BRITISH ASTRONOMICAL ASSOCIATION

VARIABLE STAR SECTION

CIRCULAR No. 31 1977 JULY

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Chart Curator

Steve Anderson has asked to be relieved of the duties of chart curator. He has been doing the job admirably for over five years, and we cannot begrudge him a rest. Rodney Lyon has kindly agreed to deal with chart distribution; his address is given on the front cover.

Circulars

A number of Section members (mainly active observers) have been receiving Circulars without having submitted SAE's to Storm Dunlop. Storm reports that the situation is now getting out of hand, with almost half the Circulars being distributed in this way. We therefore regret that, except for overseas recipients, NO-ONE who does not supply SAE's will get VSSC's. If we make one exception we must make many, so it has to be done in this way. It is hoped that observers will respond appropriately.

Reprints of V.S.S. Reports from B.A.A. Journal

A certain number of reprints of Section Reports which have appeared in the B.A.A. Journal are available for distribution to Section members. These reprints are not comprehensive as some stocks have been exhausted, but they cover from Vol. 70 (approximately) to date. Copies may be obtained, free, by sending an envelope (at least 16.5 x 24 cm) and stamps to cover postage, to Steve Anderson at 65 Peartree Road, Luton, Bedfordshire. LU2 8AZ. Reprints are heavy, so adequate postage should be sent. Steve will try to meet specific requests, but obviously these reprints are offered on a 'first come, first served' basis.

Canterbury Programme

The Director is grateful to Messrs. Broadbent, Hollis, Hufton, Jashin, Lewis, MacLeod, Pickard, Swain and Withers for their response to last issue's request for results. The Canterbury programme is terminating in September, so keep those observations going - and don't forget the Hatfield programme!

Secretary's Report, 1976

A total of 14,038 observations were received from 72 observers. This total is 64% of that for 1975, and is partly accounted for by the loss of observations from O.J. Knox (who was the most prolific early morning observer) and Dr. R.A.H. Paterson (who was the main observer of faint stars). Moreover, because of change of employment, future observations from B.J. Beesley, D.P. Griffin (both early morning observers) and J.A. Bailey will be greatly reduced in numbers.

Tables I and II give the breakdown in numbers by observer and by star respectively, both tables being given in alphabetical order.

Table I

S.W. Albrighton	233	R.H. Chambers	153
S.J. Anderson	187	F.D. Chesterfield	129
J.A. Bailey	341	E.H. Collinson	162
B.J. Beesley	1671	A. Connell	101
D.E. Beesley	41	T. Cook	147
T. Brelstaff	372	R.W. Cripps	32
G. Broadbent	432	E.K. Davison	34
L.K. Brundle	125	R.B. Fraser	77
J.T. Bryan	36	L. Fry	34
J.S. Bullivant	718	P.J. Garner	80

cont...

Table 1 cont.

R.J. Godden	359	W.E. Pennell	113
D.P. Griffin	395	R.D. Pickard	224
G. Hirst	247	A.K. Porter	116
A.J. Hollis	649	J.H. Robinson	46
D. Hufton	141	T.A. Robinson	127
G.M. Hurst	80	D.A. Rothery	115
M. Joslin	69	D.R.B. Saw	820
K. Lewis	485	J.D. Shanklin	224
G.J. Kirby	129	H.W.S. Smith	37
R.J. Livesey	190	G. Spalding	84
R.L. Lyon	944	I. Stanley	37
R.M. McLeod	57	D. Stott	253
L. Matthews	252	D.M. Swain	297
A. Maudsley	249	P.J. Swift	116
I.A. Middlemist	383	M.D. Taylor	357
P.A. Moore	140	P.B. Withers	312
C.R. Munford	643	19 observers	243

In order to extend the light-curves of many stars to cover as much of the year as possible, early morning observations are essential. Thanks for these especially useful contributions are due to B.J. Beesley, T. Brelstaff, G. Broadbent, J.S. Bullivant, F.D. Chesterfield, R.J. Godden, D.P. Griffin, M. Hapgood, D. Hufton, K. Lewis, R.M. McLeod, P.A. Moore, C.R. Munford, D.A. Rothery, J.D. Shanklin, G. Spalding, S. Sto t and D.M. Swain.

