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PUBLICATIONS OF THE

VARIABLE STAR SECTION

ROYAL ASTRONOMICAL SOCIETY OF NEW ZEALAND

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1998 December 1

AN ATTEMPT TO DETERMINE THE SUPERCYCLE OF BR LUPI

Frank M. Bateson
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SUMMARY: **Visual observations of the dwarf nova BR Lupi from J.D. 2441,563 to 2450,721 indicate a supercycle of 308 days. Super outbursts have mean maximum magnitude of 13.72. Normal short outbursts average a magnitude fainter and have an outburst cycle of about 35 days. The data is discussed in detail.**

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1. INTRODUCTION

BR Lupi (=HV 4889) was discovered at Harvard during an examination of plates of MWF 176 (1) and classified as a SS Cyn dwarf nova. It was subsequently classed as U Gem (2) and as UG SU UMa (3) on the basis of a paper by Szkody & Wade (4). Its range is 13.1 to 17.5p with an outburst cycle of 24 days (2).

BR Lupi is shown on charts 540/1 (5) with a V sequence of comparison stars by Vogt (6).

2. OBSERVATIONS

Seventeen outbursts were tabulated in previous papers (7:8). These are used in the present discussion. The observing season is January through October. However, observations in January and February in most years are few, if any, because the short southern summer nights make it difficult from most sites to make early morning estimates as BR Lupi emerges from conjunction. October observations are also limited in number, being generally confined to the first ten days.

The first observation was on September 2, 1972 so that BR Lupi was observed on 14 nights out of a possible 43 nights in that year. The number of nights on which observations were made in each observing season were compared to the number of nights on which observations could be made. The number of nights covered were limited from 1973 through 1981, varying from 5% to 35%. The estimates in these years were almost entirely due to five observers who did not all observe in the same season.

BR Lupi has never been a popular object with observers because of the faintness of its outbursts. However, the publication of papers on this variable (7:8) served to stimulate interest from 1982 onwards. Danie Overbeek started a persistent monitoring of BR Lupi in 1982 which has continued ever since. The threshold of his telescope is mag 14.0 under the best seeing. Most of his estimates have been negative despite detecting most of the bright outbursts. Albert Jones also monitored BR Lupi from 1982 through 1984 and then turned to brighter objects. Overbeek's observations were supplemented by many other less regular observers. Rod Stubbings in the course of his close attention to dwarf novae has closely monitored BR Lupi in the past three years.

The number of nights on which observations were possible from 1982 onwards after allowing for varying weather conditions ranged from 250 to 298. The average was 276 nights per season. The percentage of nights when observations were made ranged from 50% to 70%. Naturally some nights had many estimates.

AN ATTEMPT TO DETERMINE THE SUPERCYCLE OF BR LUPI (Cont.)

Table 1 lists the outbursts observed in continuation of the previous lists. This table is in the usual format and supplemented by remarks on some of the outbursts. The light curve appears as Figures 1 and 2.

3. DISCUSSION

The problem is to determine the mean cycle for both super and normal outbursts from data which has many gaps. First there is a gap of about 89 days when BR Lupi cannot be observed from mid October through December each year. This gap varies slightly in length according to whether early morning observations were made in January. Secondly there are often other gaps in the records so the observations do not cover every night in each observing season. A third complication is that it is easy for users of small telescopes to misidentify comparison star mag 13.7 just south of BR Lupi for the variable. A few observations when the observer questioned his identification of the variable or when other observations indicated it was wrong have been rejected. These comments mean that my conclusions should be treated with caution.

Ten outbursts from Harvard plates are listed (1) of which those on JD 2424,678 and 2442,682 may be the same outburst possibly a super outburst. There are three other outbursts which may be super outbursts judging by the magnitudes given. The intervals between these are far too large to be useful in determining a mean cycle.

Table 2 lists all outbursts for which the visual maximum magnitude was 14.0 or brighter. These appeared likely to be super outbursts. Outburst No. 24 was added because it was probably brighter than the magnitude recorded.

The first column of Table 2 gives the outburst number as shown in Table 1 or in the lists with previous papers. The original observations were then used to determine which entries in Table 2 appeared definitely to be a super outburst. The last column identifies these by the word "Definite". The remaining outbursts were termed either" possible" or "unlikely". The former I considered were probably super outbursts and the latter probably not super outbursts. The remarks which follow Table 2 show the reasons for my classification.

Column 4 gives the interval in days between successive outbursts classed as either definite or possible. The intervals against outbursts termed unlikely are shown in brackets and have been ignored in determining a possible mean super cycle. Thus the interval against outburst No. 10 is that interval from outburst 7 ignoring Nos. 8 and 9.

The mean maximum magnitude of super outbursts is 13.72 with a visual range of 13.3 to 14.0. The mean cycle for super outbursts is 424.7 days. However, there is a very wide range in individual intervals from 126 to 754 days. This wide range may be due to the scattered nature of the observations with large gaps. There appears to be often a large interval followed by an interval much shorter than the mean.

The next step was to check whether large gaps in the observations preceded all intervals greater than 500 days. Outbursts 3 and 6 had very large gaps preceding the outburst e.g. 41,970 to 42,155 and 42,656 to 42,810. The large gaps in other cases were those expected of around 89 days when BR Lupi was unobservable.

AN ATTEMPT TO DETERMINE THE SUPERCYCLE OF BR LUPI (Cont.)

There was no way of telling whether super outbursts did occur in each of these gaps although it was presumed they did. These long intervals were divided into two. The six long intervals were deducted from the total intervals and replaced by 12 intervals. This gave an arbitrary total of 29 super outbursts with a mean cycle of 308 days. This may be more probable that the 424 days given above.

The mean magnitude of normal outbursts at maximum is 14.69. The mean cycle of normal outbursts is 35.7 days but must be much shorter because many normal outbursts would have passed unobserved.

4. CONCLUSIONS

BR Lupi is a typical dwarf nova of the SU UMa type with super and normal outbursts. The mean maximum magnitudes are 13.72 and 14.69 respectively.

I conclude that the super cycle is about 308 days. This must be treated with caution for the reasons given in the above discussion. The observations give a cycle of 38.8 days which I consider is really much shorter. It is obvious that many normal outbursts passed unobserved because of their faintness and the gaps in the observations. The observations give no information on minima as these are too faint for the telescopes used.

ACKNOWLEDGEMENTS

My appreciation to all observers for their contributions. Especial thanks are due to Danie Overbeek for his many years of monitoring BR Lupi despite only seeing the brightest outbursts. Ranald McIntosh kindly supplied a print out which was particularly useful when observers had sent their observations on disk.

REFERENCES

(1) 1930. Swope H.H. & Caldwell I.W. Harvard Bull. 879.

(2) 1985. Kholopov P.N. (Ed) Gen. Cat. Var. Stars 4th ed. Vol. 2, Nauka, Moscow.

(3) 1997. Downes R.A., Webbink R.F. & Shara M.M. Pub. Ast. Soc. Pacific 109, 734.

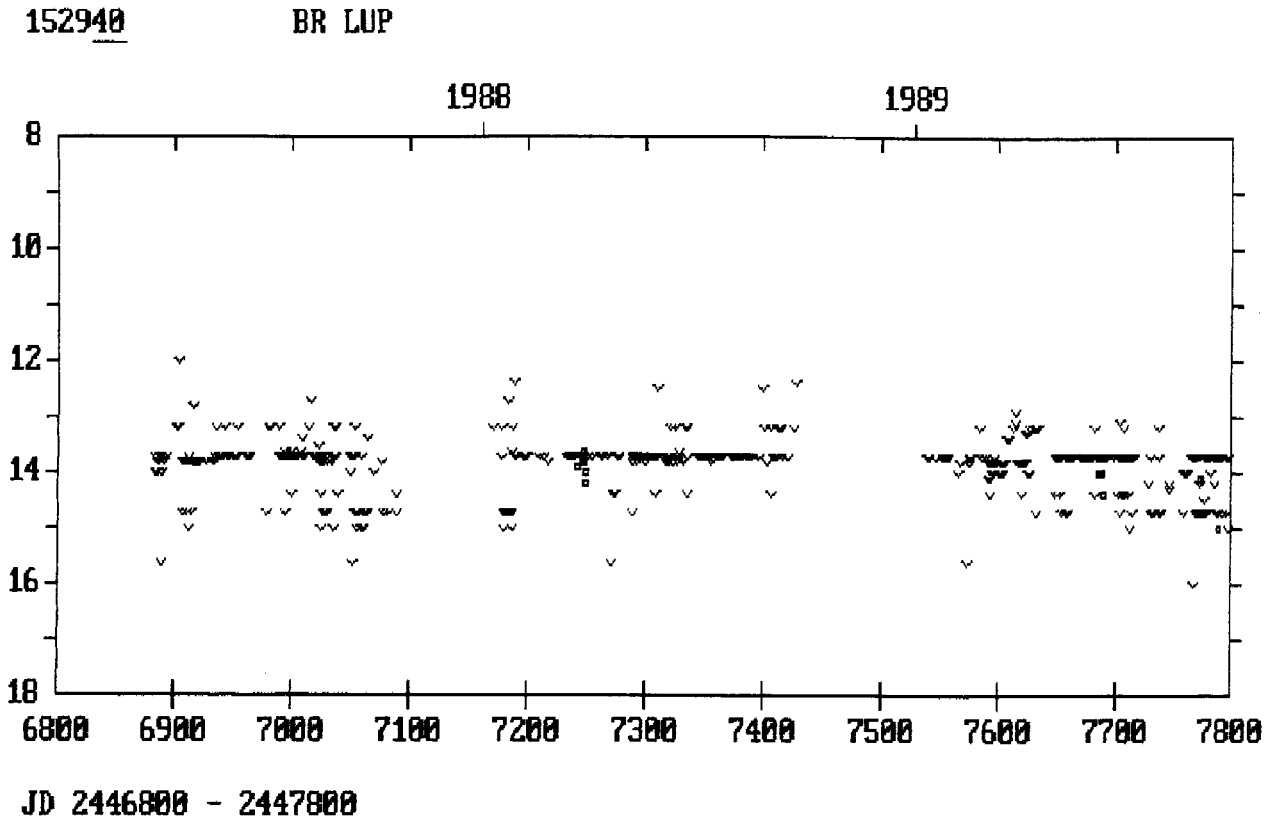
(4) 1980. Szkody P. & Wade R.A. Pub. Ast. Soc. Pacific 92, 806.

(5) 1980. Bateson F.M., Morel, M, Sumner B. & Winnett R. Charts for Southern Variables, Ser. 12. Pub. by Astronomical Research Ltd. Tauranga, N.Z.

(6) 1977. Vogt N. Pub. Var. star Sect. R.astr. Soc. N.Z. Vol. 6. p 44.

(7) 1982. Bateson F.M. Pub. Var. Star Sect. R.astr. Soc. N.Z. Vol. 10 pp. 14/15.

(8) 1984. Bateson F.M. Pub. Var. Star Sect. R.astr. Soc. N.Z. Vol. 12 p 53.



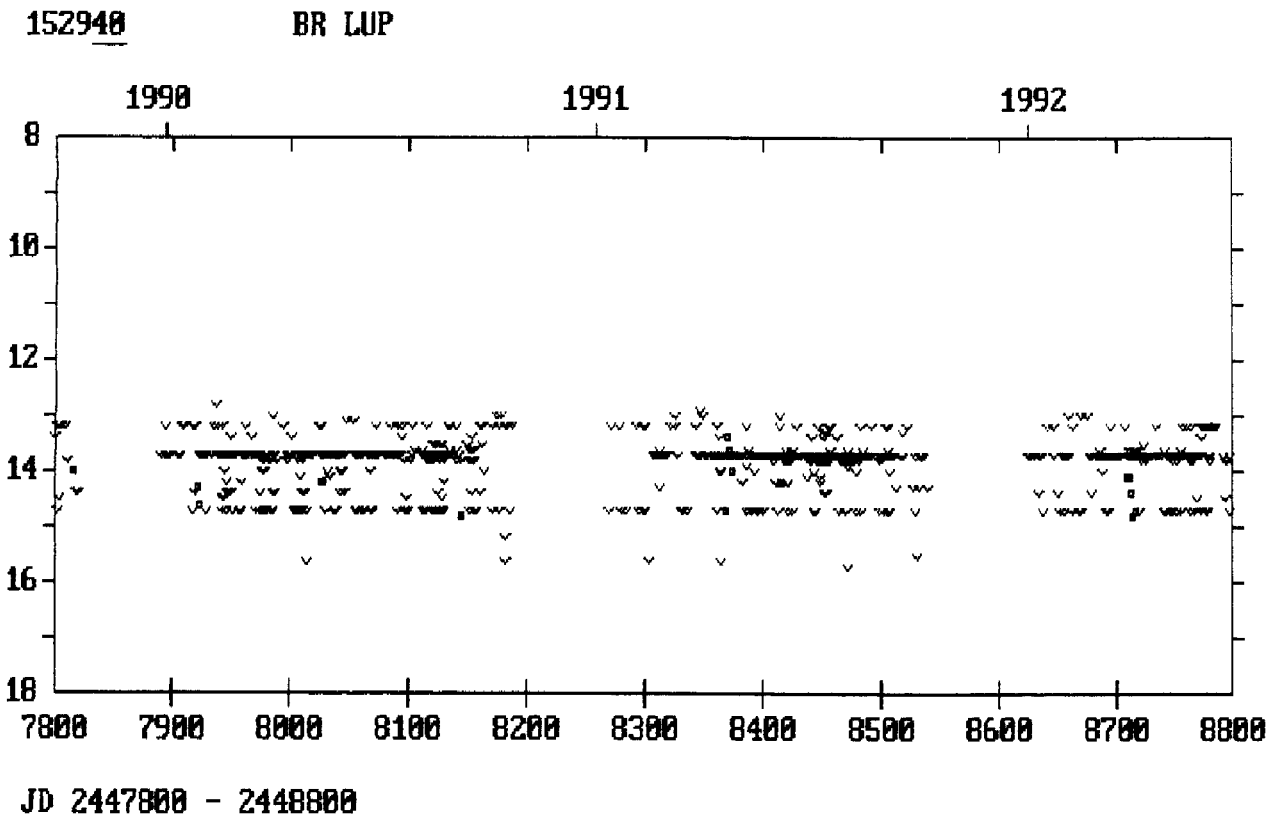
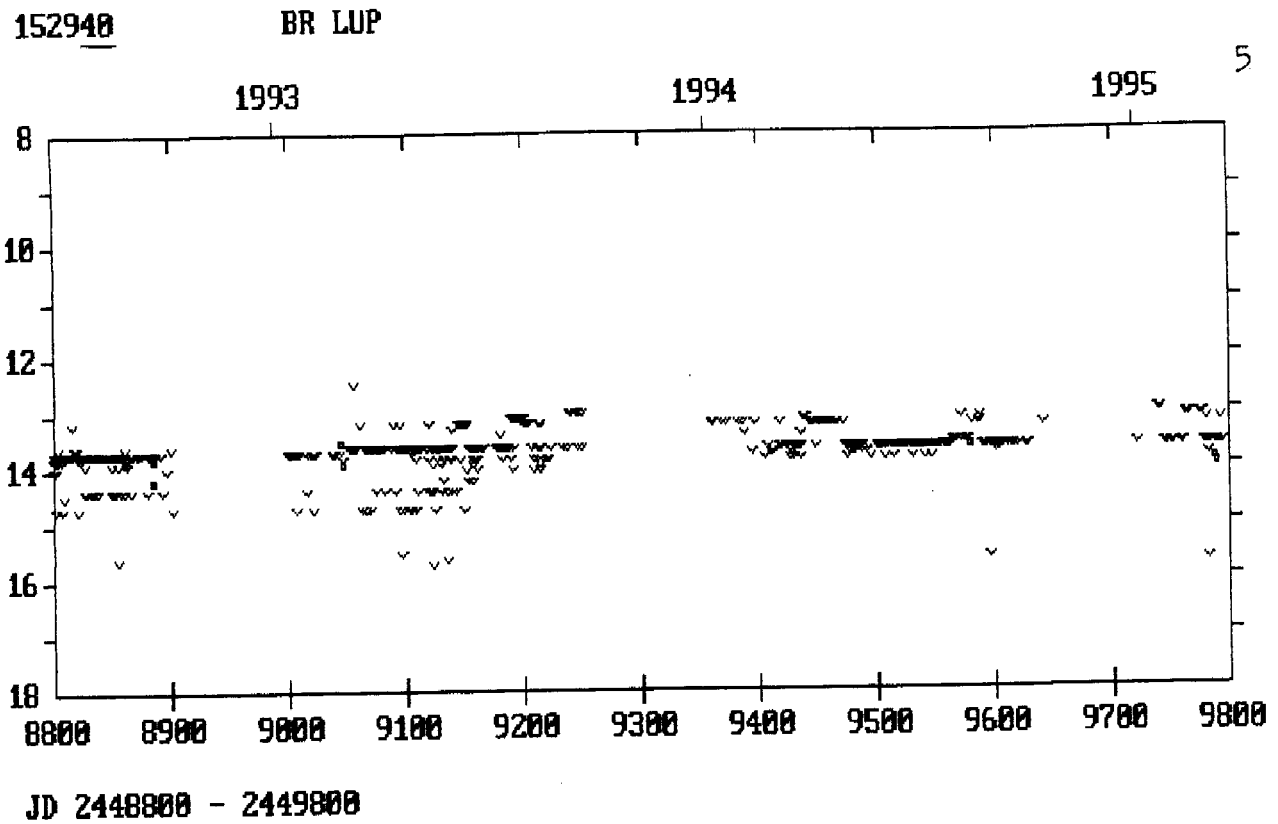


