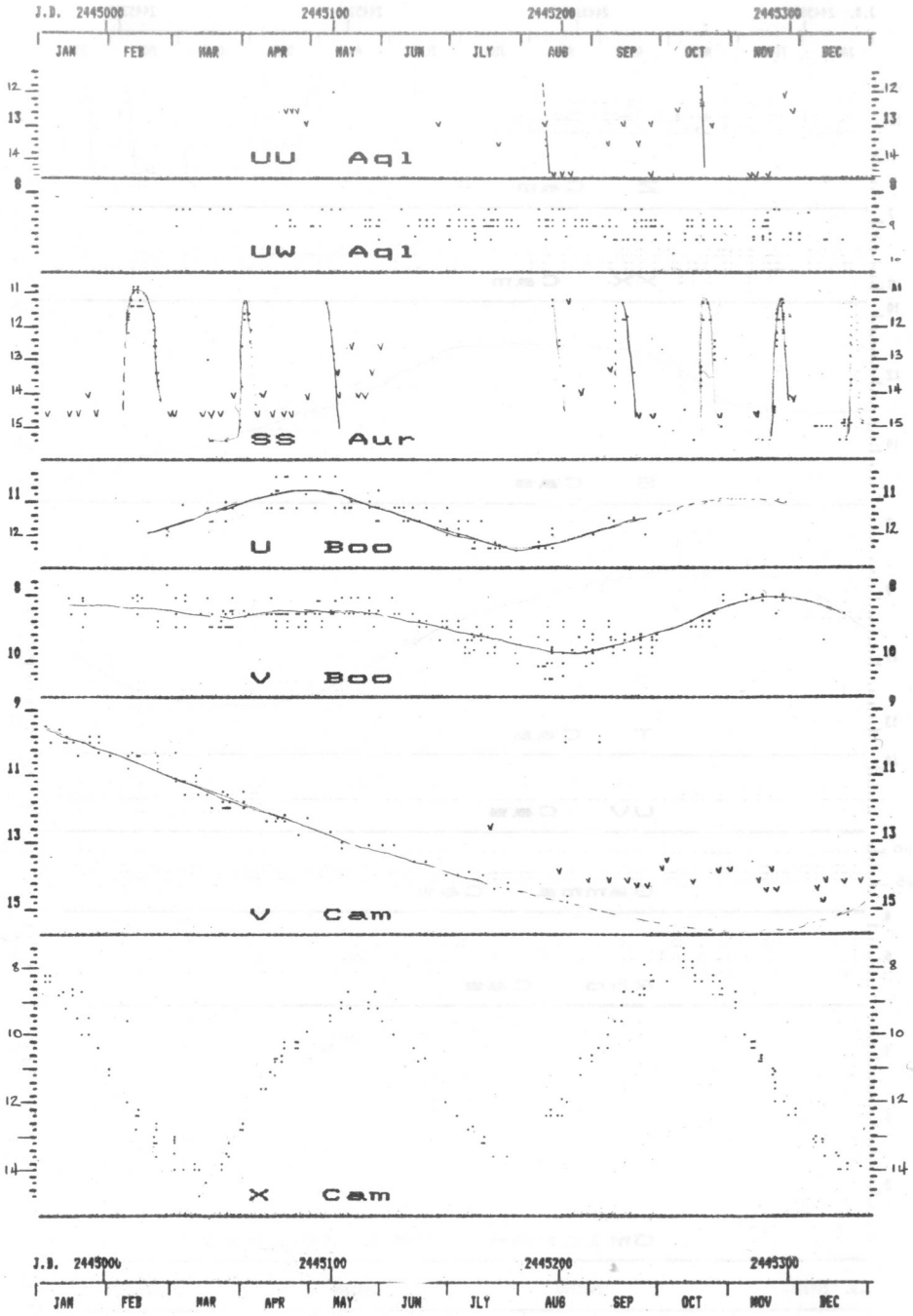
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