Our main observer of faint stars is R. Lyon. Without his work many minima of both U Gem and Mira stars would have been underobserved.

Of the new observers, the results of K. Lewis, D. Stott and P.B. Withers are highly commendable; we also welcome back A.J. Hollis.

I would like to thank the following for their invaluable assistance with the logging of observations:- B.J. Beesley, D.P. Griffin, C.R. Munford and D.M. Swain. This work is not only tedious but also requires numeracy and neatness. Unfortunately two of these helpers are unable to continue because of increased work commitments.

Turning now to the programme, coverage of stars is again very uneven. The two most over-observed stars (but not during their 'awkward' times of the year) continue to be SS Cyg and R CrB. Fortunately the numbers of observations of Gamma and Rho Cas have been reduced to reasonable proportions, though two members contributed 251 observations, over a third of the total! At the other end of the scale, less than 20 observations were received for each of the following stars: - DZ And, SU Lac, GK Per and RT Vir, and 70 or less for RW Aur, SU Aur, UV Cas, S Cyg, CI Cyg, AH Her, R Hya, CN Ori, CZ Ori, RS Vir and V Vul (omitting the Orion variables which have now been dropped).

Of the remaining 72 stars on the 1976 programme, no less than 28 are underobserved, almost 40% of the total. These stars are marked with an asterisk in Table II. They include 8 U Gem (or Z Cam), 7 Mira, 6 out of 10 semi-regular variables, 3 out of 6 R CrB and 2 out of 3 'T Tau' types. In particular, the following stars were badly underobserved:-

U Gem/Z Cam AB Dra, AH Her, CN Ori, CZ Ori, SW UMa, CH UMa.
Mira (LPV) V Cam, S Cas, S Cyg, U Her, SU Lac, R LMi, RS Vir.
Semi-regular UW Aql, BC Cyg, BI Cyg, RS Per, BU Per, RT Vir.
R CrB DZ And, UV Cas, SU Tau.
Irregular variable RW Aur, SU Aur.
Z And CI Cyg
RV Tau V Vul.

Table II

Star	Obsns.	Obsrs.	Star	Obsns.	Obsrs.
R And	169	19	U Mon	182	18
+RX And	441	17	V616 Mon	3	2
+DZ And	15	3	RS Oph	154	11
R Aql	228	24	T Ori	31	7
+UU Aql	111	10	U Ori	154	18
+UW Aql	71	10	+CN Ori	67	10
+RW Aur	62	1	+CZ Ori	47	7
SS Aur	346	20	GW Ori	33	1
+SU Aur	70	4	IU Ori	35	7
U Boo	139	13	KS Ori	29	7
V Boo	157	13	KX Ori	75	9
+V Cam	125	8	LP Ori	52	8
X Cam	279	16	MX Ori	42	8
Z Cam	480	16	NU Ori	73	12
XX Cam	357	12	NV Ori	51	8
+S Cas	88	7	V359 Ori	83	10
+UV Cas	70	4	V361 Ori	60	9
Gam Cas	375	12	+V372 Ori	51	9
Rho Cas	371	16	V566 Ori	26	6
Omi Cet	174	20	CSV100567 Ori	65	11
R CrB	658	27	Var. No.2 Ori	64	9
S CrB	319	22	RU Peg	357	20
T CrB	241	13	S Per	194	15
+W CrB	124	13	+RS Per	81	8
R Cyg	120	14	TZ Per	298	13
+S Cyg	52	5	UV Per	204	9
W Cyg	348	20	+BU Per	76	9
SS Cyg	857	27	+GK Per	7	2
+BC Cyg	126	13	WZ Sge	130	4
+BI Cyg	123	14	R Sct	324	21
+CI Cyg	33	4	R Ser	149	17
V1500 Cyg	259	22	T Tau	119	9
Chi Cyg	206	18	RV Tau	164	18
HR Del	129	10	RY Tau	48	2
+AB Dra	161	7	+SU Tau	152	12
U Gem	279	25	T UMa	184	13
+U Her	3	1	SU UMa	263	13
SS Her	133	15	+SW UMa	79	7
AC Her	197	12	+CH UMa	128	6
+AH Her	58	5	+RS Vir	62	7
R Hya	59	10	+RT Vir	4	2
+SU Lac	1	1	+V Vul	68	7
X Leo	130	15	NQ Vul	443	37
+R LMi	95	10			
AY Lyr	197	11	† V529 Ori	91	4