FIGURE 1

LIGHT CURVE FROM INDIVIDUAL OBSERVATIONS
J.D. 2446,800 - 2448,800



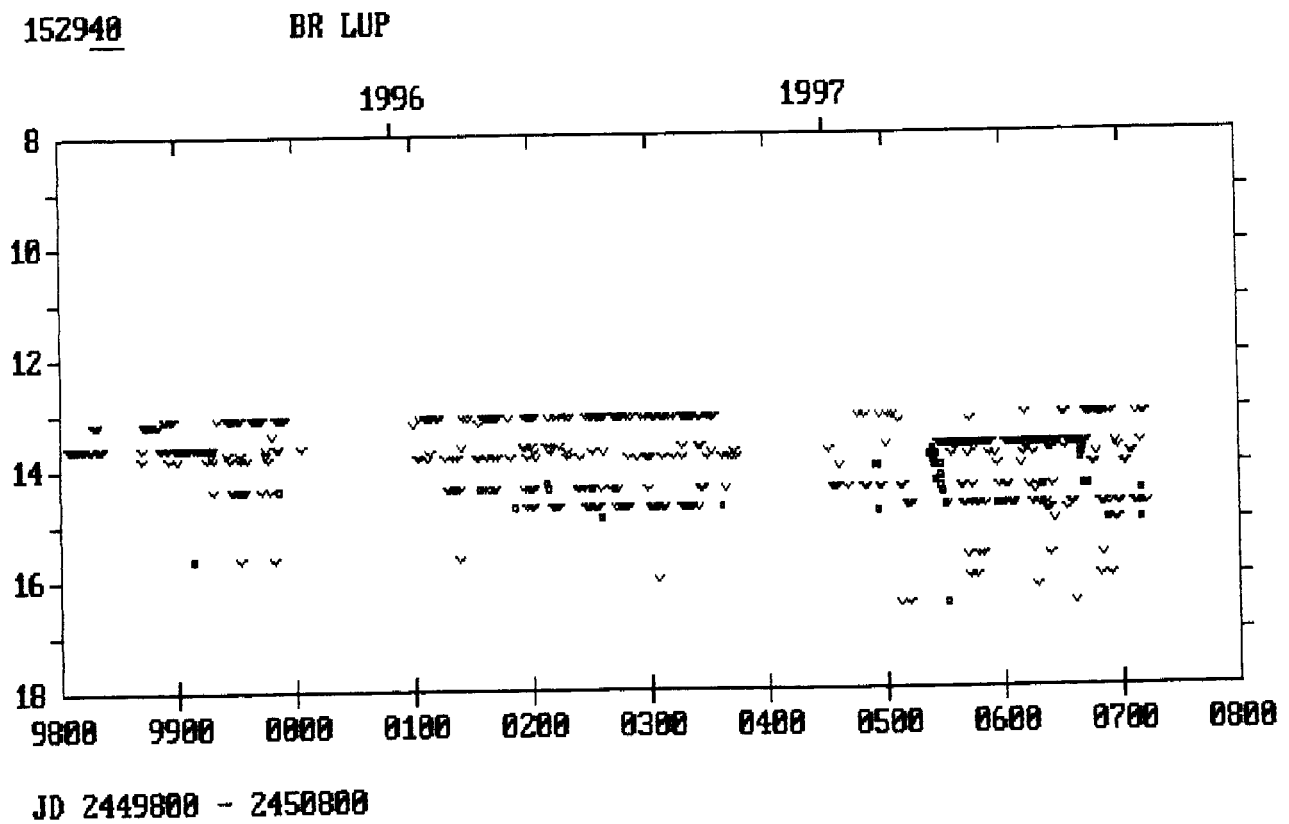


FIGURE 2

LIGHT CURVE FROM INDIVIDUAL OBSERVATIONS
J.D. 2448,800 - 2450,800

TABLE 1

BR LUPI - OBSERVED OUTBURSTS

No.	JD Max 244	Max M_V	Int $_d$	Type	No. Obs.	
18	45,973?	14.0?	150?	?	1	*
19	46,315	14.9	342	?	2	*
20	527	14.0	212	S	6	*
21	589	14.7	62	?	1	*
22	596	15.9	7	?	1	*
23	641	15.0	45	?	1	
24	715	14.2?	74	?	2	*
25	833	15.0	118	?	1	
26	47,245	13.7	412	S	8	*
27	685	14.0	440	?	4	*
28	773	14.1	88	N	1	
29	790	15.0	17	N	1	
30	816?	14.0?	26?	N?	1	*
31	922	14.3	106	N	2	*
32	977	14.7	55	N	1	
33	48,027	14.2	50	N	2	
34	144	14.8	117	N	1	*
35	370	13.4	226	S?	6	
36	414	14.2	44	N?	2	
37	709	14.1	295	?	5	*
38	885	13.8	176	N	2	
39	49,044	13.5	159	N	2	*
40	579	13.6	535	?	1	
41	787	13.9	208	?	4	*
42	915	15.6	128	?	1	
43	954	14.4	39	N	3	*
44	986	14.4	32	N	1	
45	50,156	14.4	170	N	2	
46	185	14.7	29	N?	2	*
47	212?	14.3	27?	?	2	*
48	251	14.4	39	N	1	*
49	270	14.4	19	N	2	*
50	306	14.7	36	N	2	*
51	360	14.7	54	N?	2	
52	491?	14.0	131	?	4	*
53	538?	13.8	47	S	21	*
54	594	14.7	56	N	1	
55	632	14.4	38	N	8	*
56	664	13.9	32	S	11	*
57	687	15.0	23	N	3	
58	716	14.5	29	N	4	*

BR LUPI - OBSERVED OUTBURSTS (Cont.)

REMARKS TO TABLE 1

No. 18	Gaps 8 days before & 96 days after 973.
19	Gap 4 days before 315.
20	Duration 10 days.
21 & 22	May possibly be same outburst.
24	Gap 84 days after 715.
26	Duration 7 days.
27	Duration 5 days.
30	Gap 6 days before 816.
31	Gap 3 days before 922.
34	Gap 6 days after 144.
35	Duration at least 5 days.
	Rise commenced at 14.7 on 368 but fall after 14.0 not seen.
37	Duration 6 days.
39	Gap 5 days after 13.9 on 046.
41	Gap 4 days before 787.
43	Was <15.6 on 953.
44	Was <15.6 on 983.
46	Gap 7 days after 185.
47	Gap 8 days before 212.
48	Was <14.7 on 250 & 253.
49	Was <14.4 on 268 & <14.7 on 272.
50	Was <14.7 on 303 & 307.
52	Gap 7 days before 491.
53	Gap of 16 days before 538.
	Duration 12 days was 16.5 on 552.
55	Was <14.7 on 631. Duration 2 days.
56	Duration 7 days. Was <16.5 on 660.
57	Was <16.0 on 691.
58	Duration 1 day.

TABLE 2

BR LUPI - POSSIBLE SUPEROUTBURSTS

Ouburst No.	JD Max 244	Max $_{Mv}$	Int $_{d}$	Remarks
1	41,745?	13.6	-	Definite *
3	42,266	13.6	521	" *
4	630	13.6	364	" *
5	875	13.7	245	Possible *
6	43,629	13.6	754	" *
7	901	13.3	272	Definite *
8	44,000	13.9	(99)	Unlikely *
9	039	13.9	(39)	" *
10	313	13.7	412	Definite *
11	44,414	14.0	141	Possible *
12	730	13.7	276	Definite *
14	45,062	13.8	(332)	Unlikely *
15	178	13.5	448	Definite *
16	533	13.8	355	Possible *
17	823	13.8	(290)	Unlikely *
18	973?	14.0?	440	Possible *
20	46,527	14.0	554	Definite *
24	46,715	14.2?	188	Possible *
26	47,245	13.7	530	Definite *
27	685	14.0	440	Possible *
35	48,370	13.4	685	Definite *
38	885	13.8	515	Possible *
39	49,044	13.5	(159)	Unlikely *
40	579	13.6	694	Possible *
41	787	13.9	208	" *
53	50,538	13.8	751	Definite *
56	664	13.9	126	" *

BR LUPI - POSSIBLE SUPEROUTBURSTS (Cont.)

REMARKS TO TABLE 2

No. 1 <14.4 on 723; <13.7 on 738; 13.7 on 745; 13.6 on 747 & 748; 14.6 on 751; 14.4 on 754; <14.7 on 773.

3 <14.7 on 251; 14.2 on 264 followed by 9 positive observations to 14.9 on 277.

4 <14.4 on 626; 13.7 on 630 then 5 positive observations to 14.1 on 638; <13.7 on 641; <14.7 on 642.

5 <13.7 on 873; 13.7 on 875 & 876; <13.0 on 901.

6 A single positive observation with gap of 242^d before & 100^d after 629.

7 Gap 150^d before 901; 13.3 on 901; 13.6 on 902; 13.7 on 903 & 13.8 on 903 14.2 on 910.

8 <14.4 on 999; 13.9 on 000; <14.7 on 011.

9 <14.4 on 024; 13.9 on 039; <13.8 on 041.

10 <14.0 on 293; 13.7 on 313.21; 13.7 on 313.38; <14.0 on 321.

11 <14.4 on 435; 14.1 on 454; 14.0 on 455; 14.4 on 459; <14.4 on 461.

12 <14.0 on 727; 13.7 on 730 & 731; <13.7 on 732; 13.9 on 733; 14.3 on 734; <13.6 on 735.

14 <13.7 on 060; 13.8 on 062; <13.7 on 063.

15 13.9 on 175; <13.7 on 176; <14.4 on 176 & 177; 13.5 on 178; 14.0 on 179; 13.8 on 180; <14.0 on 188. Then 13.9 on 715. May have been a flare.

16 530 <13.7; 533 13.8; 544 <13.6.

17 822 <13.7; 823 13.8; 825 13.9; 827 <13.6.

18 Gaps 8 days before & 96 days after. A single observation of 14.0 on 973.

20 <13.7 on 525; 14.0 on 527 followed by positive observation to 14.0 on 537; <14.7 on 540.

24 711 <14.5; 715 14.2; 716 14.4; then gap of 84 days.

26 <13.7 on 241; 243 13.9; followed by 6 positive observations to 14.2 on 250.

27 <13.7 on 683; 685 14.0; 686 & 687 14.0; 689 14.2.

35 14.7 on 368; 13.4 on 370; 13.6 on 371; 13.7 on 372; 14.0 on 373.

38 881 <14.4; 882 & 884 <13.7; 885 13.8; 886 14.2.

39 043 <13.7; 044 13.5; 045 <13.8; 046 13.9. Positive obs. probably misidentification.

40 A single positive observation.

41 782 <15.7; 783 <13.6; 787 13.9; 788 13.6; 789 14.0; 790 13.6.

53 519 <16.5; 522 <14.7; 538 13.8; then daily obs. by 3 observers to 14.4 on 547; 14.5 on 549; 14.7 on 550.

56 660 <16.5; 661 & 662 <13.6; 664 13.7; then daily obs. by 2 observers to 14.4 on 670 & 671.

THE MEAN CYCLE OF V373 CENTAURI

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SUMMARY: A table of observed outbursts is presented for the UG type dwarf nova V373 Centauri. The mean cycle is 48.5 days. V373 Cen has the usual wide and narrow maxima common to UG stars with wide maxima more frequent. There is a definite tendency for the rise and fall to and from maxima to be slow.

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1. INTRODUCTION

V373 Cen is classified as UG type with a range of 13.5p to 16.3V and is at (Equinox 2000) 12h 26m 4.93s –45° 49 30.0' (1). Charts 371/2 were published with comparison stars denoted by letters (2). N Vogt (3) published three colour values for five comparison stars with a finder chart. This sequence was also shown on a chart by B. Sumner dated February 20th 1979.

2. OBSERVATIONS

Bateson (4:5) discussed observations from J.D. 2442,810 to 2445,434. We now present subsequent observations up to 2450,710.

There are 1135 visual observations available for discussion in this paper. The main observing season is December through August which means there are large gaps in the observations. Gaps also occur during the observing season despite the untiring monitoring by Wes Taylor, who recorded most of the outbursts listed in Table 1. His observations were supplemented by Bill Goltz and Andrew Pearce with less regular observations from several other members of the VSS RASNZ. Gordon Herdman made a major contribution in recent years while one of us (RS) has carefully monitored V373 Cen from J.D. 2449,914 onwards.

Table 1 lists the observed outbursts in continuation of previous papers. The final column gives the number of observations used to determine the details for each maximum given in the other columns.

3. DISCUSSION

Outbursts are defined as those in which the maximum visual magnitude was 14.5 or brighter. There are a number of observations in the range 14.8 to 15.7. These were regarded as variations near minimum except where there was clear evidence that these observations immediately preceded or followed a rise and fall to or from maximum.

Outbursts were either termed wide when their duration was 6 days, or longer, or narrow with durations of 5 days or less. Wide outbursts appear to be the most frequent which may be an observational effect because they are more likely to be recorded. The mean maximum magnitude differs slightly between the two types of outbursts – 13.74 for wide and 13.85 for narrow.

We found that in all well observed outbursts both the rise and fall were very slow with both taking 3 to 4 days and in some outbursts even longer.

It is difficult to be certain as to which outbursts are consecutive when there are gaps in the observations. We gave close attention to the frequency of observations between outbursts that appeared to be consecutive. There were 17 intervals ranging from 14 to 65 days which we considered to be consecutive. These give a mean cycle of 48.5 days. This compares to 53 days found by Bateson (4).

4. CONCLUSIONS

We found V373 Cen to be a dwarf nova of UG type with both wide and narrow outbursts. These differ marginally in mean maxima visual magnitudes being respectively 13.74 and 13.85. The mean outburst cycle is 48.5 days.

A marked feature of V373 Cen is its very slow rise and fall to maximum brightness in most wide outbursts.

ACKNOWLEDGEMENTS

Our appreciation is due to all contributing observers and, especially to Wes Taylor for his close monitoring of V373 Cen over so many years. We thank Ranald McIntosh for supplying printouts of the database file.

REFERENCES:

(1) 1997. Downes, R.A., Webbink, R.F. & Shara, M.M. "A CATALOG & ATLAS OF CATACLYSMIC VARIABLES." 2nd ed. Pub. Astr. Soc. Pacific 109, No. 784.

(2) 1977. Bateson F. M, Morel M. & Winnett R. "CHARTS FOR SOUTHERN VARIABLES", Ser. 9. Pub. by Astronomical Research Ltd., Tauranga, N.Z.

(3) 1977. Vogt N. Pub. Var. Star Sect. R.astr. Soc. N.Z., 5, pp. 44 & 47.

(4) 1982. Bateson F.M. Pub. 10, Var Star Sect., R.astr. Soc. N.Z., pp 12, 13.

(5) 1985. Bateson F.M. Pub. 12. Var. Star Sect. R.astr. Soc. N.Z. p. 53.

V373 CENTAURI - OBSERVED OUTBURSTS

No.	JD Max 244	Max Mv	Int d	Width d	Type	No. Obs.
19	45,496	13.6	70	6	W	7
20	520?	12.8?	24	?	?	1
21	576	13.6	56	?	?	2
22	786	13.6	(210)	6	W	7
23	874	13.6	88	10	W	6
24	46,240	13.8	(366)	2	N	3
25	535	13.5	(295)	12	W	10
26	591	13.8	56	1	N	2
27	904	13.6	(313)	6	W	4
28	47,175	14.5	(271)	9	W	11
29	47,266	13.6	91	1?	N?	2
30	335	13.8	69	15?	W	4
31	388	13.6	53	3?	?	2
32	630	13.7	(242)	3	N	3
33	684	14.3	54	?	?	2
34	698	13.6	14	12	W	10
35	745	14.0	47	4	N	3
36	966	13.7	(221)	8	W	8
37	48,014	13.7	48	7?	W?	6
38	086	13.7	72	3	N	3
39	48,269	13.5	(183)	?	?	2
40	320	13.7	51	10	W	10
41	409	13.7	89	2	N	3
42	468	14.0	59	4	N	4
43	648	13.7	(180)	?	?	1
44	776	13.3	(128)	6	W	5
45	986	13.4	(210)	?	?	3
46	49,060	13.5	74	12	W	13
47	147	13.8	87	3	N	2
48	214	13.7	67	8	W	8
49	49,388	13.7	(174)	4	N	2
50	449	13.7	61	13	W	6
51	520	13.8	71	14	W	6
52	598	13.7	78	5?	W?	2
53	889	13.8	(291)	?	?	1
54	914	13.4	25	5	W?	3
55	50,126	14.4	(212)	14	W	14
56	190	13.6	64	16	W	15
57	244	13.7	54	15	W	13
58	309	13.7	65	7	W	10
59	50,450	14.2	(141)	2	N	3
60	489	14.0	39	12	W	6
61	574	13.3	85	14	W	15
62	642	14.0	68	4	N	5
63	696	13.9	54	9	W	6

VISUAL OBSERVATIONS OF THE 1996 ECLIPSE OF BL TELESCOPII

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SUMMARY: **Visual observations of the 1996 eclipse of BL Tel are presented. These indicate the date of mid eclipse was 1996 June 21.5 UT (GJD 2450,256.0), an interval of 775.0 days since the previous event.**

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1. INTRODUCTION

BL Tel is a large amplitude, long period eclipsing system of the type EA/GS+SR (1). It is particularly suited to accurate visual observation and the results of previously observed eclipses in 1983. 1985, 1987, 1990, 1992 & 1994 have been described by Williams (2), (3), (4) & (5).

Given the poor coverage of the 1990 eclipse, the results presented here represent the 6th successfully observed event.

2. OBSERVATIONS

The observations were made visually by members of the VSS, RASNZ. A total of 142 magnitude estimates were reported by 9 observers. These observations are shown as daily means in Table 1 wherein column 1 gives the G.J.D, column 2 the mean magnitude and column 3, the number of observations used to derive the mean. No heliocentric correction has been deemed necessary due to the nature of visual observations.

Figure 1 shows a light curve based on the daily mean magnitudes. These are plotted using the "mirror image" method which assumes a symmetrical shape for the light curve. Here, large dots represent original mean magnitudes and small dots are points generated by the mirror image plot.

All observers used comparison stars shown previously in (4).

3. DISCUSSION

The 1996 eclipse of BL Tel was well observed with at least one observation made on all but 9 days during the eclipse event. This has allowed for accurate determining of the date of mid eclipse and other features of the light curve.

The observations indicate this eclipse commenced on 1996 May 20.0 UT (GJD 2450,223.5) and ended on 1996 July 24.0 UT (GJD 2450,288.5) giving a total duration of 65.0 days.

Mid eclipse occurred on 1996 June 21.5 UT (GJD 2450,256.0) an interval of 775.0 days since the date of previous mid eclipse. This date of mid eclipse is 1.4 days later than that predicted by the elements JD 2434,692.6 + 778.1 days given by Kholopov (1).

A mean minimum magnitude of 8.90v was recorded, giving an amplitude of 1.9 magnitudes, to which BL Tel declined in 27.0 days, yielding an average decline rate of 0.07 magnitude per day. A similar daily change is evident during the return to maximum.

VISUAL OBSERVATIONS OF THE 1996 ECLIPSE OF BL TELESCOPII (Cont.)

An interesting feature of this eclipse is the apparent constant brightness at minimum lasting 11 days, suggesting this was a total eclipse. This lasted from GJD 2450,250.5 to GJD 2450,261.5. Of the 5 previously well observed eclipses of BL Tel during the current programme, the 1996 event is the only one to suggest the occurrence of a well defined total phase.

