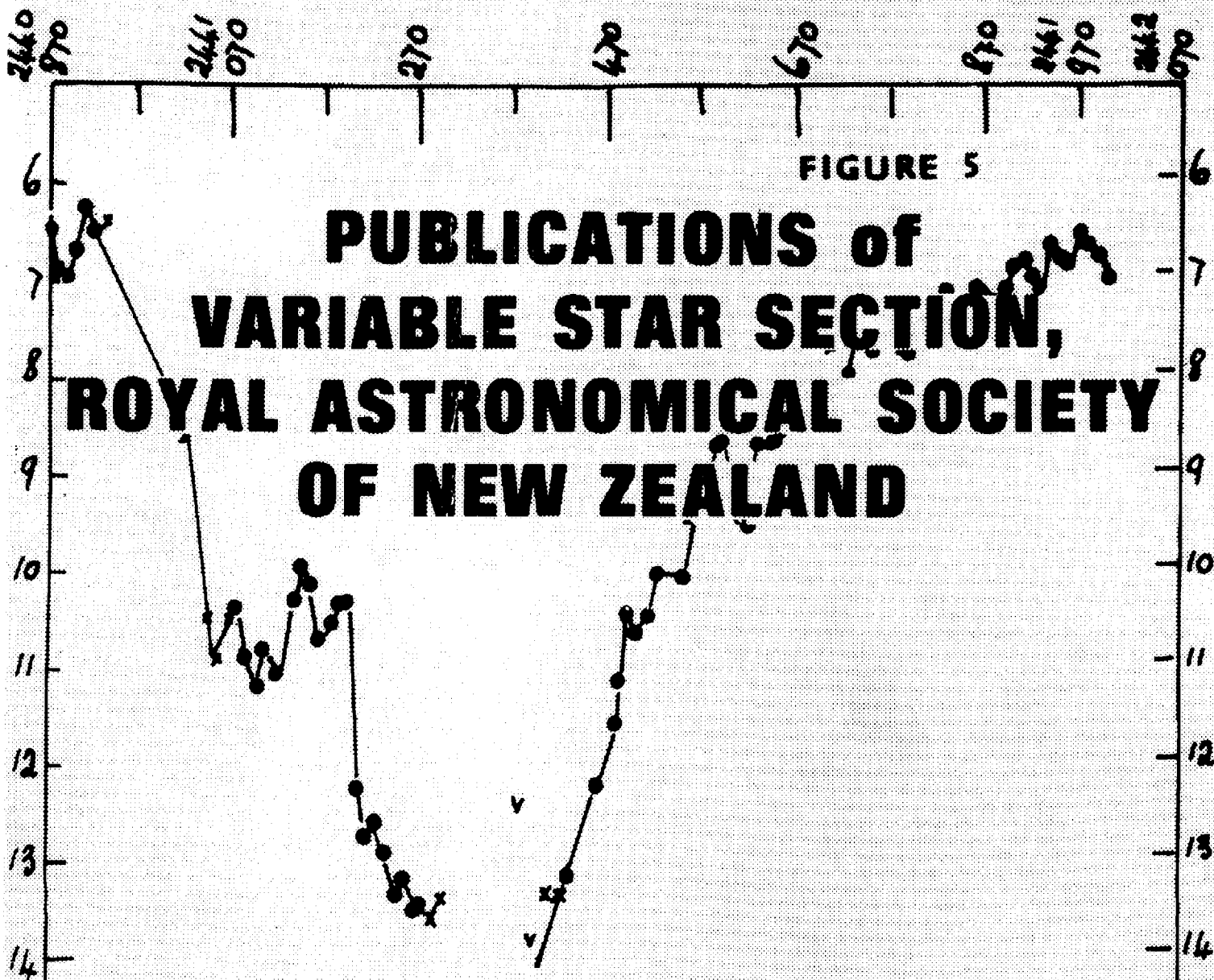


FIGURE 5

PUBLICATIONS of VARIABLE STAR SECTION, ROYAL ASTRONOMICAL SOCIETY OF NEW ZEALAND



GU SGR

IU SGR

Director: Frank M. Bateson
P.O. Box 3093,
GREERTON,
TAURANGA,
NEW ZEALAND.

PUBLICATIONS OF THE VARIABLE STAR SECTION
ROYAL ASTRONOMICAL SOCIETY NEW ZEALAND

No. 18

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ENDED 31st December 1992.

EDITORIAL

Recent issues of these publications have mainly been devoted to the publication of the results of close visual monitoring of dwarf nova because of the professional interest in knowing details of their outbursts. Such results are now almost up-to-date with the exception of those dwarf nova being discussed elsewhere.

We commence in this issue the publication of light curves of Miras and other variables based on decades of observation by members of the Variable Star Section, Royal Astronomical Society of New Zealand. These light curves will be continued in Publications Nos. 19 and 20 so that the curves are available to those interested. To conserve space the elements determined from these light curves will be then tabulated in one paper rather than given in separate papers with each set of light curves.

The Section is deeply indebted to our member, Don Brunt, for computer processing of the observations prior to 1st April 1987 that had been maintained in ledger sheets by our former Recorder, the late Gordon Smith. This has enabled Ranald McIntosh to produce the light curves, including observations after 1st April 1987, which he maintains with his well known efficiency. It is only the devoted co-operation and invaluable assistance of these two members that makes the publication of computer light curves possible.

.

THE LIGHT CURVE OF RU PEGASI, 1980 - 1992

Frank M. Bateson, R. McIntosh & D. Brunt
Variable Star Section, R. astr. Soc. of N.Z.
P.O. Box 3093, Greerton, Tauranga, New Zealand.

SUMMARY: The visual light curve of the dwarf nova, RU Peg,
from 1979 Sept.23 to 1992 May 31 is reproduced.

.

1. INTRODUCTION

The visual light curve of RU Peg is shown in Figs.1 - 6. The plotted points are from individual observations for the interval J.D. 2,444,100 (1979 Sept.23) to 2,448,774 (1992 May 31). This northern star is one for which the V.S.S. sends observations to the B.A.A. so that they can combine our results with theirs and discuss the combined results. The B.A.A. are having problems in bringing their data up to date, and, for this reason we publish our light curve so that members can see the results of their estimates but the full discussion of the results are left to the B.A.A.,

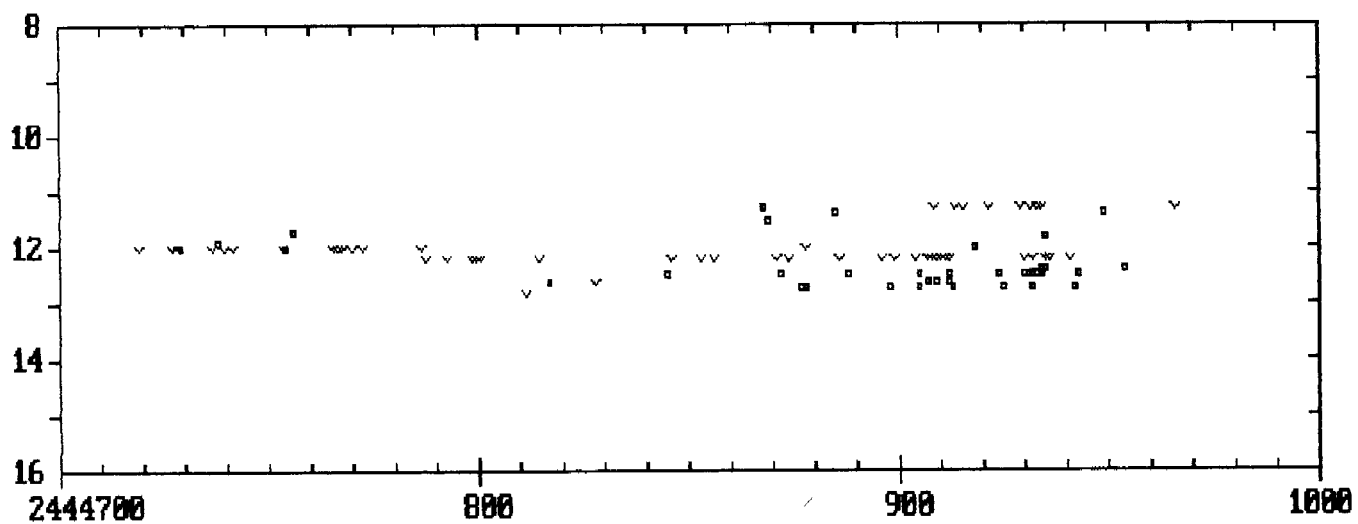
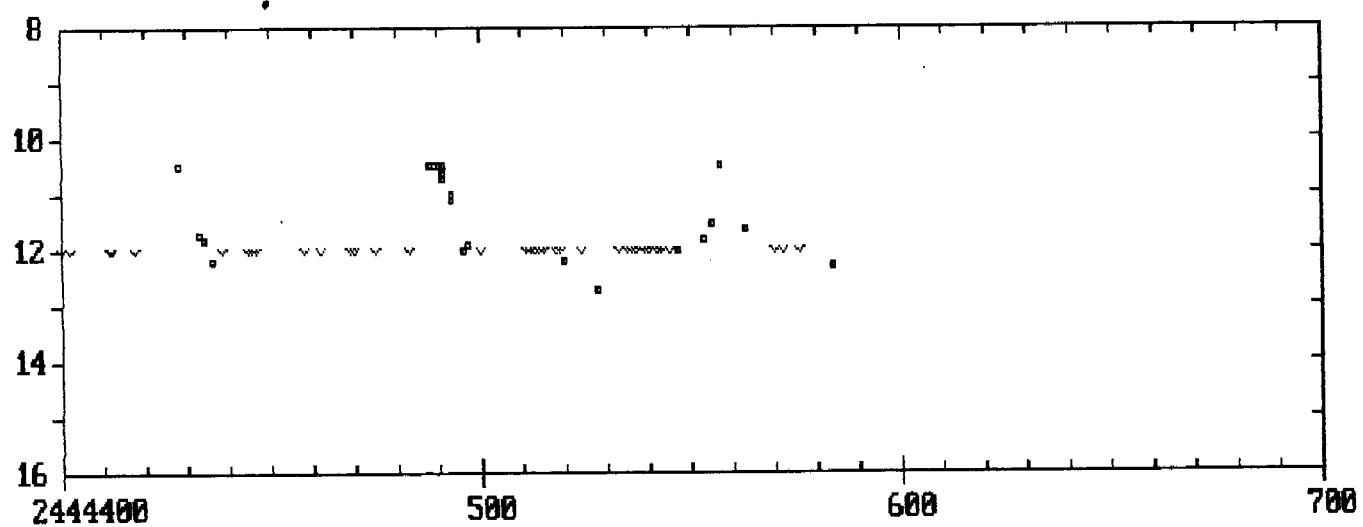
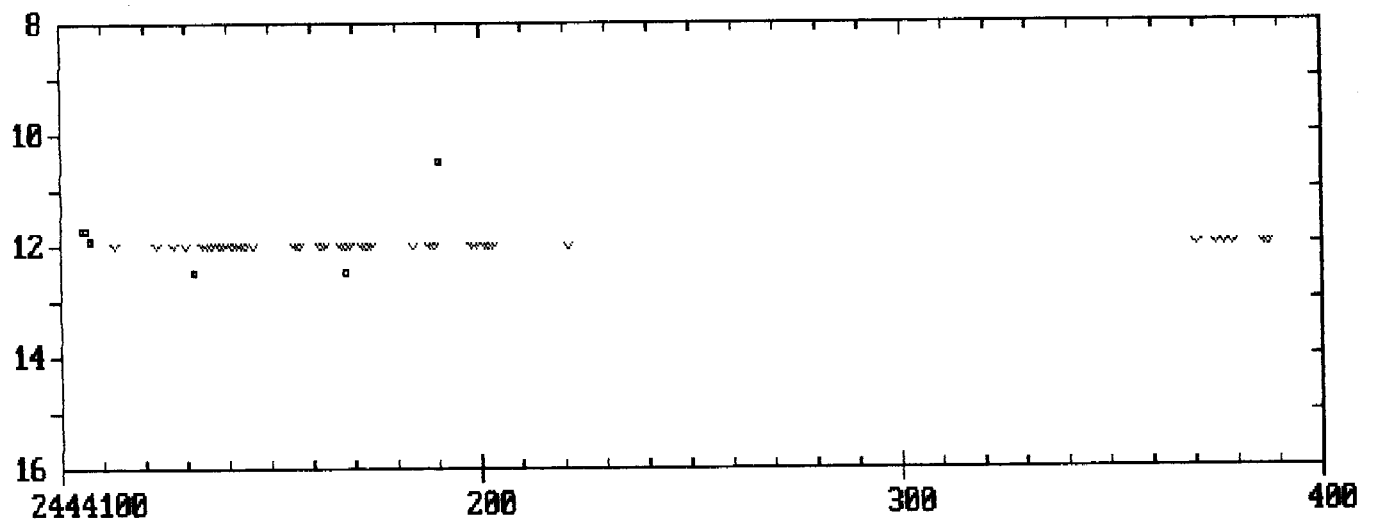
I.D. Howarth (1) discussed observations from 1927 to 1969. D.R.B. Saw (2) reexamined these results in his paper which also included the observations from 1970 - 79. He gave the mean cycle as 73.5 ± 18.1 days. He stated that long and short maxima occur in about equal numbers with anomalous maxima 13% of the total. The latter Saw defined as having a long, slow rise with a halt or reversal. He also classified as anomalous two faint maxima, one when the star remained fainter than $11^m.0$ with a long flat maximum, irrespective of the rate of rise, and, the other a short maximum with the star barely reaching $11^m.5$.

