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Variable Star Section Circular

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Nova and Supernova Discoveries	First phone Nova/Supernova Secretary. If only answering machine response then try the following: Denis Buczynski 0524-68530 Glyn Marsh 0772-690502 Martin Mobberley 0245-475297 (weekdays) 0284-828431 (weekends)
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For subscription rates and charges for charts and other publications see inside back cover

Forthcoming Variable Star Meeting in Cambridge

Jonathan Shanklin says that the Cambridge University Astronomical Society is planning a one-day meeting on the subject of variable stars to be held in Cambridge on Saturday, 19th February 1994. Further details will be published in VSS Circulars, in the BAA Newsletter and in Astronomy Now when the arrangements have been finalised.

Editorial

Some of you may be rather mystified by Mike Carson-Rowland's article in this issue. In it he describes some of his experiences typing up observations as part of the VSS Computerisation Project. By using various short-cuts, he has been able to greatly speed up the rate at which he can enter the observations. The details he gives are specific to the word-processor that he uses but the overall ideas should be more generally applicable. However, don't assume that you have to understand all that Mike says to be able to help with data entry - Herbert Joy is still getting along very well without all of these tricks, using a very simple word-processor on an ancient BBC Micro!

Adding Stars to the Program

Shaun Albrighton, after discussions with Mike Gainsford, suggests that we could add some of the recently discovered red variables to the Program to replace those binocular stars that have been and that are likely to be dropped. He also points out that there is a marked lack of dwarf novae in the spring sky and a lack of Mira's and semiregulars in the summer sky. The Director agrees that some of Mike Collins' red variables would make good additions to the Program, however, most of them are fainter than mag 8.5 and so are more suited to small telescopes than binoculars. Charts for many of these stars can be found in back issues of The Astronomer. Has anyone been observing any of them visually? It would be useful to have some idea of the visual range and level of activity of any stars before we comitted ourselves to observing them long-term. Also, it would be nice to pick some stars for which there already exists at least one dedicated observer and a reasonable run of estimates. If you have any suggestions then please send them to the Director.

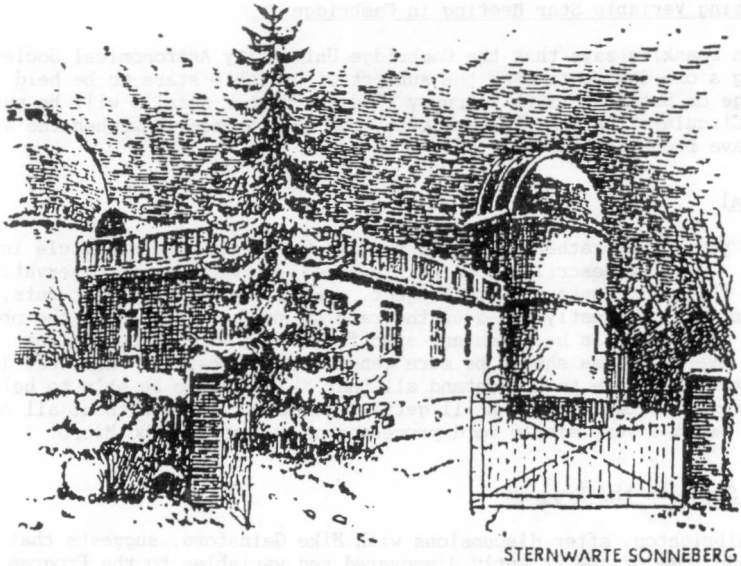
V1016 Orionis (= Theta 1 Ori A)

Apologies to A Viertel of Germany and to any one else who tried to observe the eclipse of V1016 Orionis which, in VSS 75, was predicted for March 14/15. This should have read February 14/15. I should have checked the prediction against the Krakow Yearbook. The following list gives the minima of this star which should be observable from Britain over the next couple of years. The times are GMAT and the format is similar to that used in the main eclipsing binary predictions elsewhere in this Circular. Mark these dates on your calendar. Even fragmentary observations of these eclipses could be useful.

1993 Nov 3 Wed L10(06)15	1994 Nov 30 Wed 11(20)17L
1994 Jan 7 Fri 07(16)15L	1995 Feb 4 Sat D06(06)13L
1994 Mar 14 Mon D07(02)10L	1995 Apr 10 Mon D08(17)09L
1994 Sep 26 Mon L13(10)17D	1995 Aug 19 Sat L15(13)16D

Erratum

Apologies to Graham Pointer for calling him 'Gary' on page 4 of VSSC 76.



STERNWARTE SONNEBERG

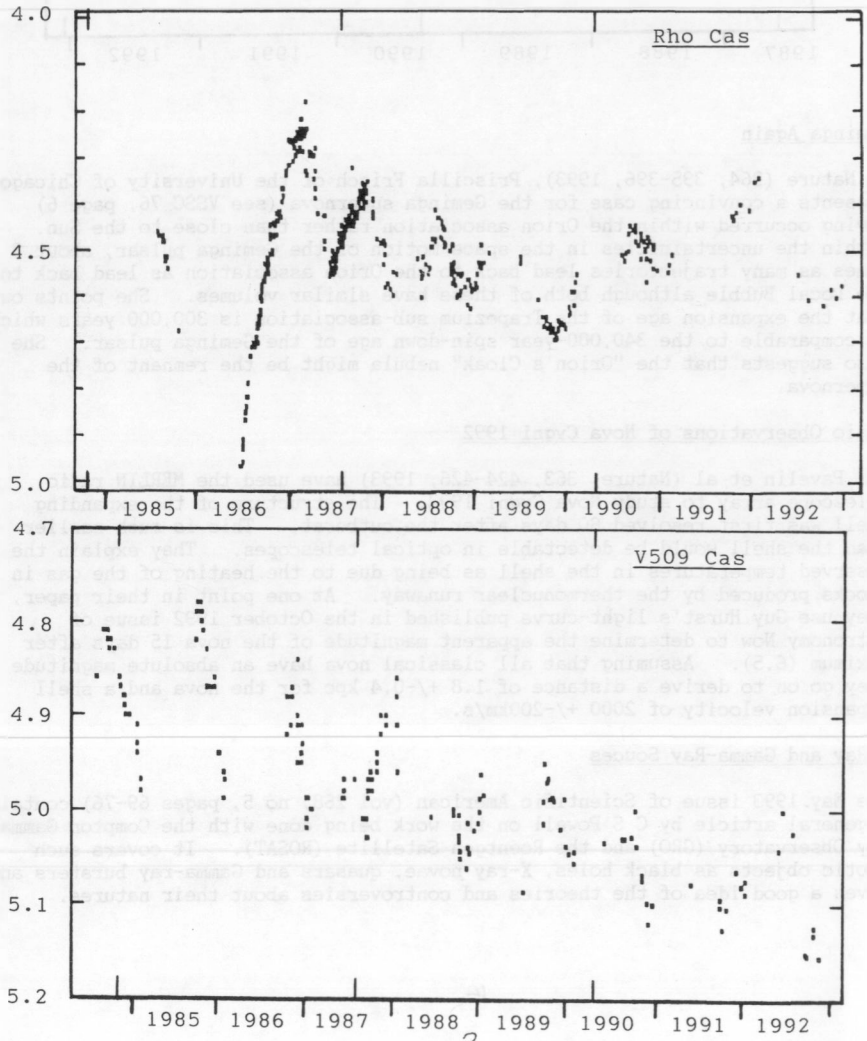
Sonneberg Observatory threatened

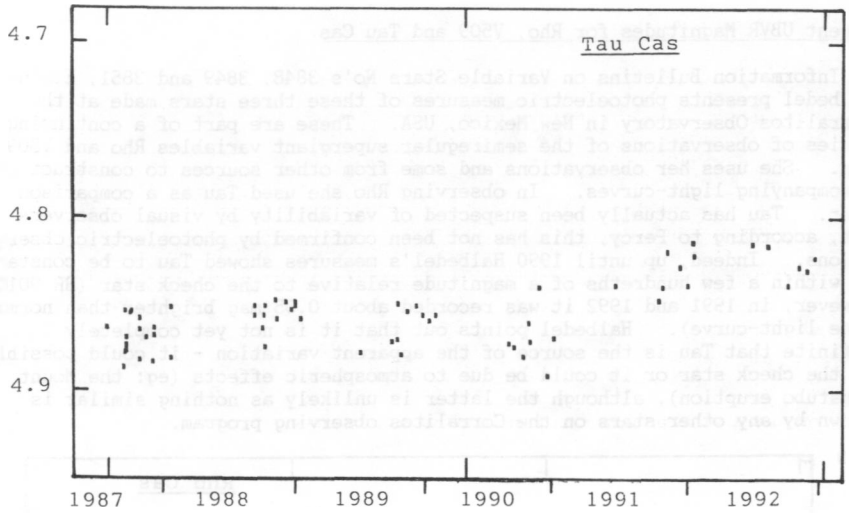
'To many astronomers, the name of Sonneberg Observatory is synonymous with variable star research and its importance can hardly be over-estimated. The Sky Patrol has been operating since 1926, and the huge collection of plates forms an indispensable archive and source of data, recently described in ESO's 'The Messenger' 68 (1992 Jun), p24-26. The importance of maintaining the archive has been recognized by a recent resolution of the IAU Commissions 27 and 42 (IAU Inf. Bull. 67, 39-40, 1992). There is also a pool of expertise among the staff, which is less easily quantified, but nonetheless of major importance for the study of variable stars. Sonneberg is now threatened with closure in 1994. Those professional and amateur astronomers who wish to protest against this action should contact the special group that has been formed to fight for the observatory's survival: Freunde der Sternwarte Sonneberg, Sternwarte Sonneberg, Sternwartestrasse 32, DO-6400 Sonneberg, Germany.'

Storm Dunlop wrote the above piece which has also appeared in other publications. He is right when he says the importance of the observatory can hardly be over-estimated: the collection of over 240,000 plates is second only to the Harvard collection(400,000) and in some respects (continuity and accessibility) it is superior. Our knowledge of the historical variations of many of the most important variable stars is heaviliy dependent on the Sonneberg plate collection: the X-ray star HZ Her, V651 Mon (the central star of the planetary nebula NGC 2346), the unique object FG Sge, and the quasar 3C273, to name just a few. Robert McNaught's 'rediscovery' of VY Aqr was followed up at Sonneberg by Wenzel and Richter who found several historical outbursts which had previously gone undetected. A quick glance at the IBVS summaries in this Circular will show that Wenzel is, even now, continually producing new and interesting results using the plate collection.

Recent UBVR Magnitudes for Rho, V509 and Tau Cas

In Information Bulletins on Variable Stars No's 3848, 3849 and 3851, Elaine Halbedel presents photoelectric measures of these three stars made at the Corralitos Observatory in New Mexico, USA. These are part of a continuing series of observations of the semiregular supergiant variables Rho and V509 Cas. She uses her observations and some from other sources to construct the accompanying light-curves. In observing Rho she used Tau as a comparison star. Tau has actually been suspected of variability by visual observers but, according to Percy, this has not been confirmed by photoelectric observations. Indeed, up until 1990 Halbedel's measures showed Tau to be constant to within a few hundreths of a magnitude relative to the check star (HR 9010). However, in 1991 and 1992 it was recorded about 0.05 mag brighter than normal (see light-curve). Halbedel points out that it is not yet completely definite that Tau is the source of the apparent variation - it could possibly be the check star or it could be due to atmospheric effects (eg: the Mount Pinatubo eruption), although the latter is unlikely as nothing similar is shown by any other stars on the Corralitos observing program.





Geminga Again

In Nature (364, 395-396, 1993), Priscilla Frisch of the University of Chicago presents a convincing case for the Geminga supernova (see VSSC 76, page 6) having occurred within the Orion association rather than close to the Sun. Within the uncertainities in the space motion of the Geminga pulsar, about 8 times as many trajectories lead back to the Orion association as lead back to the Local Bubble although both of these have similar volumes. She points out that the expansion age of the Trapezium sub-association is 300,000 years which is comparable to the 340,000-year spin-down age of the Geminga pulsar. She also suggests that the "Orion's Cloak" nebula might be the remnant of the supernova.

Radio Observations of Nova Cygni 1992

P E Pavelin et al (Nature, 363, 424-426, 1993) have used the MERLIN radio telescope array to study Nova Cygni 1992. The structure of the expanding shell was first resolved 80 days after the outburst. This is much earlier than the shell would be detectable in optical telescopes. They explain the observed temperatures in the shell as being due to the heating of the gas in shocks produced by the thermonuclear runaway. At one point in their paper, they use Guy Hurst's light-curve published in the October 1992 issue of Astronomy Now to determine the apparent magnitude of the nova 15 days after maximum (6.5). Assuming that all classical nova have an absolute magnitude they go on to derive a distance of 1.8 +/-0.4 kpc for the nova and a shell expansion velocity of 2000 +/-200km/s.