Kenyon (6) notes a number of similarities between BL Tel and the symbiotic type variables (Z AND type stars). The apparent total phase of the 1996 eclipse may reflect change in either the F8 super giant primary or its M0 giant companion, or both, or change in the surrounding circumstellar shell. This is, however, mere speculation and beyond the scope of this paper but it does indicate BL Tel is a potentially interesting object for study by more sophisticated methods.

Table 2 summarises the O-C values derived to date from the visual data of 6 eclipses over the 13 year interval 1983 to 1996. These O-C values are based on the elements given by Kholopov but it should be noted because of the long orbital period of the BL Tel system, this data represents only 7 cycles. The average observed period between eclipses during this interval is 777.417 days. A much longer data set appears necessary to allow detailed investigation and continued observation of future eclipses is therefore encouraged.

5. CONCLUSION

The date of mid eclipse of the 1996 eclipse of BL Tel is 1996 June 21.5UT (GJD 2450,256.0). This is 775.0 days since the date of previous mid eclipse.

6. ACKNOWLEDGEMENTS

All contributing observers are thanked for their magnitude estimates without which this paper could not have been written.

REFERENCES

1. Kholopov P. N. Ed. 1987. Gen. Cat. Var. Stars, 4th ed. Vol. III, Nauka, Moscow.

2. Williams P.F. 1985. Publ. Var Star Section, R.astr. soc. N.Z. No. 12; pp. 8-10.

3. Williams P.F. 1988. Publ. Var Star Section, R.astr. soc. N.Z. No. 14; pp. 40-43.

4. Williams P.F. 1992. Publ. Var Star Section, R.astr. soc. N.Z. No. 18; pp. 11-16.

5. Williams P.F. 1997. Publ. Var Star Section, R.astr. soc. N.Z. No. 22; pp. 46-48.

6. Kenyon, S.J. 1986. "The Symbiotic Stars", pp 244-245. Cambridge University Press.

TABLE 1

DAILY MEAN VISUAL MAGNITUDES FOR THE 1996 ECLIPSE OF BL TEL.

GJD 2450 000+	mag.	No. Obs.	GJD 2450 000+	mag.	No. Obs.
213	7.0	1	256	8.90	2
214	7.0	1	257	8.6	1
215	7.3	1	258	8.7	1
216	7.0	1	259	8.76	5
217	7.3	1	260	8.7	1
218	7.2	1	262	8.7	1
219	7.3	1	264	8.80	2
220	7.30	2	265	8.9	1
221	7.15	2	266	8.87	3
224	7.0	1	267	8.44	5
225	7.00	2	268	8.50	2
226	7.30	2	269	8.5	1
227	7.20	2	271	8.35	2
228	7.3	1	272	7.97	3
229	7.45	2	273	7.90	3
230	7.40	3	274	8.10	2
232	7.60	2	276	7.9	1
233	7.60	2	277	7.8	1
234	7.77	3	278	8.0	1
235	7.83	3	279	7.80	2
239	8.10	3	280	7.47	3
240	8.4	1	281	7.43	3
241	8.3	1	282	7.0	1
242	8.35	2	283	7.0	1
243	8.50	2	284	7.23	3
244	8.53	4	286	7.4	1
245	8.50	5	287	7.4	1
246	8.67	3	288	7.4	1
247	8.67	3	289	7.20	3
249	8.8	1	292	7.0	1
250	8.73	3	294	7.2	1
251	8.6	1	295	7.2	1
252	8.90	2	302	7.0	1
253	8.87	3	306	6.3	1
254	8.90	3	307	6.9	1
255	8.75	4	309	7.0	1

TABLE 2

BL TELESCOPII

0-C Values for observed eclipses 1983 - 1996
Based on elements JD 2434,692 + 778.1 days

Year	Observed	Calculated	O-C
1983	2445591.5	2445586.0	+4.5
1985	2446369.5	2446364.1	+5.4
1987	2447144.5	2447142.2	+2.3
1992	2448703.0	2448698.4	+4.6
1994	2449481.0	2449476.5	+4.5
1996	2450256.0	2450254.6	+1.4

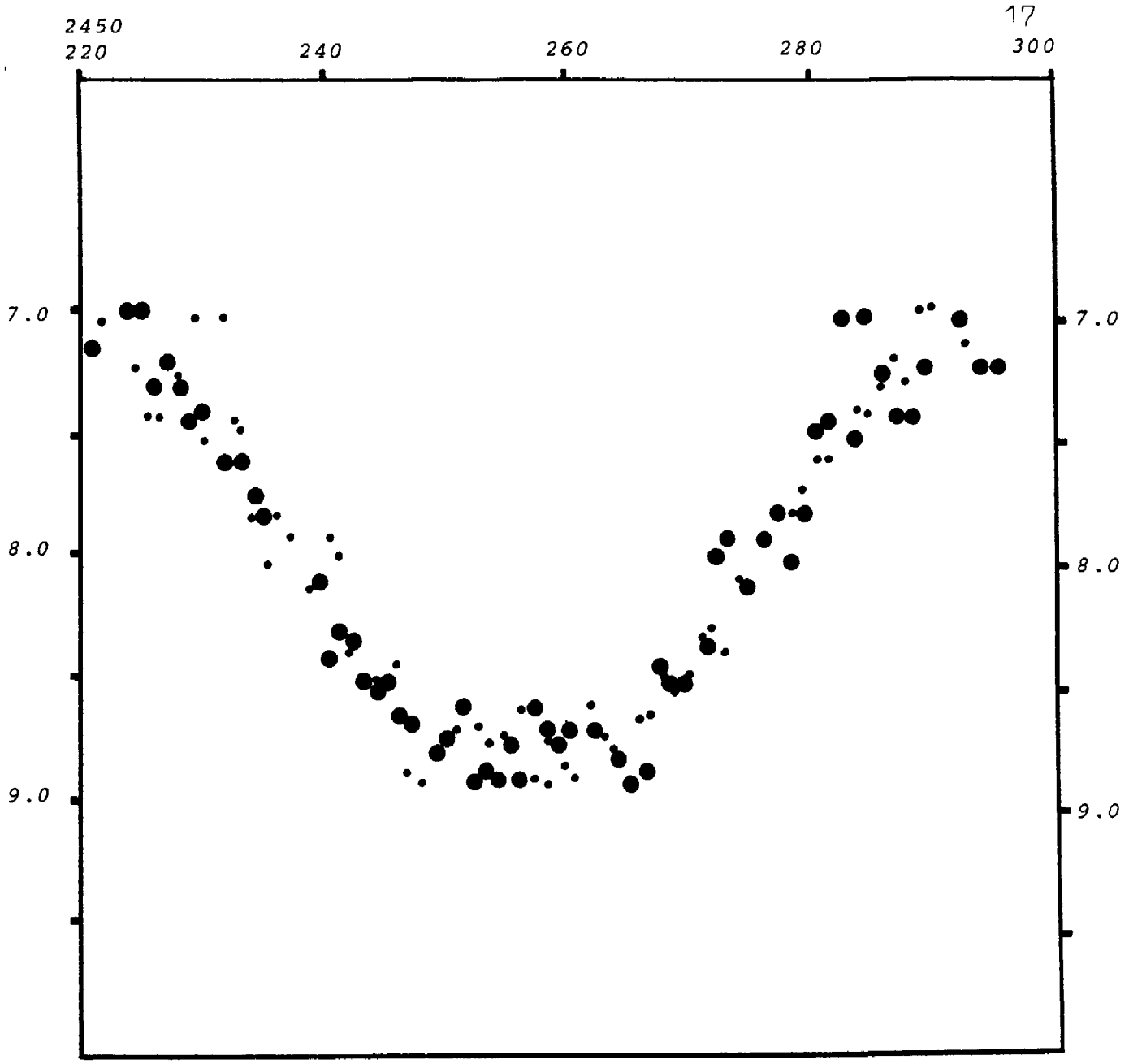

Figure 1.

1996 eclipse of BL Telescopii. Visual light curve based on 142 observations by nine observers. Date of mid eclipse was JD2450256, an interval of 775.0 days since the previous eclipse. Large dots represent original observations and small dots are points generated by a mirror image plot. The period of constant light at minimum suggests this was a total eclipse, totality lasting for 11.0 days.

THE LIGHT CURVE OF NOVA CIRCINI 1995 (BY CIR)

Frank M. Bateson & Ranald McIntosh
Variable Star Section, R.A.S.N.Z.

SUMMARY: The visual light curve of Nova Cir 1995 is presented and discussed. A table of daily means covers the first 227 days of observations, after which there were only single estimates each day. This was a slow nova of type NB.

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1. INTRODUCTION

Nova Cir 1995 was discovered by W. Liller (Chile) on January 27-28, 1995. The nova was subsequently designated BY Cir. Its position is: 14h 44m 53.48s -63° 53' 55.6" (2000).

2. OBSERVATIONS

Visual observations commenced on J.D. 2449,746 (1995 January 28). Mati Morel, in accordance with our normal procedure, issued a preliminary chart. This was followed by a list of two colour magnitudes for the brighter comparison stars. Later chart 1190 was published (1) with lettered comparison stars for which GSC magnitudes were given. Some observers also made their own charts and sequences from a variety of sources.

The visual light curve is shown in Figs. 1 and 2. The following table lists the daily means from J.D. 2449,746 to 2449,972 after which there were mainly single estimates each night. However, these can be read from the light curve.

This nova was observed by most members of the Variable Star Section, Royal Astronomical Society of New Zealand until it reached 10th magnitude. Thereafter the observations were mainly made by the two senior observers – Albert Jones and Danie Overbeek to around magnitude 13.5. Subsequent observations were mainly made by Rod Stubbings with a limited number of estimates from other experienced observers until the nova became invisible and fainter than 15.0.

3. DISCUSSION

Individual observations are plotted in Figs. 1 and 2. It is obvious that there is a lot of scatter especially in the first segment of Fig. 1. Presumably some of this was due to variations inherent in the nova. However, much of the scatter is due to the different sky conditions prevailing at the various sites, and to the different magnitudes used for the comparison stars.

The table of daily means shows a decline of 1.37 magnitudes in the first 18 days after which the decline rate slowed. A fall of three magnitudes to 10.70 took 125 days but the nova then varied slightly brighter than 10.70 with the result that it was only definitely fainter than 10.70 after 157 days. It was difficult to determine the precise date on which the fall of three magnitudes occurred because the estimates of the two senior observers dominated the light curve at this stage. Their estimates usually differed by half a magnitude either because of the use of different comparison stars but more likely because of the difference in observing conditions and the altitude of the nova at their respective sites.

THE LIGHT CURVE OF NOVA CIRCINI 1995 (BY CIR) Cont.

4. CONCLUSIONS

We conclude that Nova Cir 1995 was a slow nova of type NB requiring 157 days to fall 3 magnitudes. Thereafter the rate of decline slowed and it required 836 days to fall a further 4.3 magnitudes to 15.0 after which it was invisible and fainter than 15.0.

ACKNOWLEDGEMENTS

We are grateful to all observers for their estimates.

REFERENCE

(1) 1997. Bateson F.M. & Morel M. Charts for Southern Variables. Series 25. Pub. by Astronomical Research Ltd., Tauranga, N.Z.

DAILY MEANS - BY CIR (NOVA CIR 1995)

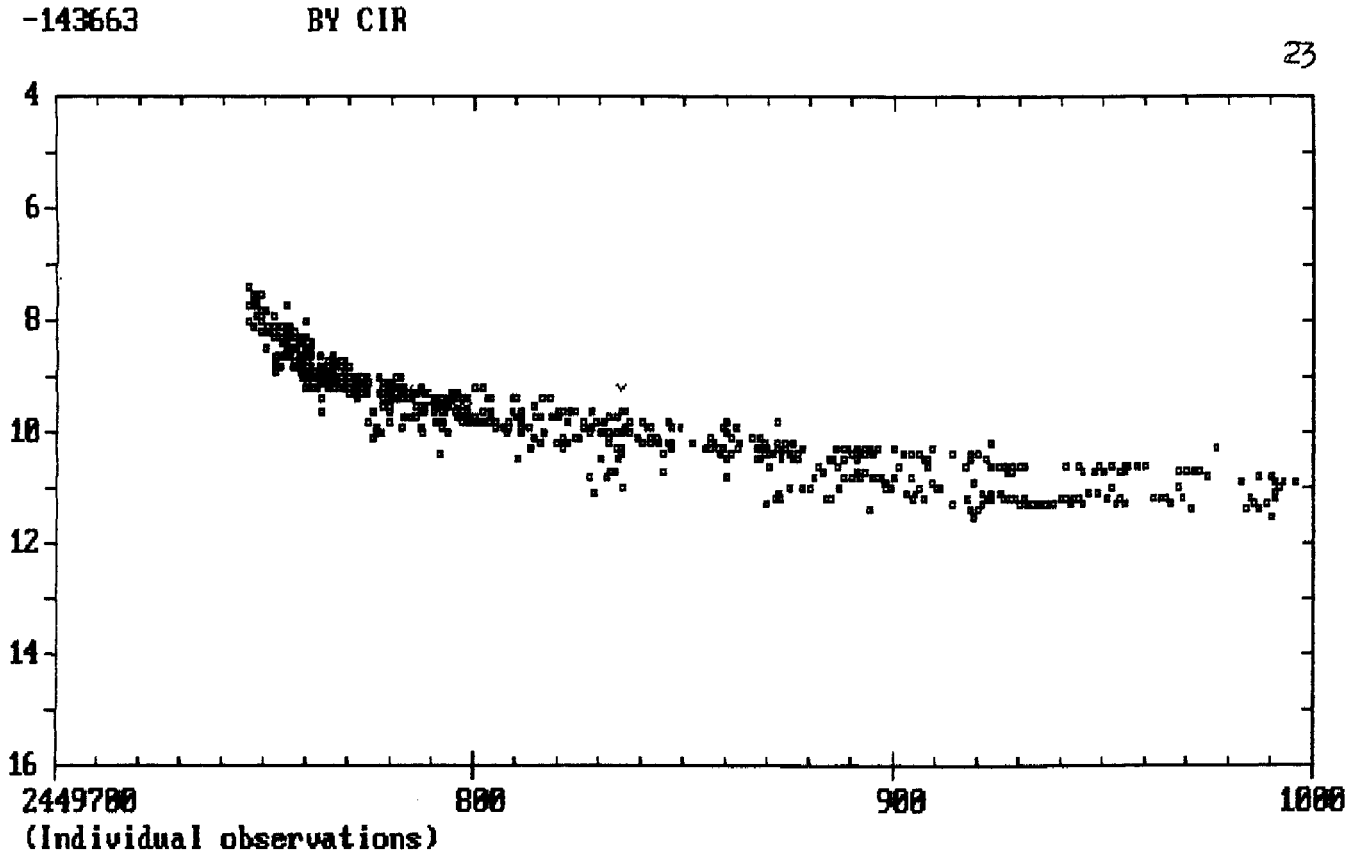
Mean J.D. 2,449,004	Mean M_v	No. Obs.	Mean J.D. 2,449,004	Mean M_v	No. Obs.
746.04	7.70	3	787.04	9.62	4
747.01	7.67	7	787.90	9.60	4
748.04	7.65	6	790.07	9.60	7
749.02	7.85	11	791.38	9.4	1
750.09	8.10	6	792.02	9.50	5
751.12	8.20	1	793.15	9.55	2
752.10	8.14	15	794.00	9.67	4
753.07	8.47	6	795.95	9.53	3
754.09	8.30	4	797.02	9.62	4
755.00	8.29	10	798.00	9.62	4
755.96	8.45	9	799.03	9.77	3
757.00	8.48	10	799.92	9.45	2
758.06	8.63	9	801.13	9.80	3
759.09	8.65	15	801.96	9.60	4
759.99	8.76	12	803.15	9.60	2
760.98	8.80	12	804.05	9.57	3
762.00	8.98	6	804.92	9.85	2
762.97	8.97	10	807.12	9.95	2
764.00	9.07	8	808.06	9.85	2
765.00	9.00	6	809.13	9.57	3
766.00	8.94	12	810.17	9.55	2
767.03	9.02	5	810.92	9.97	7
768.04	8.94	5	813.15	10.10	2
768.98	9.04	9	814.00	9.77	3
769.97	9.07	7	815.30	9.7	1
771.17	9.17	6	816.00	9.87	3
772.02	9.17	11	818.02	9.55	2
773.01	9.14	15	818.9	9.7	1
774.02	9.17	8	819.82	9.83	3
775.19	9.83	3	821.00	10.08	5
776.80	9.55	4	821.97	10.00	2
777.94	9.41	7	822.9	9.6	1
779.07	9.32	9	823.8	9.85	2
779.92	9.31	7	826.06	9.95	2
781.09	9.25	8	827.00	9.95	2
781.96	9.21	7	828.08	10.05	4
782.95	9.51	6	828.9	9.8	1
784.12	9.45	4	830.12	10.10	2
785.00	9.50	4	831.14	10.20	3
786.00	9.50	6	832.09	10.24	5

DAILY MEANS - BY CIR (NOVA CIR 1995) Cont.

Mean J.D. 2,449,004	Mean M_v	No. Obs.	Mean J.D. 2,449,004	Mean M_v	No. Obs.
834.02	10.25	6	884.18	11.2	1
834.98	9.92	6	885.00	10.73	3
835.81	10.12	3	886.00	10.45	2
837.05	9.90	2	887.22	11.0	1
839.02	10.1	1	888.00	10.53	3
839.95	10.00	2	889.05	10.35	2
840.84	9.9	1	890.11	10.55	2
841.94	10.15	2	891.08	10.50	3
843.05	10.00	2	892.07	10.60	2
844.20	10.2	1	893.03	10.47	3
845.00	10.55	2	894.02	10.85	2
846.03	10.00	2	895.05	10.60	2
847.00	10.12	4	896.03	10.65	2
848.85	9.9	1	897.21	10.85	2
851.94	10.2	1	898.22	10.95	2
855.00	10.40	2	899.23	11.0	1
855.90	10.20	3	900.10	10.55	2
856.87	10.2	1	901.22	10.6	1
858.11	10.33	3	901.87	10.4	1
858.88	10.10	2	903.21	11.0	1
859.90	10.32	4	904.17	10.80	3
860.92	10.25	2	905.20	11.1	1
862.13	10.10	2	906.09	10.70	2
862.88	10.2	1	907.05	10.85	2
865.95	10.1	1	908.08	10.55	2
866.85	10.40	2	909.02	10.60	2
868.08	10.30	2	910.20	11.0	1
869.21	10.55	4	911.20	11.0	1
870.05	10.50	2	914.00	10.85	2
871.14	10.80	2	917.18	11.00	3
871.98	10.35	4	918.00	10.77	3
873.01	10.70	3	919.16	11.20	2
874.00	10.25	2	920.08	10.90	2
876.06	10.35	2	921.24	11.20	2
877.06	10.45	2	923.10	10.80	4
878.03	10.65	2	925.12	10.85	2
881.05	10.90	2	926.18	10.90	2
882.29	10.6	1	927.08	10.95	2
883.19	10.7	1	928.02	10.83	3

DAILY MEANS - BY CIR (NOVA CIR 1995) Cont.