It is only too clear from the abo e lists that there is no shortage of objects to observe. An unfortunate new situation, which has arisen since last year, is that only a very small number of observers are covering the U Gem stars and the Mira stars when faint. This work of course requires telescopes of apertures 250 mm or more and observers using such instruments are urged to concentrate on objects of 12^m and fainter.

This includes virtually all the dwarf novae and in itself, is quite a heavy programme. Fortunately there is good coverage of Mira stars when near maximum, although it should be borne in mind that stars such as V Cam, S Cas, S Cyg and SU Lac only attain about 10^m at maximum and consequently may be missed by observers with small aperture instruments.

With regard to observers with telescopes of apertures about 75 to 220 mm the groups of stars most in need of attention are the semi-regular and irregular variables in the 'under-observed' list above. The largest numbers of observations received were 126 for BC Cyg and 123 for BI Cyg. The next highest total was 81 for RS Per; the lowest was 33 for CI Cyg and 4 for RT Vir. Such totals are insufficient for plotting anything except the sketchiest of light-curves. One correspondent has suggested 'tinkering' with the programme and suggests more stars for inclusion in view of the "good response to BC/BI Cyg and RS/BU Per". Sadly, he has got his facts wrong; the figures above speak for themselves and the obvious inference from the facts is that there should be a contraction of the programme to allow better coverage of a smaller number of stars. To some extent this has been done by omission of the 'Orion variables' for the reason given by the Director. In any case, if stars are to be added, it should not be on an ad hoc basis at the whim of an observer. It is up to the proposer to put forward a good reason for the inclusion of each star. The programme does not remain static; as readers of VSSC 30 will know, six new stars have already been added to complement the 'Hatfield' programme. This extra work will of course be useful to the professionals and is a satisfying opportunity for those observers who would like to increase their programme.

Meantime, thank you to all observers who sent in observations for 1976. Please send observations for 1977 to the Secretary before the END OF FEBRUARY 1978 to enable light-curves to be plotted in time for the Exhibition Meeting. Members are reminded that observations sent to the BAA/VSS for official publication must NOT be sent elsewhere as well. Good observing to everybody and please add some under-observed stars to your programme.

Doug Saw

The Programme Further to Doug Saw's comments, Andy Hollis writes: "I do hope we are not going to see another great upheaval in the Section programme with wholesale new additions. There are sufficient underobserved stars on the programme to more than satisfy small (or large) telescope users. One look at the break-down of the number of observations per star printed in the Circulars should be evidence of the futility of further enlarging the Section's task - it is manifestly overstretched as it is, and further stretching is going to reduce coverage still further.

I agree with your suggestion about pruning the BG programme, since it would appear that here we have the highest percentage of under-observed stars (since the blitz on nebulars). ... Many BG stars show such small variation that the observational errors must exceed the variations and yield a completely false light curve.

I don't think there is very much to do to the main programme (which has always provided much of interest) though if there are any stars for which we cannot produce useful results these could well be omitted - note the use of the word cannot in preference to do not is deliberate."

No-one has objected to the removal of the Orion nebulars from the programme; but Geoff Kirby's article, below, highlights at least one of the problems encountered by observers of these stars.