X-Ray and Gamma-Ray Souces

The May 1993 issue of Scientific American (vol 268, no 5, pages 69-76) contains a general article by C S Powell on the work being done with the Compton Gamma-Ray Observatory (GRO) and the Roentgen Satellite (ROSAT). It covers such exotic objects as black holes, X-ray novae, quasars and Gamma-ray bursters and gives a good idea of the theories and controversies about their natures.

Submitting Observations on Computer Disks or via E-Mail
By Dave McAdam

More observers have been sending their current observations on disk or by electronic mail and a couple have also provided data for previous years in this form. In several cases software has had to be specially written to convert files to the required format but this is preferable to entering the observations again from scratch. However, devising different solutions for each new contributor takes up extra time so it would be very helpful if everyone kept as close as possible to the standard format. The following example shows the preferred layout for a machine-readable observer report:

```
*BAAVSS*
*Year* 1990
*Name* A N Other
*Addr* 1 Place, Over There. London.
*Loc*  0W 51N
*Inst* 1 = B10X50, 2=R250

*Star*  AH Dra
*Chart* DAP 25.1.72
*GMAT*
Jan 04,1159 / 2(2)v(1)6 /   7.8 /  2/ 1/ M
Jan 16,0825 / 1(2)v(1)2 /   7.4 /  1/  / T,H
Feb 10,1000 / 2+2 , 1-1 /  7.4  /  1/  / O{5W 52N} x01
*X01* Obs from South Wales

*Star* GK Per
*Chart* IDH 1977 Aug
*UT*
Feb 14,1912 / <D        /  <12.3 / 2 / 2/ M
Mar 19,2205 / D(1)V(1)E /   12.5 / 1 /  /
Apr 23,2000 / =C        /   11.8 /   /  / H

*End*
```

Further blocks of observations for other variables can be added before '*End*', and files can contain up to about 700 observations. All files should be simple ASCII text with the observation lines divided into fields by a separating character ('/' in the above example, but the ':' or ';' can also be used). The last three fields are the class, instrument code, and comment fields, respectively. If the class or instrument fields are blank, the entry on the previous line is assumed. The important point to note is that the lines should still have the same number of separators. It is quite important to get the format of the observation lines right as it can be very fiddly to correct them (it is much easier to correct the keyword lines).

Another helpful detail is to use standard comments in the last field rather than whole words. The following table lists the meaning of comment letters that are handled automatically by the system:

A Artificial light	H Haze	O Other location	V Averted vision
B Bias	I Invisible	P Photographic	W Wind affecting
C Cloud	J	Q Query?	X Extra comment
D Difficult	K	R	Y
E Extrafocal	L Low altitude	S Speed (hurried)	Z
F Fog/mist	M Moon	T Twilight/dawn	
G Glimpsed	N Mean (averaged)	U Universal time	

The letters 'I', 'N', and 'U' are unnecessary in computer reports and 'J', 'K', 'R', 'Y', and 'Z' should not be used. The letter 'P' on its own denotes that the estimate and photograph were by the same person. If an estimate is made from a photo taken by someone else, then enclose the photographer's name in braces - eg: 'P{D McAdam}' - both names are then logged. The named photographer becomes the default on further P-comments with empty braces: 'P{}'. Temporary geographical locations can also be placed inside braces in the comments, eg: 'O{37E 2S}' for an observation made from Nairobi, Kenya. Latitude and longitude are stored to 1 degree accuracy and these examples are read automatically. A more precise position could be entered further along the default location line ('*Loc*').

Initially it was thought that the method column would have to be included in machine readable reports but this proved unnecessary. Although step estimates are written and keyed in different styles the recognition routine has a degree of sophistication and is able to read and understand them in conjunction with cross-related sequences. In the following table of methods s1, s2 represent numeric step values and c1, c2 represent comparison names with c1 brighter than c2 on the sequence. Each line in the table contains various ways of writing one method separated by commas and the equivalent Argelander ones continue on the line below. The first variation on each line is the preferred form. Non-specific estimates have a single chevron with '>', meaning brighter than, and '<', meaning fainter than. Observations containing only the latter method, of course, are negative observations made when the variable was too faint to be seen.

1.	V(s1)c1(s2)c2	(F)	V s1 c1 s2 c2
2.	c1(s1)V(s2)c2	(F)	c1 s1 V s2 c2
3.	c1(s1)c2(s2)V	(F)	c1 s1 c2 s2 V
4.	=c1, V=c1, c1=V	(P)	
5.	c1+s1, =c1+s1, V=c1+s1,	(P)	
	(s1)c1, V(s1)c1	(A)	
6.	c1-s1, =c1-s1, V=c1-s1,	(P)	
	c1(s1), c1(s1)V	(A)	
7.	>c1, V>c1, c1<V	(P)	
8.	<c1, V<c1, c1>V	(P)	
9.	>c1+s1, V>c1+s1	(P)	
10.	<c1-s1, V<c1-s1	(P)	

On all estimating methods, leading chevrons and round or square brackets ('<', '(', '[') are taken to be equivalent; similarly, the trailing ones are also interchangeable ('>', ')', ']'). Fractional estimates are occasionally written without brackets as shown at the extreme right. These cannot be read automatically so they should be keyed with the brackets. Mixed estimates separated by commas are allowed in an observation and the average is taken. Method 2 is sometimes purposely written 'c2(s1)V(s2)c1' where two sequence comparisons of nearly the same magnitude have been seen in reverse order. If such estimates are unavoidable, they are best confirmed with an X-comment.

Greek letters can be produced on certain computers by using special character codes but these codes are machine-dependent so it is best to use their English names instead. These can be abbreviated to the first three letters to save on typing, eg: 'omi' = omicron, 'eps' = epsilon, and so on.

Instrument specifications on the *Inst* lines can be read automatically if they comply with a simple syntax, eg; '1=R305, 2=C127X60, 3=C127X100, 4=B10X50...' etc. Initial letters denote 'R'eflector, 'C'atadioptric, 'G'lass (refractor), 'F'inder, 'M'onocular and 'B'inocular. The aperture in millimetres should come first except for Binos, Monoculars, and Finders.

Photographers can include film types after the focal length and F-ratio, eg: '305mm F4 K2415'.

Some less-used ways of writing dates and times can be handled: decimal days UT or GMAT are indicated by placing a full stop after the preceding keywords - '*UT*.' or '*GMAT*.' - which switches the routine into reading decimals instead of hhmm. JD are always in decimal but are seldom used in normal reports.

Finally, please keep sending computer reports, if you are already doing so, because this is a great help towards dealing with the annual input. If the files are near to the format outlined above, so much the better. Observers who think they can start reporting this way are invited to contact me for more details. I would also be pleased to hear from more people who can undertake entry of some of the more historic lists.

International Campaign on OJ 287

Gary Poyner is looking for people to observe this active galaxy as part of a major international campaign. If you have adequate instrumentation and are interested in joining in then write to him at the address given inside the front cover. The following outline of the campaign is based on an announcement by Dr H Lehto which has been passed on by B Granslo:

'We have launched a major campaign to observe the BL Lac object OJ 287 (0851+20) during 1993/1994. All the telescopes on the Canaries are involved in this international project. This includes the 4.2m William Herschel Telescope, 2.6m Nordic Optical Telescope, 2.5m Isaac Newton Telescope, 1.5m Carlos Sanchez Telescope, 1m Jacobus Kapteyn Telescope, and the 18cm Carsberg Automatic Meridian Transit Circle. Other telescopes involved are located around the world, eg: in Japan, Finland, Germany, Italy, Spain, USA and Mexico and cover wavelengths from X-ray to radio. Note that there is a long gap (in longitude) between Japan and Finland.'

'Both amateurs, with telescopes in their backyards, as well as professionals who have access to telescopes are invited to help build up the most complete light curve of a BL Lac object. This BL Lac object is highly variable and is normally about V=15.5 but may brighten to V=12 during an outburst; smaller outbursts occur quite frequently. Variations are likely to be slow but could also be very fast. If you are an experienced observer and could observe this object, please get in touch with us (through Gary Poyner). Please include at least the following information. This will be extremely valuable for us in planning a detailed observing strategy.'

1. Your Name.
2. Your postal and E-mail addresses, phone and fax numbers.
3. Level of your previous experience.
4. How often could you observe and at what times of night?
5. Telescope location, size and type (optical, radio, IR, etc)
6. If optical then state:
   a) Which instruments you could use (visual, photographic, photoelectric, uncooled CCD, cooled CCD, etc).
   b) Which filters you could use (ie: none, U, B, V, R, I, etc).
7. If other type of telescope then give relevant details.

UK Nova/Supernova Patrol
Recurrent Objects Programme
Report 1992

The Recurrent objects programme was set up as a joint BAAVSS/'The Astronomer' project, specifically to monitor poorly studied eruptive stars of various types, where outbursts generally occur at periods greater than one year. Most of the objects on the programme have no known period (yet!), and details of maximum and minimum brightness are rather spurious.

At present there are 75 objects on the programme. Most are thought to be type UG, but several novae have been included where more than one outburst has been detected. Professional interest in these stars remain high, and pro-am collaboration is an important aspect to consider when deciding which stars should be monitored.

1992 has been a successful year. The following list shows stars on the programme which have been detected in outburst, along with the observers who made the initial and confirming observations.

Jan 10:	FN And.	O	Midtskogen/	R.	Mitchell
Feb 28:	DX And.	O	Midtskogen/	W.	Worraker
Mar 20:	SW UMa.	H	Dahle /	O.	Midtskogen
Mar 28:	EY Cyg.	P.	Schmeer /	B.	Granslo
Apr 20:	HV Vir.	P.	Schmeer /	A.	Gilmore
Apr 24:	SS UMi.	G.	Poyner /	W.	Worraker
Jly 07:	GK Per.	J.	Bortle	; Independently observed by Worraker.	
Jly 07:	EF Peg.	P.	Schmeer /	G.	Poyner
Jly 18:	BC UMa.	P.	Schmeer /	G.	Poyner
Jly 22:	DM Lyr.	W.	Worraker /	G.	Poyner
Sep 05:	FN And.	G.	Poyner /	W.	Worraker
Oct 26:	BZ UMa.	G.	Poyner /	P.	Schmeer
Nov 23:	V795 Cyg.	P.	Schmeer /	W.	Worraker

Two reported sightings of DM Lyr (Sep) and AK Cnc (Dec) remain unconfirmed. Both objects were reported to be fainter than magnitude 14.5 at the time, and adverse weather conditions disrupted attempts to confirm the reports.

The highlight of the year was undoubtedly Patrick Schmeers first ever visual sighting of HV Vir. Previous to this observation, the star had been recorded only once before -during February 1929 - by Schiller and Duerbeck, and had been classed as Nova Vir 1929 ever since. During the April outburst, superhumps were detected, indicating that HV Vir is in fact a dwarf nova of type UGSU.

Observers world wide are participating in the programme, but sadly very few from the U.K. (which is obvious from the list). However, much valuable work has been undertaken by Bill Worraker, whose help in regular monitoring of stars and helping in vital confirmations has been invaluable. Scandinavian observers are very active, and valuable results have been achieved by their

group. In Germany, Patrick Schmeer remains as enthusiastic as ever, and is often one of the first to report activity in recurrent stars.

The majority of objects on the programme reach a maximum magnitude greater than 14, and many reach magnitude 11 or brighter, so that a 20cm telescope will provide valuable results.

New observers are urgently needed, especially in the U.K. Variable star section members who are interested in participating in the programme are invited to write or e-mail me at the addresses given below, giving details of equipment and availability for responding to alerts. Charts for stars are available from the Coordinator Guy Hurst. A complete list of stars on the programme is included with this report.