Mean J.D. 2,449,004	Mean M_v	No. Obs.
929.20	11.2	1
930.04	10.95	2
931.03	10.90	2
932.22	11.3	1
933.23	11.3	1
934.20	11.30	2
936.19	11.3	1
937.19	11.3	1
938.20	11.3	1
940.21	11.2	1
941.00	10.80	3
942.22	11.3	1
943.21	11.2	1
944.00	10.90	2
945.04	11.00	2
946.20	11.1	1
948.03	10.90	2
948.96	10.8	1
949.88	10.7	1
951.20	11.2	1
952.04	10.80	2
953.20	11.3	1
954.00	10.95	2
955.02	10.57	3
955.84	10.6	1
957.92	10.60	2
959.86	10.6	1
962.21	11.2	1
964.21	11.2	1
965.20	11.2	1
966.21	11.3	1
968.05	10.85	2
969.20	11.2	1
969.84	10.7	1
971.22	11.4	1
971.87	10.7	1
972.86	10.7	1



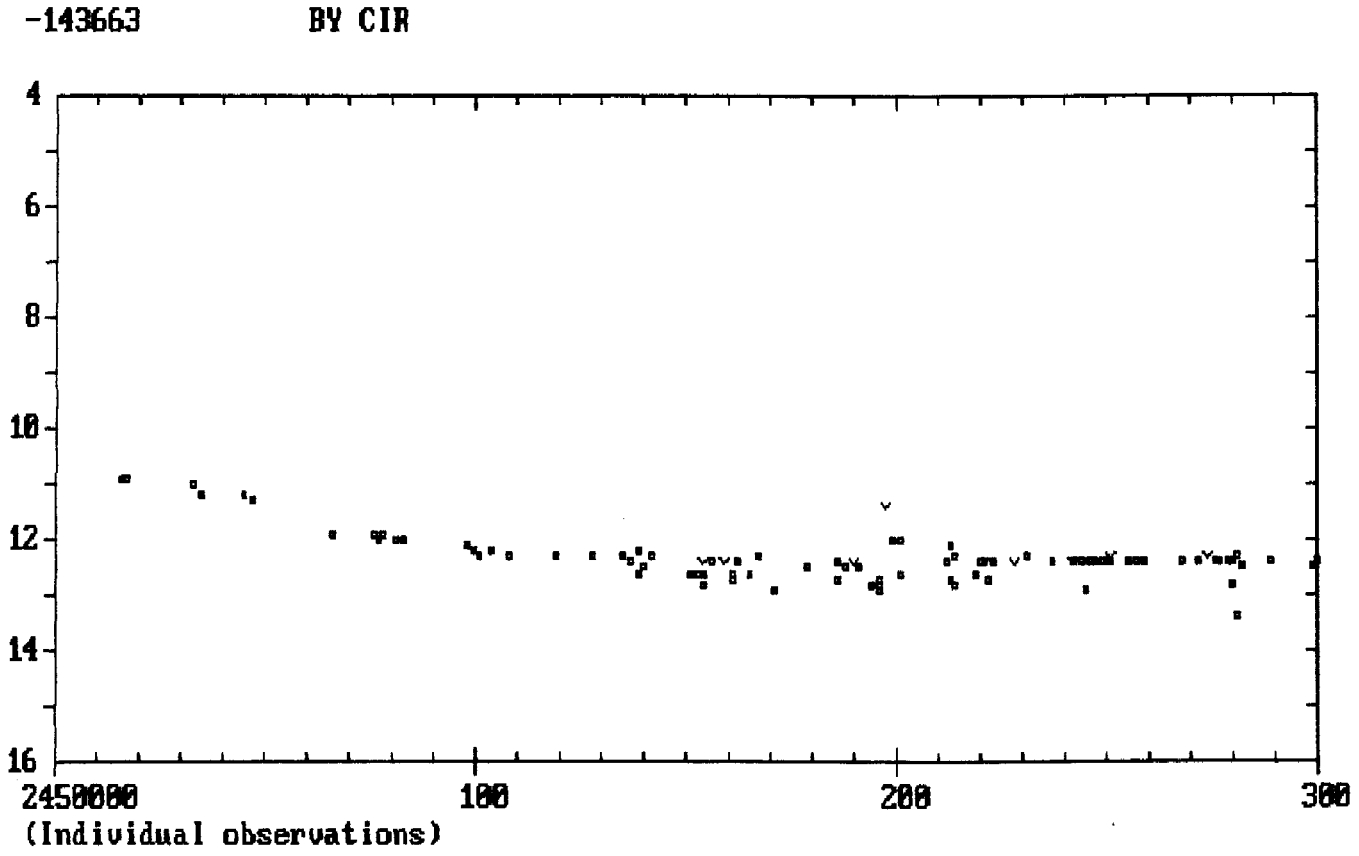
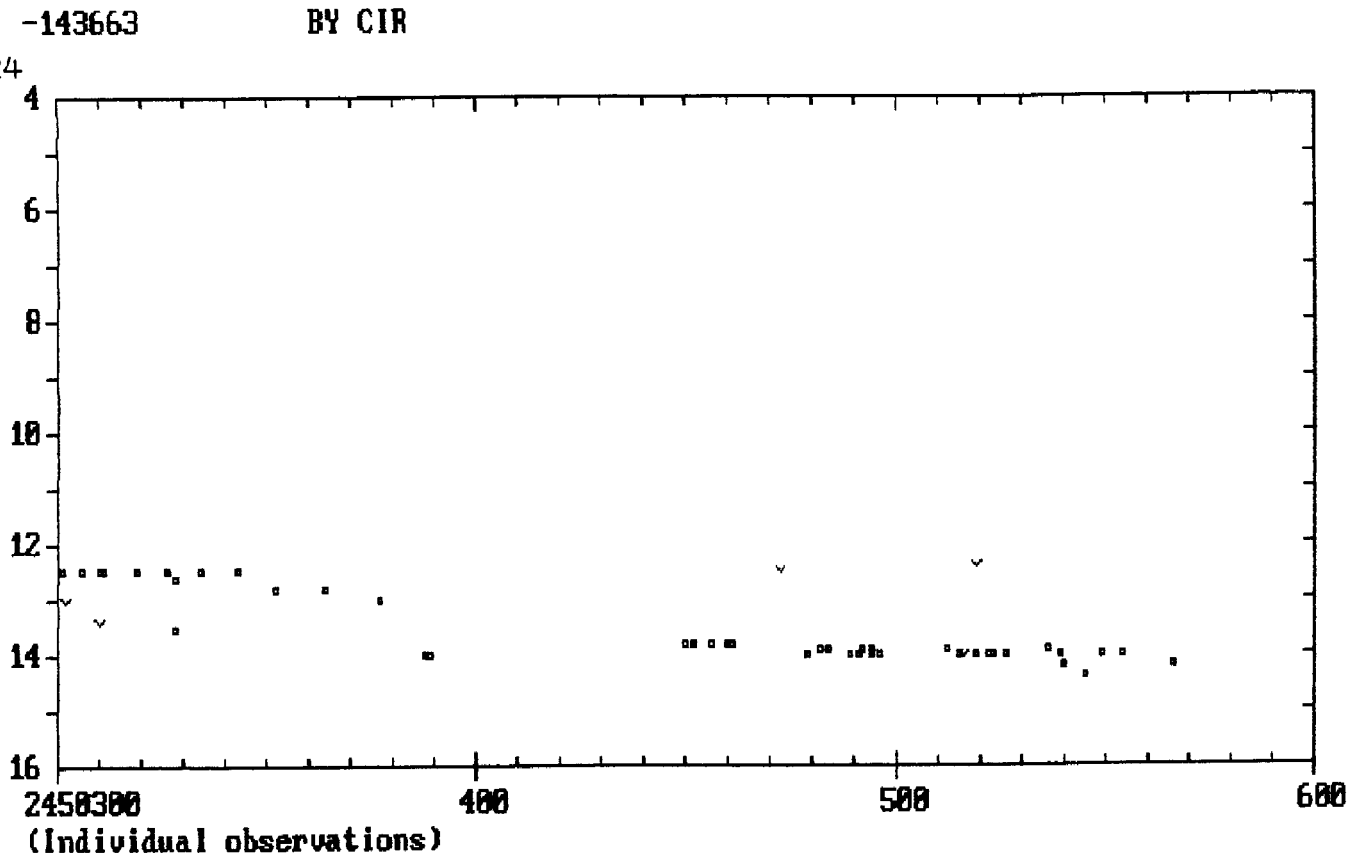


FIGURE 1

LIGHT CURVE FROM INDIVIDUAL OBSERVATIONS

J.D. 2,449,700 - 2,450,300



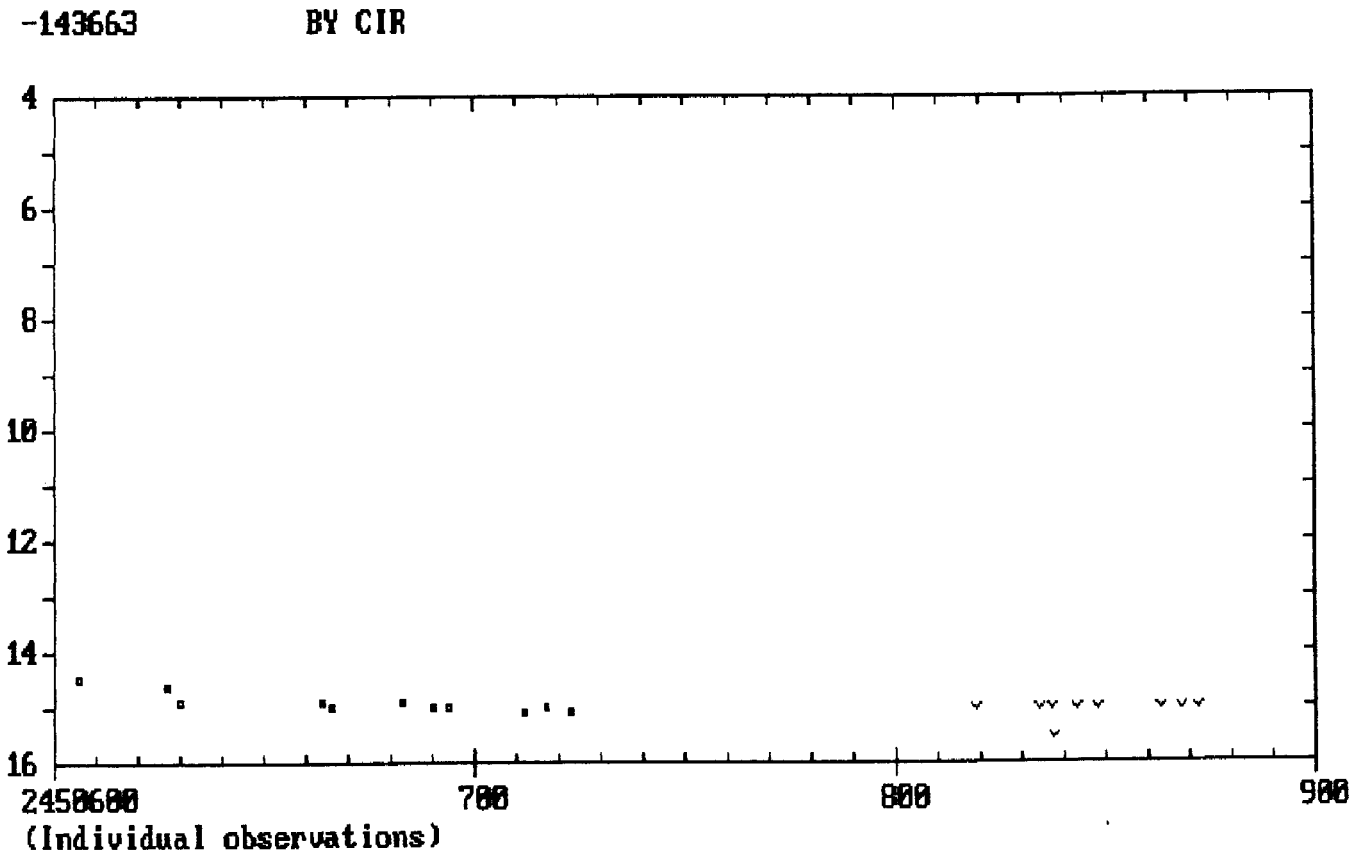


FIGURE 2

LIGHT CURVE FROM INDIVIDUAL OBSERVATIONS

J.D. 2,450,300 - 2,450,900

THE DWARF NOVA BF ARAE HAS A SHORT OUTBURST CYCLE

Frank Bateson, Ranald McIntosh & Rod Stubbings
Variable Star Section, R.A.S.N.Z.

SUMMARY: Observed outbursts of BF Arae are listed covering the interval JD 2445,551 to 2450,721. The mean outburst cycle is 17 days. Maxima are either wide or narrow. These differ slightly in their mean brightness.

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1. INTRODUCTION

BF Arae (HV 6576) is classified as a dwarf nova of the UGSS type with a range of 13.6p to <16.0p (1). It appears to be a neglected variable with few references in the literature.

2. OBSERVATIONS

Charts Nos. 550/1 and the V sequence of comparison stars thereon (2) were used by visual observers of the VSS, RASNZ. Between JD 2445,551 and 2450,721 a total of 1,700 estimates were made. The outbursts observed are shown in Table 1 in the usual format. In the column headed "TYPE" 'W' denotes a wide outburst which lasted 6 days or more and 'N' an outburst considered as narrow lasting 5 days or less.

Remarks that follow the Table give indications of gaps preceding and following the date of outburst when this was uncertain as denoted by a question mark following the JD in column 2. The remarks also list the duration, or width, of an outburst when this could be determined.

Six outbursts were listed in previous papers (3:4), but these have not been combined with those in Table 1, because in the intervals covered observations were few and widely scattered in time.

It is easy for observers with small telescopes to mistake a comparison star mag. 13.4 for the variable. We rejected some observations where mis-identification appears to have occurred.

3. DISCUSSION

The maxima magnitudes of outbursts means these can be observed only by those using telescopes with thresholds of mag. 15.0, or fainter. Outbursts 7 through 42 are mainly due to W. Goltz, supplemented occasionally by other observers making less regular estimates. Outbursts from 46 onwards are usually from the observations of one of us (R.S.) His observations were supplemented by other observers who made spasmodic estimates.Throughout all the observations Danie Overbeek persistently followed BF Arae but was able to see only the brightest outbursts.

The agreement regarding maxima magnitudes between W. Goltz and R.S. makes us confident that the means found are correct. The same remark applies to the mean outburst cycle.

Outbursts in Table 1 which were definitely wide have maxima magnitudes ranging from 13.4 to 14.5 with a mean of 13.9. The corresponding values for narrow maxima are range 13.6 to 14.9, mean 14.33.

Intervals between outbursts vary widely. We consider that there are 28 intervals that represent consecutive outbursts.

THE DWARF NOVA BF ARAE HAS A SHORT OUTBURST CYCLE (Cont.)

These range from 6 to 29 days with a mean of 17 days.

4. CONCLUSIONS

We conclude that at BF Ara is a typical UGSS type dwarf nova with an amplitude of at least four magnitudes and a mean outburst cycle of 17 days. There are two types of outburst, wide and narrow which differ only marginally in their mean brightness. Narrow maxima are about three times more frequent.

ACKNOWLEDGEMENTS

We thank all observers for their estimates.

REFERENCES

(1) 1985. Kolopov,P.N. (Ed). Gen. Cat. Var Stars Vol. l, Nauka, Moscow.

(2) 1980 Bateson, F.M, Morel, M, Sumner, B. & Winnett, R. Charts for Southern Variables. Ser.l2, Pub. by Astronomical Research Ltd., Tauranga, N.Z.

(3) 1982. Bateson, F.M. Pub. Var. Star Sect. R.astr. Soc. N.Z. No.10, p. 18.

(4) 1984. Bateson, F.M. Pub. Var. Star Sect. R.astr. Soc. N.Z. No. 12 pp 54/5.