2. OBSERVATIONS

All observations were made visually by members of the Variable Star Section, RASNZ using charts 563-5 and the visual sequence thereon. It should be noted that RU Peg has a close companion (magnitude 12.6). That is the usual minimum magnitude reported. Most observers have instruments capable of separating the two stars. However, it does appear that at times some observers have been unable to do so since there is clear evidence that often, when their estimates are at 12.6 other observers, with larger telescopes and dark skies estimated it around 13.1-13.2.

RU Peg is classified (3) as a dwarf nova, type UGSS+ZZ: with a range of 9.0 to 13.2. The very short, low amplitude oscillations of ZZ Cet type would not be observable visually. Possibly the faint, short outburst Saw classified as anomalous may have been a flare as these occur in ZZ Cet stars. This suggestion, if correct, implies that the companion may be a flare star. At maximum RU Peg is rarely brighter than $10^m.0$ and very infrequently reaches $9^m.5$.

We leave the full discussion of the observations to the B.A.A. as part of our co-operative programme with them.

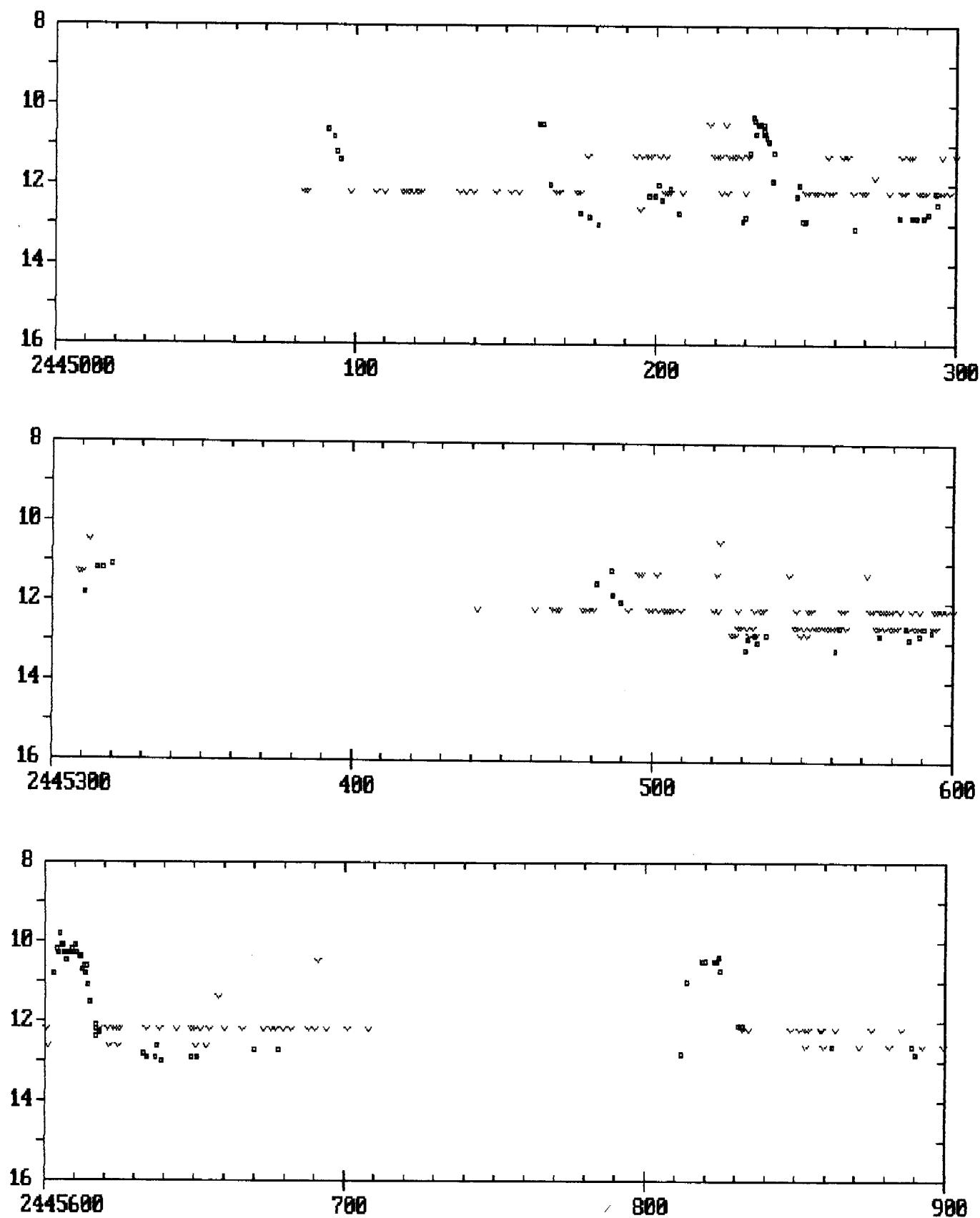


RU PEG

FIGURE 1

Light Curve From Individual Observations

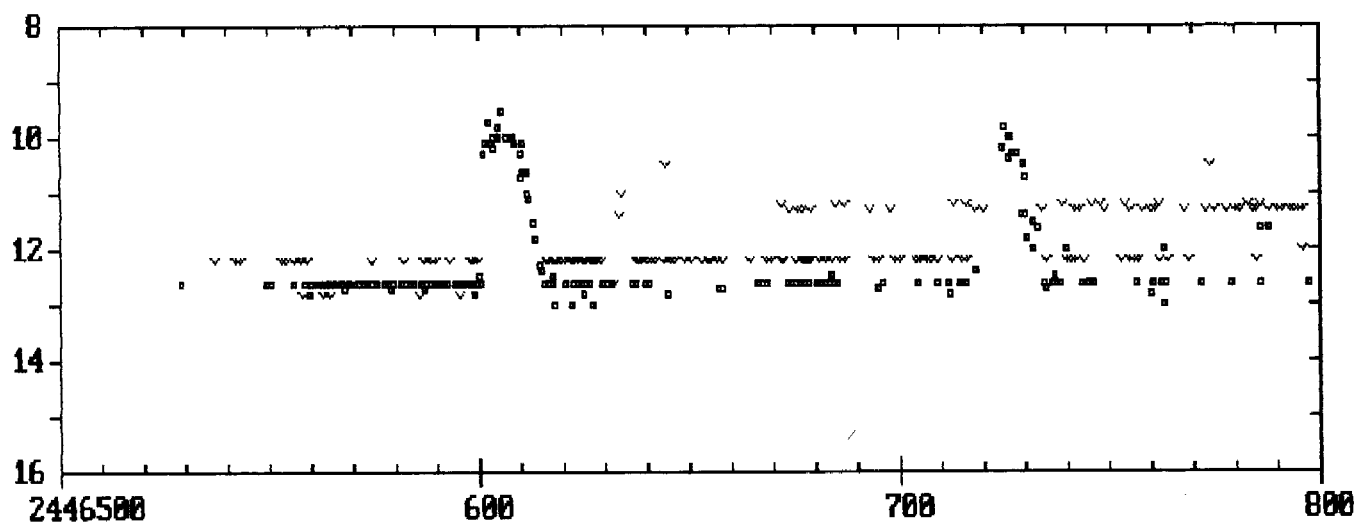
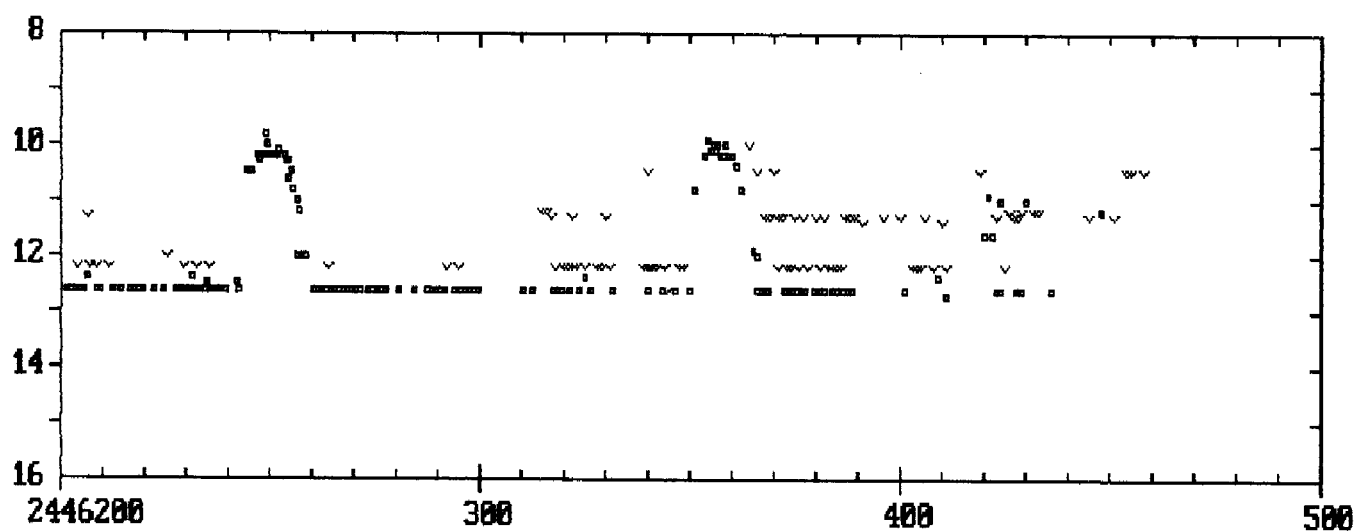
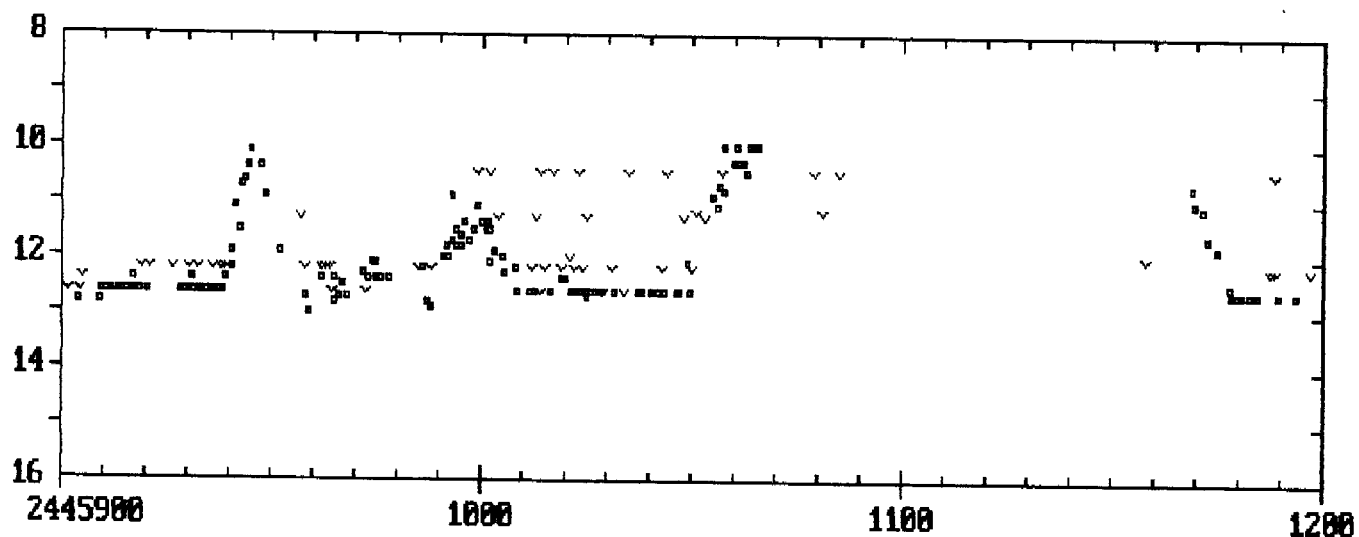
J.D. 2,444,100 - 2,445,000