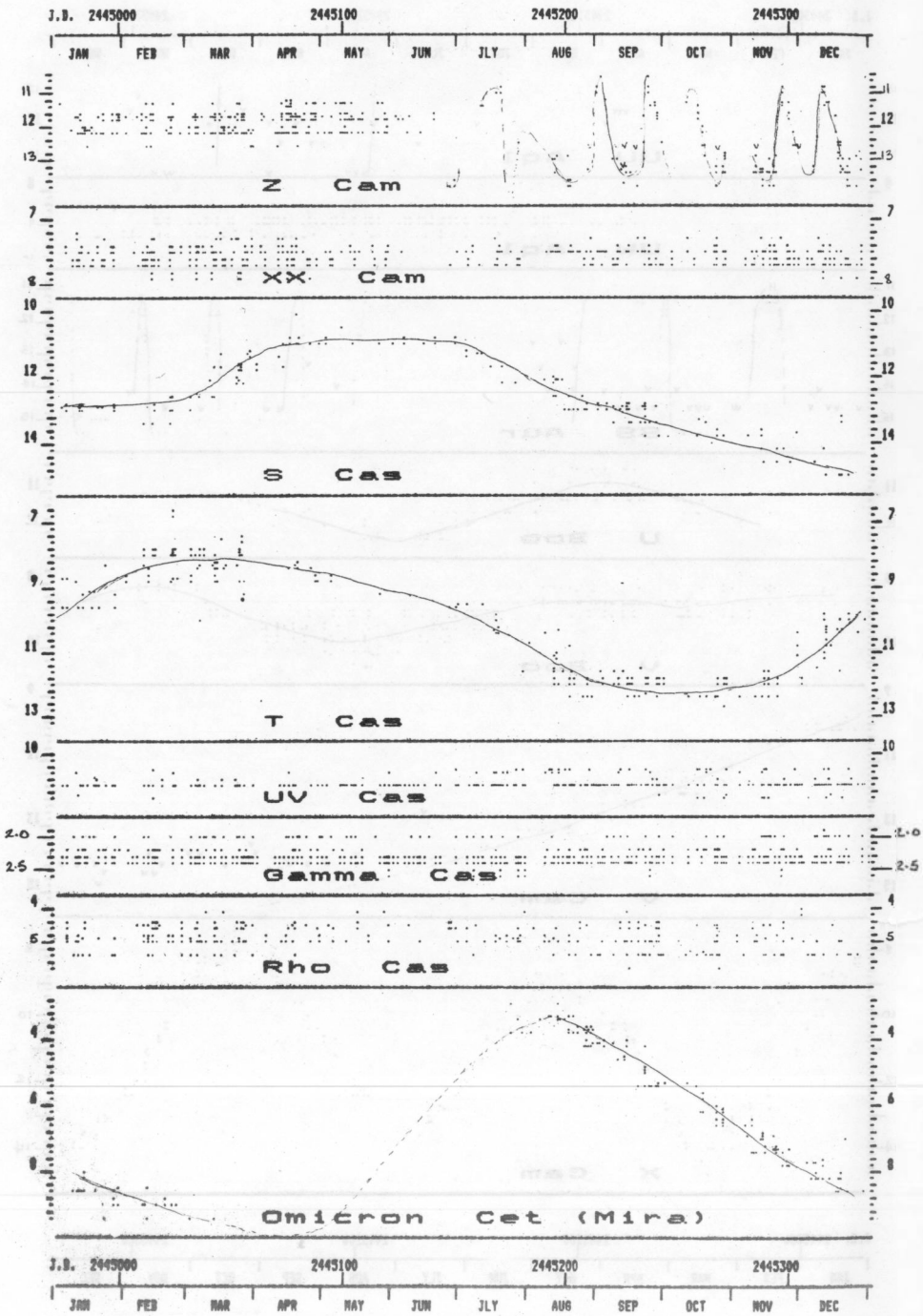
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