Observations of Variable and Comparison Stars in the Orion Nebula Regions

During late 1976 I started to observe the Orion Nebula Variables and I was soon struck by the inconsistencies in the quoted magnitudes on VSS charts and my observations using a 110 mm refractor. I also concluded that certain comparisons were themselves variable. I therefore started to estimate comparison stars as well as variables. Having no means of determining an absolute visual sequence I selected stars A, F, K and L as standards and assigned to them arbitrary magnitudes 0, 10, 20 and 30 respectively. This was purely because the VSS chart gives these comparisons separations of about 1 magnitude in each case.

Estimates were made relative to these stars. It is first necessary to determine whether any of the standard stars themselves have varied. This can be done by looking for correlation in variation of stars near to the standard in brightness. Graph 1 shows the brightness of star B plotted against the brightness of star C. It can be seen that a strong correlation exists implying that star A has varied. The small scatter about a line through these data points implies that the stars B and C have not shown significant variation relative to each other.

It is concluded from my observations that the stars have varied with roughly the amplitudes below, bearing in mind that the random error in estimation is about ± 2 steps. Since no other variation correlations have been found I conclude that stars F, K and L did not vary significantly over this period.

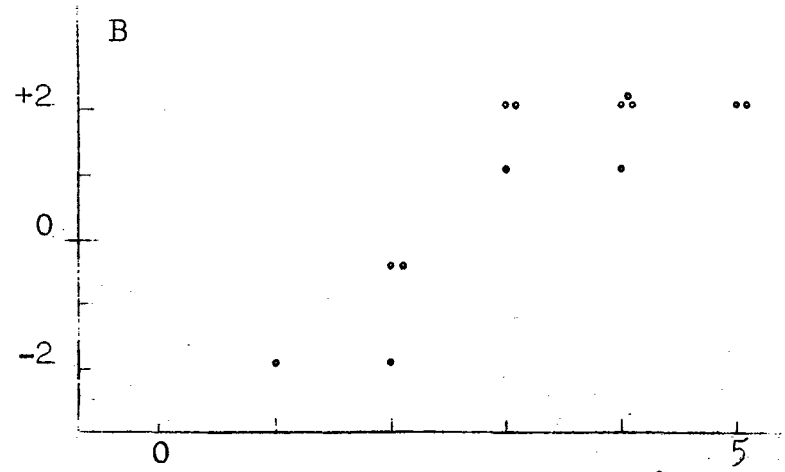
Star	Amplitude	Star	Amplitude
KX	± 4½	f	± 2½
LP	± 1½	g	± 1
NU	± 6½	B	-
V359	± 5½	C	-
V361	± 4½	D	± 5
V372	± 3	E	± 2
CSV 100567	± 5	G	± 3½
a	± 2	H	± 4
b	± 7½	L	± 1½
		M	± 1

Results for other stars are too few to be meaningful.

It can be seen that the comparison stars b, D, G, H, all show significant variability. In particular star b should be noted for its wide range. On the night of January 29 1977 the star G appeared to show rapid variations. The tabulated results show a peak some 6 steps (0.6 mag) above normal to have occured over a period of less than one minute. Soon after, a sequence of photographs was secured which also appears to show a peak of the same value lasting about one minute. The photographs were each of 15 seconds exposure with about 15 seconds interval on Tri-X using a 200 mm lens FL at f/2.9. The gibbous Moon fogged the shots somewhat. The camera was hand guided and some shots are rather indistinct as a result.

It is concluded that comparison stars b, D, G, H are probably variables and are useless as comparisons. Star G may exhibit rapid variations of the timescale of minutes.

Graph 1 overleaf ...



Graph 1

G. Kirby
1977 May 20

Nova Search Programme - Joint Project by BAA and 'The Astronomer'

I was recently delighted to accept the invitation from Ian Howarth to coordinate the existing Nova Patrol of the BAA alongside the Nova Search Programme commenced in 1976 by 'The Astronomer'. Such a joint project between the two bodies, in an area where amateurs can play a very valuable part in astronomy, must surely aid the fundamental objectives of many of our 'true' observers. The discovery of a nova is, without doubt, of considerable interest, and the amateur who spends long hours meticulously sweeping his allotted zones on every clear night, can notify his results via the usual channels to the professionals. The latter can then bring their more sophisticated equipment to bear for further research on these fascinating objects.