RU PEG

FIGURE 2

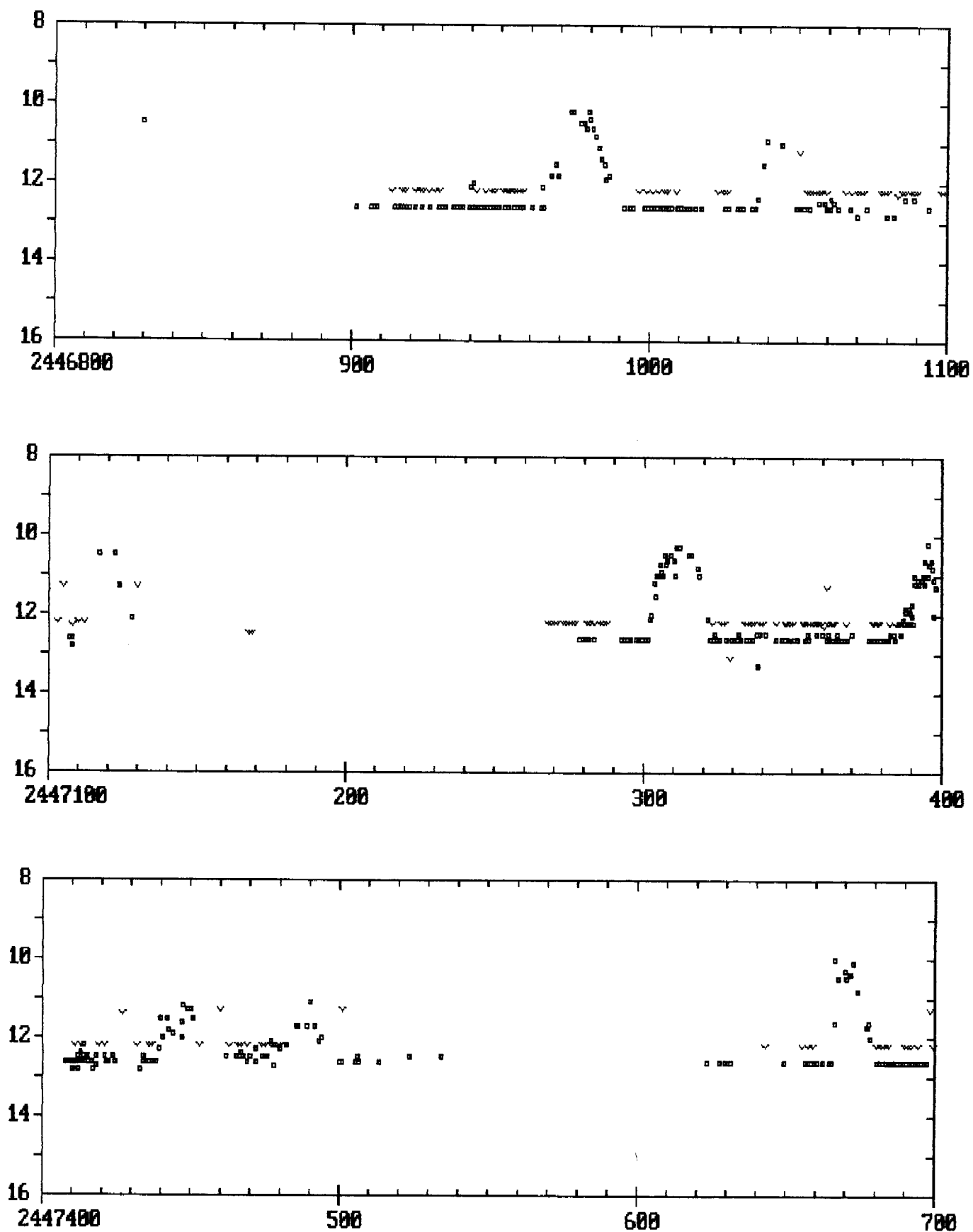
Light Curve From Individual Observations
 J.D. 2,445,000 - 2,445,900



RU PEG

FIGURE 3

Light Curve From Individual Observations
J.D. 2,445,900 - 2,446,800

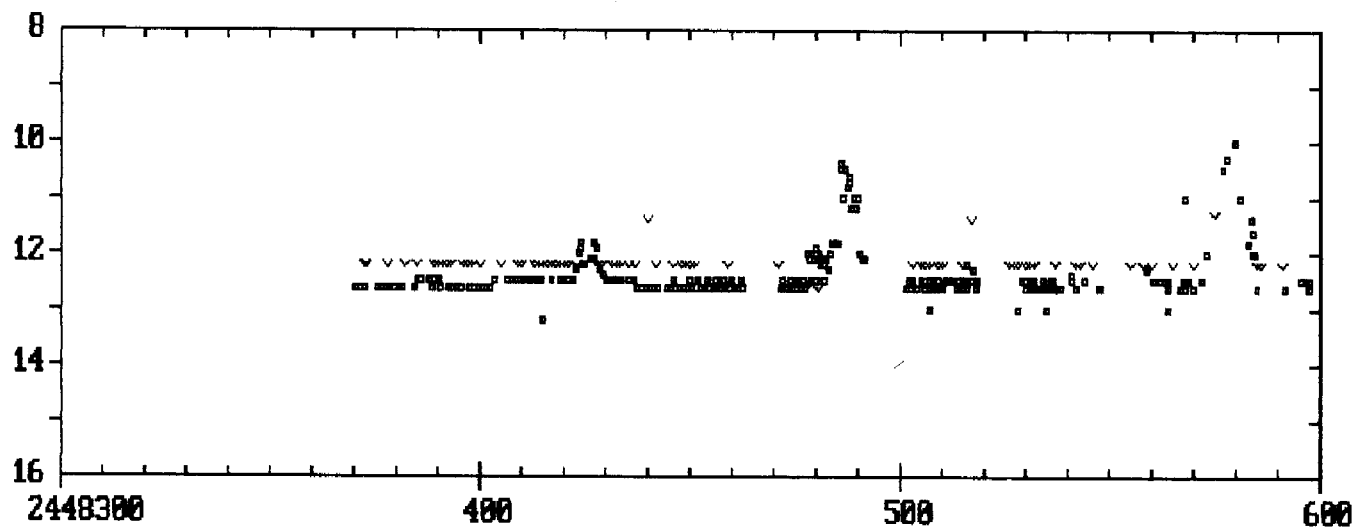
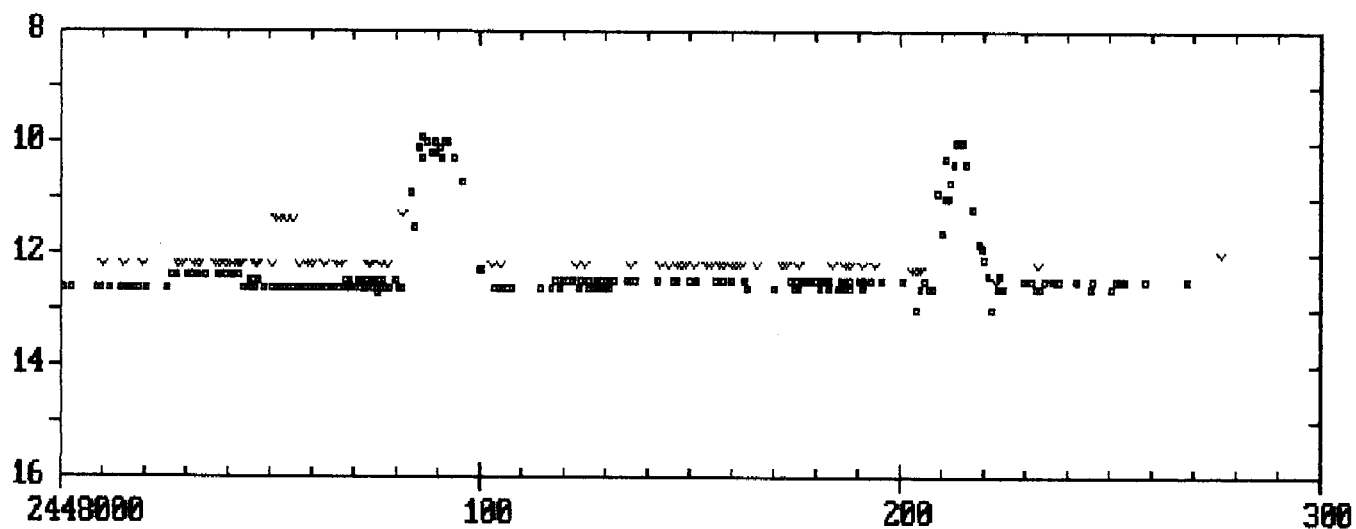
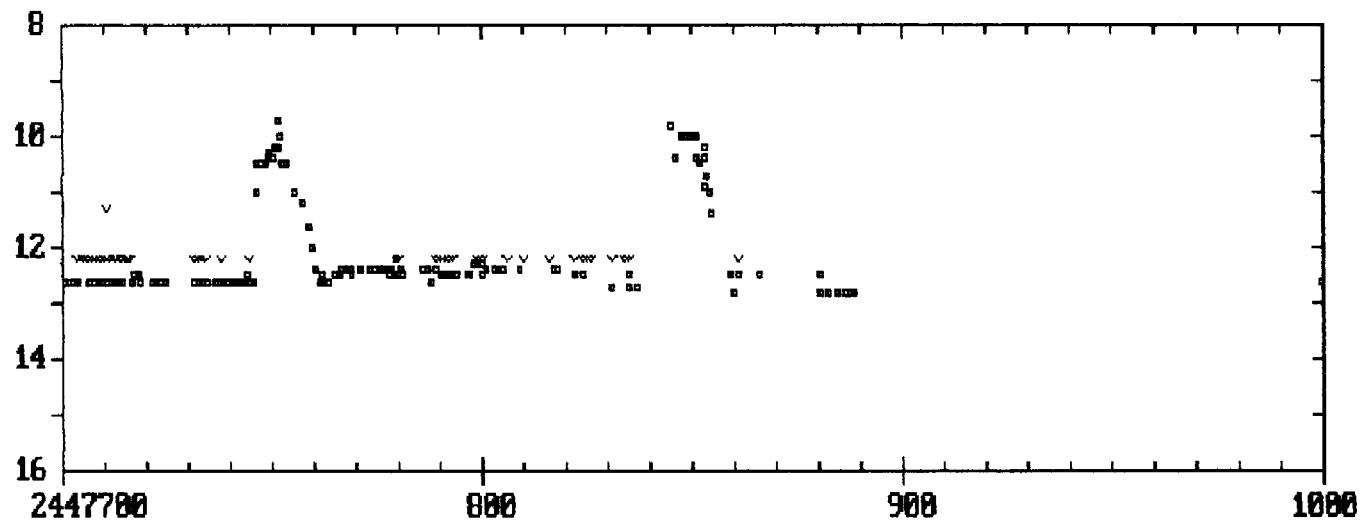