Gary Poyner
Ast.Coordinator Nova/Supernova Patrol
67 Ellerton Rd
Kingstanding
Birmingham B44 0QE
tel: 021 350 4312 (Available all night)
E-Mail: Starlink: BHVAD::GP
Janet: GP@UK.AC.BHAM.SR.STAR

Recurrent Objects Programme

Variable	RA & Dec(1950)	Mag Range	Type	Charts							limit	Qu	Revised
HP And	00 16.5 +41 11	10.5-(14.5p	UG:	A19*	B	*	C	*			13.0	3	880219
LS And	00 29.5 +41 42	11.7-20.5p	?	A19	B	*	C	*			16.4	1	880219
LL And	00 39.2 +26 21	13-(17v	UG?	N	N		C	*			09.1	3	890422
V452 Cas	00 49.5 +53 36	14-17.5:	UG?	N	B	*	C	*			12.5	3	880221
HT Cas	01 07.0 +59 48	12.6-19.3v	UGSSEA	N	N		C	*			16.6	3	850120
XY Psc	01 07.6 +03 17	13.0-(20p	UG:	N	N		C	*			F	4	881224
FN And	01 09.2 +35 02	13.5-(17.5p	UG	N	B	*	C	*			18.0	3	900927
WX Cet	01 14.6 -18 12	9.5-18.5v	UG?	A	* B	*	C	*			13.9	1	830923
V635 Cas	01 15.2 +63 29	13.5-16.3v	XNGP	N	B	*	C	*	1		14.9	2	921121
UV Per	02 06.7 +56 57	11.0-17.5v	UGSS	N	N		C	*			16.5	1	881228
UW Per	02 08.9 +56 52	13.5-18.8p?	UG?	N	B	*	C	*	2		15.6	2	921010
PQ And	02 26.4 +39 49	10.1-19V	NA:	N	B	*	C	*			16.0	3	900927
NSV 00895	02 39.0 +43 09	11.7-(20p	UGorSN	N	N		C	*			16.2	3	860824
SV Ari	03 22.2 +19 39	12-22pg	Nova?	N	B	*	C	*			16.7	3	881129
GK Per	03 27.8 +43 44	0.2-14.0v	NA	A01	B52*		C	*			15.9	2	890912
G J0422+32	04 18.6 +32 47	12-(20B	?	N	N		C	*	1		14.9	3	930102
HW Tau	05 00.6 +26 19	11.5-(17p	UGSS	N	N		C	*			12.9	3	881223
BY Cam	05 38.3 +60 50	14.6V-(17B	XPRM?	N	N		C	*			F	4	900927
V616 Mon	06 20.2 -00 19	11.2-20.2B	XND	A08*	B	*	C	*			14.8	1	890109
CG CMa	07 02.0 -23 41	13.7-(15.7p	Nova?	N	B	*	C	*			11.8	4	880723
SW UMa	08 33.0 +53 39	9.7-16.5V	UGSU	N	N		C	*			14.7	1	900927
EG Cnc	08 40.1 +28 02	11.9-17:V	NL	N	B	*	N				09.5	3	881230
BZ UMa	08 49.9 +58 00	10.5-15.3B	UG	N	B	*	N				16.8	3	881223
AK Cnc	08 52.6 +11 30	13-(17p	UG	N	N		C	*	1		16.3	2	920118
T Pyx	09 02.6 -32 11	7.0-15.77B	NR	N	B	*	C	*			14.4	3	880403
TU Leo	09 27.0 +21 37	11.7-15.19B	UG:	N	B	*	C	*			14.9	3	880218
DV UMa	09 43.4 +45 01	14-19.8B	UG	N	B	*	N				09.3	3	881223
RZ Leo	11 34.8 +02 06	10.5-17.5p	UG:	N	B80*		C	*			15.0	2	910310
DO Dra	11 40.8 +71 58	10.0-15.8v	UG	N	B	*	C	*			14.2	3	900718
BC UMa	11 49.7 +49 31	10.9-18.3B	UG	N	B	*	N				15.8	3	880530
1215-17 Crv	12 17.8 -18 10	12-19B	UG	N	B	*	N		1		15.3	3	930219
W Com	12 18.6 +28 29	14.5-16.5	QSO	N	B76*		C	*	1		17.1	1	920227
AL Com	12 29.9 +14 37	13.0-20.0p	UGSS	N	B	*	N				19.5	2	830403

EX Hya	12 49.7	-28 59	9.6-13.99v	UGSU	N		B	*	N			13.5	2	870507
3C 279	12 53.6	-05 31	11-18pg	QSO	N		B	*	C	*	2	15.4	2	920516
GO Com	12 54.2	+26 53	13.1-20.0p	UGSS	N		N		C	*		14.8	2	900913
HV Vir	13 18.5	+02 09	11-20.5B	UGWZ?	A	*	B	*	C	*	2	15.4	2	920421
CR Boo	13 46.4	+08 12	13.0-17.5v	AM:	N		N		C58	*	1	15.1	3	910519
UZ Boo	14 41.7	+22 13	11.5-<16.1v	UG	N		B	*	C	*		16.5	1	881224
SS UMi	15 51.3	+71 55	12.6-17.6p	UG	N		B	*	C	*		16.0	3	910825
T CrB	15 57.4	+26 04	2.0-11.3p	NR	N		B	*	N			10.5	1	900927
U Sco	16 19.6	-17 46	8.8-19p	Nova	A05	*	B	*	C	*		14.2	2	870516
V592 Her	16 28.8	+21 23	12.3-[22p	UG?	N		B	*	C	*		15.4	3	910720
V2110 Oph	17 40.5	-22 44	12-22V	NovaNC	N		N		C	*		F	4	860825
V1172 Sgr	17 47.4	-20 40	9.0-18p	Nova?	N		N		C	*		F	4	911024
RS Oph	17 47.5	-06 42	4.3-12.5V	NR	N		B	*	N			13.8	1	900927
V745 Sco	17 52.1	-33 14	9.9-21?	NR	N		N		C	*		09.1	3	900927
V2204 Oph	18 23.7	+11 53	13.7-16.8B	NL?	N		N		C	*		16.8	3	900927
V1017 Sgr	18 28.9	-29 26	6.2-14.73B	Z And?	A	*	B81	*	C56	*		14.5	3	861018
V3645 Sgr	18 32.9	-18 44	12.6-18p	NR?	N		N		C	*		14.4	3	911024
V344 Lyr	18 43.1	+43 19	14.5-<20p	UG?	N		N		C	*		14.8	2	901020
Nova Sct81	18 44.2	-05 00	8.0v-?	N??	A	*	B	*	N			11.9	3	901104
EU Sct	18 53.6	-04 16	8.4-18p	NR?	A09	*	B	*	C	*		16.3	3	911024
FS Sct	18 55.6	-05 28	10.1-18p	NA:	A09		B	*	C	*		7.5	3	911024
DM Lyr	18 56.8	+30 12	13.6-18p	UG	N		B	*	N			14.2	3	881229
V1113 Cyg	19 21.5	+52 39	14-<17p	UG	N		B	*	N			F	4	901020
V795 Cyg	19 32.6	+31 26	13.4-<17.9p	UGSS	N		N		C	*		17.9	3	881229
V542 Cyg	19 48.3	+58 22	13.0-18.3p:	UGSS	N		B	*	N			13.9	3	881227
V1454 Cyg	19 51.8	+35 11	13.9-<17.0p	UGSS	N		N		C	*	1	13.9	2	920110
EY Cyg	19 52.7	+32 14	11.4-15.7p	UGSS	N		B	*	C	*		14.4	2	870704
AW Sge	19 56.3	+16 33	13.8-<17.5p	UG	N		N		C51	*		14.5	2	881227
V1028 Cyg	19 59.8	+56 48	13.0-18p	UGSS	N		N		C	*		17.5	3	881223
V1363 Cyg	20 04.3	+33 34	13.0-<17.6p	UGZ	N		B	*	C	*		13.2	3	901029
WZ Sge	20 05.3	+17 34	7.0-15.0p	UGWZ	N		N		C	*		14.9	1	900927
V404 Cyg	20 22.1	+33 42	11.0:-20.5B	Nova	A	*	B	*	C	*		15.3	3	890730
TY Vul	20 39.6	+25 25	14-19:p	UG	N		B	*	C	*		14.7	3	901021
UY Vul	20 53.7	+26 29	13.0-<16.0p	UG:	N		B	*	N			09.0	3	881231
UZ Vul	20 54.6	+23 23	14-<16p	UG:	N		B	*	N			F	4	881229
VY Aqr	21 09.5	-09 02	8.4-17.2p	UGSU	A22	*	B	*	C	*		15.5	2	880723
EF Peg	21 12.7	+13 52	10.7-(17p	UG	N		N		C	*		12.8	3	880515
V632 Cyg	21 33.9	+40 12	12.6-17.5p	UGSS	N		N		C50	*		16.8	1	900327
V1251 Cyg	21 39.0	+48 26	12.5-<15p	UGSU	N		B06	*	C	*		14.8	1	920124
Scovil Cyg	21 40.8	+31 20	12.8-?	UG?	N		B07	*	N			10.9	3	860118
DX And	23 27.3	+43 28	10.9-16.4p	UGSS	N		B	*	C	*		14.4	3	890109
V630 Cas	23 46.5	+51 11	12.3-17.1p	UG?	N		B	*	C	*		17.3	3	880219

33 Ceti

Mike Collins supplies the following further details on 33 Ceti (see VSSC 76, pages 7 - 11): 'It appears to be quite a strong infrared source: IRC+00015 = IRAS 01079+0210. The IRAS Point Source Catalog records the star having a percentage probability of variability in the 10-20% range. This suggests variability in the IR but of course does not prove it. The star is also listed in the Hipparcos Input Catalogue which may mean that photometry may be forthcoming from that project in due course.'

44(=i) Bootis

A query from Robert Nurse of Cardiff illustrates a trap which many would-be eclipsing binary observers have fallen into over the years. The main tables of the General Catalogue of Variable Stars lists 44(=i) Bootis as a W UMa type eclipsing binary with a visual range of 5.8 to 6.4. On the face of it, this would suggest that this would be an easy variable to follow with binoculars. However, the notes in the back of the GCVS reveal that the eclipsing star is the faint component of a close double star. Component A is mag 5.1 and the separation at the present is about 1.9". The combined range of the two stars is only about 0.2 mag which is too small to be detectable visually.

Professional-Amateur Exchanges Report No 9 (1992 July 1 to Dec 31)
By Guy Hurst

Date	Subject	Professional

920702 Poss SN N4411B — *Rob McNaught, Siding Spring, Australia*
Report relayed that R.Evans discovered a possible supernova on July 1.37UT mag 13.5 40"E, 40"S of nucleus of NGC 4411B. Confirmed by J.Spyromilio and designated SN 1992ad. (see IAU Circular 5552)

920707 Nova Sco 1992 — *Rob McNaught, Siding Spring*
Steep decline in brightness according to measures by Alan Gilmore, Mt.John Observatory and W.H.Allen, Adams Lane Observatory, Blenheim, New Zealand. By July 1.59UT, V=7.62. (IAUC 5555)

920706 GK Persei Outburst — *Brian Marsden, CBAT, USA*
John Bortle, USA reports brightening of GK Persei (Nova 1901) to mag 12.3 on July 3.31UT. W.Worraker confirms July 7.031UT, 11.8. We relay confirmation to CBAT (Central Bureau for Astronomical Telegrams). (IAUC 5558)

920712 EF Pegasi Outburst — *Brian Marsden, CBAT*
We relay to CBAT a report of an outburst of EF Peg (UG) found by Patrick Schmeer, Germany: July 3.970UT, [12.4; 7.899, 12.6 and confirmation by Gary Poyner, Birmingham July 11.059UT, 12.6. Only second ever visual sighting! (For the first see IAUC 5369)

920802 Nova Sgr 1992 No 2 — *Alan Gilmore, Mt John, New Zealand*
Alan Gilmore supplies us with photometry of comparison stars to assist in chart development of this new object.

920805 X Persei — *Paul Roche, Southampton University*
Paul Roche relays that X Persei undergoing rapid brightening in infrared. Asks for optical data but although relayed there is no obvious change in visual magnitude. July 15.064, 6.7; 22.07, 6.6; Aug 7.052, 6.5 (John Day); 12.955, 6.5 (Poyner).

920816 QQ Vul — *Gavin Ramsay, Mullard Radio Astronomy Observatory, Cambridge*
Gavin advises study of ROSAT and GINGA data on cataclysmic variable QQ Vul in progress and they wish to know its magnitude on 1991 Apr 9. We establish this was formerly E2003+225 and is located at: RA 20h03m30s DEC +22 31.5' [1950]. IAUC 3733 appears to be sole reference but no chart and thus no observations held.

920902 RS Ophiuchi — *Nye Evans, Keele University*
We send copy of TA E-Circular 665 announcing rapid brightening of RS Oph (Recurrent nova): Aug 30.886, 11.0 (W.Worraker); 30.93, 11.2 (Poyner); 31.89, 10.3 (Worraker); Sept 1.817, 10.5. Nye responds that IR spectrum obtained end of July but showing nothing unusual. They will now monitor.

920903 FG Sagittae — *Taichi Kato, Japan*
We e-mail Taichi regarding a report that this unique variable may be fading from its 'normal' magnitude of about 9.3. Two Japanese observers report it near 9.5 but they state this may be within normal pulsation range.

920913 FG Sagittae — *J.Papousek, Brno University, Czech Republic*
Reports to us that V=10.05 on Sept 2.88UT about 0.7 magnitudes below 'normal' brightness (IAUC 5604). We carry out an analysis 29 estimates (Aug 8 - Sept 8) which confirm the fade suggested and published on E-Circular 667.