Our patrol caters for the visual observer with binoculars or the photographer who possesses only a camera and tripod. No sophisticated equipment is required, merely dedication, consistency and a little luck! The discoveries by George Alcock and, more recently, John Hosty, illustrates that the novae are there, just waiting for the amateur who is prepared to devote his time to a regular and systematic sweep of the sky.

The visual and photographic limit of the search is 8.0. This may sound impossible to some, but I can assure the reader that after several months our existing members have found it quite practical. The sky has been divided into 121 regions to declination -30°, and there are further areas being studied for a possible international nova project covering the whole sky. Any overseas observers or organisations considering, or interested in, programmes similar to ours are invited to write to the coordinator to discuss possible cooperation.

Each observer is allotted three or four areas to start with. For checking suspect stars, atlasses may be consulted, but photographic prints, which are available through the patrol only, are strongly recommended, as they overcome the problems of the numerous stars omitted from atlases, which in many cases are much brighter than the stated magnitude limit.

For the photographer, there is the choice between the 'standard' or 'specialist' patrols. The former requires the use of a standard 50 mm lens at full aperture with no driving, giving merely a 30 second exposure on a tripod-mounted camera. Results show that on a good night magnitude 8 or 9 can be reached quite easily and the star trails are only slight. The 'specialist' patrol, unlike the 'standard', whose field centres are aimed to cover as much of the plane of the Milky Way as possible on each occasion, involves the use of a telephoto lens, such as 135 mm, working at, for example,

f/2.8. Such photos are driven by mounting the camera onto a special mount, or by merely putting it 'piggy back' on an existing equatorial telescope. One minute exposures have shown that on HP5 or Tri-X, limiting magnitudes of 11 or 12 can be reached on moonless nights, and even in moonlight, mag 10 is possible. This patrol uses the same field centres as the visual search, and the aim is to have at least one visual and one photographic observer on each area. The visual observer should pick up the brighter objects and has the advantage of instant success, but the photographer, checking at his leisure indoors, should find fainter novae. Such photographic checks can be made by projecting the negative directly onto atlas images, slightly offset; by the use of twin projectors with negatives of different dates; or by the use of a 'blink' device. The negatives also provide a permanent record of the sky which can be checked for prediscovery images of novae.

Apart from the Directors of the existing Sections of the BAA, it was felt that a supplementary service should be made available giving the telephone numbers of three amateurs who could be contacted at any time of the night by a person who has discovered a possible nova. An announcement to this effect was made in a recent BAA Journal, and I would stress that I am available for any nova query. I have the 'back up' of an experienced team of visual and photographic amateurs, together with easy access to most atlases and catalogues, including the Palomar Sky Survey Prints, if necessary.

Further information and application forms can be obtained from myself against receipt of a foolscap SAE. I would strongly urge any observer who is looking for a worthwhile project which does not involve elaborate equipment to consider joining us, so that all areas may be effectively covered, with, I am sure, the chance of improving the discovery rate of novae in the coming years.

G.M. Hurst - Coordinator

1975 Light-Curves (continued from VSSC 30)

S CrB: Max, $7^{m}.2$, Jan 19; $13^{m}.1$ min on Sep 5. Hump about $9^{m}.6$ on decline. 11^{m} by the end of the year; underobserved in Dec.

HR Del: Steady at $11^{m}.3$.

AB Dra: Maxima at about $12^{m}.5$ occurred every 10 days or so, 29 outbursts being recorded. Minima varied between $13^{m}.5$ and $14^{m}.5$. The light-curves continued to be peculiar. This star deserves close attention by observers with access to larger apertures.

U Gem: Two outbursts observed, both 'longs', about Feb 6 ($9^{m}.2$) and Nov 24 ($9^{m}.0$). No obs. May 11 - Aug 29. Presumably a 'short' occurred around July.