RU PEG

FIGURE 4

Light Curve From Individual Observations

J.D. 2,446,800 - 2,447,700

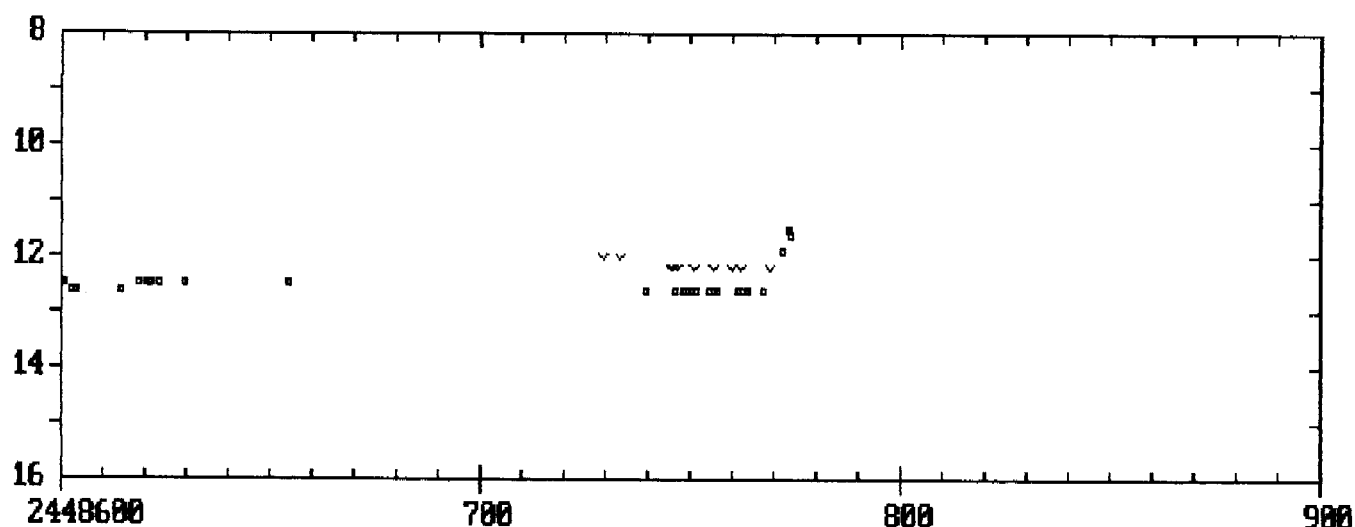


RU PEG

FIGURE 5

Light Curve From Individual Observations

J.D. 2,447,700 - 2,448,600



RU PEG

FIGURE 6

LIGHT CURVE FROM INDIVIDUAL OBSERVATIONS

J.D. 2,448,600 - 2,448,774

RU Peg is unobservable between early January and mid-April which accounts for the breaks in the light curve.

ACKNOWLEDGEMENTS

We extend Our thanks to all observers for their estimates and especially to Danie Overbeek and Abby Jones who between them accounted for 65% of the observations,

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NOVA SCORPII 1992 - PRELIMINARY LIGHT CURVE

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SUMMARY: A preliminary light curve of Nova Sco 1992 from J.D. 2,448,766 to 2,448,867 is presented.

.

1. INTRODUCTION

Nova Sco 1992 was discovered by Paul Camilleri on May 22, 1992 in the course of his Nova search programme. The discovery was confirmed by Tom Richards, who immediately produced a chart from the GSC, with comparison stars identified by letters. Mati Morel used this chart for a finder chart on May 25 and a more detailed chart on May 28. V magnitudes for the lettered comparison stars were determined later at the Mount John University Observatory by A. Gilmore. These magnitudes were shown on the final charts, Nos. 1080 and 1081 in Series 23 of Charts for Southern Variables.

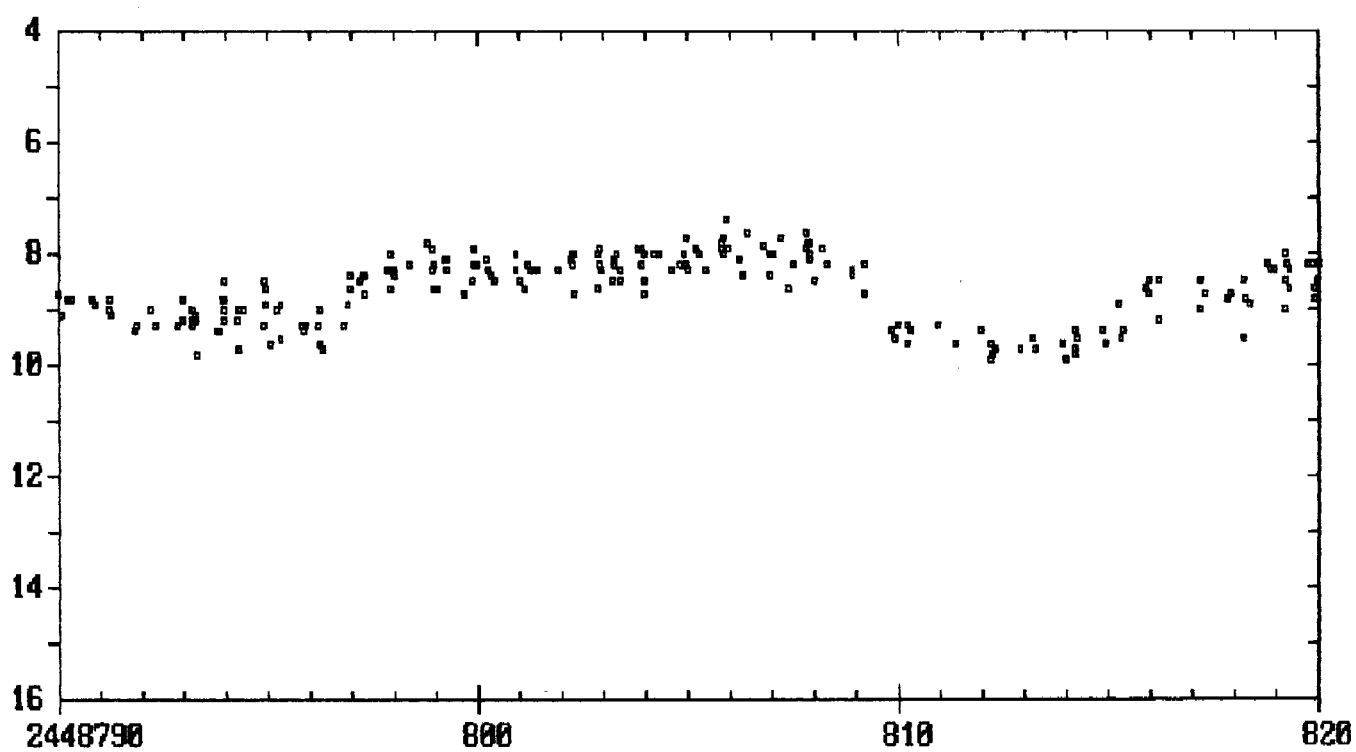
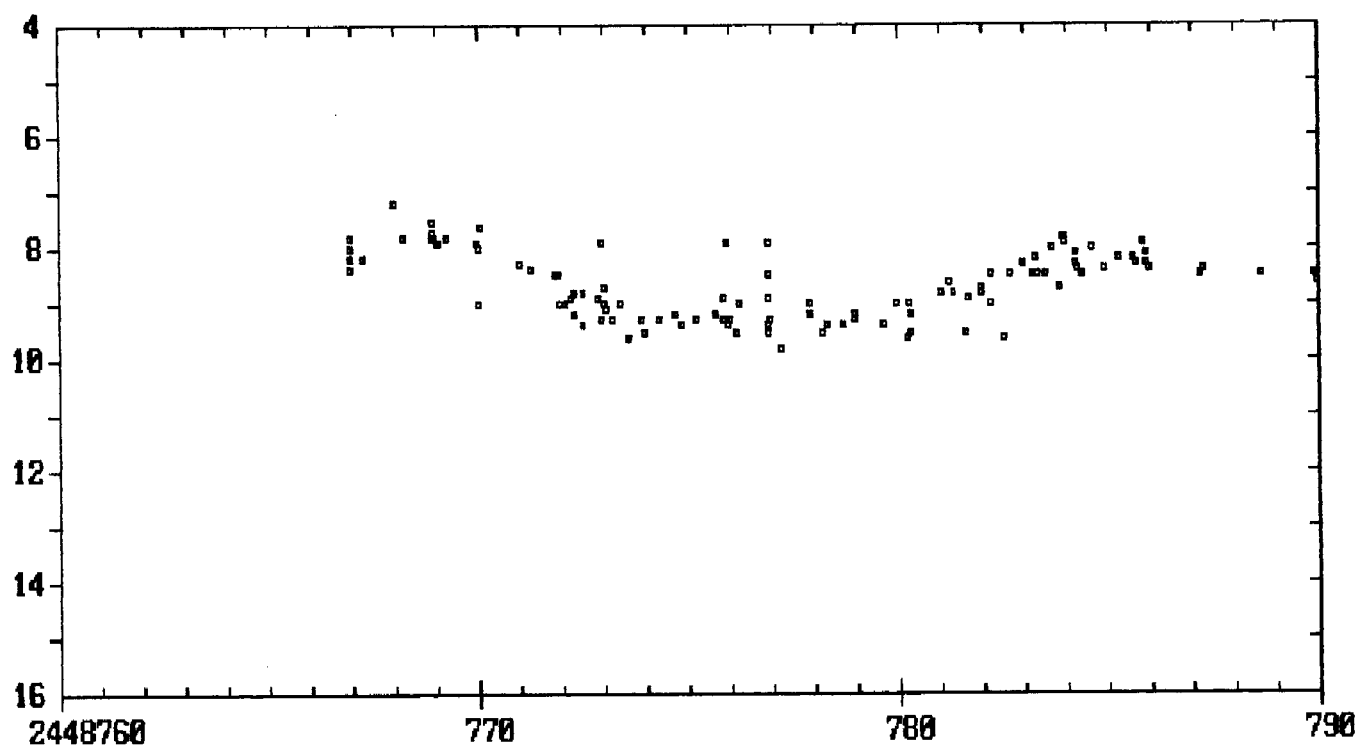
2. OBSERVATIONS

Members of the Variable Star Section, RASNZ made 612 visual observations between J.D. 2,448,766 and 2,448,867. These are plotted in Figs. 1 and 2. These plots are preliminary because some observers used comparison stars other than the lettered sequence and V magnitudes for these have yet to be measured.

3. DISCUSSION

The preliminary light curve is on a large scale which tends to exaggerate differences in the estimates on any one night. It appears, however, that the nova varied on many nights by several tenths of a magnitude. This variation is shown by the most reliable observers who made several estimates on the same night, which showed distinct changes in their estimates from hour to hour. I conclude that the nova did actually vary in brightness by from 0.3 to 0.9 magnitudes on many nights. A few points away from the main light curve are obviously due to either mis-identification or use of incorrect magnitudes for the comparison stars. These will be eliminated when the final light curve is published. The purpose of this paper is to enable observers to see the result of their observations.