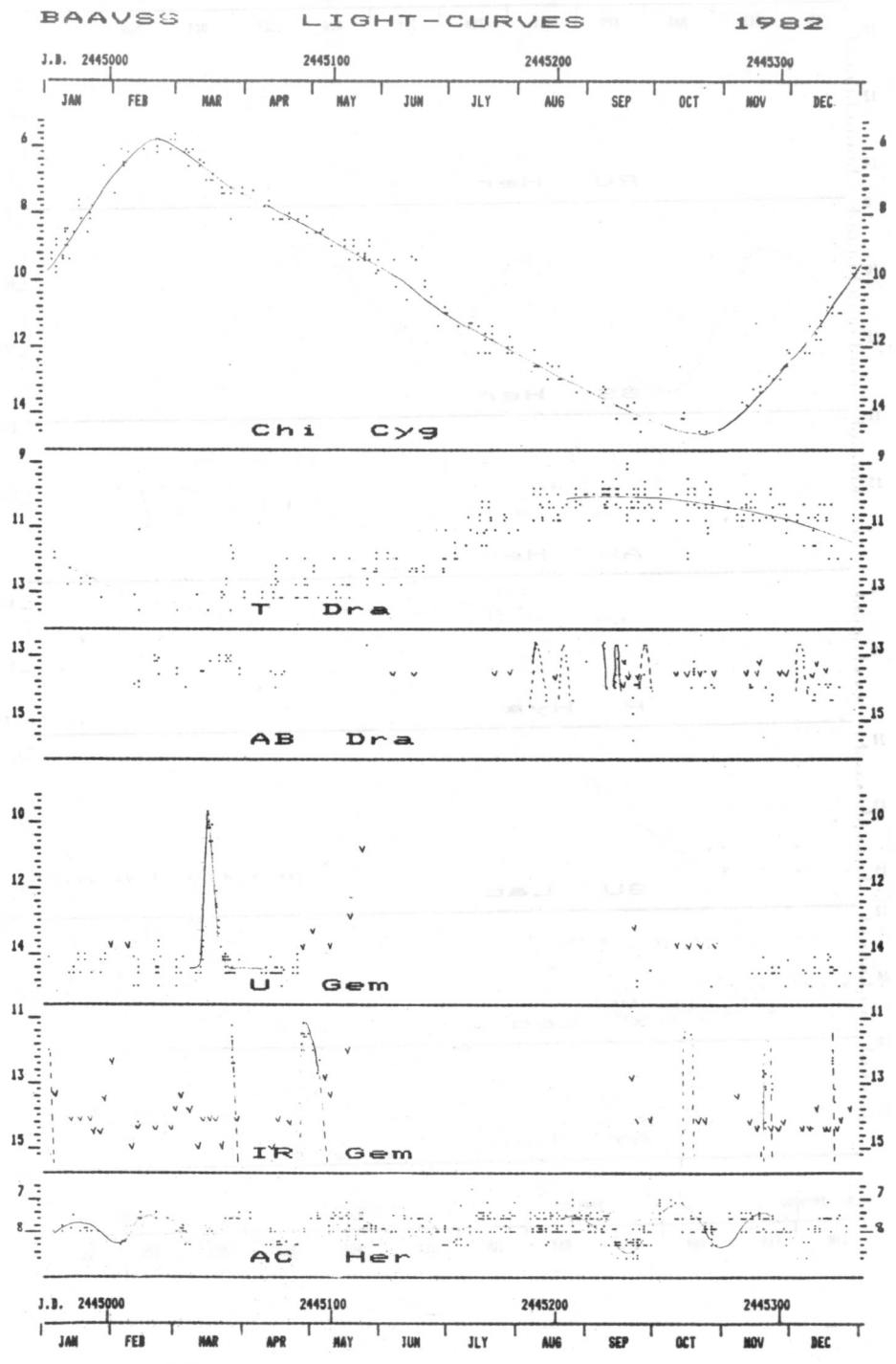
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