920921 Nova Sgr 1992 No 2 *Alan Gilmore, Mt John, New Zealand*
Further photometry of comparison stars has been supplied to us to improve the sequence for this nova. Latest measure on the nova from Alan is Sept 17.44UT, V=11.86.

920921 FG Sagittae *Mark Kidger, Tenerife*
Advises us that infrared data taken around the onset of the fade and we supply visual data for comparison.

920922 HO Del *Taichi Kato, Japan*
Taichi advises that this UG star is in outburst according to observations by Japanese observers: Sept 21.687, 13.5 (M.Moriyama); 22.480, 13.8 (M.Iida). He also reports an incorrect position is quoted in GCVS and that it should read: RA 20h34m36s DEC +13 52.9'[1950]. We agree to investigate further.

921002 FG Sagittae *Mark Kidger, Tenerife*
Further to note (920921) reports analysis shows J magnitude has faded by 1.6 since 1991 Sept. Suggests star forming a shell of warm dust causing the optical fade.

921019 Plate Research *Brian Skiff, Lowell Observatory, USA*
We make contact with Brian Skiff who offers assistance in plate research of the 10,000+ Pluto camera collection which goes back to 1929! B-mag limit varies 16-18 and plates cover zones as far south as -40deg dec.

921019 New mag 11 star nr M57? Bob Argyle, Royal Greenwich Observatory
Bob relays a message from Riku Henriksson, Tampere, Finland that a mag 11.5 'new' object was seen Sept 21 near M57. Oct 14 photograph by Brian Manning shows central star but no new object.

921030 Nova in Pegasus? *Brian Marsden, CBAT*
Brian asks us to check a possible nova near NGC 7814 at: RA 00h02m DEC +16 10' [2000], mag 8-9. Seen Oct 27.90UT. P.J.Andrews (RGO) checks Palomar Observatory Sky Survey in response to original report from Ian Redding, Winchester, but found nothing. Observations by G.Poyner and G.Hurst Oct 30.9UT show no new object in Pegasus and CBAT advised. It appears the suspect is an omission from Uranometria.

921115 V366 Lac *Andrejs Alksnis, Radioastrophysical Observatory, Riga, Latvia*
Requests we monitor this unusual variable which has evidently faded to below magnitude 15 and not recovered. We ask for copies of papers, charts and sequences which are duly received via FAX. We convert to 'finders' format.

921122 V635 Cas *Diane Roussel-Dupre, Los Alamos, USA*
Collaborative project involving X-ray study in USA, spectral analysis in Russia and optical monitoring in UK set up. E-Circular 687 issued to give full details of this optical component of an x-ray source.

921123 Novae in M31 *James Bryan, USA*
James, discoverer of several novae in M31, requests we set up system to help with confirmation of such events. He supplies set of finder charts for future use.

921128 Information exchange *Thorsteinn Saemundsson, University of Iceland*
General exchange set up with contact via electronic mail.

921128 IP Pegasi *Janet Wood, Keele University*
Request our assistance in alerting outbursts of this UG star as they have 'target of opportunity' on the Hubble Space Telescope.

921128 AX Persei *Taichi Kato, Japan*
Requests recent data on this symbiotic variable. We provide: Nov 1, 12.2; 3, 12.3 (Alfredo Pereira, Portugal) and Nov 7, 12.3 (Bjorn Granslo, Norway).

921128 V635 Cas *Diane Roussel-Dupre, Los Alamos, USA*
As a follow-up to 921122 we supply visual data by G.Poyner: Nov 2.941, 15.2; 5.979, 15.2; 16.960, 15.3; 17.948, 15.4; 19.800, 15.4; 20.845, 15.2; 27.936, 15.4.

921128 R CrB stars *A.Pugach, Main Astronomical Observatory, Kiev, Ukraine*
After considerable e-mail connection difficulties, we respond to earlier fax requesting us to monitor R CrB, SU Tau, V482 Cyg, DY Per, RR Tau. November data sent but shows no unusual activity.

921128 DY Persei *Andrejs Alksnis, Riga, Latvia*
As part of our continuing monitoring of this possible R CrB type variable for astronomers in Latvia we supply visual data by G.Poyner: Nov 2.961, 11.2; 6.853, 11.5; 11.892, 11.5; 12.723, 11.5; 17.000, 11.5; 17.886, 11.4; 19.798, 11.4; 20.898, 11.0; 27.967, 11.4.

921203 IP Pegasi *Janet Wood, Keele, Keith Horne, STSCI, USA, Paula Szkody, USA*
Further to the note of 921128 schedule of contacts and dates agreed for next outburst of this star.

921204 R CrB Stars *A.Pugach, Kiev, Ukraine*
Feedback received that observing run for spectral analysis of R CrB type variables has been completed and our visual data proved useful in planning the session. (cf 921128)

921209 DY Per and V366 Lac *Andrejs Alksnis, Riga, Latvia*
Andrejs supplies further notes on DY Per activity and asks for bi-monthly reports. He mentions V366 Lac has not been recorded for some years and must be very faint. We agree to try and record it probably using CCD equipment and this request is relayed to Martin Mobberley.

921210 Novae in M31 *James Bryan, USA*
Following paper on this subject by James Bryan which was published in 'The Astronomer' further translations into French enabled it to appear in 'L'Astronomie'. Subsequently N.N.Samus, Moscow, proposes entries now be listed in the General Catalogue of Variable Stars.

921211 IP Pegasi *Janet Wood, Keele, Keith Horne, STSCI, USA, Taichi Kato, Japan, Rob McNaught, Australia*
Outburst detected by Gary Poyner (see note 921203): Dec 8.720, [13.8; 10.718, 13.3; 10.729, 13.3; 10.768, 13.3; 10.793, 13.3. We relay by telephone to STSCI and e-mail to Keele. They reply that they are impressed with our speed! Appeals for other observations bring immediate response from Taichi Kato: Dec 11.387, 13.3 and Rob McNaught: 11.50, V=13.0 (1.0-m and CCD).

921212 IP Pegasi *Janet Wood, Keele*
Due to critical test of fine guidance system on HST, their 'Target of Opportunity' has been declined but they ask us to continue monitoring for other outbursts.

921213 R CrB Stars *A.Pugach, Kiev, Ukraine*
Further data for December supplied (cf 921204) to conclude this exchange.

921213 V635 Cas *Diane Roussel-Dupre, Los Alamos, USA*
Further visual data by G.Poyner supplied: Nov 30.925, 15.4; Dec 3.801, 15.4; (cf 921128)

921217 RR Tau *A.Pugach, Kiev, Ukraine*
Fade detected by B.Granslo. As this is on the Ukraine list we telex results to Dr.Pugach. Nov 29.81UT, 10.7 (Granslo, Norway); Dec 12.83, 12.3 (Granslo); Dec 13.85, 12.7 (Margareta Westlund, Sweden). Telex response received 921224 thanking us for the alert.

921218 V635 Cas *Diane Roussel-Dupre, Los Alamos, USA*
Further to our report (921213) Diane reports that the Russian collaborators confirm that eschelle spectra have been obtained.

921219 Nova in M31 *James Bryan, USA*
James Bryan reported a nova found on photographs by W.Wren of McDonald Observatory with the 0.76-m telescope (IAUC 5658). We obtain confirmation photographs: 1992 Nov 20 18.30UT, 17.4pv N.James 0.30-m refl. 1992 Nov 17.93410UT, 17.6pv B.Manning 0.21-m Wright Camera.

921224 V635 Cas *Diane Roussel-Dupre, Los Alamos, USA*
Diane advises that all agree this object is still in quiescence. We supply new visual data by G.Poyner: Dec 16.841, 15.3; 20.837, 15.2; 22.837, 15.2.

921230 V366 Lac *Andrejs Alksnis, Riga, Latvia*
We advise Andrejs that Martin Mobberley obtained a conventional photograph on Dec 22 with the 0.36-m reflector. I estimate the limit as magnitude 17 and send a print. V366 Lac is not recorded.

921231 HT Cas *Taichi Kato, Japan*
Reports circulating that this UG star was in outburst. We appeal for results which are received as follows: Dec 31.05UT, V=16.8 (0.19-m + CCD) Herman Mikuz, Slovenia. 31.406UT,V=16.0 (CCD) Taichi Kato, Japan. We circulate that the original report is probably in error.

The Decreasing Amplitude of Polaris

In the 1976 Supplement to the 3rd Edition of the General Catalogue of Variable Stars, Polaris is listed as a Delta Cepheid with a period of 3.969778 days and a range of 1.92 to 2.07V. In 1982, Arrelano Ferro (Astrophysical Journal, 274, p755, 1983) found that the amplitude was only 0.04 mag and the period was decreasing by 3.3 seconds per year. Recently, Fernie, Kamper and Seager (Astrophysical Journal, in press) have found that the amplitude is now less than 0.01 mag. They are unable to explain this apparent disappearnce of the pulsations - it cannot be that Polaris is leaving the Cepheid Instability Strip because its location on the HR Diagram places it near the middle of the Strip. They suggest that the decrease in amplitude has been accompanied by a slow expansion and cooling of the atmosphere of the star.

In IBVS 3854, Fernie presents a period study of the Cepheid RT Aurigae. This 5th-magnitude star is quite similar to Polaris in many respects - its period is 3.73 days and it its colour is very similar so it lies close to Polaris on the HR Diagram. However, RT Aur show an amplitude of 0.82 mag. Fernie uses 5 photoelectric timings of maxima and 66 visual ones (given 1/3 weight) going back to 1910. He finds that the period is decreasing by 0.14 seconds per year. However, the difference between the rate of period change between RT Aur and Polaris is unlikely to be related to their differing amplitudes.

Summaries of Information Bulletins on Variable Stars Nos 3845 to 3901

3845 *No Long-Term Variability of PG 0900+401 (Kuczawska et al, 1993)* - Mag 13 white dwarf.

3846 *G172 - The Fourth Horizontal Branch Variable Star Blueward of the RR Lyrae Gap in M4 (Yao Bao-An, 1993)* - Microvariable.

3847 *W Cru - A Phase Diagram (Pazzi, 1993)* - Long-period Beta Lyrae star.

3848 *Recent UBVR Magnitudes for Rho Cas (Halbedel, 1993)* - See article elsewhere in this circular.

3849 *Recent UBVR Magnitudes for HR 8752 = V509 Cas (Halbedel, 1993)* - See article elsewhere.

3850 *Optical variability and H-alpha Emission for the Bright O Star HR 2806 (Halbedel, 1993)* - Microvariable.

3851 *Tau Cas: A Variable Star after All? (Halbedel, 1993)* - See article elsewhere.

3852 *Lightcurve and Period of the System V450 Herculis (Groebel & Lichtschlag, 1993)* - Mag 10 small-amplitude eclipsing binary.

3853 *Time of Light Minimum of BW Vulpeculae (Sterken, 1993)* - Microvariable.

3854 *The Period Change of RT Aur: An Update (Fernie, 1993)* - Finds slight decrease in period over past century. See article elsewhere for similarites between this star and Polaris.

3855 *New Variable Stars in Cygnus, Lyra and Vulpecula (Dahlmark, 1993)* - Finder charts for 80, mainly red, variables, mags 10-14, found photographically. Confirms a couple of Mike Collins' stars. See The Astronomer, vol 29, pp135-137 and p162 (1992) for more details on Dahlmark's search technique.

3856 *NGC 2169-12, a Photometric and Spectroscopic Silicon Variable (Maitzen & Lebzelter, 1993)* - Microvariable.

3857 *ubvy-beta Photometry of the Newly Discovered Pulsating Star HR 8851 (Jinxin Hao & Lin Huang, 1993)* - Microvariability (see IBVS 3832).

3858 *Suspected Variable Star near V654 Her (Konstantinova-Antova et al, 1993)* - Mag 8 red star showed 0.2 mag flare in U-band.

3859 *A New Eclipsing Binary (Fr3 Cnc) (Frank, 1993)* - This IBVS missing!

3860 *The Differential Extinction toward Nova Cygni 1992 (Elias, 1993)* - Attempt to determine distance to Nova.

3861 *New Photometric Minima Times of V566 Ophiuchi and its Period Study (Rovithis-Livaniou et al, 1993)* - Mag 8 W UMa star on VSS Program.

3862 *Photographic Observations of NSV 1671 (Chinarova & Andronov, 1993)* - Alias 49 Eri (see VSSC 75). No clear fades found.

3863 *Photoelectric BVR Observations of the RR Lyrae Star V381 Cyg (Berdnikov, 1993)* - Mag 14.

3864 *BVR Observations and New elements for the Cepheid FT Mon (Berdnikov, 1993)* - Mag 13.

3865 *Photoelectric BVR Observations of the Eclipsing Variable HY Tau (Berdnikov, 1993)* - Mag 12, amp 0.8 mpg.