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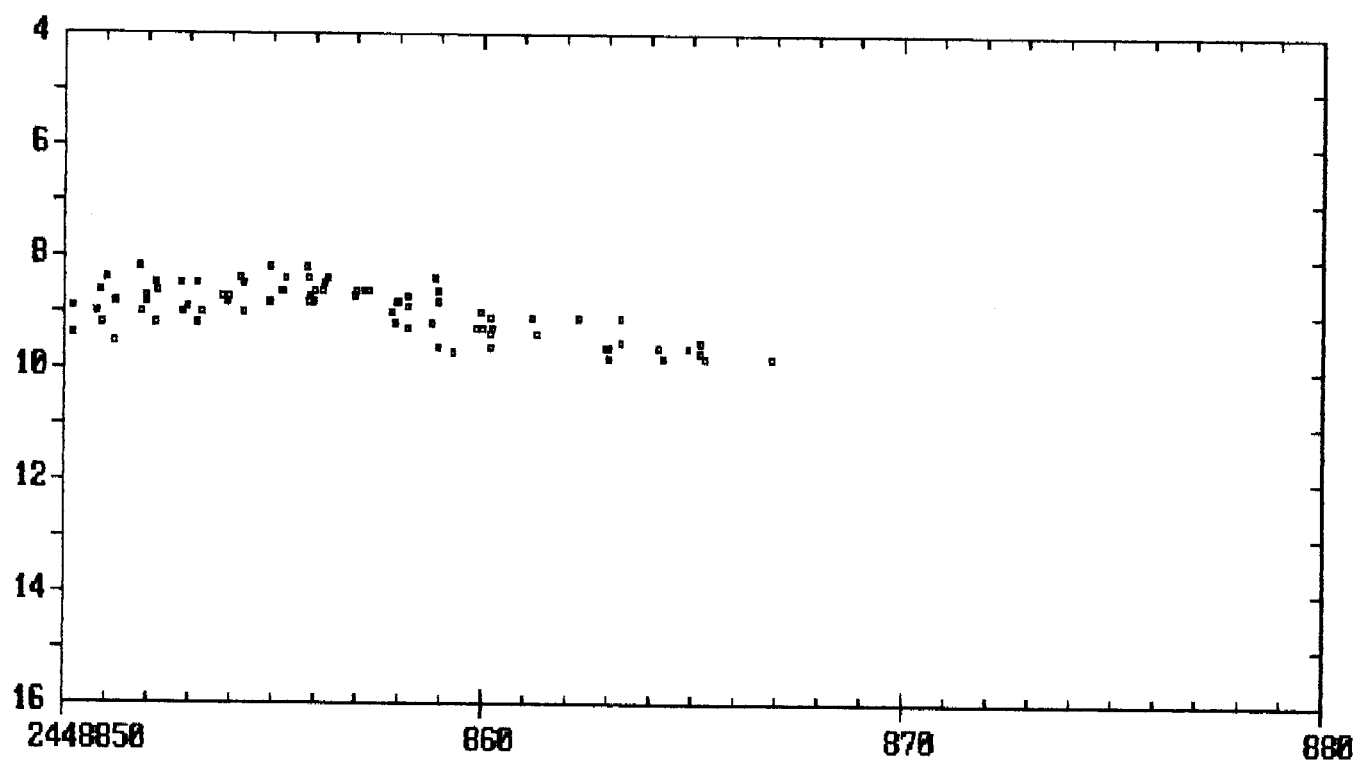
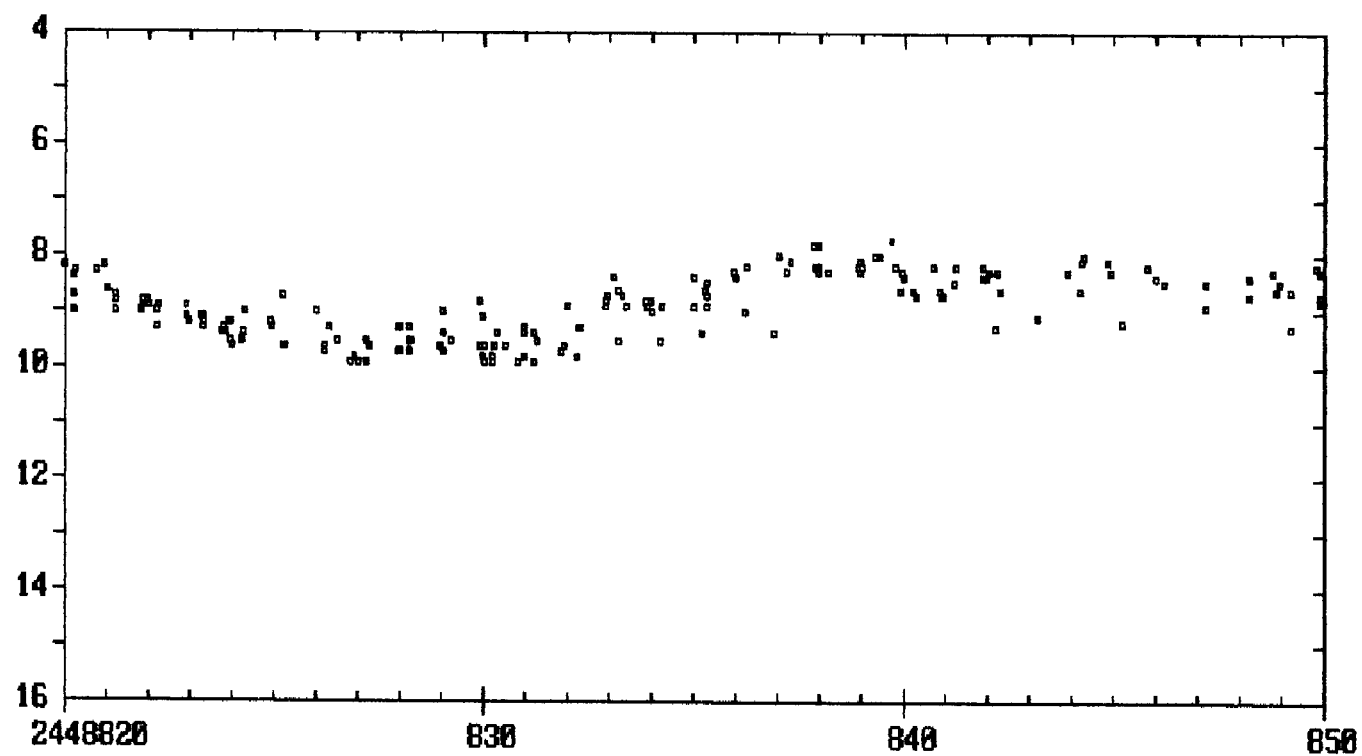


NOVA SCO 1992

FIGURE 1

LIGHT CURVE FROM INDIVIDUAL OBSERVATIONS

J.D. 2,448,766 - J.D. 2,448,820



NOVA SCO 1992

FIGURE 2

LIGHT CURVE FROM INDIVIDUAL OBSERVATIONS

J.D. 2,448,820 - 2,448,867

VISUAL OBSERVATIONS OF BL TELESCOPII

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SUMMARY: Visual observations of the 1987, 1990 & 1992 eclipses of BL Tel are summarised and discussed. Respective dates of mid eclipse for the 1987 and 1992 events are 1987 December 15.0 U.T. and 1992 March 21.5 U.T. Little can be said about the 1990 eclipse due to the lack of observations.

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1. INTRODUCTION

BL Tel is classified (1) as of type EA/GS + SR with a V range of 7.09 to 9.41. Thus it is an Algol type eclipsing system with one, or both components giants or supergiants although one component may be a main sequence star. The semi-regular variation is of pulsational character (7.09 - 7.26V), is observed outside eclipses and is sometimes represented by P=65.1 days but sometimes cannot be traced (1). The semi-regular variations are too small for visual observations.

Results for the 1983 and 1985 eclipses of BL Tel were discussed by Williams (2)&(3). These showed that BL Tel, a large amplitude long period eclipsing system, is particularly suitable for accurate visual observation. It is an ideal object for long term visual study, being observable at maximum with binoculars whilst a small telescope is capable of reaching it at minimum.

2. OBSERVATIONS

Observations were made visually with a variety of instruments. Those contributing estimates are listed in Table 1. All used the standard methods of estimating the brightness of a variable as described by Bateson (4). Williams gave a list of suitable comparison stars (2). These are shown in Fig. 1 with their magnitudes.

TABLE 1

BEMBRICK, Colin	NELSON, Peter
BRYANT, Ken	SKILTON, Peter
FARRELL, Fraser	TREGASKIS, Bruce
GOLTZ, William	WILLIAMS, Peter
HENSHAW, Colin	WILLIAMSON, Len

Figs. 2 & 3 illustrate the 1987 and 1992 eclipses. These were plotted using the "mirror image" method wherein large dots represent original observations and small dots values generated by the mirror plot. This method assumes a symmetrical shape for the light curve.

3. DISCUSSION

(A) THE 1987 ECLIPSE: This was a difficult event to observe as BL Tel was essentially a twilight object from shortly after commencement of the eclipse. Table 2 lists the 19 individual observations reported. These are plotted in Fig. 2. There appears to have been a gradual decline from magnitude 7.0 to 7.6 in seven days (0.086 mag/day) after which a more gradual fall of 0.3 magnitude over 12 days (0.025 mag/day) occurred. Finally a much steeper decline 1.5 magnitudes followed during the next 12.5 days (0.120 mag/day), reaching a minimum of 9.3. The actual date of mid eclipse cannot be determined with certainty owing to a lack of observations around minimum. The best date for mid eclipse that could be determined from the available observations is 1987 December 15.0 U.T. (GJD 2,447,144.5). The eclipse commenced on November 13.5 U.T. (GJD 2,447,113.0), suggesting a duration of 63.0 days. However, little can be stated about the rising branch of the light curve as this is solely based on mirror image plots.

(B) THE 1990 ECLIPSE: This was another unfavourable event with respect to morning twilight. The following two observations were all that were reported:

<u>GJD 2.447,000+</u>	<u>Mag</u>
936.24	7.8
939.23	7.7

All that can be said is that an eclipse occurred.

(C) THE 1992 ECLIPSE: This was a well observed event despite its predawn circumstances. A total of 130 observations were used to derive the daily means shown in Table 3. Considerable scatter is present within the raw observations and this remains apparent in the daily mean magnitude.

Figure 3 shows the visual light curve of this eclipse based on the derived means. These observations suggest the eclipse commenced on February 21.5 U.T. (GJD 2,448,674.0), reached mid-eclipse on 1992 March 21.5 U.T. (GJD 2,448,703.0) and returned to maximum on 1992 April 18.5 U.T. (GJD 2,448,731.0). Minimum light was at magnitude 9.2v and the total duration 58.0 days. Mid eclipse for this event occurred some 5 days later than predicted by Kholopov (1) who gives the elements JD 2,434,692.6 + 778.1 days. This, however, is of no great concern as BL Tel has been shown to depart from the dates of predicted mid eclipse by several days.

4. CONCLUSIONS

Williams (3) suggested on the basis of the light curve of the 1985 eclipse that BL Tel shows variations in the rates of decline and recovery during eclipses. The 1987 eclipse also suggests varying rates of change on the declining branch, as do the eclipses of 1983 (2) and 1992 but to a lesser extent.

This effect is to be expected and is seen in a number of other eclipsing systems. As the interval between successive minima varies it would be interesting to ascertain whether the rates of decline and rising from eclipses bears any relationship to the intervals between eclipses. I recommend to all observers that they monitor future eclipses closely at all phases. It is essential that all observations be accurately timed and made at frequent intervals.

ACKNOWLEDGEMENTS

I thank all observers for their estimates without which this paper could not have been written. I am indebted to Frank Bateson for his valuable comments and suggestions.

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- (4) BATESON, F.M. 1987. The Observation of Variable Stars. 4th ed. Tauranga Print Ltd. Tauranga, N.Z.