TABLE 1

BF ARAE - OBSERVED OUTBURSTS

No.	JD Max	Max M_V	Int d.	Type	No. Obs.	
7	45,581	14.5	36	?	1	*
8	940?	14.0?	(359)	?	1	*
9	46,561?	14.1?	(621)	?	1	*
10	668?	14.5?	107	N?	3	*
11	47, 026	13.9	(358)	W	3	*
12	061	14.4	35	N	2	
13	086	13.8	25	N	3	*
14	294?	13.8	(208)	?	1	
15	303	13.6	9	N	3	*
16	332	13.6	29	N	1	
17	402	13.4	70	W	6	*
18	575?	13.9?	173	?	1	*
19	657	13.9	82?	N	4	*
20	712	14.2	55	N	3	*
21	740	13.8	28	W	5	*
22	776	14.3	36	N	2	
23	816	14.3	40	N	3	*
24	833	14.1	17	?	1	
25	919	14.1	86	N	3	
26	956?	14.5?	37	?	1	*
27	48,006?	14.3?	50	W	4	*
28	040	14.1	34	N	1	
29	092	14.2	52	W	4	*
30	129	14.5	37	N	2	
31	180	13.9	51	W	8	*
32	390	14.5	(210)	N	2	
33	437	13.8	47	N	5	*
34	471	14.5	34	?	1	
35	483	14.5	12	?	1	
36	506	14.5	23	W	3	
37	669?	14.4?	(163)	?	1	*
38	695	14.3	26	?	1	
39	769	14.5	74	?	1	
40	778	14.5	9	?	1	
41	803	14.4	25	N	3	
42	49,121	14.1	(318)	N	5	
43	512	13.2	(391)	?	2	
44	788	14.4	(276)	?	1	
45	49,925	14.1	(137)	?	1	
46	952	13.7	27	W	7	*
47	986	14.3	34	N	2	

TABLE 1 (Cont.)
BF ARAE - OBSERVED OUTBURSTS

No.	JD Max	Max M_V	Int d.	Type	No. Obs.	
48	50,017	14.1	31	?	1	
49	128	14.1	11	N	3	
50	161	14.7	33	?	2	
51	197	14.3	36	N	4	
52	212	14.1	15	W	7	*
53	249	14.3	37	N	2	
54	259	14.4	10	N	2	
55	268?	14.4	9	N	2	
56	289	14.0	21	N	4	
57	307	14.6	18	N	2	
58	329	14.1	22	W	3	
59	344	14.1	15	W	6	*
60	374	14.1	30	W	9	*
61	385	14.1	11	N?	2	*
62	394	14.1	9	N	2	
63	516?	14.9?	(122)	?	1	*
64	526?	15.1?	10?	?	1	*
65	540	14.1	14?	W	9	*
66	568	14.8	28	N	1	
67	597	14.4	29	N	1	
68	627	14.1	30	W	19	*
69	665	14.9	38	N	4	
70	683	14.8	18	N	5	
71	696	14.1	13	N	5	
72	708	14.0	12	N	4	
73	716?	14.8?	8	N?	2	*
74	722	14.2	6	W?	7	*

REMARKS TO TABLE 1

7 Gap two days before 581.
8 Gap 5 days before & 7 days after 940.
9 Gap 20 days before & 21 days after 561.
10 Gap 23 days before 668.
11 Duration 10 days.
13 Duration 2 days.
15 Duration 2 days.
Faded to <14.1 after No. 14.
17 Duration 6 days.
18 Gap 7 days before 575.
19 Duration 5 days.
20 Duration 2 days.
21 Duration 7 days.
23 Duration 5 days.
26 Gap 4 days before 956.
27 Gap 6 days before 006.
Duration at least 6 days.
29 Duration 6 days.
31 Duration at least 8 days.
33 One observer had 10 observations at 13.8 from 440 to 446. These rejected as obvious errors as other observers showed BF Ara declined from 14.5 to <14.7 over this interval.
37 Gaps 2 days before & 10 days after 669
47 Duration 6 days.
52 Duration 9 days.
55 Gap 7 days before 268.
59 Apparently a slow fade of 16 days.
60 At Max 5 days, fall not seen.
61 Gap 6 days before 385.
63 Gap 4 days before & 2 days after 516.
64 Gaps 4 days before & 3 days after 526.
65 Duration 11 days.
68 Duration 12 days.
70 Faded to 15.7 in 2 days.
73 & 74 May be same outburst.

IDENTIFICATION OF NSV 6819

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SUMMARY: A more precise position is reported for NSV 6819, a very neglected variable. A finder chart is also presented. Observations of this variable in 1993 by W. Liller suggest that this star may be an eruptive variable. This note draws attention to this star and the need for additional observations to determine its behaviour.

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1. INTRODUCTION

NSV 6819 is an obscure southern variable, about which virtually nothing is known. Its variability was first mentioned in the Spectral Survey of the Southern Milky Way, Table 7 by Sundman et al (1). To their list of stars with M. spectra, they appended one star called A9. They suspected it of variability, but no magnitudes were given, nor an accurate position. The field photos they publish do show a faint image, but it is not certain if this is of the variable or a close companion. In 1992 I thought that A9 (now named NSV 6819) might be an unrecognised Mira star, or other red variable, so I enlarged the published finder chart and, by precisely matching it to a plot of SAO stars, obtained the improved position of a star at or near the position of NSV 6819: (J2000) 14h 50m 01.0s -56°54'35"

2. OBSERVATIONS

In correspondence from William Liller (2) I learned that his equipment set-up was well suited for detecting red variables. This is attested to by the number of new red variables he has picked up over the past dozen years or so. Liller kindly agreed to conduct a mini-campaign on NSV 6819 in 1993 to see if any variable of large amplitude could be found here. He took CCD images of the region on 16 nights between 1993 May 23 and 1993 Nov. 11. No red variable was found, and there was no apparent change in any of the tight group of stars around GSC 8688-02493 (the nearest GSC star, magn. =13.80). However, at UT August 21.013, a new image appeared very close to my presumed position of NSV 6819. The new stellar image is not present on images taken July 29.0, nor on August 28.0, nor any of the other images taken in the 1993 season. The magnitude of the new object is 13.72v, and its position, determined by Liller, relative to GSC stars is (J2000) 14h 50m 02.4s - 56°54'31".

He used an SBIG ST-4 CCD, no filter and a 20 cm f1.5 Schmidt.

3. DISCUSSION

Liller (3) provided me with copies of several CCD images, showing the region. In discussing his observations, he states: "I suppose there is the possibility that the image was left by a cosmic ray, but from a close examination of the image, I'd say it is a real star, i.e. it looks like no cosmic ray that I have ever seen". The close positional coincidence between NSV 6819 and Liller's "star" lend heavy weight to the conviction that there is a photometric variable at this spot. The object is normally invisible, fainter than 16.5, on Liller's CCD frames, and also fainter than 17 on NASA's digitized SKYVIEW image. The rise is therefore greater than 2.8 magnitudes. In addition, due to the gaps in the record, the true maximum brightness may have been somewhat brighter than 13.7. The finder

IDENTIFICATION OF NSV 6819 (Cont.)

chart (Fig. 1) has been prepared from the SKYVIEW image, and Liller's CCD frames. Liller has determined CCD magnitudes for three faint comparison stars, tied in to the GSC magnitude scale. They are identified on the chart, and listed in Table 1.

4. CONCLUSION

Considering the apparently rapid rise and fall, a U Gem type is a possibility, but the published spectral type M points to a late-type star. From the classification notes in (1) for M stars, it appears that A9 = NSV 6819 had a definite M spectrum, but due to its faintness the TiO bands could not be used to assign a subtype. Probably the continuum vestiges between the bands are the only traces visible on their plate. No emission lines seen.

A careful examination of archival patrol plates may be very helpful in determining the nature of NSV 6819. As it is a fairly faint star in a rich milky way field, it should be a suitable target for observers with CCD cameras. Liller's work indicates that CCD coverage is a very effective way of observing this star.

5. ACKNOWLEDGEMENTS

I am indebted to William Liller of Vina del Mar, Chile, for his co-operation in making CCD observations. This note would not have been written without his contribution.

6. REFERENCES

(1) Sundman A, Loden L.O., and Nordstrom B. 1974. Aston. Astrophys. Suppl. 16, 445.

(2) Liller W. 1992. Private Communication.

(3) Liller W. 1993, 21 Dec. Private Communication.

Table 1.
CCD Magnitudes of Comparison Stars

Letter	Magnitude	Notes	UCAC2
n	13.80	=GSC 8688-02493	07098776
A	14.55		07098736
B	14.30		07098750
C	14.22	Double, or multiple	07098769

FIGURE 1 - NSV 6819

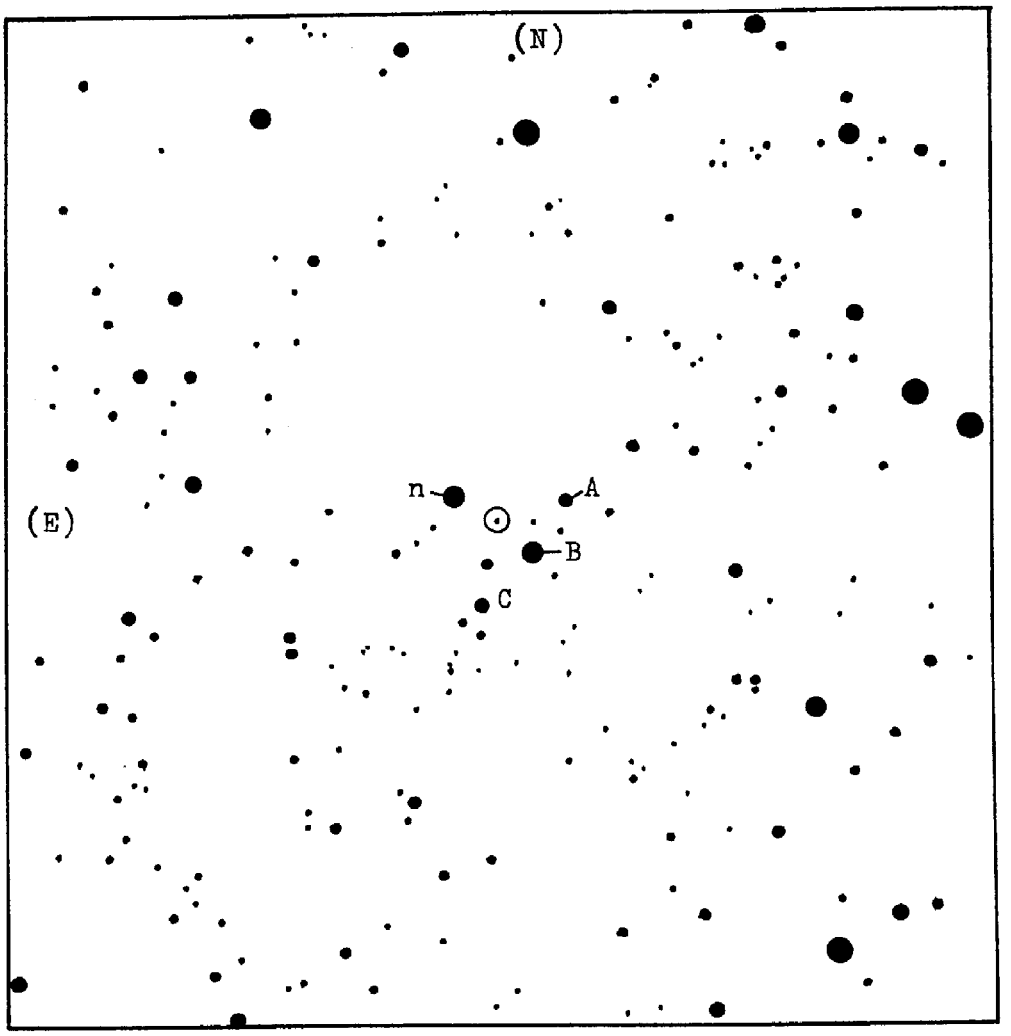

Fig. 1. Finder chart for Liller's object = NSV 6819. Scale: 2.8" = 1mm. Centred at (J2000) 14h50m2.4s -56°54'31". Lettered stars are Liller's comparison stars. See Table 1 for magnitudes.

THE SHORT MEAN CYCLE OF V485 CENTAURI

Frank M. Bateson, Ranald McIntosh & Rod Stubbings
Variable Star Section, R.A.S.N.Z.

SUMMARY: Outbursts of the dwarf nova V485 Cen are tabulated, derived from 2,611 visual observations during the interval JD 2,445,865 to 2,450,709. These have been combined with previous results to give a mean outburst cycle of 20 days and a mean maximum magnitude of 13.98.

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1. INTRODUCTION

V485 Cen is a dwarf nova of UG type with a range of 12.9 to <16.5p (1). It is shown on charts 483/4 (2) with a sequence of V magnitudes for the comparison stars from N. Vogt (3).

2. OBSERVATIONS

The main observing season for V485 Cen is December through August with occasional observations in other months. The star has been monitored by members of the VSS RASNZ. A total of 2,611 visual observations were made during the interval JD 2445,865 to 2450,709, most of which were negative.

Table 1 lists the outbursts recorded. The majority of the outbursts prior to 2450,127 depend on very few positive estimates. One of us (RS) has paid close attention to this variable in recent years with a marked improvement in the detection of outbursts. Observations before JD 2445,865 were discussed by Bateson (4,5,6). These have been combined with the data now presented.

3. DISCUSSION

There are very large gaps in the observations because:

(a) whether an observer using a sufficient aperture was observing;
(b) the months in which few, if any, observations were possible and,
(c) normal breaks in the weather.

There are 42 maxima for which the magnitude is considered reliable. These give a mean maximum magnitude of 13.98 with a range of 13.4 to 15.0. Most appear to be narrow with a duration of less than 5 days. This may be due to outbursts being rarely followed below mag. 15.0. However there does appear to be an occasional wide outburst.

We found it difficult to be certain which outbursts were consecutive. The intervals between maxima in Table 1 and previous lists range from 10 to 91 days, omitting intervals of 100 days or longer. We consider that the 12 intervals less than 30 days are probably of consecutive outbursts. These have a mean of 20 days and range from 10 to 29 days. There are

a further six intervals between 30 and 40 days. These, if considered consecutive, would increase the mean outburst cycle to 24 days. However, we consider the shorter cycle of 20 days to be correct.

V 485 Cen may belong to the Z Cam type of dwarf novae, but we can offer no evidence on this because outbursts are not observed below mag. 15.0. A very limited number of estimates show minima are fainter than 16.0.

4. CONCLUSIONS

We conclude that V485 Cen is a dwarf nova with a probable mean cycle of 20 days and a mean maximum magnitude of 13.98.

ACKNOWLEDGEMENTS

All observers are thanked for their data.

REFERENCES

(1) 1985. Kholopov, P.N. (Ed). Gen.Cat.Var stars. Vol. 1, Nauka, Moscow.
(2) 1979. Bateson, F.M., Morel, M., Sumner, B. & Winnett, R. Charts for Southern Variables. Ser. 11. Pub. by Astronomical Research Ltd., Tauranga, N.Z.
(3) 1977. Vogt, N. Pub. Var. Star Section , R.astr.Soc., N.Z. Vol. 5. p.44.
(4) 1979. Bateson, F.M. Pub. Var. Star Section. R.astr.Soc. N.Z. Vol. 7. pp. 47/8.
(5) 1982. Bateson, F.M. Pub. Var. Star Section, R.astr.Soc. N.Z. Vol. 10. pp. 13/14.
(6) 1985. Bateson, F.M. Pub. Var. Star Section, R.astr.Soc. N.Z. Vol. 12, p.53.

REMARKS TO TABLE 1

A single observation of 13.3 on 45,909 was rejected as considered very doubtful.

No. 12	Duration 3 days. Observation of 13.0 on 46,150 rejected as other observations on this date were <14.0.
No. 14	Gap 2^d before & 3^d after 46,286.
15	Duration 4 days.
16	Possibly too bright.
20	Duration 4 days.
21	Gap 3^d before & 7^d after 48,046.
24	Duration 5 days.
25	Duration 5 days.
26	Duration 4 Days.
30	Gap 8^d before & 82^d after 49,972.
31	Duration 1 day.
33	Duration 10 days.
35	Slow rise of 3 days.
39	Fall 2 days to 16.5
41	Rose from 15.0 in 1.6 days.
44	Fall to <16.0 in 1 day.

TABLE 1

V485 CEN – OUTBURSTS

No.	JD Max 24.. ...	Max m_v	Int.$_d$	Type	No. Obs.	
12	46,148	13.6	(391)	N	6	*
13	239	14.5	91	?	1	
14	286	15.0	47	N	2	*
15	524	14.3	(238)	N	2	*
16	579	12.8?	55	N	1	*
17	827	14.4	(248)	N	1	
18	47,669	14.0	(842)	N	2	
19	706	15.0	37	?	1	
20	981	13.9	(275)	N	3	*
21	48,046	13.1?	65	N?	1	*
22	253	14.8	(207)	N	1	
23	284	14.8	31	N	1	
24	308	14.4	24	W?	3	*
25	467	14.4	(159)	W?	4	*
26	776	14.0	(309)	N	8	*
27	49,157	14.4	(381)	?	1	
28	892	14.8	(735)	?	1	
29	955	14.8	63	?	1	
30	972	14.0	17	?	1	*
31	50,127	14.2	(155)	N	4	*
32	139	14.8	12	N	2	
33	155	14.0	16	W	9	*
34	223	14.8	68	N	2	
35	253	14.8	30	?	3	*
36	272	14.9	19	N	1	
37	289	13.9	17	N?	3	
38	492	14.9	(203)	N	2	
39	521	14.8	29	N	2	
40	539	14.7	18	N	6	*
41	584	13.9	45	N	4	*
42	636	15.0	52	N	5	
43	661	14.8	25	N	1	
44	690	14.8	29	N	4	*

VISUAL OBSERVATIONS OF U PISCIS AUSTRINI

(Proved to be RR Lyr star by R. Stubbings and Stan Walker

Frank M Bateson
Director, Variable Star Section, R.A.S.N.Z.

SUMMARY: Visual observations of U PsA from J.D. 2427,710 to 2451,027 are discussed. These indicate that this variable is probably of SRD type with a period of around 35 days but which varies widely. The visual range is 12.4 to 15.0.

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1. INTRODUCTION

Kholopov (1) does not assign U PsA to any class of variable but gives its range as 12.5 to <14p with a possible GO spectrum.
Its position for Equinox 2000 is 22h 02m 29s −27° 52.'9. It is shown on chart 506 (2) with Harvard ptm sequence of comparison stars down to magnitude 13.0.

2. OBSERVATIONS

A total of 1629 observations were made of which many were negative.
The observations fall into three different intervals which are now outlined.

Observations between J.D. 2427710 and 2438918 were mainly made by Albert Jones and four other observers. The thresholds of the telescopes used was magnitude 14, or slightly brighter, U PsA was not monitored closely with the result that there are large and frequent gaps in the observations. No attempt was made to observe the variable on successive nights when by chance it was seen at maximum. Hence most maxima are dependent on only one or two observations.

Very few observations were made after 2438918 up to 2441594 and all were negative. Albert Jones stopped observing U PsA during this interval. Several observers commenced monitoring U PsA after 2441594 and their numbers, and the number of observations, increased to 2449212. These observers had larger apertures with thresholds of mag. 15, or slightly fainter. No effort was made to obtain several estimates when the star was visible so any maxima recorded depended on only a single observation whilst others at intermediate magnitudes indicated that a maximum may have occurred but if so its maximum phase was not seen.

Peter Williams made the first attempt to obtain multiple observations of a maximum on 2449220. This served to spark interest from a number of observers resulting in closer monitoring and better observed maxima which has continued to the end of the interval covered in this paper.

All observers operating during this interval were very reliable and experienced visual observers. Their estimates at, or near maxima, are in excellent agreement. There was a slight difference between observers when the variable was at minima. This difference was only 0.2 to 0.3 mags which may have been due to the different comparison stars used or the method adopted to estimate the fainter magnitudes. One observer recorded slight fluctuations during the rise and fall to and from maxima but others reported that they did not notice such minor variations.

The lack of reliable magnitudes for fainter comparison stars has no doubt contributed to the scatter within the results.

VISUAL OBSERVATIONS OF U PISCIS AUSTRINI (CONT.)

Table 1 lists the probable dates of maxima and dates close to which a maximum may have occurred. It had to be assumed that when the variable was visible a maximum had occurred around the dates shown. This assumption had to be made due to the limited number of positive observations during the first two intervals discussed previously.

Figures 1 to 3 show the light curve for intervals when observations were numerous.