3866 *WW Vulpeculae - Light Variations for 1929 to 1992 (Friedemann et al, 1993)* - A young, irregular variable of type Isa. Mag 10-12, showing 'Algol-like' minima at irregular intervals. At max it also shows a 5200-day variation with an amp of about 0.3 mag.

3867 *BF Draconis (Diethelm et al, 1993)* - Mag 10 eclipsing binary.

3868 *Period of SV Centauri continues decreasing (Drechsel & Lorenz, 1993)* - Southern eclipsing binary.

3869 *Is V371 Sco an RCB Star? (Paolantonio & Calderon, 1993)* - Spectrum suggests it isn't.

3870 *A New Variable Star in Cepheus (Semkov, 1993)* - Mag 14, possible nebular variable near NGC 7129.

3871 *Times of Minimum needed for AR Aurigae (Nordstroem & Johansen, 1993)* PEP timings needed over 1993-1998 to clarify period. The timings of this eclipsing binary show a 24-year period caused by a 3rd body.

3872 *SAO 189111 in Sagittarius is an Eclipsing Binary (Kissling et al, 1993)* - Mag 9, amp 0.3 mag. Found while observing asteroids!

3873 *Identification of NSV Stars in the Hubble Space Telescope Guide Star Catalogue (Lopez, 1993)* - Covers 50 stars.

3874 *Note on the Intermediate Polar RE 0751+14 (Wenzel, 1993)* - No outbursts detected. Range 13.8-14.2.

3875 *UBVR Photometry of the Eclipsing Binary DK Persei (Zakirov & Azimov, 1993)* - Mag 11.3-12.6.

3876 *The Discovery of Apsidal Motion in the Binary System Alpha CrB (Volkov, 1993)* - Small-amp (0.1 mag) eclipsing binary.

3877 *CCD Times of Minima of Faint Eclipsing Binaries (Borovicka, 1993)* - 24 stars, mags 11.5-13.5 at max.

3878 *A Study of Four Red Stars (Shugarov & Savenkov, 1993)* - Mira stars and semiregular variables reaching 13-15B at max.

3879 *A New Variable Star GSC 4383.0384 (Hanzl et al, 1993)* - The 10.80-mag comparison star for SN 1993J! Amp: 0.3 mag, period: 'a few hours'.

3880 *UBVR Observations of the Double-Mode Cepheid AS Cas (Berdnikov, 1993)* - Mag 12.

3881 *A New Semiregular Variable Star in Lyra (Katsyka & Samus, 1993)* - Mag 17B.

3882 *Unsuccessful Search for an Optical Counterpart of GRS 1215+105 (Wenzel et al, 1993)* - X-ray 'Transient' in Aquila.

3883 *A New Cataclysmic Variable S 10930 in Lyra (Wenzel, 1993)* - 13.2mpg at max, mag 18 at min, period about 300 days, position: 18h 59m 58s +42d 50.'4 (1950.0). Finder chart included.

3884 *Complete BVRI Light Curves of the Very Short Period W UMa Variable YZ Phoenicis (Arruda et al, 1993)*

3885 *New Elements of the Small Amplitude Cepheid V1726 Cyg (Berdnikov, 1993)* - Mag 9, amp only 0.2 mag.

3886 *On the Period of the Cepheid CI Per (Berdnikov, 1993)* - Mag 13-13.8.

3887 *Which is the Star V380 Per? (Renson, 1993)* - Microvariable given wrong HD number in Hipparcos Input Catalogue.

3888 *18 Additional Historical Outbursts of the Cataclysmic Variable J05.23 (Hazen, 1993)* - New dwarf nova in Crater (not TT, see IBVS 3829).

3889 *Card Catalogue of Eclipsing Binaries (Wood, 1993)*

3890 *Long-Term Light Curve of the Cataclysmic X-Ray Source 1ES1113+432 = AR Ursae Majoris (Wenzel, 1993)* - AR UMa is listed in the GCVS as a semiregular variable but Wenzel finds it to be a cataclysmic variable with a range of 13-15.5mpg.

3891 *Precision UBVRI Observations of the Very Short Period Eclipsing Binary BC Gruis (Samec & Becker, 1993)* - Southern W UMa star.

3892 *26 New H-alpha Emission Objects (Piceno et al, 1993)*

3893 *Serendipitous Discovery of Delta Scuti Pulsation in the Early A Star HD 127269 (O'Donoghue & Kurtz, 1993)* - Microvariable.

3894 *V577 Ophiuchi: An Eclipsing Binary with a Non-Circular Orbit and a Pulsating Component (Diethelm, 1993)* - Delta Scuti type variations (amp 0.1 mag) found while observing secondary min of this mag 11 star.

3895 *Light Curve Peculiarities of AS 422 = NSV 13308 (Melnikov et al, 1993)* Mag 11 Herbig Ae/Be star (nebular variable).

3896 *UBV Photoelectric Observations of UV Piscium (Jassur & Kermani, 1993)* Mag 9-10 RS CVn type eclipsing binary.

3897 *UBV Photometry of GO Cyg (Jassur & Puladi, 1993)* - Mag 9 eclipsing star.

3898 *BVR Photometry of Six Pre-Main-Sequence Spectroscopic Binaries (Zakirov et al, 1993)* - Searching for periodicities in mag 11 'naked' T Tau stars.

3899 *NSV 13679: A Detailed Investigation of its Suspected Variability (Dinescu & Girard, 1993)* - Probably due to plate defect.

3900 *Times of Minimum Light for 35 Eclipses of 21 Apsidal Motion Binaries (Caton & Burns, 1993)*

3901 *Times of Light Maximum of BW Vulpeculae (Sterken et al, 1993)*

Eclipsing Binary Predictions

The following predictions are calculated for an observer at 53 degrees north, 1.5 degrees west but should be usable for observers throughout the British Isles. The times of mid-eclipse appear in parentheses with the start and end times of visibility on either side. Times are hours GMAT, that is UT-12h. 'D' and 'L' are used to indicate where daylight and low altitude, respectively, prevent part of the eclipse from being visible. Charts for all of the stars included in these predictions (17 in all - see VSSC 75 for a list) are available from the Director at 10p each (please enclose a large SAE). Copies of two of these charts are included here.

1993 Oct 1 Fri
TX UMa D07(06)09L
SW Cyg D07(11)17
Z Per 09(14)17D
RZ Cas 12(15)17D
X Tri 13(16)17D

1993 Oct 2 Sat
U Sge D06(04)10
U Cep 07(12)16
Z Dra 08(10)12
X Tri 12(15)17D

1993 Oct 3 Sun
TW Dra D06(10)15
RW Tau L08(06)11
RW Gem L10(08)14
X Tri 12(14)17
SS Cet 12(17)17D
Z Dra 16(19)17D

1993 Oct 4 Mon
TX UMa D06(08)08L
Y Psc D06(09)14
Z Per 11(16)17D
X Tri 11(14)16
TX UMa L11(08)13

1993 Oct 5 Tue
RZ Cas D06(05)07
S Equ D06(06)11
Z Vul D06(11)13L
U Sge 08(14)13L
X Tri 10(13)15
ST Per 11(15)17D

1993 Oct 6 Wed
SW Cyg D06(01)07
TW Dra D06(05)10
RZ Cas 07(09)12
Z Dra 09(12)14
X Tri 10(12)15
RW Gem L10(05)10
SS Cet 12(16)17D

1993 Oct 7 Thu
TX UMa D06(09)08L
U Cep 06(11)16
X Tri 09(11)14
TX UMa L11(09)14
RZ Cas 12(14)17
Z Per 12(17)17D

1993 Oct 8 Fri
Y Psc D06(04)08
ST Per D06(07)11
X Tri 08(11)13
S Equ 11(17)13L
RW Tau 14(19)17D
RZ Cas 16(19)17D

1993 Oct 9 Sat
Z Dra D06(05)07
X Tri 08(10)13
SS Cet 11(16)17D

1993 Oct 10 Sun
Z Vul D06(09)13L
TX UMa 06(11)08L
X Tri 07(09)12
SW Cyg 08(14)17D
TX UMa L11(11)16
Z Dra 11(13)16
Z Per 13(18)17D

1993 Oct 11 Mon
RZ Cas D06(04)07
X Tri 06(09)11
RW Tau 09(13)17D
V640 Ori L12(10)13
TW Dra 15(20)17D

1993 Oct 12 Tue
S Equ D06(03)08
U Sge D06(08)12L
X Tri D06(08)11
U Cep 06(11)16
RZ Cas 06(09)11
SS Cet 10(15)17D

1993 Oct 13 Wed
Z Dra D06(07)09
X Tri D06(07)10
TX UMa 08(12)08L
ST Per 10(14)17D
TX UMa L10(12)17
RZ Cas 11(14)16
V640 Ori L12(11)13
Z Per 15(20)17D

1993 Oct 14 Thu
X Tri D06(07)09
RW Tau L07(08)12
TW Dra 10(15)17D
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RW Gem 14(20)17D
RZ Cas 16(18)17D

1993 Oct 15 Fri
SW Cyg D06(04)10
X Tri D06(06)08
Z Vul D06(07)12
S Equ 08(13)13L
SS Cet 10(14)17D
U Sge 11(17)12L
Y Psc 12(17)15L
V640 Ori L12(11)14

1993 Oct 16 Sat
X Tri D06(05)08
ST Per D06(06)10
TX UMa L10(14)17D
Z Per 16(21)17D

1993 Oct 17 Sun
RZ Cas D06(04)06
X Tri D06(05)07
U Cep D06(11)15
TW Dra D06(11)16
Z Dra 06(08)11
RW Tau L07(02)07
RW Gem 11(16)17D
V640 Ori L12(12)14
Z Vul 12(18)13L

1993 Oct 18 Mon
X Tri D06(04)06
RZ Cas 06(08)11
SS Cet 09(14)17D
Z Dra 15(17)17D
ST Per 17(21)17D

1993 Oct 19 Tue
U Sge D06(02)08
Y Psc 06(11)15L
RZ Cas 11(13)15
TX UMa 11(15)17D
SW Cyg 12(18)17L
V640 Ori L12(12)15
RW Tau 16(21)17D

1993 Oct 20 Wed
Z Vul D06(05)10
TW Dra D06(06)11
RW Gem L09(13)17D
RZ Cas 15(18)17D

1993 Oct 21 Thu
Z Dra 08(10)13
ST Per 09(13)17
SS Cet 09(13)18D
V640 Ori L12(13)15

1993 Oct 22 Fri
U Cep D06(10)15
S Equ D06(10)12L
U Sge D06(11)12L
Z Vul 10(15)12L
RW Tau 10(15)18D
TX UMa 12(17)18D
Z Dra 16(19)18D

1993 Oct 23 Sat
TW Dra D06(01)07
Y Psc D06(05)10
RW Gem L09(10)15
V640 Ori L12(13)16

1993 Oct 24 Sun
ST Per D06(04)08
SW Cyg D06(08)14
RZ Cas D06(08)10
SS Cet 08(13)17
U Cep 17(22)18D

1993 Oct 25 Mon
Z Vul D06(02)08
RW Tau L06(09)14
Z Dra 09(12)14
RZ Cas 10(12)15
V640 Ori L11(14)16
TX UMa 14(18)18D
TW Dra 16(21)18D