TABLE 2

Individual visual observations for 1987 eclipse of BL Tel

<u>GJD 2,447,000+</u>	<u>Mag</u>	<u>GJD 2,447,000+</u>	<u>Mag</u>
074.91	7.0	121.92	7.7
098.95	7.0	124.92	7.7
100.92	7.0	127.94	7.8
106.93	7.0	128.94	7.8
111.90	7.0	132.93	7.9
112.91	7.0	135.93	8.7
114.92	7.2	144.93	9.3
117.92	7.5	150.94	8.4
119.93	7.6	151.93	8.6
120.92	7.6		

TABLE 3

Mean of visual observations for 1992 eclipse of BL Tel

<u>GJD 2,448,000+</u>	<u>Mag</u>	<u>No.</u> <u>Obs</u>	<u>GJD 2,448,000+</u>	<u>Mag</u>	<u>No.</u> <u>Obs</u>	<u>GJD 2,448,000+</u>	<u>Mag</u>	<u>No.</u> <u>Obs</u>
661.0	7.0	1	691.0	8.20	4	717.0	8.02	3
664.0	6.8	1	692.0	8.34	5	718.0	7.80	2
669.0	7.05	2	693.0	8.43	4	719.0	8.15	2
670.0	6.95	2	694.0	8.6	1	720.0	7.75	2
671.0	7.3	1	695.0	8.67	3	721.0	7.3	1
672.0	7.30	2	696.0	8.70	3	722.0	7.75	2
674.0	7.17	3	698.0	8.87	3	723.0	7.70	3
675.0	7.27	3	700.0	9.0	1	724.0	7.60	2
676.0	7.20	2	701.0	9.1	1	725.0	7.30	2
677.0	7.30	2	702.0	9.1	1	727.0	7.4	1
678.0	7.27	3	703.0	9.20	2	728.0	7.4	1
679.0	7.75	2	705.0	8.80	2	729.0	7.2	1
680.0	7.63	4	706.0	8.8	1	730.0	7.1	1
681.0	7.40	2	707.0	8.6	1	732.0	7.1	1
683.0	7.7	1	708.0	8.80	2	734.0	7.2	1
684.0	7.6	1	709.0	9.07	3	736.0	7.10	2
685.0	7.90	2	711.0	8.65	2	737.0	7.00	3
686.0	7.80	2	712.0	8.6	1	738.0	7.0	1
687.0	8.20	2	713.0	8.47	3	739.0	7.00	2
688.0	8.10	2	714.0	8.40	3	741.0	7.0	1
689.0	7.9	1	715.0	8.4	1	743.0	7.0	1
690.0	8.20	2	716.0	8.3	1			

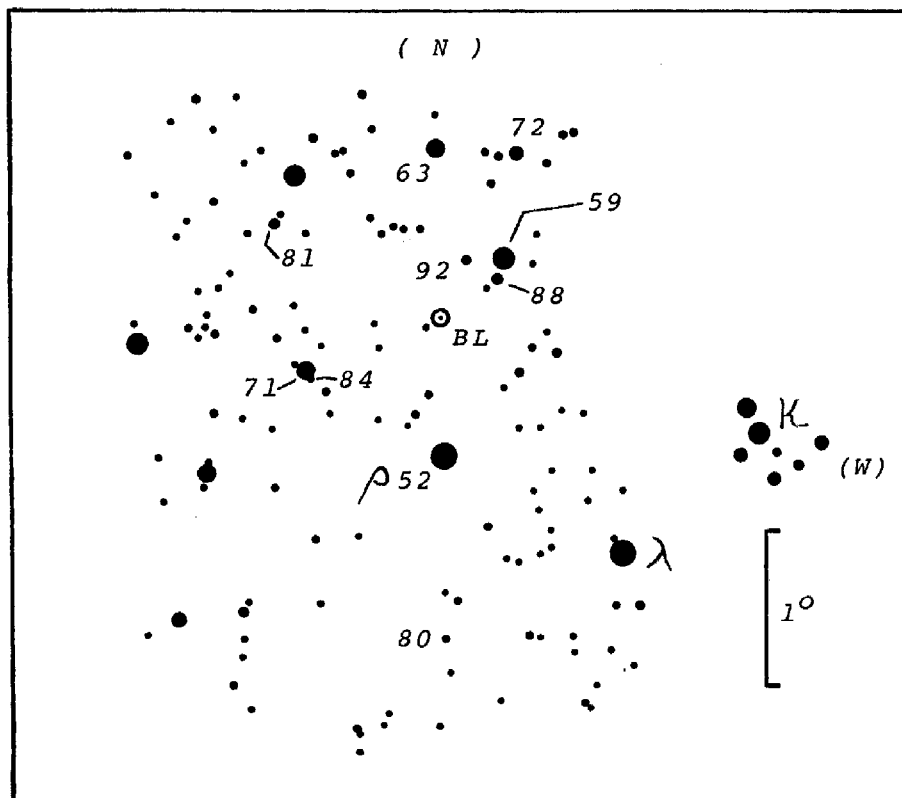


FIGURE 1

BL TEL

Identification Chart

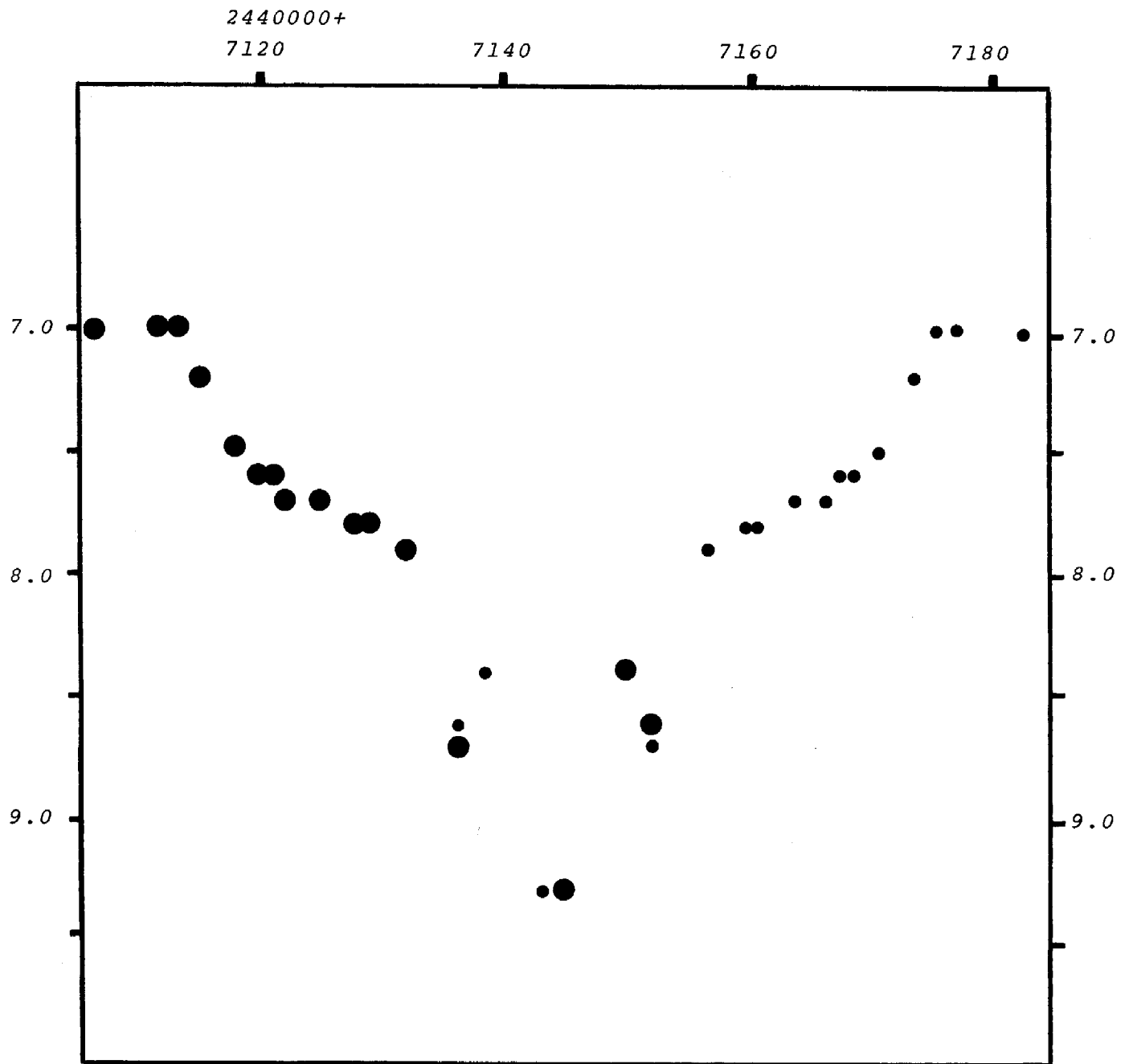
BL TELESCOPII

FIGURE 2

BL TEL

Light curve of the 1987 eclipse

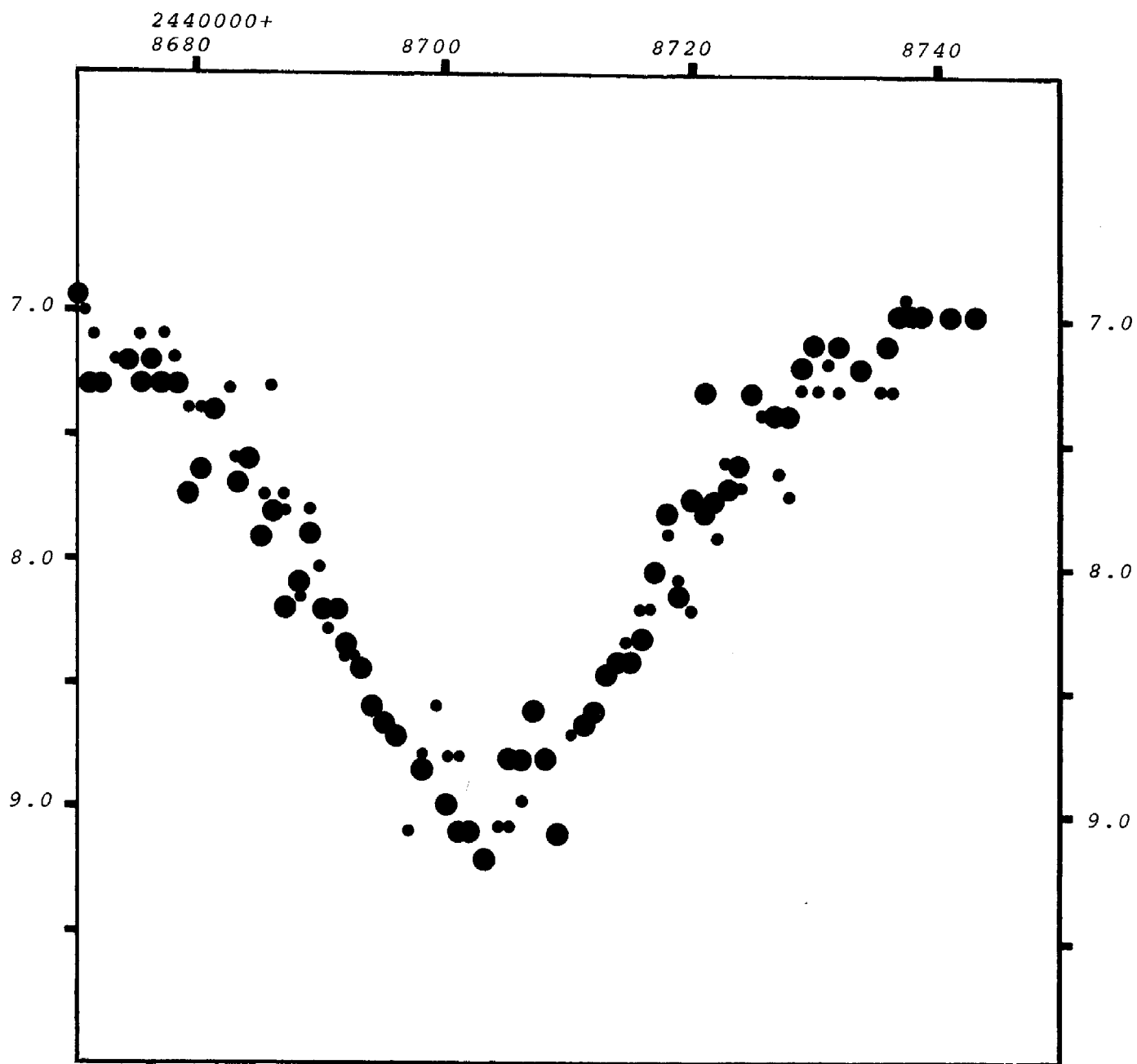
BL TELESCOPII

FIGURE 3

BL TEL

Light curve of the 1992 eclipse

A POSSIBLE OUTBURST OF V430 CARINAE

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SUMMARY: A series of visual observations of V430 Carinae = HD 96446 is presented, covering the interval JD 2,443,610 to JD 2,444,116 (1978 April 10 to 1979 August 30). There is tantalizing evidence for a prolonged and unusual brightening of this star, by about 0.5 magnitude. Attention is drawn to the possibility of this star being more strongly variable than previously thought.