3. DISCUSSION

The mean maximum magnitude is 13.68, derived from all values considered reliable. The range is 12.4 to 14.3. Most maxima magnitudes brighter than 13.5 were recorded in the first two intervals. The mean from the last interval is 13.81, ranging from 13.6 to 14.3. This is the interval when U PsA was best observed.

It is probable that the brightest maxima magnitudes were due to seeing conditions. Therefore the mean and range from the last interval are correct.

The variations appear to occur in a semi regular manner with a period between 30 and 40 days. There is uncertainty about the precise dates of maxima during the first two intervals, because most depend on one or two observations, and the lack of close monitoring preceding and following the maxima. This affects the intervals between successive maxima making it difficult to determine any period changes. It does appear that at times any period is supressed for about 100 days. The semi regular period derived from all intervals that seem reliable is 35.4 days and 32.2 days from the last interval alone. The range is 11 to 113 days.

4. CONCLUSIONS

U PsA is a semi regular variable with a period of 35.4 days which becomes suppressed at times. The variable is probably of the SRD class. The mean maximum magnitude is 13.81 with a range of 13.6 to 14.3. The extreme visual range is 12.4 to 15.0. Minima were observed during the last interval and have the same semi regular period as maxima.

ACKNOWLEDGEMENTS

This paper was only made possible by the data from so many members of the Variable Star Section, R.A.S.N.Z. My thanks are extended to all observers. I also thank Ranald McIntosh for print outs for the data held in the data base and for producing the light curves.

REFERENCES

(1) 1987. Kholopov P.N. (Ed).
General Cat. Var. Stars. Vol 3. Nauka, Moscow.

(2) 1980. Bateson F.M, Morel M, Sumner B. & Winnett R.
Charts for Southern Variables Ser. 12.
Pub. by Astronomical Research Ltd. Tauranga, N.Z.

U PsA - TABLE 1

PROBABLE MAXIMA & POSSIBLE DATES NEAR WHEN MAXIMA MAY HAVE OCCURRED

No.	JD Max 244	Max Mv	Int d	No. Obs.
1	31,685	13.0	-	1
2	760	13.0	75	2
3	886	12.4	(126)	1
4	923	13.4	37	1
5	952	13.0	29	1
6	32,028	13.4	76	3
7	067	13.0	39	2
8	124	12.8	57	2
9	143	13.0	19	2
10	492	13.5	(349)	1
11	771	13.6	(279)	2
12	795	13.1	24	1
13	823	13.8	28	1
14	845	14.2	22	1
15	33,097	14.0	(252)	2
16	210	14.5	(113)	1
17	230	14.2	20	4
18	421	13.8	(191)	5
19	449	14.5	28	2
20	478	14.0	29	1
21	509	14.5	31	1
22	587	14.5	78	1
23	784	14.0	(197)	1
24	864	13.6	80	2
25	884	14.0	20	1
26	34,184	14.0	(300)	1
27	292	13.8	(108)	1
28	457	13.8	(165)	1
29	478	13.5	21	1
30	581	13.8	(103)	1
31	711	14.0	(130)	1
32	750	13.0	39	1
33	873	13.8	(123)	1
34	905	13.8	32	1
35	35,966	13.7	(1061)	1
36	984	14.0	18	1
37	36,047	14.0	63	4
38	374	13.8	(327)	1
39	737	13.5	(363)	2
40	37,262	13.8	(525)	1

U PsA - TABLE 1. Cont.)

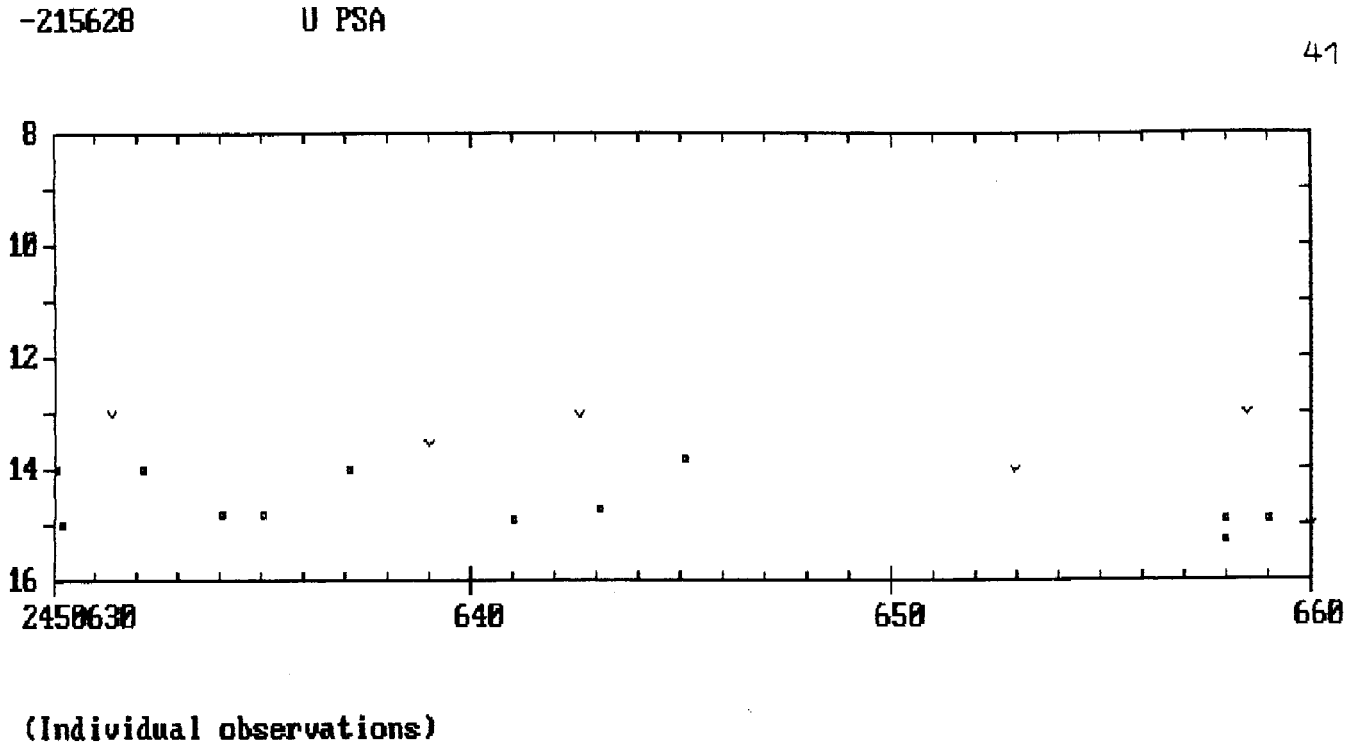
No.	JD Max 244	Max Mv	Int d	No. Obs.
41	38,650	13.4	(1388)	1
42	675	14.0	25	1
43	918	13.8	(243)	1
44	41,607	14.5	(2689)	1
45	632	14.5	25	1
46	656	14.7	24	1
47	951	14.0	(295)	1
48	977	14.0	26	1
49	42,002	14.5	25	1
50	166	13.6	(164)	1
51	42,739	13.2	(573)	3
52	43,099	14.8	(360)	1
53	125	14.8	26	1
54	335	14.3	(210)	1
55	455	14.7	(120)	1
56	489	15.0	34	1
57	754	15.2	(265)	1
58	805	14.3	51	1
59	832	13.7	27	1
60	44,136	14.3	(304)	1
61	162	13.7	26	1
62	192	14.0	30	1
63	230	14.6	38	1
64	383	14.7	(153)	1
65	499	14.7	116	1
66	570	14.3	71	1
67	818	13.8	(248)	1
68	852	13.5	34	1
69	907	13.7	55	1
70	932	13.2	25	3
71	45,146	14.7	(214)	1
72	171	13.5	25	1
73	282	13.6	(111)	3
74	633	14.7	(351)	1
75	677	15.2	44	1
76	943	14.2	(266)	1
77	46,047	14.1	(104)	1
78	276	13.5	(229)	1
79	294	13.7	18	2
80	626	13.5	(332)	2

U PsA - TABLE 1. Cont.)

No.	JD Max 244	Max Mv	Int d	No. Obs.
81	46,643	14.0	17	1
82	739	13.5	96	2
83	766	13.0	27	3
84	47,337	13.5	(571)	3
85	388	13.6	51	2
86	437	13.1	49	1
87	477	13.5	40	1
88	746	13.5	(269)	1
89	769	13.5	23	1
90	794	13.5	25	1
91	851	14.7	57	1
92	877	14,5	26	1
93	48,069	13.8	(192)	2
94	183	15.5	114	2
95	210	14.5	27	1
96	239	14.5	29	1
97	619	15.2	(380)	1
98	872	15.0	(253)	1
99	920	14.5	48	1
100	950	15.5	30	1
101	971	14.5	21	1
102	49,220	13.6	(249)	6
103	272	13.8	52	6
104	307	14.5	35	1
105	335	13.7	28	1
106	466	14.5	(131)	1
107	517	14.0	51	1
108	537	13.8	20	4
109	562	14.0	25	3
110	592	13.2	30	2
111	626	13.8	34	3
112	659	13.5	33	2
113	894	14.6	(235)	2
114	961	14.6	67	1
115	988	13.4	27	3
116	50,013	13.5	25	2
117	047	13.8	34	2
118	068	13.8	21	2
119	214	13.8	(146)	1
120	252	13.6	38	4

U PsA - TABLE 1. Cont.)

No.	JD Max 244	Max Mv	Int d	No. Obs.
121	50,282	13.8	30	10
122	306	13.7	24	13
123	340	14.3	34	5
124	360	14.0	20	8
125	398	14.0	38	8
126	606	13.8	(208)	4
127	630	14.0	24	7
128	645	13.8	15	6
129	670	14.0	25	8
130	683	13.7	13	6
131	694	13.8	11	41
132	714	13.8	20	81
133	753	13.6	39	31
134	767	13.8	14	27
135	786	13.6	19	4
136	811	13.8	25	1
137	924	13.7	(113)	4
138	51,014	13.6	90	31



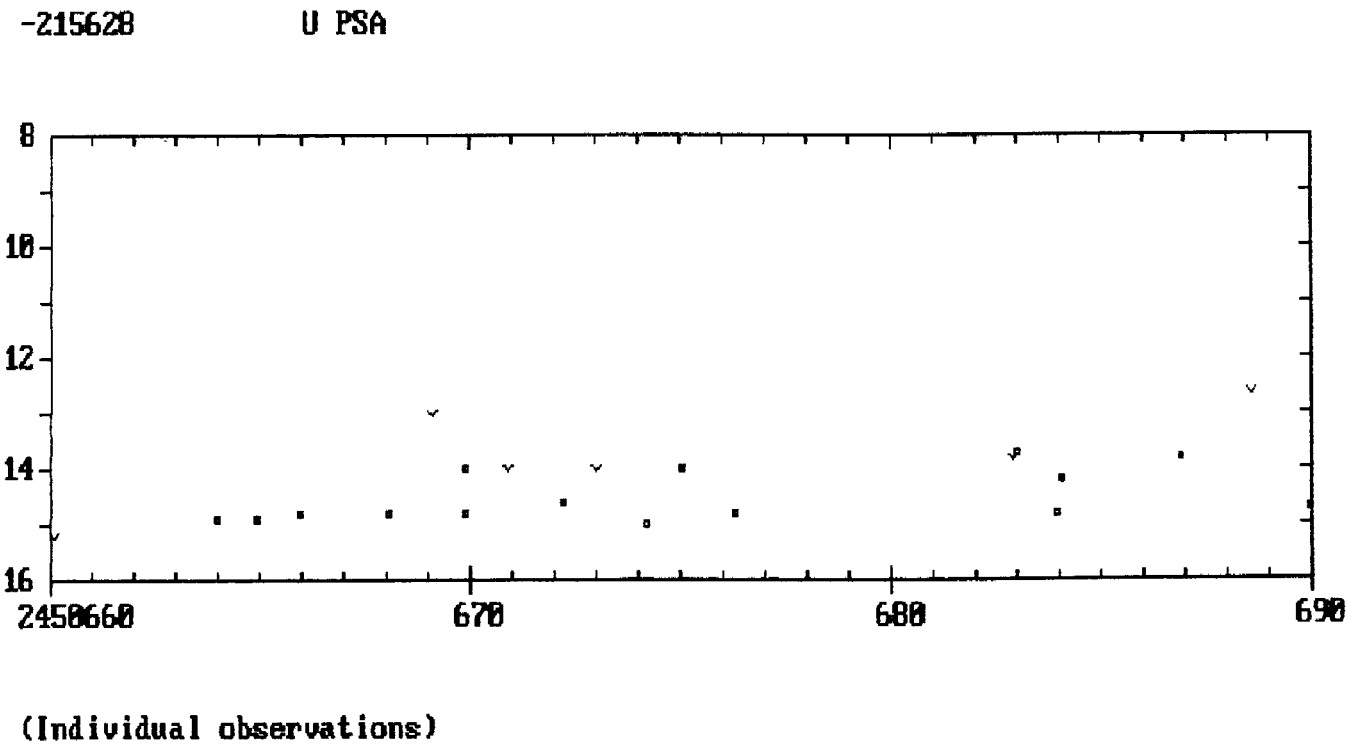
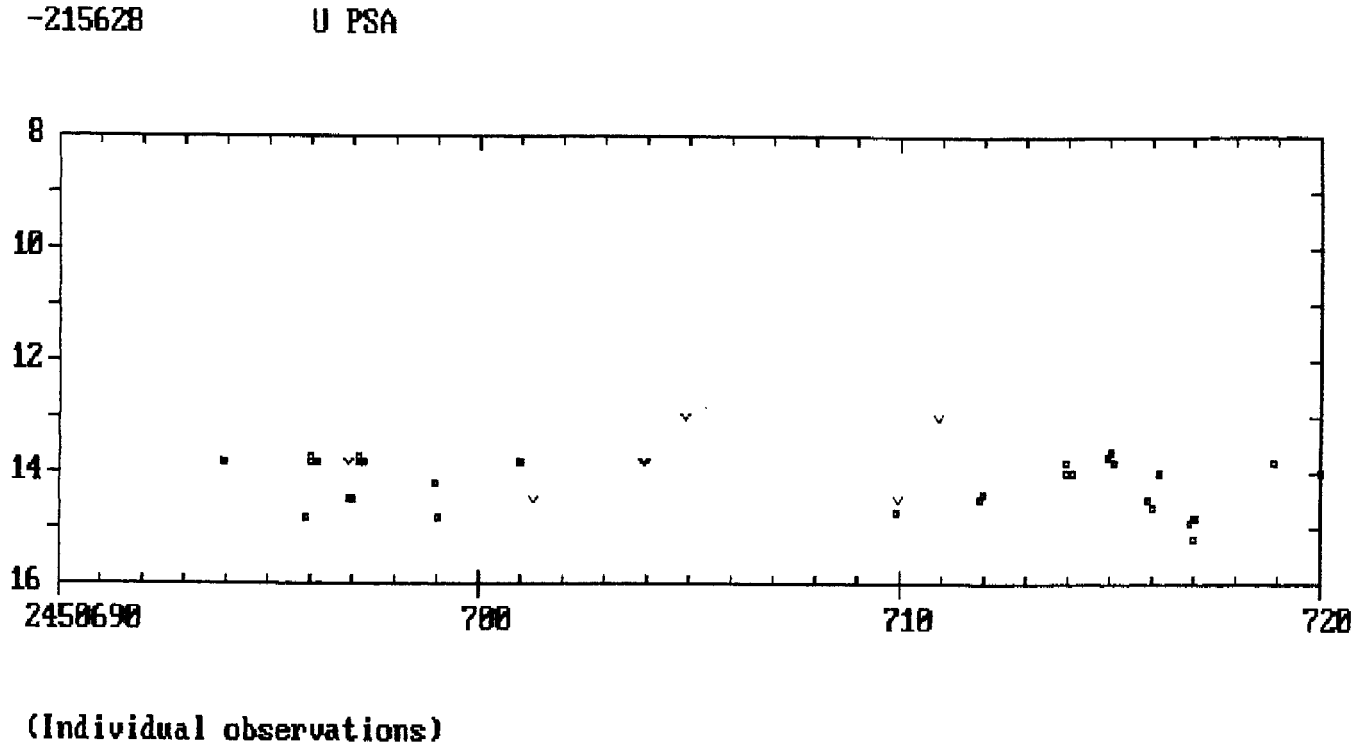