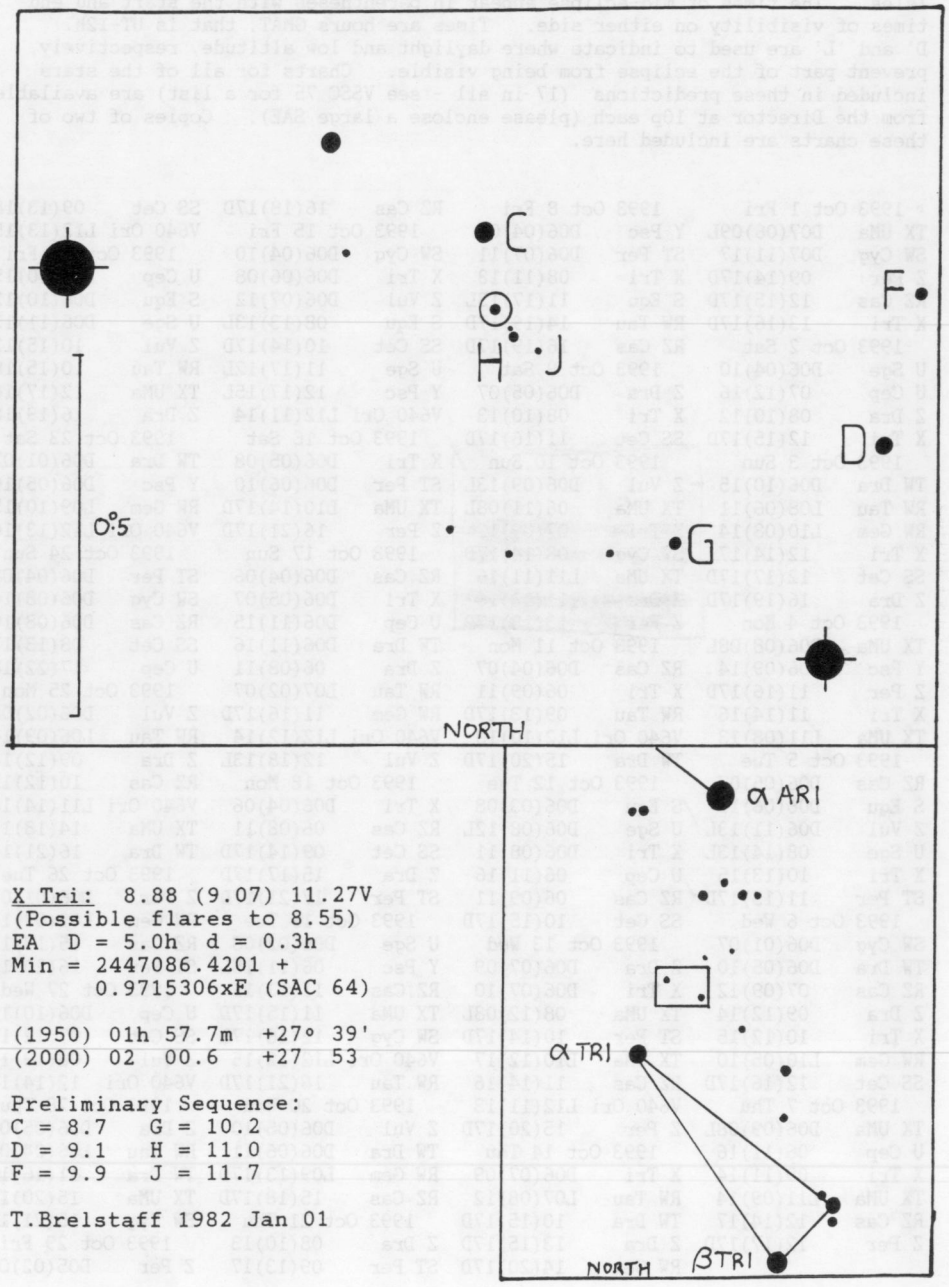
1993 Oct 26 Tue
Z Per D06(01)06
RW Gem L09(07)12
RZ Cas 15(17)18D
ST Per 16(20)18D

1993 Oct 27 Wed
U Cep D06(10)15
SS Cet 07(12)17
Z Vul 08(13)12L
V640 Ori 12(14)17

1993 Oct 28 Thu
Z Dra D06(05)07
RW Tau L06(04)09
TW Dra 11(16)18D
TX UMa 15(20)18D
SW Cyg 15(21)17L

1993 Oct 29 Fri
Z Per D05(02)07

X TRIANGULI



X Tri: 8.88 (9.07) 11.27V
(Possible flares to 8.55)
EA D = 5.0h d = 0.3h
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(1950) 01h 57.7m +27° 39'
(2000) 02 00.6 +27 53

Preliminary Sequence:
C = 8.7 G = 10.2
D = 9.1 H = 11.0
F = 9.9 J = 11.7

T.Brelstaff 1982 Jan 01

U Sge D05(05)11
S Equ D05(07)12L
ST Per 07(11)15
RW Gem L08(03)09
Z Dra 11(14)16
V640 Ori 12(15)17
U Cep 17(22)18D
X Tri 17(20)18D

1993 Oct 30 Sat

Z Vul D05(00)05
RZ Cas D05(07)10
SS Cet L07(11)16
Y Psc 14(18)14L
X Tri 17(19)18D
RW Tau 18(22)18D

1993 Oct 31 Sun

TW Dra 07(12)17
RZ Cas 09(12)14
V640 Ori 13(15)18D
X Tri 16(18)18D
TX UMa 17(22)18D

1993 Nov 1 Mon

ST Per D05(03)07
Z Per D05(04)09
Z Dra D05(07)09
U Cep D05(10)14
Z Vul 06(11)12L
U Sge 09(15)11L
RZ Cas 14(17)18D
X Tri 15(18)18D

1993 Nov 2 Tue

SW Cyg D05(11)16L
SS Cet L07(11)15
RW Tau 12(17)18D
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V640 Ori 13(16)18D
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1993 Nov 3 Wed

TW Dra D05(07)12
Y Psc 08(12)14L
X Tri 14(16)18D
ST Per 14(18)18D
RW Gem 16(21)18D
U Cep 17(21)18D

1993 Nov 4 Thu

Z Per D05(05)10
X Tri 13(16)18D
V640 Ori 14(16)18D

1993 Nov 5 Fri

U Sge D05(00)05
S Equ D05(04)10
RZ Cas D05(07)09
Z Dra 06(08)11
RW Tau 07(11)16
SS Cet L07(10)15
X Tri 12(15)17

1993 Nov 6 Sat

TW Dra D05(02)07
Z Vul D05(09)11L
U Cep D05(09)14
ST Per 06(10)14
RZ Cas 09(11)14
X Tri 12(14)17
RW Gem 13(18)18D
V640 Ori 14(17)18D
Z Dra 15(17)18D

1993 Nov 7 Sun

TX UMa D05(01)05
SW Cyg D05(01)07
Z Per D05(06)11
Y Psc D05(07)11
X Tri 11(14)16
RZ Cas 14(16)18D

1993 Nov 8 Mon

U Sge D05(09)11L
RW Tau L05(06)10
SS Cet L06(10)14
S Equ 09(15)11L
X Tri 10(13)15
V640 Ori 15(17)18D
U Cep 16(21)18D
TW Dra 17(22)18D

1993 Nov 9 Tue

ST Per D05(02)06
Z Dra 08(10)13
RW Gem 09(14)18D
X Tri 10(12)15

1993 Nov 10 Wed

TX UMa D05(02)06L
Z Per D05(08)13
X Tri 09(12)14
V640 Ori 15(18)18D
Z Dra 16(19)18D

1993 Nov 11 Thu

Y Psc D05(01)06
RZ Cas D05(06)08
Z Vul D05(07)11L
U Cep D05(09)14
SS Cet L06(09)14
X Tri 08(11)13
SW Cyg 09(15)16L
TW Dra 12(17)18D
ST Per 13(17)18D
SW Cyg L18(15)18D

1993 Nov 12 Fri

S Equ D05(01)07
Z Dra D05(03)06
RW Gem L07(11)16
X Tri 08(10)13
RZ Cas 08(11)13
V640 Ori 16(18)18D

1993 Nov 13 Sat

TX UMa D05(04)06L
Z Per D05(09)14
X Tri 07(10)12
Z Dra 10(12)14
RZ Cas 13(15)18
RW Tau 14(19)18D
U Cep 16(21)18D

1993 Nov 14 Sun

ST Per D05(09)13
SS Cet L06(08)13
X Tri 06(09)11
TW Dra 07(12)17
V640 Ori 16(19)18D
RZ Cas 18(20)18D
Z Dra 18(21)18D

1993 Nov 15 Mon

U Sge D05(03)09
X Tri 06(08)11
S Equ 06(12)11L
RW Gem L07(08)13

1993 Nov 16 Tue

SW Cyg D05(04)10
Z Vul D05(05)10
Z Dra D05(05)07
TX UMa D05(05)06L
X Tri D05(07)10
U Cep D05(09)13
Z Per 06(11)15
TX UMa L08(05)10
RW Tau 08(13)18
V640 Ori 17(19)18L

1993 Nov 17 Wed

RZ Cas D05(05)08
X Tri D05(07)09
TW Dra D05(08)13
SS Cet L06(08)12
Z Dra 11(14)16

1993 Nov 18 Thu

X Tri D05(06)09
U Sge 07(12)10L
RW Gem L07(05)10
RZ Cas 08(10)13
Y Psc 09(14)13L
Z Vul 10(16)11L
U Cep 16(20)18D
V640 Ori 17(20)18L

1993 Nov 19 Fri

X Tri D05(05)08
TX UMa D05(07)05L
RW Tau D05(08)12
Z Per 07(12)17
TX UMa L08(07)11
ST Per 12(16)18D
RZ Cas 12(15)17

1993 Nov 20 Sat

TW Dra D05(03)08
X Tri D05(05)07
Z Dra D05(07)09
SS Cet L06(07)12
SW Cyg 12(18)15L
SW Cyg L17(18)18D
RZ Cas 17(20)18D
V640 Ori 18(20)18L

1993 Nov 21 Sun

Z Vul D05(02)08
X Tri D05(04)07
U Cep D05(08)13
Z Dra 13(15)18

1993 Nov 22 Mon

RW Tau D05(02)07
X Tri D05(03)06
ST Per D05(07)11
TX UMa D05(08)05L
Y Psc D05(08)13
S Equ D05(09)10L
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Z Per 08(13)18
TW Dra 17(22)18D

1993 Nov 23 Tue

X Tri D05(03)05
RZ Cas D05(05)07
SS Cet L05(06)11
Z Vul 08(13)10L
U Cep 15(20)18D
RW Gem 17(22)18D

1993 Nov 24 Wed

Z Dra 06(09)11
RZ Cas 07(10)12
RW Tau 16(20)18D

1993 Nov 25 Thu

U Sge D05(07)10L
SW Cyg D05(08)14
TX UMa 05(10)05L
TX UMa L08(10)14
Z Per 10(15)18D
RZ Cas 12(14)17
TW Dra 13(18)18D
Z Dra 15(17)18D

1993 Nov 26 Fri

Z Vul D05(00)06
Y Psc D05(03)07
U Cep D05(08)13
SS Cet L05(06)10
RW Gem 14(19)18D
RZ Cas 17(19)18D

1993 Nov 27 Sat

RW Tau 10(15)19D
ST Per 10(14)19D

1993 Nov 28 Sun

Z Vul 06(11)10L
TX UMa L07(11)16
Z Dra 08(10)13
TW Dra 08(13)18
Z Per 11(16)19D
U Cep 15(20)19D

1993 Nov 29 Mon

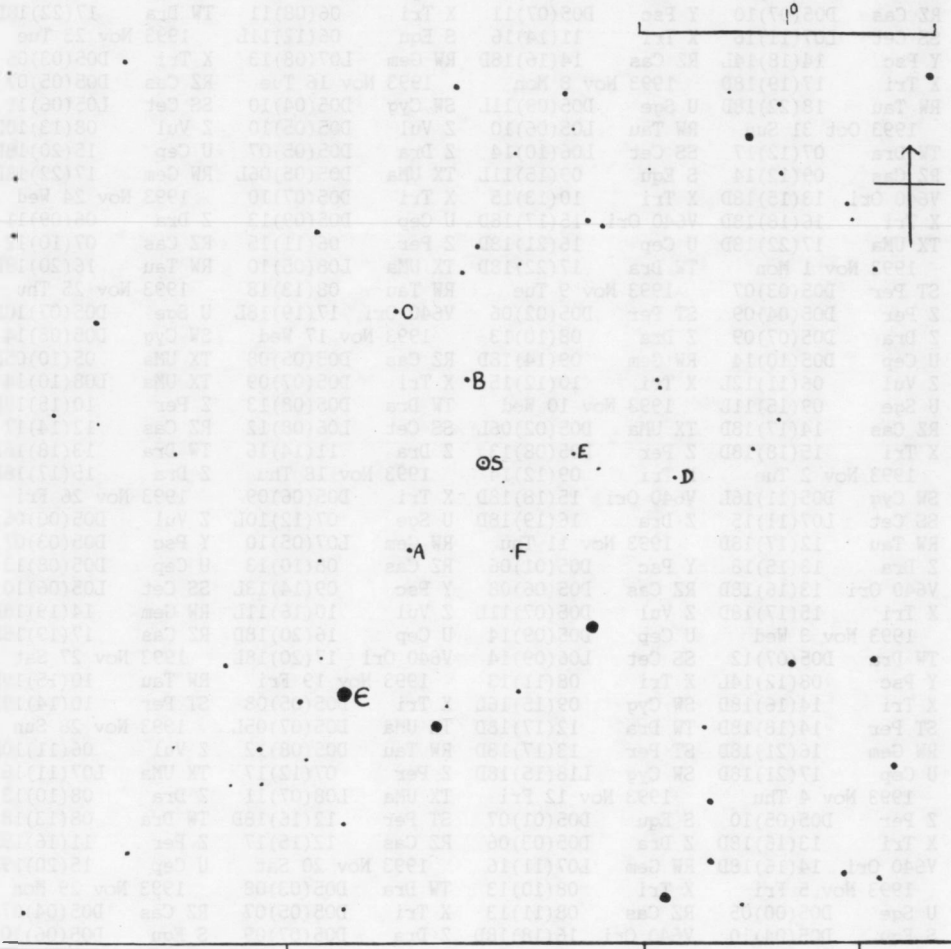
RZ Cas D05(04)07
S Equ D05(06)10L
SS Cet L05(05)10
RW Gem 11(16)19D
SW Cyg L16(22)19D
Z Dra 16(19)19D