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1. INTRODUCTION

HD 96446, located at R.A. (1950) 11h 03m 59s, Dec. (1950) -59 40.8, is a star of unusual spectral characteristics. Its spectral type has been variously classified as B2 IIIp, B2 V He and B3 Vp (1). It is classified as a Helium star with lines of varying strength (2). The Helium lines are very strong, according to (3). It is a member of an open cluster or stellar group first studied in detail by Feinstein (4). He gives the following UBV data for HD 96446 - $V = 6.68$; $B-V = -0.16$; $U-B = -0.87$.

HD 96446 has been studied photometrically by Matthews and Bohlender (5) who determined small amplitude (0.03V) variations, consistent with Beta Cephei-type variability. On this basis the star has been named V430 Carinae (6).

This paper describes my own observations of this star.

2. CHARTS AND SEQUENCE

HD 96446 = V430 Car is plotted on chart 452 (7), (8), but is not labelled. It lies on an E-W line between stars '83' and '84'. A list of V magnitudes suitable for observation of U Car is given by Morel (7). Three of these stars are especially useful for observing V430 Car, namely HD 95880 (6.9V), HD 96248 (6.6V) and HD 95324 (6.2V).

Fig. 1 shows the immediate vicinity of V430 Car in greater detail.

3. OBSERVATIONS

My attention was first drawn to this star in 1978 April, purely by chance. I was engaged in the preparation of a chart and sequence for the bright Cepheid U Carinae, which lies a little to the west. HD 96446 and neighbouring stars appeared to be suitable for use as comparison stars for a campaign on U Car, described in (7). None of the bright

stars in the vicinity of HD 96446 was known or suspected to be variable at that time. Upon observing the field for the first time on 1978 April 10, I noticed that HD 96446 appeared to be noticeably brighter than its published magnitude. The discordance was quite striking, especially when comparing it with nearby HD 96248 ($V=6.55$, spec. type B0). The star was thereafter observed regularly (apart from seasonal gap) until 1979 August 30. The observations from JD 2,443,610 to 2,443,747 were made with 20 x 65 mm binoculars (tripod mounted). When observations resumed on 2,443,902 I used 10 x 50 mm binoculars exclusively until monitoring was terminated on JD 2,444,117.

The star appeared to be unusually bright in 1978 April-May.

4. DISCUSSION

My observations are presented in the form of a light curve (Fig 2). The large scale of this curve permits me to make the following comments on the gross features of V430 Car's behaviour.

- (a) JD 2,443,610 to 2,443,617. Very steady at 6.2v.
- (b) JD 2,443,625 to 2,443,685. The overall trend is a decline in magnitude, possibly with fluctuations. There is much scatter in the points during this phase, and it is impossible to state how much of the variation is real, and how much is due to observational error. The night-to-night fluctuations are more erratic here than in other parts of the light curve.
- (c) JD 2,443,697 to 2,443,950. Fairly steady at about 6.7v with few, if any, significant fluctuations. During this phase the observed magnitude agreed well with the published value for V (6.68). There were no observations from JD 2,443,747 to 2,444,902.
- (d) JD 2,443,953 to 2,444,030. The observations suggest a slight overall brightening, but it is not possible to be certain about this, as any such increase would have barely exceeded the normal errors of observation.
- (e) JD 2,444,030 to 2,444,117. Observations are very few and widely scattered, but do not indicate any further rises of a protracted nature.

The ability of individual visual observers to resolve small amplitude features in a light curve has been discussed recently by Lawson et al (9), who demonstrated that the estimates of very experienced visual observers can be quite accurate down to the 0.1 mag level. Whilst I do not claim that my estimates are all accurate to ± 0.1 mag, I do consider that consistent estimates that are 0.5 mag above the normal level, as recorded for V430 Car, do represent an increase in brightness that is real. Obviously, corroboration and confirmation is required from other observers to validate my observations.

5. CONCLUSION

There is sufficient information to suggest that in 1978 April/May, V430 Car did show unusual behaviour (a mini-outburst?). The observations reported here do not cover the early part of the rise, so the duration, and other features, are not known. Confirmation of the event is needed, possibly from suitable archival photographs. My own observations are reported here to draw attention to V430 Car and its potential for substantial variations in brightness.

6. REFERENCES

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1992 PVSS...18...17M

A Possible Outburst
of V430 Carinae

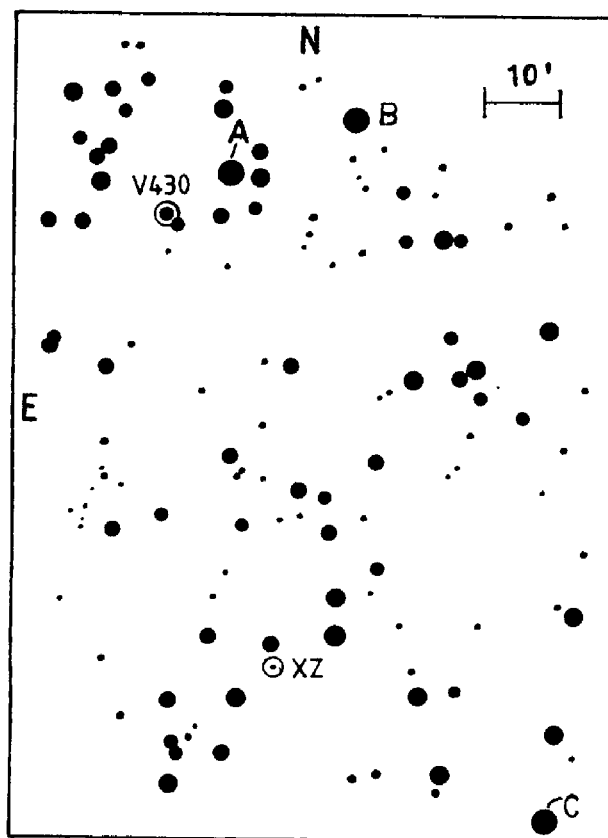
V430 CARINAE

Fig. 1. Identification chart for
V430 Car and comparison stars.
 A = HD 96248; B = HD 95880;
 C = HD 95324.

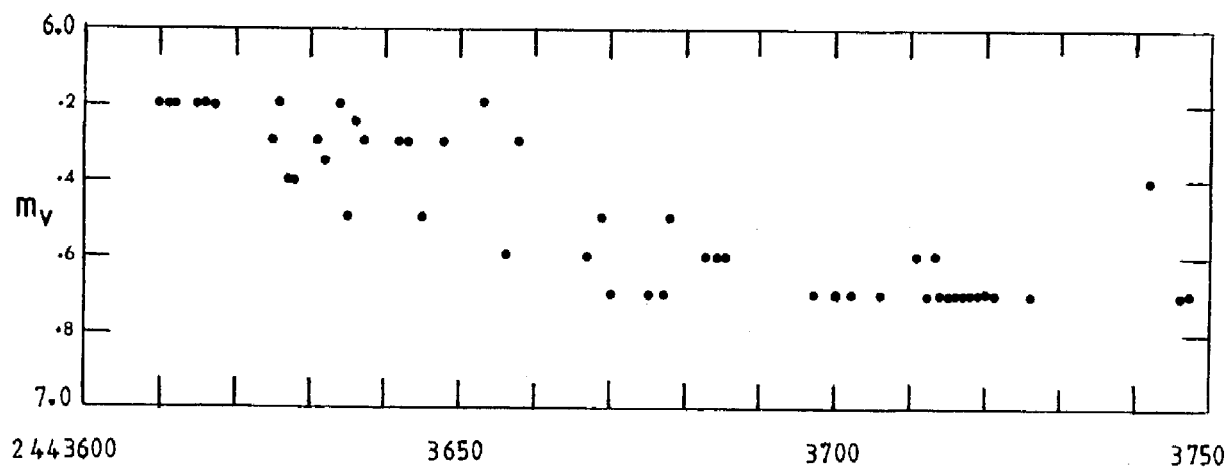
V 430 CARINAE

Fig. 2(a). JD 2,443,600 - 2,443,750.

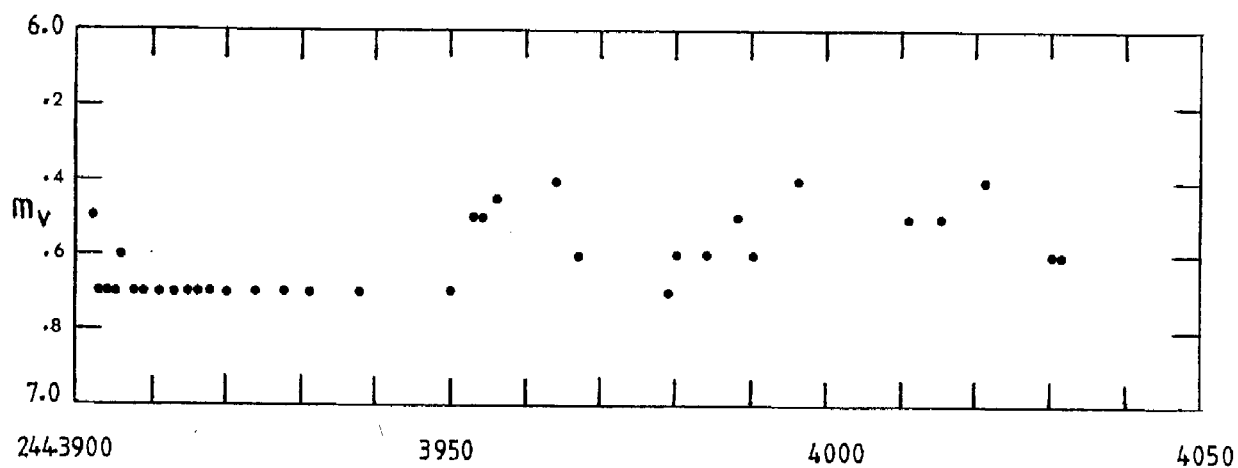


Fig. 2(b). JD 2,443,900 - 2,444,050.

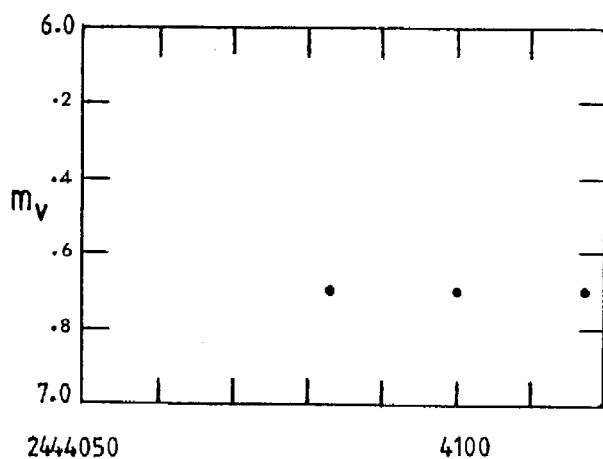


Fig. 2(c). JD 2,444,050 - 2,444,120

Fig. 2. Visual light curve for V430 Carinae. Individual observations.

OBSERVATIONS OF THE TRANSIENT X-RAY SOURCE A0538-66

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SUMMARY: Positive visual observations of A0538-66 are tabulated. No definite recurrent cycle is apparent. Two possible flares were recorded. Otherwise fluctuations over a small range occurred. It is pointed out that observers using telescopes with thresholds of 14.0, or slightly brighter, mistake a 13th magnitude star immediately south of the x-ray source for the latter.

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1. INTRODUCTION

A0538-66 is an extremely powerful LMC recurrent x-ray transient source. P.A. Charles et al (1) discussed photometric, spectroscopic and satellite data from which a model of this system was proposed. It was also shown that A0538-66 had a recurrent period of 16.6 days but it also had intervals of inactivity.