FIGURE 1

J.D. 2,450,630 - 2,450,690



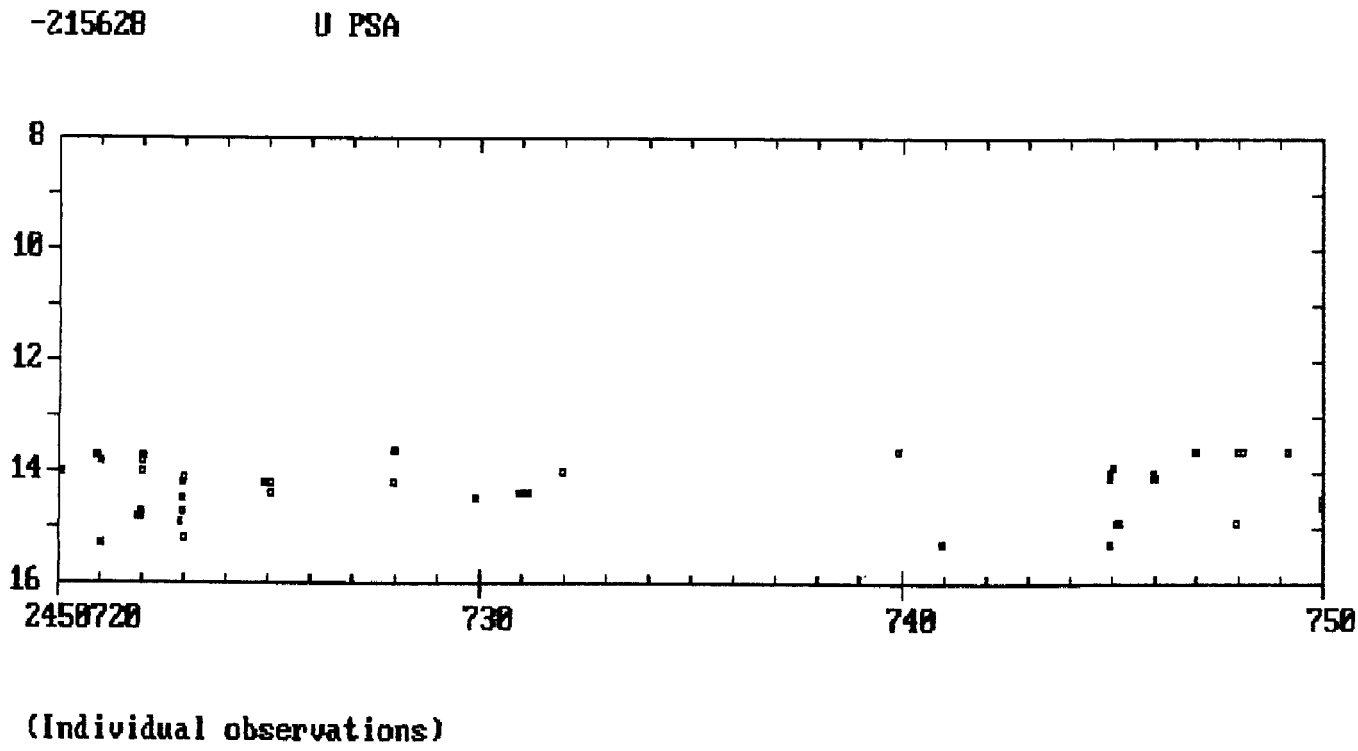
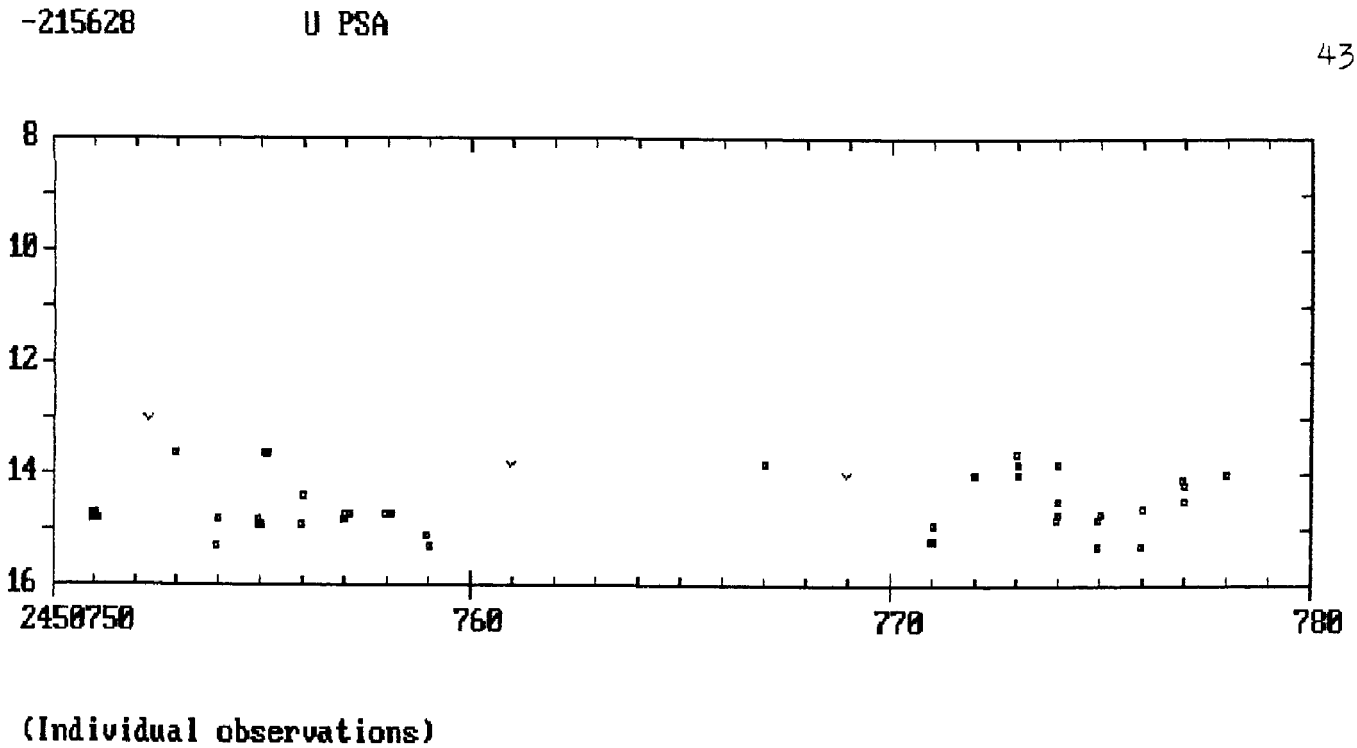


FIGURE 2

J.D. 2,450,690 - 2,450,750



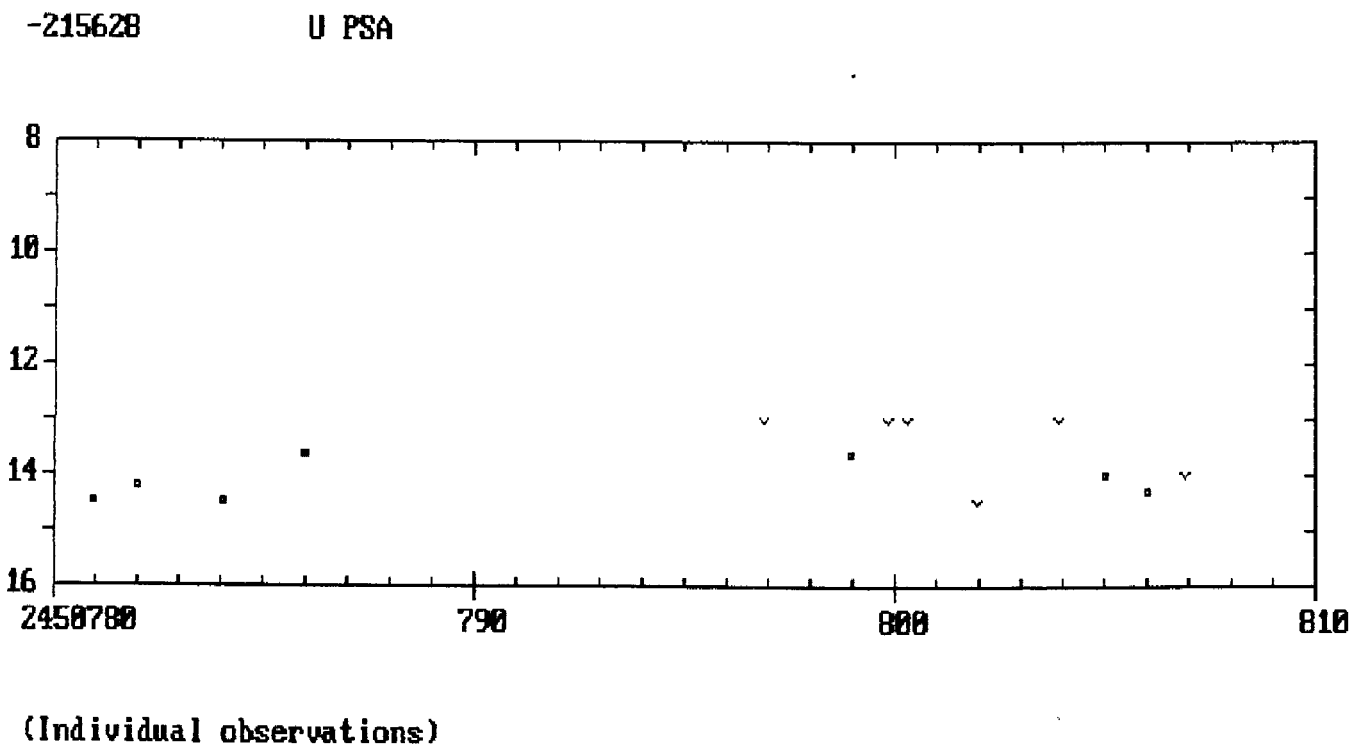


FIGURE 3

J.D. 2,450,750 - 2,450,810

SOME SUPEROUTBURSTS OF DH AQUILAE

Frank M. Bateson
Director, Variable Star Section, R.A.S.N.Z.

SUMMARY: **Results from a very limited number of visual observations show that DH Aql has superoutbursts with a maximum magnitude of 12.6 and probably normal outbursts about a magnitude fainter.**

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1. INTRODUCTION

DH Aql is at 19 26 11 -10 15 28 (2000). It is classified as type UGSS (1) with a range of 12.5 to <17.0p and a possible cycle of 268 days. It was subsequently shown as type UGSU (2) with a range of 12.5p to 18.3V. Vogt (3) published a finder chart and three colour magnitudes for 3 comparison stars. Charts were published by the AAVSO.

2. OBSERVATIONS

A total of 951 visual observations were made between J.D. 2,444,355 and 2,450,722. The estimates were almost entirely made by Albert Jones before 2,450,270 after which date DH Aql was well observed by Nicholas Brown and Rod Stubbings. There are large gaps in the earlier records because of the season in which DH Aql is unobservable and because Jones concentrated on more southerly variables and hence did not monitor DH Aql closely.

The threshold of his telescope meant that with one exception Jones only recorded the bright outbursts. A bright outburst was recorded by a new observer between 2,450,700 and 721. These were rejected as observations by Rod Stubbings showed the variable was fainter than 15.0.

3. DISCUSSION

The accompanying table lists details of ten outbursts including the two given in previous papers (4:5). It is probable that seven maxima were superoutbursts. These have a mean maximum magnitude of 12.6, ranging from 12.3 to 12.9. It is impossible to be certain which super outbursts are consecutive given the broken nature of the observations. There are five intervals ranging from 259 to 450 days that may be consecutive. These suggest a mean super cycle of 361 days, which must be treated with caution.

It is probable that there are also short outbursts with maximum around mag 14.0. More observations are required to determine the cycle for the short outbursts.

4. CONCLUSIONS

DH Aql is definitely of the SU Ursae Majoris type of dwarf novae with super outbursts with a mean maximum magnitude of 12.6. The super cycle may possibly be around 361 days but this should be regarded with caution. It is probable that there are also short outbursts of around mag 14.0. Nothing can be stated about the cycle for the short outbursts until DH Aql has been monitored closely over a long interval.

ACKNOWLEDGEMENTS

All observers are thanked for their observations. Ranald McIntosh kindly supplied the print out of data held in the database.

SOME SUPEROUTBURSTS OF DH AQUILAE (Cont.)

REFERENCES

(1) 1985. Kholopov P.N. (ed). Gen. Cat. Var. Stars, Vol. 1. 4th ed. Nauka, Moscow.
(2) 1997. Downes R.A., Webbink R.F., & Shara M.M. "A Catalog & Atlas of Cataclysmic Variables. 2nd Ed. Pub. Astr. Soc. Pacific. 109, No. 784.
(3) 1980. Vogt N. Pub. Var. Star Sect., R.astr.Soc. N.Z. No. 8.
(4) 1982. Bateson F.M. Pub. Var. Star Sect. R.astr.Soc. N.Z. No. 10, p.19.
(5) 1985. Bateson F.M. Pub. Var. Star Sect. R.astr.Soc. N.Z. No. 12, p.55.

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DH AQUILAE - OBSERVED OUTBURSTS

No.	JD Max 2400,000+	Max M_V	Int d	No. Obs.	Type	Width d
1	44,455	13.8	-	1	N?	?
2	45,479	12.3	1024	4	S?	3?
3	45,852	12.3	373	3	S	8
4	46,582	12.9	730	1	S?	?
5	49,107	12.7	(2525)	4	S?	3
6	49,466	12.5	359	1	S?	?
7	49,916	12.9	450	1	S?	?
8	50,314	14.0	398	1	?	?
9	50,573	12.5	259	15	S	9
10	50,653	15.4?	80	1	?	?

Remarks:

No. 10. Gap 10 days before 653.

HAS THE FAINT DWARF NOVA, FV ARAE, A SHORT OUTBURST CYCLE?

Frank M. Bateson
Director, Variable Star Section, RASNZ

SUMMARY: Observed outburst are tabulated for the interval JD 2445,240 to 2450,709. These are combined with earlier results to discuss whether FV Ara has a short outburst cycle or whether it has long intervals of inactivity.

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INTRODUCTION

FV Ara is HV6770, discovered by H.H. Swope (1) as a UG dwarf nova with a range of 12 to <18p. R. Prager (2) states the star was not seen on 47 plates taken between 1889 and 1918 which showed stars fainter than mag. 14.5 to 16.0. It was seen only three times, viz: 2426,810 (mag 14.7); 2427,168 (13.0) and 2427,181 (13.9). The interval between the last two dates is 13 days.

2. OBSERVATIONS

FV Ara is shown on charts 488/9 (3) with lettered comparison stars. N Vogt (4) published a three colour sequence from which the V magnitudes have been used to reduce all estimates. A total of 1,993 observations were made visually by members of the VSS, RASNZ between JD 2445,240 to 2450,709, of which most were negative.

Fifteen outbursts were published in a previous paper (5). An additional interval, JD 2445,000 to 2445,239 yielded no outbursts (6). Table 1 lists outbursts recorded during the interval discussed in this paper. However, these have been combined with the earlier results in the following discussion.

3. DISCUSSION

The list of outbursts published in the first paper must be viewed with caution because there appeared from the original records to be some uncertainty as to the identification of FV Ara. The maximum magnitudes that seem to be reliable range from 13.1 to 14.0 with a mean of 13.35. The intervals between maxima range widely. There are four intervals of 8 to 32 days which possibly are consecutive maxima.

Outbursts in Table 1 have maximum magnitudes ranging from 13.7 to 15.0 with a mean of 14.46. The intervals between outbursts again have a very wide range with only two intervals of 13 and 27 days possibly representing consecutive maxima.

The marked difference between the magnitudes of the first 15 outbursts, listed in the first paper, and those in Table 1 might indicate that FV Ara is running out of steam. However, it may suggest that a number of the first 15 outbursts are mis-identification of a field star with the variable. The three outbursts quoted by Prager appear to support this view.

It appears that the true visual range is 13.7 to 15.0, or possibly fainter.

There are many very large gaps in the records during which no observations were made. The observations have many gaps of several days even when FV Ara was monitored more closely. These facts make it difficult to be certain which outbursts are consecutive. The slender

evidence available indicates an outburst cycle of about 15 days.

The long intervals of apparent inactivity raise the question whether these are separate periods of intense activity. It appears that the detection of outbursts depends on observers with apertures capable of seeing to mag. 14.5, or fainter, operating. This assumes that the visual magnitudes of outbursts are between 13.7 and 15.0.

A careful inspection of the records shows that one observer (W. Goltz) made frequent negative observations of FV Ara fainter than mags. 14.5 to 15.0. Typical examples are: 2447,700 to 2447,849; 111 observations. No outbursts. 2447,928 to 2448,204; 250 observations. 1 outburst.

Naturally, there were breaks of a few days during these intervals but it is reasonable to think that more than one outburst would have occurred. This appears to suggest that FV Ara may have intervals of inactivity.

There is no information about minima as there are a limited number of observations recording the variable as fainter than mags. 15.5 to 16.7.

4. CONCLUSIONS

It is concluded that the outbursts of FV Ara range from mags. 13.7 to 15.0, or slightly fainter, at maximum. The faintest maxima are more frequent than the brighter ones. There appears to be evidence suggesting that the variable has intervals of inactivity but this must be treated with caution.

The mean outburst cycle when the star is active is probably about 15 days.

ACKNOWLEDGEMENTS

This paper was only made possible by the dedicated work of all observers. My sincere appreciation is extended to them.

REFERENCES:

(1) 1936. Swope, H.H. Harvard Ann. 90, p.7.

(2) 1941. Prager, R. Harvard Ann. 111, p150

(3) 1979. Bateson F.M., Morel M, Sumner B, Winnett R. Charts for Southern Variables. Ser. 11. Pub. by Astronomical Research Ltd. Tauranga, N.Z.

(4) 1980. Vogt, N. Pub. Var Star Section, R. astr.Soc. N.Z. No. 8, p.10.

(5) 1982. Bateson F.M., Pub. Var Star Sect. R.astr.Soc. N.Z. No. 10, pp. 16/17.

(6) 1985. Bateson, F.M. Pub. Var. star Sect. R. astr. Soc. N.Z. No. 12, p.54.

HAS THE FAINT DWARF NOVA, FV ARAE, A SHORT OUTBURST CYCLE? (cont.)

TABLE 1

FV ARAE - OBSERVED OUTBURSTS

No.	JD Max	Max $_{mv}$	Int. $_{d}$	No. Obs	
16	2448,008	14.4	(3270)	2	
17	498	13.7	490	1	
18	712	14.5	214	1	
19	755	14.5	43	1	
20	805	14.5	50	1	
21	860	14.5	55	1	
22	902	15.0	42	1	
23	915	14.5	13	3	*
24	942	14.5	27	1	

REMARKS TO TABLE 1

No. 23: 14.5 on 915; 917 & 922. Presumably same outburst.

REPORT OF THE VARIABLE STAR SECTION
ROYAL ASTRONOMICAL SOCIETY OF NEW ZEALAND

FOR YEARS ENDED 31st DECEMBER 1996 & 1997

This report covers two years in order to bring reports up to date with the more frequent issue of the publications.

1. OBSERVATIONS (1996) - 67,604
(1997) - 71,219

These totals are for programme stars. Totals for non-programme stars are not included for the reason given in the 1993 report. Observations from the B.A.A. as part of the co-operative programme with them are also omitted from the totals so that the totals reflect the work of Section members. The contributions from each member are shown in the Tables at the end of this report with diagrams illustrating the monthly totals. All totals are for the years ending on 31st August to provide strict comparison with previous years.

The above totals of observations are almost the same as in the two previous years. The marked improvement in monitoring of many variables to faint limits mentioned in the previous report continued. This was mainly due to the outstanding contribution from Rod Stubbings who has shown a very high degree of accuracy. The two senior members, Danie Overbeek and Albert Jones, made their usual outstanding contributions. Members have been kept informed of special programmes by special circulars and through our newsletter, 'CHANGING TRENDS'. The introduction of email at headquarters in 1997, and its use by many members, made communications easier and less costly.

2. REQUESTS FROM PROFESSIONALS

Professionals have made extensive use of our data as the following examples demonstrate. These will show observers how valuable their dedicated observing is and how their data is fully used.

All requests from professional colleagues were supplied within a fortnight of receipt. Edited data was supplied on floppy disks or as computer print outs and computer light curves. This prompt service was made possible by the invaluable assistance of Ranald McIntosh.

EF ERI
Christopher Mauche (USA) and Christine Done (UK) requested that this object be monitored so that they could be advised when it became active, when they could commence IUE and XTE observations. Regular observations, especially by Rod Stubbings, have shown no activity and it is stuck at minimum. This monitoring continues.