1993 Nov 30 Tue

ST Per D05(06)10
RW Tau D05(09)14
RZ Cas 07(09)11

205204 S Equulei 8.0-10.0 EA 3.44^d

(1950) 20^h 54.7 +04° 53′ D = 10^h



Sequence derived from H.A. 54 and photovisual plate by W.E.P.; corrected to V scale	A = 8.1 B = 8.2 C = 8.6	D = 9.1 E = 9.6 F = 10.1	© Binocular Sky Society 1972	J.E.I. 72.06.10

1993 Dec 1 Wed
Z Dra D05(03)06
U Cep D05(08)12
TW Dra D05(09)14
TX UMa 08(13)17
RZ Cas 11(14)16
Z Per 12(17)19D
1993 Dec 2 Thu
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SS Cet L05(05)09
RW Gem 08(13)18
Z Dra 10(12)14
RZ Cas 16(18)19D
ST Per 17(22)19D
1993 Dec 3 Fri
RW Tau D05(04)08
Z Vul D05(09)10L
Y Psc 11(15)12L
U Cep 15(19)19D
Z Dra 18(21)19D
1993 Dec 4 Sat
TW Dra D05(04)09
SW Cyg 05(11)14L
TX UMa 10(14)19D
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SW Cyg L16(11)17
1993 Dec 5 Sun
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SS Cet D05(04)09
Z Dra D05(05)08
U Sge D05(10)09L
RW Gem L06(09)15
ST Per 09(13)17
X Tri 15(18)16L
RW Tau 18(22)18L
1993 Dec 6 Mon
S Equ D05(02)08
U Cep D05(07)12
RZ Cas 06(08)11
Z Dra 11(14)16
X Tri 15(17)16L
TW Dra 18(23)19D
1993 Dec 7 Tue
Y Psc 05(10)12L
RZ Cas 11(13)16
TX UMa 11(16)19D
X Tri 14(16)16L
Z Per 15(20)19D
1993 Dec 8 Wed
SS Cet D05(03)08
ST Per D05(05)09
Z Vul D05(07)09L
RW Gem L06(06)11
RW Tau 12(17)18L
X Tri 13(16)16L
U Cep 14(19)19D
RZ Cas 15(18)19D
1993 Dec 9 Thu
SW Cyg D05(01)07
Z Dra D05(07)09
S Equ 08(13)09L
X Tri 13(15)16L
TW Dra 14(19)19D
1993 Dec 10 Fri
X Tri 12(14)16L
TX UMa 13(17)19D
Z Dra 13(16)18
ST Per 16(20)19L
Z Per 17(21)19D
Z Vul L19(18)19D
1993 Dec 11 Sat
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RZ Cas D05(03)06
Y Psc D05(04)09
U Cep D05(07)12
RW Gem L06(03)08
RW Tau 06(11)16
X Tri 11(14)16L
1993 Dec 12 Sun
U Sge D05(04)08L
RZ Cas 05(08)10
TW Dra 09(14)19D
X Tri 11(13)16
1993 Dec 13 Mon
Z Vul D05(05)09L
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ST Per 08(12)16
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X Tri 10(12)15
RZ Cas 10(13)15
U Cep 14(19)19D
TX UMa 14(19)19D
SW Cyg L15(15)19D
Z Per 18(23)19L
RW Gem 19(24)19D
1993 Dec 14 Tue
SS Cet D05(02)07
RW Tau D05(06)10
X Tri 09(12)14
RZ Cas 15(17)19D
Z Dra 15(17)19D
1993 Dec 15 Wed
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U Sge 08(13)08L
X Tri 08(11)13
Z Vul L18(16)19D
1993 Dec 16 Thu
ST Per D05(03)08
U Cep D05(07)11
S Equ D05(10)08L
X Tri 08(10)13
RW Gem 15(21)19D
TX UMa 16(20)19D
1993 Dec 17 Fri
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RZ Cas D05(03)05
X Tri 07(10)12
Z Dra 08(10)13
1993 Dec 18 Sat
Z Vul D05(03)08
SW Cyg D05(05)11
TW Dra D05(05)10
RZ Cas 05(07)10
X Tri 06(09)11
U Cep 14(18)19D
ST Per 15(19)18L
Z Dra 17(19)19D
U Sge L19(22)19D
1993 Dec 19 Sun
X Tri 06(08)11
RZ Cas 10(12)14
RW Gem 12(17)19D
RW Tau 14(18)18L
TX UMa 17(22)19D
1993 Dec 20 Mon
SS Cet D05(01)05
Z Per D05(01)06
Z Dra D05(04)06
X Tri 05(08)10
Z Vul 08(13)09L
RZ Cas 14(17)19D
Z Vul L18(13)19
1993 Dec 21 Tue
TW Dra D05(00)05
U Cep D05(06)11
X Tri D05(07)09
ST Per 06(11)15
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1993 Dec 22 Wed
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RW Tau 08(13)17L
RW Gem 09(14)19L
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Z Dra 18(21)19D
TX UMa 19(23)19D
1993 Dec 23 Thu
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Z Per D05(03)08
X Tri D05(05)08
S Equ D05(07)08L
U Cep 13(18)19D
TW Dra 14(19)19D
1993 Dec 24 Fri
ST Per D05(02)06
X Tri D05(05)07
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RZ Cas D05(07)09
1993 Dec 25 Sat
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RZ Cas 09(11)14
Z Dra 11(14)16
U Sge L18(17)19D
1993 Dec 26 Sun
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Z Per D05(04)09
Y Psc D05(06)10
U Cep D05(06)11
TW Dra 10(15)19D
ST Per 14(18)18L
RZ Cas 14(16)18
1993 Dec 27 Mon
X Tri D05(03)05
SW Cyg D05(08)13L
V640 Ori L07(05)08
Z Vul L18(22)19D
RZ Cas 18(21)19D
1993 Dec 28 Tue
RW Tau D05(02)07
Z Dra D05(07)09
RW Gem D05(08)13
U Cep 13(18)19D
1993 Dec 29 Wed
U Sge D05(02)07L
Z Per D05(05)10
ST Per 05(09)13
TW Dra 05(10)15
TX UMa L05(02)07
V640 Ori L07(06)08
Z Dra 13(16)18
1993 Dec 30 Thu
S Equ D05(04)08L
RZ Cas D05(06)09
Z Vul D05(09)08L
RW Tau 16(20)17L
1993 Dec 31 Fri
RW Gem D05(04)10
U Cep D05(06)10
V640 Ori L07(06)09
RZ Cas 08(11)13
SW Cyg 16(22)19D

Data Input

(or, Mike Carson-Rowland's guide on how to Stop Worrying and Learn to Love the Keyboard)

It all seemed so innocent, back in October 1991. A casual comment by John Isles in the *Report of the Council* indicated that further help with word processing for the Variable Star Section would be most welcome. Being possessed of a reasonably fast PC and a very good word processor,[1] I thought long and hard about this for 3 or 4 minutes. *Go for it!* I decided. The cognoscenti amongst you, especially those who have had any association, however tenuous, with the Armed Forces of whatever country, will be shaking their heads sadly and reminding themselves of the old adages "**Never** volunteer for anything!" and "You've only yourself to blame." Now, I'm not suggesting for one minute that our esteemed and splendid organisation is anything other than "Gentlemanly" in the best sense of that word: Good Heavens, no. Therein, of course, lies the trap, and a particularly subtle one, it is, too! Having put pen to paper, I compounded things by posting the letter. No one forced me to; indeed had they tried I would most likely have become quite abusive. Just shows.

A couple of *very* nice letters arrived, implying that by offering my services I would be doing an inestimable service to the BAA in general and the VSS in particular. I positively glowed. A few days later a package arrived. Intrigued, I delved. At first glance, it didn't seem too bad: observations for a couple of years for U Orionis. Nothing to it. That, of course, is until I started to type it in! A little history is appropriate here: in my early to mid teens I acquired an ancient upright Remington and taught myself to type. Nothing so exotic as touch-typing, but I was able to get along quite briskly. A dozen or so years later I joined the staff of a High Street bank and one of the first things they did was to send me on a course which included touch-typing. I recall that some of the exercises appeared to have been conceived by a mind which, charitably, could best be described as warped. At the end of it all I had a typing speed slightly less than half that which I had when I started! However, had they had the benefit of the documents which now adorned my desk, they would have drooled. After all, sticking a couple of pages of such stuff as **Nov 25,1003 /E[1]V[1]F/6.2/1/1/** in front of an unsuspecting typist, is enough to make anyone think. It certainly did me!

Not to be deterred, however, I typed it all in and sent it off. Would you believe, I actually asked for more? It will come as no surprise to learn that the packages became bigger. My postman has taken to leaving brochures extolling the virtues of living in remote Scottish crofts. After hammering in some 15-16,000 observations for a variety of stars, I had discovered how to develop some shortcuts, shortcuts which allowed me to automate repetitious entries with just a keystroke or two. For instance, **<t/<13.7/VA** became **TV**.

Instead of keeping quiet about this amazing discovery[2], I went and committed the incredible folly of mentioning it! The gum on the stamp had scarcely had time to dry before the reply came pelting in; "...some of the really extensive memoirs and wonder...For instance, R CrB has accrued over 30,000 obs...128 memoir pages...

amenable to your method...to speed the entries." Now you see the subtlety of the trap: it is highly sophisticated and self-springing. 128 double-sided 16" x 12" pages!

Now I'd really gone and done it. What's more, the trap developed a twist which can best be described as machiavellian. The observations for R CrB, far from lending themselves to the shortcuts I'd devised, proved to be horrendous. For example, several observers all had different ways of arriving at a deduced magnitude of 6.1: **c[6]V[4]d; c[3]V[2]d; c[1]V[4]M** are just three of them. And when it takes one of its famous dips, **36[1]V[3]40/13.9/SH**, or **l-2,m+1,2+3/8.8/HL** are not the sort of key sequences that flow readily to the fingertips. Well, not to mine, they don't. And there are hundreds of such entries. My heart sank.

However, I reminded myself that the reason I get a salary every month is for solving other people's problems in the personal computer field. It was high time I solved one of my own. I have, for many years, believed firmly in Carson-Rowland's First Principle of Computing, which has two Rules. They are:

Rule 1: There is always a solution.

Rule 2: If this should prove not to be the case, then *Rule 1* applies.

(I forget which popular dictionary is reputed to include the following definition:

recursion n. *see* recursion.)

One of the principle reasons for failing to solve any problem first time round is because it has been defined incorrectly. I took a look at what I was trying to achieve, and decided on a total rethink. This involved entering a couple of pages of data into the word processor and then analysing what I'd got. It's always hard to chuck out your cherished systems, especially when you're the one who spent the time developing them. Still, that's what I ended up doing. I managed to hang onto one or two of the original shortcuts, but strongly suspect that that was my ego breaking out. If I'd been doing this for someone else, they would have been *out*!

So what's the secret? The answer, as they say, lies in the software. If it's a good, up-to-date word processor, there will be numerous features which you can turn to your advantage. Some of them might not be too obvious. Others may appear daunting or inappropriate. But they *are* there and if they can be coerced, cajoled or just plain kicked into easing your task then do it. Apart from anything else, no matter how well you think you know your software, you could be in for a few surprises and pleasant ones at that. I don't claim to be an *expert* on any software; but having to support several hundred users of word processors, spreadsheets, databases etc, I do have a feel for when a particular package is, so to speak, holding out. Which often means that you aren't asking it the right questions. After all, computers are there to help, aren't they? So they should be able to do exactly what we want them to, right? Right.

Erm, well, no; it isn't as easy as that. Computers are funny things. Logical, they are. The thing is, they expect *us* to be logical when we ask a question, which is just what we seldom are. What's more, even when we *think* we are, we often aren't, which

usually complicates things a bit! I don't pretend to have all the answers, but I can claim to have made life easier. Let's have a look at what we've got, and see what we can do about it.

Here are some sample lines, taken from the R CrB memoirs of 1947; the first 4 digits of the JD, 2432, have been input at the start of the year won't need amending until the end of March 1949, when they'll become 2433...We can ignore them, except at the start of a year. What has to be typed in (excluding the figures in () brackets) is:

425.35/c[3]V[2]d/6.1/BZ	(24)
425.35/c[2]V[1]M/6.4/HE	(24)
425.36/S-2/5.8/WL	(18)
426.36/c[3]V[2]d/6.1/BZ	(24)
426.36/S-2/5.8/WL	(18)
427.35/c[2]V[1]M/6.4/HE	(24)
	(132)

This count includes carriage returns. Because the particular keys, /, [&] aren't the ones most used there is likely to be an extra delay, however small, whilst they are keyed in. (Unless, of course, you type nothing but VSS observations, or are a good touch typist.)