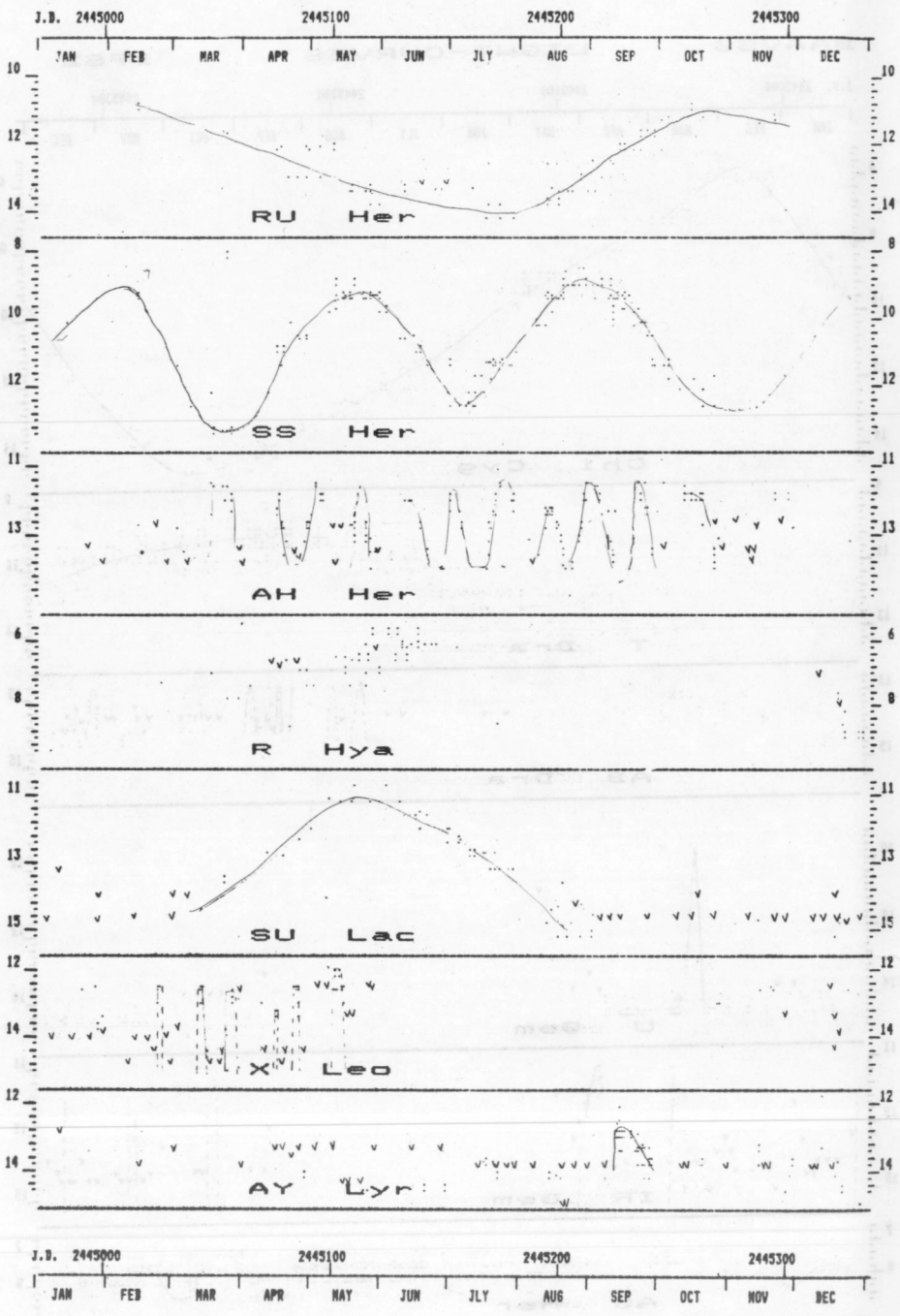
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