SS Her: Maxima Feb 10± ($9^{m}.5$?), May 30 ($8^{m}.7$), Sep 20 ($9^{m}.3$); minima Jan 1± ($13^{m}.3$?), Apr 10 ($12^{m}.8$), Jul 20 ($13^{m}.1$), Nov 5 ($12^{m}.9$). Could be better observed, particularly during minima, and in winter-spring.

AH Her: Maxima (11^{m} - 12^{m}) about Jan 25, Mar 13, May 11, May 28, July 2, July 26, Aug 14, Sep 7, Sep 25, Oct 16, Nov 3. Mean period ca. 22^{d}. Minima about $13^{m}.8$.

R Hya: Max, $5^{m}.2$:, early Jan; min, 8^{m}±, mid summer; $6\frac{1}{2}^{m}$ at the end of this year. More observational effort is needed on this important star.

X Leo: Maxima Jan 30 ($12^{m}.0$), Feb 22 (12^{m}), Mar 11 ($12^{m}.2$), Mar 31 ($12^{m}.1$), Oct 30 (12^{m}), Nov 23 ($12^{m}.9$), Dec 14 ($12^{m}.4$). A few obs. show minima of about $14^{m}.8$. The November outburst appears to be an 'anomalous', the first recorded for this star. Period 21^{d}.

R LMi: Observed around $9^m.7$ in June and late Dec (presumably 'humps' in the light-curve). Min, $12^m.0$, mid-Oct.

AY Lyr: 'Bright' (about $13^m.5$) Apr 19, Jul 3, Sep 4, Sep 26, Nov 21. Supermax, $12^m.5$, Jun 4. Four obs at minimum, $15^m.3$.

RS Oph: Irregular variations, $11^m.0$ - $11^m.5$.

U Ori: Fell from 11^m to $13^m.0$ (Mar 24); no obs. May 2 - Jul 30; max, $6^m.5$, Aug 31; down to $10^m.5$ at the end of Dec.

CN Ori: Maxima, about $12^m.0$, Jan 14, Feb 1, Feb 16, Feb 27, Mar 17, Nov 10, Nov 23, Dec 6, Dec 24. No obs Apr 9 - Oct 1. Period comes to 17^d.

CZ Ori: Maxima (12^m) about Jan 15, Feb 5, Mar 5, Apr 12, Sep 9, Oct 6, Oct 29, Dec 11, Dec 30. If one max was missed in mid-Nov the period was 25^d.

RU Peg: Maxima Apr 19 ($10^m.4$), Jun 26 ($10^m.3$), Aug 19 ($10^m.6$), Nov 4 ($10^m.4$). Probably only one outburst (in Feb?) was missed. Period 66^d. Minima at $12^m.6$.

S Per: $9^m.0$ until early May, when a steady fall to $11^m.3$ at the end of the year set in.

RS Per: Possible slight fluctuations about $8^m.3$.

TZ Per: 'Outbursts' to $12^m.3$-7 Jan 1, Feb 1, Mar 9, Apr 8, Jul 1, Oct 26, with disturbed 'minima' $12^m.9$ - $13^m.7$. Underobserved in May and June.

UV Per: A single short outburst on Sep 4, $12^m.0$, 340^d after the last observed max. Minima fainter than 15.

BU Per: About $10^m.0$ during the first half of the year, $9^m.5$ during the second.

GK Per: An outburst to $10^m.9$ in Jan-Feb, lasting about 30^d, was reasonably well observed, but the star was only estimated 12 times in the rest of the year, at about 13^m.

V400 Per: A steady fade from 12^m to 14^m was observed for Nova Per 1974.

WZ Sge: Positive obs range $14^m.5$ - $15^m.0$. Underobserved in the first half of the year.

V373 Sct: Shortly after discovery, Nova Sct 1975 was observed to be fluctuating, but the general trend was of a steady decline from 9^m in mid-June to $11\frac{1}{2}^m$ at the end of the year.

R Ser: Fell from 10^m to min ($13^m.7$) Apr 23. Maximum ($6^m.3$) was on Sep 17, the star fading to $9^m.0$ at the end of the year. More observations Dec - Apr inclusive would be useful.

T Tau: Essentially constant at $10^m.3$.