What I actually typed in, was:

425.35/C32Z	(12)
7C21ME	(7)
336/2SW	(8)
426 3C32Z	(9)
427.35/C21ME	(13)
	(49)

This is a saving of 63% of the keystrokes. I've counted CTRL 7 as one key press, as one would SHIFT a to give A. Let's look at one more example, before I start giving the game away; this is taken from R CrB 1950:

(2433)	**436.41/c[3]V[1]M/6.4/HL**	(24)
	437.42/c[3]V[1]M/6.4/HL	(24)
	448.43/c[3]V[1]M/6.4/HL	(24)
	462.45/c[3]V[1]M/6.4/HL	(24)
		(96)

This became:

436.41/C31MH	(13)
437.42 E	(7)
448.43 E	(7)
462.45 E	(7)
	(34)

A slightly better saving of 65%. Remember, these are genuine examples. Let's do a bit of arithmetic to see what this means when applied to R CrB Memoirs as a whole. The 10 lines have a total of 228 key presses, an average of 22.8 per line, or observation. How many observations were there? Oh yes, 30,000. That's 684,000 key presses. I saved an average of 64%, leaving a mere 249,000 key presses. Still a good number, but I'll settle for not hitting the keyboard 435,000 times!

Having got things a little bit more into perspective, and proved that the work done could be deemed A Good Thing, let's examine the process from the start.

The Tools

Why use a word processor in preference to a spreadsheet, or database or dedicated programme for input of this kind? The reasons, in no particular order, are :

1. Most people who have a computer, have a word processor.
2. Most word processors have some way of coping with oft-repeated text *easily*.
3. This really isn't the sort of thing you should be doing on a spreadsheet.
4. It *is* the sort of thing that a database can cope with, but the time required to design it would be better spent inputting.
5. Dedicated programmes are not, to my knowledge, widely available, which gives similar objections to 4. above.
6. Word processors, no matter how sophisticated, are very flexible and generally less complicated to 'program' than databases.

The Tools within the Tool

Glossaries. Or 'boilerplates' as they are often termed. Quite simply, all you do is to select the appropriate text and then assign a key or keys to it. This where my F3 appears - it's Word for Windows' Insert Glossary key. Thus in an example above, pressing **C32Z**F3 actually types in **c[3]V[2]d/6.1/BZ** and adds a carriage return. I'll explain the logic behind this later. Most packages quote limits for the numbers different glossary entries, etc etc which can be used in a document. Whilst I was getting R CrB Memoirs under way, I was hammering in glossary entries as if they were going out of fashion. It occurred to me that I ought to see if I was getting near the limit. Since this was one of the many statistics I don't carry in my head, I looked it up. 150. Hmm, I thought. I must be getting near that. When I counted them, there were 403! Now, there are 722! See what I mean about pleasant surprises?

Macros. There is no doubt about it, this word is likely to strike fear into the heart of the uninitiated. I might add that it doesn't do too much for those of us who have to unravel other people's macros, either. Still, if your word processor does support macros, then hold on tight, we're going in. Looking at the examples again, we see F7. So what does it do? It copies the Julian Date from the line above, **425.35/** in this instance. This is handy, since, on a popular night there could be half a dozen folk out there observing. Of course, it's likely that they won't all be recording at precisely the

same instant, so ^3 comes into its own. This copies **425.** (as an example) and you just add the decimals. Equally, a series of observations can fall at the same time on different days, so ^3 copes with this by taking **.35/** after you've typed the new day. You would be justified in asking, at this point, why ^3 when each of the examples has 4 characters. Should be ^4, yes? Yes. Remember what I said earlier about my ego? Guilty as charged, M'Lud. Moving smartly on, we have ^+^E. You'll notice that all the lines start in exactly the same place relative to the left margin: all this little macro does is move up a line and then copy everything including the carriage return at the end of the line (hence **E**). Again, very handy when you get lots of repeat observations by the same person; as you can see. Why add the ^+? As it happens, ^E was already assigned to something, and I couldn't be bothered to re-assign it. Sloppy really; I should have done. I've also got a little macro that speeds up adding new glossary entries. Nothing grand, but it saves a few mouse clicks.

The Rationale

We've seen what I've done, and why. Now for a few rules.

1 Take a long, hard look at the stuff you're about to type in. Look for consistencies.
  1.1 For instance, use **[ ]** instead of **( )**, it's easier to type. Though, if you use the method I use, you won't have to type it often.
  1.2 How many thousand observations contain entries of the form P[x]V[y]Q/a.b/ where P,x,y,Q are on the lines of **c[1]V[1]d/**, a.b is the deduced magnitude and the line ends with the observer's initials? How many thousand are of the form **c-3,d+2/6.1/FR**? Or **M+3/6.3/CO**?

2 Be logical. To be logical, you *must* have a sequence list. You're about to see why. If you haven't got one, shout. Dave McAdam's shoulders are broad!
  2.1 In the example above, if Q is adjacent to P in the sequence table, I imply it's existence by ignoring it: *vide* **C32Z**, which is shorthand for **c[3]V[2]d/6.1/BZ**. After all, **c[3]V[2]d** is *always* going to be **6.1**. **Z** of course = **BZ**. On the other hand, **C21ME** equates to **c[2]V[1]M/6.4/HE**, where **c** and **M** are *not* adjacent in the table and **E** = **HE**.
  2.2 **c-3,d+2/6.1/FR** can be represented neatly by **C3D2F**. Here, it doesn't matter if the sequence stars are not adjacent, provided that the **signs** are consistent.
  2.3 **M+3/6.3/CO** simply becomes **M3O**, whereas **b-2/5.8/GA** becomes **2BG**.
  2.4 A degree of thought is often required to make sense of the initials. Take a look at the summary produced at the end of each year of observation, and work out a method. It should be one that sticks easily in your mind, since observers have a habit of vanishing for a fair time, and then reappearing suddenly and you can't think of the single letter you've assigned them. Of course, you might argue that it's only the difference of one character and why bother? I'd counter that by saying it'll save 30,000 key presses.

3 Be prepared to improvise. And if that sounds like cheating, or flouting the logic I've been impressing on you, well, you may have a point. Not a very valid one, but a point. Let me elaborate. Some sequences crop up time and time again in the course of a couple of pages, and then vanish over the event horizon for a year or so. If it happens to be something like **C3D4M6** (*trans.* **c-3,d+4,M+6/6.0/HL**: - no letter after the shortcut, since **HL** is the only one to use the sequence at the time of writing) saving 12 key presses, and you spot that it occurs regularly in the next few pages, find a key you haven't used and assign the whole thing to the single key press. This will save another 5 so it's well worth doing. The snag is, the key is quite likely to be something like **Q**, or **J**, as all the others may be in use. *That's* where the logic gets flouted, since the key bears no resemblance to the sequence. So when its not been used for a while you tend to forget it. Well, I do. Even so, go for it. Which brings me to

4 Housekeeping. It's very tempting just to keep on going. *Don't* be so tempted. Spend a few minutes from time to time checking the list of shortcuts. Weed out the ones which are redundant. They'll be there. The observers in 1921 quite likely won't be the same in 1961. So you could well have a whole raft of shortcut sequences which won't be used again. Delete them to give some elbow room for more, up-to-date, ones. Bounce the single, curious ones that haven't been used for a while, too. If you need them again, it's no big deal to add them back. Clearing out like this *can* improve performance. It depends to a great extent on your system, and, with word processing, how fast you can type! All the same, it is a GOOD habit.

5 I was going to say that making regular back-ups is a GOOD habit as well. But that's an understatement if ever there was one. Making regular back-ups is only slightly less essential than remembering your wedding anniversary. Forget the latter, and you have the opportunity to grovel, buy an expensive present and make up. Forget the former and you will find instant proof that *nothing* comes back from a Black Hole. There are few things which generate such complete panic as discovering that the hours of hard work you've so lovingly and carefully lavished on inputting awkward data have, to use a technical phrase, gone down the pan. I know: despite being an IT professional, I know!

5.1 Save your work every few minutes. If your software has an auto save feature, use it. If it has the ability to make automatic back-ups, use it.

5.2 Get into the habit of saving the work done each time, not only to your hard disk, but also to *two different* floppy disks.

5.3 From time to time, check the contents of each of the floppies. Make sure all the files you expected to be there ARE there and test a random sample by loading them back into the word processor.

5.4 Each time you save a file to a floppy disk, *write-protect* the disk. Of course, you'll curse when you try to save the next file, because you'll have forgotten you did it. You might also, conceivably, have that self-same disk in the drive when you decide it's time to do a tidy on some of those old disks that have been lying around. Unless you're using DOS 5, or something like PCTools or Norton Utilities to format your disks, it's worth remembering that the format on a floppy disk is a *destructive* format. When it's gone, it's gone. So that write-protect tag could save another heart attack.

Where are we now?

Well, I hope I've given a few clues as to how inputting masses of data can be made, if not exactly fun, then more bearable. I don't pretend this is complete: more like a Hitchhiker's Guide to the Glossary. It is, necessarily here, restricted to one word processor. What I hope it *will* do, is give heart to those who feel they are struggling with inputting endless pages of data. It's actually quite satisfying to set up a whole load of short cuts and see the sheets flying by. Becomes something of a challenge to beat the observer, who irritatingly, is likely to think up a new sequence just when you thought you got them all captured!

One thought: Once you've got a sequence nailed down, so to speak, it cuts out typos of the deduced magnitude. This is good, of course, but keep a wary eye on what appears when you type in the short cut. If it isn't what you expect, you've undoubtedly made a typo in the short cut itself. Undoubtedly? Well, not always. I set up a whole lot of short cut keys for R CrB and was quite surprised when, quite some time later, I typed one in and got the wrong deduced magnitude. It was only out by 0.1, but it *was* out. That was when I discovered that the original observation I'd used to form the short cut was wrong! Not much of a problem, but it meant I had to go back make sure I hadn't left any incorrect values in.

The BAA Exhibition Meeting

The 1993 BAA Exhibition Meeting was held at Hawkstone Hall, London on Saturday, 19th June. The Director was able to set up a good VSS exhibition thanks to the help of Dave McAdam, Gary Poyner, Melvyn Taylor and Malcolm Porter. Guy Hurst was unable to attend but sent in material on Supernova 1993J, Nova Aquilae 1993 and on the UK Nova/Supernova Patrol and this was distibuted between the stands of the VSS, the UK Nova/Supernova Patrol and the Deep Sky Section which also had some exhibits on active galaxies.

In addition to the section exhibits there was a rather nice light-curve of TX Draconis on the stand of the Loughton Astronomical Society. This was more or less complete for the years 1979-83 and 1988-92 and showed the periodic variations rather nicely. As the observer, Jeremy Phillips, was not a VSS member and his observations would significantly enhance our records, the Director later wrote to him to ask if he would be willing to submit his observations to us for inclusion in our records. The following is part of Jeremy's reply:

'Naturally I'd be happy to send all my observations of TX Draconis to you for inclusion in your files. As you will have noticed from my light-curve, I've got a reasonably complete record from 1979 to 1983 and from 1988 to the present - the annoying interruption from 1983 coincided with my university years! Although my enthusiasm for variable stars hasn't really diminished since I started observing them in 1978, I have found that I haven't had the time over the past few years to observe a large number of stars regularly and, hence, have tried hard to maintain continuity with TX Draconis at least (and am now, of course, addicted to this star so I can't bear the thought of breaking this run after so long!).'

This rather nicely shows how binocular observers who are only able to devote a small amount of time to observing can still make a valuable contribution by concentrating their efforts on just one or two 'pet' stars.

Subscriptions for Circulars

Payments, which are for four issues, should be made out to the BAA and sent to Storm Dunlop.

United Kingdom:	£6-00
Overseas:	£7-00

Charts

Please enclose an A4-size SAE when ordering charts. Order Telescopic and Binocular charts from the John Toone. Order Eclipsing Binary charts from Tristram Brelstaff.

Telescopic:	30p per star
Binocular:	10p per star
Eclipsing Binary:	10p per star

Binocular Variable Star Charts: Vol 1

Almost out of print (if not already so). Order from Storm Dunlop.

United Kingdom:	£1-25
Overseas:	£1-50

Eclipsing Binary Programme Handbook: 1988

Although the predictions are out of date, this provides a good introduction to the work of the Eclipsing Binary Program and the list of elements for around 400 stars is still useful. Order from Tristram Brelstaff.

United Kingdom:	£1-25
Overseas:	£1-50

VARIABLE STAR SECTION
CIRCULAR 77

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