DWARF NOVAE
Luca Zangrilli (Italy) and Tansel AK (Turkey) used all our data in their Ph.D. theses. This brought to 70 the number of graduates who have used our observations of Dwarf Novae.

RY LUPI
Ruslan Yudin (Pulkovo Observatory, Russia) obtained a complete set of our observations which cover six decades.

V616 MON = NOVA MON 1975
Erik Klukers (Oxford) received our observations of this old nova.

V725 SGR
A. Wehlau (University of Western Ontario, Canada) received all our data.

RR TEL
Light curve and observations were supplied to A. Evans (Keele University, UK).

V651 MON

This is the binary central star of the planetary nebula NGC 2346. We co-operated with Rafael Costero (Mexico) to observe the 1997 occultation.

EX HYDRAE

Close monitoring continued at the request of the Goddard Space Centre and a group of UK and USA astronomers for an intensive spell of observations in March/April 1996 with the XTE satellite. The monitoring was also aimed at prompt detection of any bright outburst so that this could be observed in x-ray band.

UY PUPPIS

Janet Wood and Jon Lockley (UK) used our data in conjunction with their observations.

NOVAE

A very long term programme requires observations of old novae which are at minima. Astronomers in Germany, UK & USA have requested this monitoring to detect any renewed activity. The observations have been made by Nicholas Brown because he can observe to magnitude 17 and he should see any definite activity although this may not occur for years.

Recent novae have been well observed.

OY CAR

C. Mauche (Livermore Lab. USA) required our data on a super outburst to use with his observations from two satellites. He was amazed and delighted to have such a complete coverage from our observations.

DWARF NOVAE PREDICTIONS

The Director received a number of requests from professionals for predictions of the likely dates of outbursts especially of super outbursts of SU UMa type dwarf novae. These were needed to arrange dates for satellite observations. Some outbursts can be predicted with reasonable accuracy whilst others are really guesses. Fortunately the predictions all proved to be reasonably accurate.

W HYDRAE

Ian Beddington (Australia) received all the observations the V.S.S. had plus those found in a search of the literature. There was however a gap of several years during which it appears this star was not observed.

OTHER LONG TERM PROGRAMMES

Observers have continued to monitor RCB, S Dor, Z And variables and objects of special interest such as TV Col. These observations have been widely used by professionals.

FLARES IN DWARF NOVAE

The Director has continued his research into short lived flares in Dwarf Novae of which a number have been recorded especially in SU UMa stars. These have been included in the Monthly Circulars.

B.A.A.

The co-operative programme with the B.A.A. on variables in the equatorial zone has continued by the exchange of data on stars of interest to the B.A.A. or the V.S.S.

A.A.V.S.O.

We have continued to send the AAVSO our observations of Miras every six months for use in their predictions.

Four members attended the A.A.V.S.O. meeting in Switzerland in 1997. A report on this meeting was published in 'CHANGING TRENDS'.

HEADQUARTERS

Changes to our procedures have been necessary with the wide use of email. This has freed the Director from receiving telephone calls from observers at any hour, night or day seven days per week, as reports came in regarding outbursts or other unusual events. Observers now send these alerts direct to Kyoto with copies to headquarters by email except for a few special programmes when advice has to come to me in order that satellites with Targets of Opportunity can be switched to their targets promptly. It has also brought a large reduction in letter writing.

These changes have also brought a large increase in requests from professionals. This has increased the work but means our data is even more widely used. The volume of work has thus increased markedly especially in the second half of 1997.

Maureen Phizacklea has continued to be employed as part-time Secretary. She is responsible for all email communications and the typing of the Publications as well as many other routine matters.

Elizabeth Simpson is employed as Office Assistant for one day each week. She has taken over the typing of the Monthly Circulars and the lists of corrections to the observations so that these can be amended in the database by Ranald McIntosh.

COMPUTER DATA PROCESSING

Ranald McIntosh has maintained the computer database with his usual efficiency. He also supplies me with the print outs from which I compile the Monthly Circulars as well as sending me the light curves, print outs and data on disk for both requests from professionals and for our own publications. I am deeply grateful for all Ranald does. The functioning of the Section depends so much on his work.

Don Brunt has continued to process archival data but this work is tapering off.

PUBLICATIONS

Numbers 21 and 22 were published.
The 5th and enlarged edition of "THE OBSERVATION OF VARIABLE STARS" was published. Twelve issues of the Monthly Circulars were distributed each year.

'CHANGING TRENDS' were issued quarterly and a limited number of special circulars were circulated. Mati Morel distributed charts for Novae as these were discovered.

FINANCIAL

ASTRONOMICAL RESEARCH LTD. as a Scientific Charity has continued to provide the funds that enable the Section to function. These funds come from subscriptions, donations, grants and charges for expenses in providing data.

The Revenue & Expenditure Account for 1997 is appended to this report showing that revenue has been sufficient to pay all printing and postal costs for all publications as well as the salaries of the two part time employees but there are other costs charged to the Director.

I am most grateful to the following for their donations during the years under review.

W. Albrecht, Ballaret Ast. Soc., S. Dreves, A. Fujii, G. Herdman, A.S. Liu, P. Nelson, R. Stubbings, W. Taylor, D. Watson, P. Williams, Anonymous.

ACKNOWLEDGEMENTS

This report has already acknowledged the wonderful help so freely given by a number of members. Much of the success of the Section is due to the interest in variable star observation by the leaders of associated societies. I wish to thank, in particular, Jan Hers, Director of the Variable Star Section of the Astronomical Society of Southern Africa, and the leaders of the various Australian groups – Fraser Farrell, Peter Nelson & Peter Williams.

They are responsible for the recruiting of new members and encouraging observers.

I have often commented that it is each and every observer who makes the Section possible. There would be no section without their dedicated work. My sincere appreciation is extended to all observers, be their contributions limited or numerous.

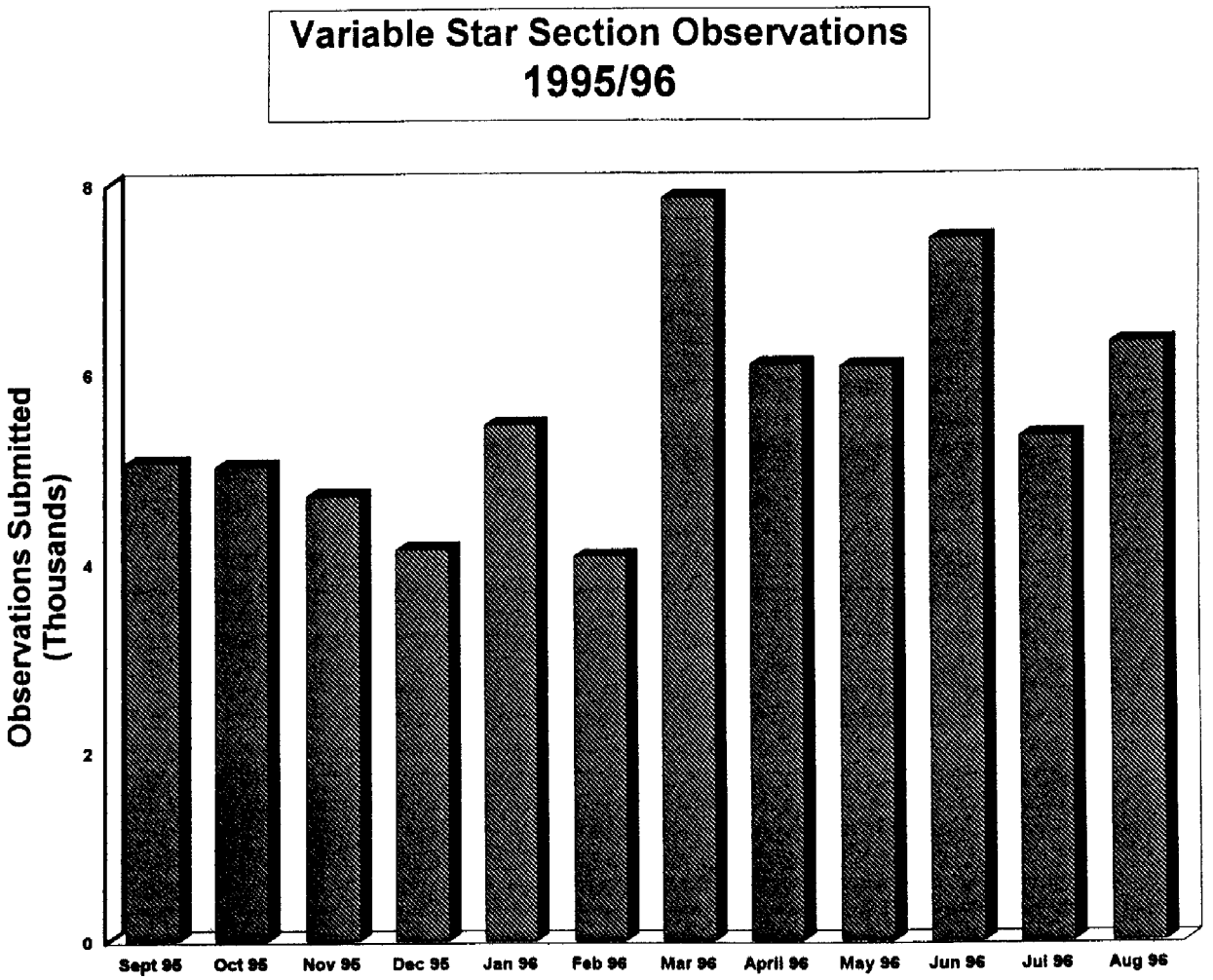
Mati Morel has continued to produce all the charts required. His work reflects the very high standard of care of detail and skilled draughtmanship that is the hallmark of anything he does.

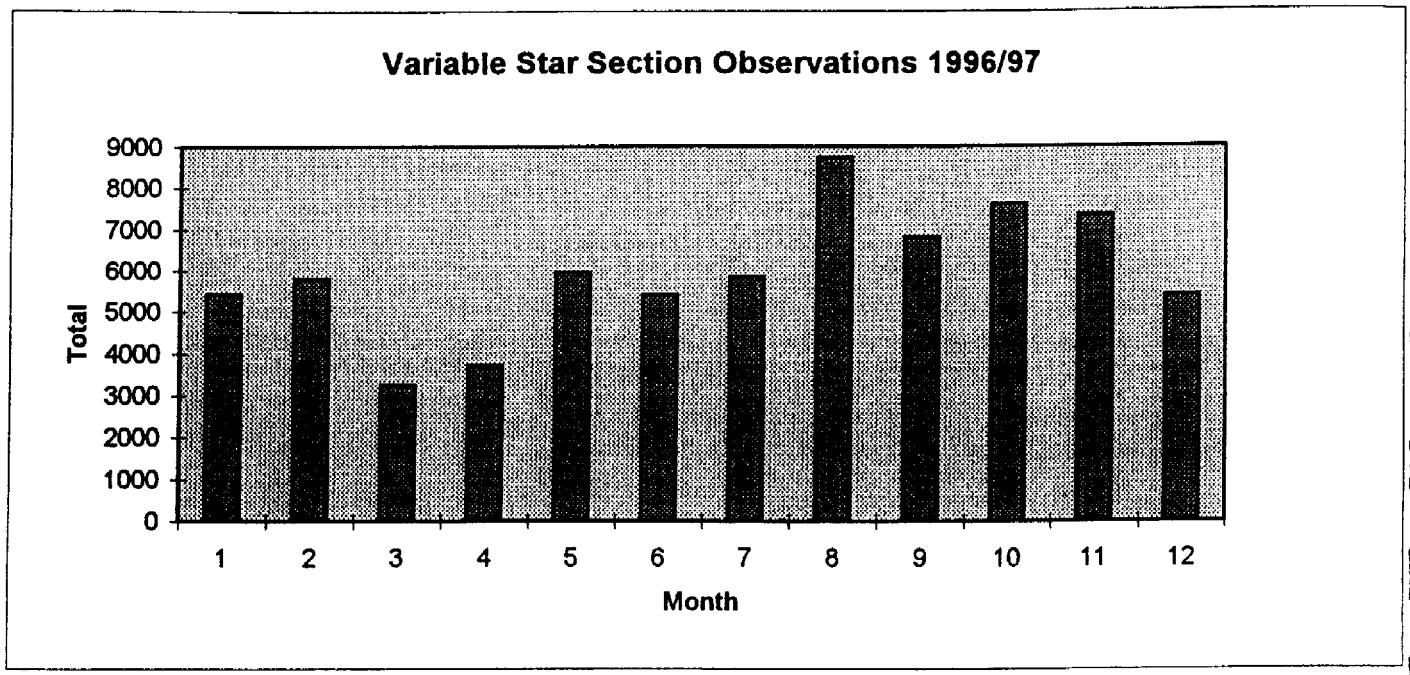
My personal thanks are extended to Maureen Phizacklea for her most efficient handling of a multitude of tasks as well as for so quietly coping with the vagaries of her Boss.

I also thank Elizabeth Simpson for her services, especially in typing the Monthly Circulars.

Finally I wish to thank all members and supporters, both amateur and professional, for their continued assistance and encouragement.

1998 January 31 Frank M. Bateson
DIRECTOR


Variable Star Section Observations
1995/96
Observations Submitted
(Thousands)
0
2
4
6
8
Sept 95
Oct 95
Nov 95
Dec 95
Jan 96
Feb 96
Mar 96
April 96
May 96
Jun 96
Jul 96
Aug 96


Variable Star Section Observations 1996/97
Total
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
1
2
3
4
5
6
7
8
9
10
11
12
Month

VARIABLE STAR SECTION OBSERVATIONS 1995/96

Observer's Name	Ob. Code	Obs. Total
Albrecht, W.M.B.	Aj	4908
Brandie, J.	BD	394
Bryant, K.	Bk	18
Blanksby, J.	BW	34
Cragg, T.A.	Cj	2075
Coghlan, R.D.	CO	25
Emmerson, R.	Em	8
Elwell, P.	Ew	15
Farrell, F.	Fm	628
Griffiths, B.	GA	14
Garland, B.	GB	147
Herdman, G.	HA	5552
Hearnshaw, C.	HH	20
Huljak, J.	HJ	66
Harries-Harris, E.	Hi	788
Hull, O.R.	Hl	2485
Hovell, S.	Hv	995
Hers. J.	Hz	860
Ives, F.	Iv	519
Jones, R.W.	Jg	1632
Jones, A.F.	Jo	10945
Lumley, E.	Lm	84
Lund, H.	Lz	105
Menzies, B.	Mf	1285
Morand, L.	MIA	2108
Mattiazzo, M.	MKA	284
Munton, L.K.	MLA	46
Moy, D.M.	MOA	13
Nelson, P.	Nl	707
Nation, P.	Nn	141

Observer's Name	Ob. Code	Obs. Total
O'Kane, J.	Ok	148
Overbeek, M.D.	Ov	12091
Parry, J.	PB	714
Stephanopoulos, G.	SK	304
Smit (Dr.) J.A.	SP	913
Saw, A.D.J.	ST	110
Skilton, P.	SU	7
Stubbing, R.	SX	10001
Stephenson, S.M.	Sy	46
Tucker, P.	TA	13
Turner, D.	Tq	32
Tregaskis, T.B.	Tr	252
Taylor (Dr.) N.W.	Ty	1815
Tilbrook, J.	Tz	782
de Villiers, P.	Vb	92
Ward, D.	WD	51
Walsh, S.	WP	4
Watson (Mrs.) D.	WJ	552
Williamson, L.J.	Wm	157
Williams, P.	Wy	2519

TOTAL: 67,504

VARIABLE STAR SECTION OBSERVATIONS 1996/97

Observer's Name	Ob. Code	Obs. Total
Albrecht, W.M.B.	Aj	3824
Brown, N.J.	BA	700
Brandie, J.	BD	506
Bryant, K.	Bk	15
Cragg, T.A.	Cj	2051
Cook, J.C.	CJ	307
Evans, R.W.	En	98
Elwell, P.	Ew	67
Farrell, F.	Fm	856
Griffiths, B.	GA	11
Garland, B.	GB	95
Goldup, G.C.	GC	17
Herdman, G.	HA	5742
Harries-Harris, E.	Hi	317
Hill, M.	HI	4
Hull, O.R.	Hl	44
Hers, J.	Hz	554
Ives, F.	Iv	282
Jones, A.F.	Jo	10189
Liu, A.S.	LA	699
Lumley, E.	Lm	39
Lund, H.	Lz	123
Menzies, B.	Mf	1610
Morand, L.	MIA	2732
Mattiazzo, M.	MKA	682
Munton, L.K.	MLA	87
Massey, A. (Dr)	MPA	7
Nelson, P.	Nl	1097
Nation, P.	Nn	26
O'Kane, J.	Ok	130

Observer's Name	Ob. Code	Obs. Total
Overbeek, M.D.	Ov	15753
Parry, J.	PB	33
Pitt, B.	PF	5
Pearce, A.	Pm	13
Rea, D.	Ra	7
Stephanopoulos, G.	SK	362
Smit (Dr.) J.A.	SP	1154
Saw, A.D.J.	ST	212
Stubbing, R.	SX	13097
Turner, D.	Tq	19
Tregaskis, T.B.	Tr	420
Thompson, K.	Tv	187
Taylor (Dr.) N.W.	Ty	1824
Tilbrook, J.	Tz	588
de Villiers, P.	Vb	125
Watson (Mrs.) D.	WJ	813
Williamson, L.J.	Wm	180
Walsh, S.	WP	121
Williams, P.	Wy	3385

TOTAL: 71,219

ASTRONOMICAL RESEARCH LIMITED

INCOME & EXPENDITURE
FOR YEAR ENDED 31 MARCH 1997

				1997 $	
INCOME:	NZ	SALES O'Seas	Total	Less Net Printing Costs	Net
Charts	32	343	375	52	323
Publications	709	3.023	3.732	399	3,333
Monthly Circulars	414	2,007	2,421	550	1,871
					5,527
Less Net Postage					2,028
					3,499
Introduced Capital					1,500
Book - Sales				185	
Royalties				127	
					312
Sales of book (Var.Stars) & Catalogues					346
Sales of Data					192
Donations					1,209
GROSS INCOME:					7,058
LESS OVERHEAD EXPENDITURE:					
ACC Levy			110		
			less 7		
				103	
Home Office Expenses				574	
Wages (Clerical)				6,717	
Subscriptions				85	
General Expenses				759	
Insurance				333	
Stationery & Office				429	
Telephone & Tolls				862	
Repairs				51	
Capital Expenditure				3,788	
TOTAL EXPENDITURE:					13,701
NET LOSS					(6,643)
Plus Depreciation					304
					(6,947)