RY Tau: Essentially constant at $10^m.8$.

SU Tau: Fell from $11^m.5$ early Jan to 15^m min (unobserved) in Feb, followed by a slow rise to 11^m on May 5. No further obs until Aug 16, after which SU fluctuated between $10^m.5$ and $11^m.5$.

T UMa: Min ($12^m.9$), Feb 3; Max ($7^m.6$) Apr 25; Min ($12^m.2$), Sep 17; Max ($7^m.0$), Dec 20.

SU UMa: Normal maxima, $12^m.0$ - $12^m.6$, on Jan 15, Jan 30, Feb 6, Feb 15, Mar 29, Apr 12, Apr 27, May 18, Jun 4, Jun 23, Sep 6, Sep 30, Nov 20. Supermax on Mar 15 ($11^m.2$) and Dec 8 ($11^m.4$). Minima about $14^m.1$.

SW UMa: A few obs. at min, $14^m.7$. Three observations of a $10^m.0$ max in early Sep. Underobserved.

CH UMa: Two obs. made of Apr 22 outburst. Minimum about $15^m.0$. Underobserved.

RS Vir: $7^m.4$ max on Jun 11. 13^m min in late Dec?

'Orion Variables': Limits of scatter are:

IU, $8^m.2$ - $9^m.0$ KS, $9^m.4$ - $10^m.3$ KX, $7^m.1$ - $7^m.7$ LP, $8^m.0$ - $8^m.7$
MX, $9^m.8$ - $10^m.4$ NU, $6^m.7$ - $7^m.5$ NV, $9^m.7$ - $10^m.5$
V359, $7^m.6$ - $8^m.2$ V361, $8^m.0$ - $8^m.7$ V372, $7^m.5$ - $8^m.0$
V566, $9^m.9$ - $10^m.6$ CSV 100567, $7^m.4$ - $8^m.1$ Var. No. 2, $8^m.3$ - $8^m.9$.

None of the stars showed any obvious trends.

RV Tau stars:

CO Aur: About $7^m.5$ - $7^m.7$.

TW Cam: Sinusoidal variations $10^m.3$ - $10^m.6$ with period of 40^d suggested.

DF Cyg: Variations $10^m.2$ - $12^m.5$ with 'double' period of 51^d.

V360 Cyg: Fragmentary observations suggest variations $10^m.7$ - $11^m.7$ with half period 40^d.

SS Gem: Varied $8^m.5$ - $9^m.8$ with 'double' period of 90^d.

SU Gem: $12^m.0$ - $12^m.7$; $2P = 40^d$?

AC Her: $7^m.0$ - $8^m.5$, double period 74^d.

EG & EP Lyr: Too few obs. to draw any conclusions.

U Mon: Varied $5^m.7$ - $7^m.2$, double period about 100^d.

TT, TX, UZ & V564 Oph: The few obs available scatter $9^m.4$ - $10^m.7$, $9^m.1$ - $10^m.4$, $10^m.2$ - $11^m.2$ and $10^m.2$ - $11^m.0$ respectively.

CT Ori: $10^m.2$ - $11^m.2$, $2P = 65^d$.

DY Ori: $11^m.4$ - $12^m.0$, no obvious period.

R Sge: Varied $8^m.8$ - $9^m.9$, $P = 37^d$.

R Sct: Poorly observed until Jun, but with no obvious minima in the first half of the year. $7^m.2$ min I July 6, min II ($6^m.0$) Sep 1, min I ($7^m.4$) Nov 15. Maxima about $5^m.5$.

Z Sex: Observations scatter about $9^m.3$.

RV Tau: Maxima (about $8^m.8$) Jan 16, Feb 27, Apr 6, Sep 9, Oct 20?, Dec 5. Minima Feb 8 ($10^m.2$), Mar 18 ($9^m.8$), Sep 30 ($10^m.1$), Nov 9 ($10^m.2$), Dec 21 ($10^m.0$).

V Vul: Varied $8^m.5$ - $9^m.4$, $P = 37^d$?

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