2. OBSERVATIONS

Members of the Variable Star Section, RASNZ, made 867 visual estimates between J.D. 2,446,882 and 2,448,771. Most were negative as can be seen from the light curve in Figs. 1 and 2.

All observations were made using Charts 630 and 631 (2) and the sequence of comparison stars thereon with V magnitudes. Some observers using apertures with thresholds of 14.0 or slightly brighter reported positive observations ranging from 13.3 to 13.6 with a mean value of 13.47. I am satisfied that these observations were of a star of magnitude 13.5 that lies very close to A0538-66 and immediately south of it. The two objects cannot be separated in small telescopes. In fact A0538-66 would normally be invisible in such telescopes so that an observer would mistake the 13th magnitude star for the variable. This view is supported by observations made with larger apertures that showed A0538-66 was at least a magnitude fainter close to the time when estimates of around 13.5 were made. All positive observations made with small apertures have therefore been rejected.

Three observers used larger instruments capable of separating the two objects. These members are shown below with the range of their estimates and the number of positive observations each made given in brackets. Their positive observations are listed in Table 1. On a few occasions they also reported negative estimates when AO538-66 was invisible and fainter than 14.5 to 14.7. These observations are not shown in Table 1.

CRAGG, T.A.	(Cj)	13.1? - 15.8	(35)
GOLTZ, W.	(Gp)	14.0 - 15.0	(133)
NELSON, P.	(Nl)	13.7? - 15.0	(49)

The observations are scattered in time and mainly confined to the main LMC observing season. All three observers operate from dark sites.

3. DISCUSSION

Usually the estimates from Cragg and Goltz indicate continuous fluctuations in brightness with some distinct peaks between 14.0 and 14.3. However Cragg normally made AO538-66 definitely fainter than did Goltz. The observations by Nelson generally showed a small range being mainly centred around magnitude 14.5.

Two possible flares were recorded and are marked in Table 1 by question marks and must be regarded with caution in the absence of confirming estimates. The first, magnitude 13.7, was reported by Nelson on J.D. 2,447,188, may indicate activity as the same observer estimated the variable at 14.0 on the previous night. The second possible flare, magnitude 13.1, was recorded by Cragg on J.D. 2,447,295, has no other observations near it.

There is no evidence for a recurrent cycle due to the scattered nature of the observations. The light curve (Figs. 1 & 2) indicate that AO538-66 mainly varied between 14.3 and 15.0 with most of Cragg's points falling below 15.0. It should be noted that the brighter observations that were rejected as referring to the star immediately south of the variable have not been erased from the curves and should be ignored.

4. CONCLUSIONS

No firm conclusions can be drawn from the data apart from stating that there appears to have been an absence of flare like activity with the exception of two very doubtful examples. This may be due to the scattered nature of the observations which also obscured any evidence for a recurrent cycle. Possibly during most of the interval covered by the observations AO538-66 was comparatively inactive but the limitations of the data make this uncertain.

One definite conclusion can be stated. It is a waste of time and effort for observers using telescopes with thresholds of 14.0, or slightly brighter, to observe this object.

ACKNOWLEDGEMENTS

My appreciation is extended to Tom Cragg, Bill Goltz and Peter Nelson for their observations and to Ranauld McIntosh for the light curves and computer print-out of the data.

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TABLE 1

A0538-66 - POSITIVE OBSERVATIONS

<u>J.D.</u> <u>2,44</u>	<u>Mag</u> <u>v</u>	<u>Obs</u>	<u>J.D.</u> <u>2,44</u>	<u>Mag</u> <u>v</u>	<u>Obs</u>	<u>J.D.</u> <u>2,44</u>	<u>Mag</u> <u>v</u>	<u>Obs</u>
6,886.9	14.7	Cj	7,144.01	15.0	N1	7,188.19	14.8	Gp
6,905.91	14.7	Gp	7,145.99	14.5	N1	7,189.03	14.0	N1
6,906.89	14.4	Gp	7,147.0	14.8	Gp	7,202.0	15.0	Cj
6,907.92	14.7	Gp	7,148.2	14.8	Gp	7,210.0	15.0	Cj
6,910.89	14.6	Gp	7,156.0	15.8	Cj	7,212.0	15.3	Cj
6,912.88	14.4	Gp	7,168.99	14.5	N1	7,215.00	15.0	N1
6,914.88	14.2	Gp	7,170.01	14.8	Gp	7,229.0	15.3	Cj
7,059.12	14.8	Gp	7,171.00	14.5	N1	7,230.96	14.5	N1
7,062.06	14.7	Gp	7,171.02	14.8	Gp	7,234.0	15.2	Cj
7,080.02	14.5	Gp	7,172.0	14.6	Cj	7,245.9	15.3	Cj
7,082.05	14.7	Gp	7,172.02	14.8	Gp	7,263.9	15.2	Cj
7,089.02	14.8	Gp	7,177.18	14.8	Gp	7,269.01	14.5	N1
7,094.04	14.8	Gp	7,179.20	14.8	Gp	7,271.9	15.0	Cj
7,097.1	15.1	Cj	7,180.21	14.8	Gp	7,295.9	13.1?	Cj
7,112.0	15.5	Cj	7,181.19	14.8	Gp	7,418.09	14.5	N1
7,136.99	14.5	Gp	7,182.19	14.7	Gp	7,434.0	15.2	Cj
7,140.03	14.7	Gp	7,185.19	15.0	Gp	7,465.05	14.5	N1
7,141.0	14.5	N1	7,186.18	15.0	Gp	7,466.01	14.5	N1
7,142.03	14.8	Gp	7,187.07	14.0	N1	7,466.98	14.5	N1
7,144.0	14.7	Gp	7,188.02	13.7?	N1	7,471.99	14.5	N1

TABLE 1 (Cont.)

A0538-66 - POSITIVE OBSERVATIONS

<u>J.D.</u> <u>2,44</u>	<u>Mag</u> <u>v</u>	<u>Obs</u>	<u>J.D.</u> <u>2,44</u>	<u>Mag</u> <u>v</u>	<u>Obs</u>	<u>J.D.</u> <u>2,44</u>	<u>Mag</u> <u>v</u>	<u>Obs</u>
7,473.92	14.5	N1	7,859.14	14.5	Gp	8,190.24	14.5	Gp
7,474.0	15.1	Cj	7,863.14	14.5	Gp	8,191.00	14.1	N1
7,475.95	15.0	N1	7,865.14	14.5	Gp	8,208.0	15.5	Cj
7,477.01	14.5	N1	7,867.16	14.7	Gp	8,220.18	14.5	Gp
7,478.01	14.5	N1	7,870.20	14.5	Gp	8,236.05	14.5	Gp
7,507.99	15.0	N1	7,877.04	14.7	Gp	8,237.0	15.7	Cj
7,509.99	14.0	N1	7,879.0	15.2	Cj	8,238.20	14.7	Gp
7,532.00	14.3	N1	7,882.05	14.7	Gp	8,254.18	14.3	Gp
7,535.0	15.2	Cj	7,885.19	14.5	Gp	8,264.00	14.7	Gp
7,536.01	14.5	N1	7,890.17	14.7	Gp	8,264.99	14.4	Gp
7,538.99	15.0	N1	7,910.03	14.5	Gp	8,265.0	15.1	Cj
7,541.12	15.0	N1	7,914.0	14.7	Cj	8,269.01	14.4	Gp
7,553.05	14.5	N1	7,914.19	14.7	Gp	8,270.07	14.5	N1
7,554.02	15.0	N1	7,917.15	14.5	Gp	8,278.02	14.5	Gp
7,555.00	14.7	N1	7,920.00	14.3	Gp	8,281.00	14.7	Gp
7,558.95	14.5	N1	7,929.19	14.5	Gp	8,284.20	14.7	Gp
7,560.01	14.5	N1	7,937.99	14.5	Gp	8,291.99	14.7	Gp
7,563.02	15.0	N1	7,940.97	14.3	Gp	8,292.0	15.1	Cj
7,566.1	15.0	Cj	7,941.0	15.0	Cj	8,294.98	14.8	Gp
7,569.03	15.00	N1	7,942.97	14.3	Gp	8,298.19	14.5	Gp
7,583.0	15.2	Cj	7,945.94	14.3	Gp	8,303.0	15.3	Cj
7,588.06	15.0	N1	7,948.95	14.5	Gp	8,305.98	14.3	Gp
7,597.9	15.1	Cj	7,951.95	14.5	Gp	8,307.98	14.5	Gp
7,613.9	15.2	Cj	7,966.93	14.5	Gp	8,320.95	14.3	Gp
7,627.9	15.1	Cj	7,968.0	15.5	Cj	8,321.0	15.1	Cj
7,677.89	14.5	Gp	7,969.92	14.5	Gp	8,322.96	14.5	Gp
7,749.33	14.7	Gp	7,973.01	14.5	Gp	8,333.9	14.8	Cj
7,772.29	14.5	Gp	7,977.03	14.5	N1	8,335.94	14.4	Gp
7,776.30	14.7	Gp	7,978.95	14.5	Gp	8,338.96	14.3	Gp
7,791.1	15.4	Cj	7,979.96	14.5	N1	8,350.9	14.7	Cj
7,804.03	14.5	Gp	7,980.93	14.3	Gp	8,351.93	14.4	Gp
7,805.23	14.3	Gp	7,985.00	14.2	N1	8,355.93	14.4	Gp
7,819.06	14.5	Gp	8,003.02	14.7	Gp	8,362.92	14.4	Gp
7,823.04	14.7	Gp	8,007.95	14.5	Gp	8,378.90	14.7	Gp
7,831.20	14.2	Gp	8,010.93	14.5	Gp	8,383.89	14.7	Gp
7,833.02	14.3	Gp	8,028.91	14.5	Gp	8,389.90	14.7	Gp
7,835.17	14.5	Gp	8,029.91	14.5	Gp	8,389.98	14.5	N1
7,852.14	14.5	Gp	8,039.90	14.5	Gp	8,391.89	14.4	Gp
7,856.01	14.3	Gp	8,055.87	14.4	Gp	8,393.91	14.4	Gp
7,857.14	14.5	Gp	8,160.26	14.5	Gp	8,411.89	14.4	Gp

TABLE 1 (Cont.)

A0538-66 - POSITIVE OBSERVATIONS

<u>J.D.</u> 2,44	<u>Mag</u> <u>v</u>	<u>Obs</u>	<u>J.D.</u> 2,44	<u>Mag</u> <u>v</u>	<u>Obs</u>	<u>J.D.</u> 2,44	<u>Mag</u> <u>v</u>	<u>Obs</u>
8,420.88	14.5	Gp	8,645.99	14.4	Gp	8,716.98	14.5	N1
8,506.30	14.5	Gp	8,647.00	14.6	N1	8,718.96	14.8	Gp
8,529.99	14.5	N1	8,651.00	14.6	Gp	8,720.93	14.0	Gp
8,534.25	14.4	Gp	8,651.99	14.5	Gp	8,768.89	14.3	Gp
8,542.23	14.5	Gp	8,655.99	14.6	Gp	8,768.93	14.2	Gp
8,561.06	14.7	Gp	8,659.00	14.4	Gp	8,771.87	14.5	Gp
8,565.22	14.5	Gp	8,663.02	14.7	Gp			
8,574.21	14.4	Gp	8,665.0	15.1	Cj			
8,578.22	14.5	Gp	8,667.23	14.7	Gp			
8,584.98	14.5	Gp	8,675.97	14.5	Gp			
8,593.97	14.5	N1	8,676.98	14.5	N1			
8,598.19	14.5	Gp	8,677.95	14.5	Gp			
8,599.0	15.3	Cj	8,679.99	14.5	N1			
8,600.98	14.5	N1	8,680.9	15.4	Cj			
8,602.21	14.7	Gp	8,689.95	14.7	Gp			
8,619.20	14.4	Gp	8,690.99	15.0	N1			
8,622.04	14.5	Gp	8,707.0	15.0	Cj			
8,625.1	15.2	Cj	8,707.93	14.7	Gp			
8,634.00	14.5	N1	8,715.0	15.5	Cj			
8,636.21	14.7	Gp	8,715.90	14.4	Gp			

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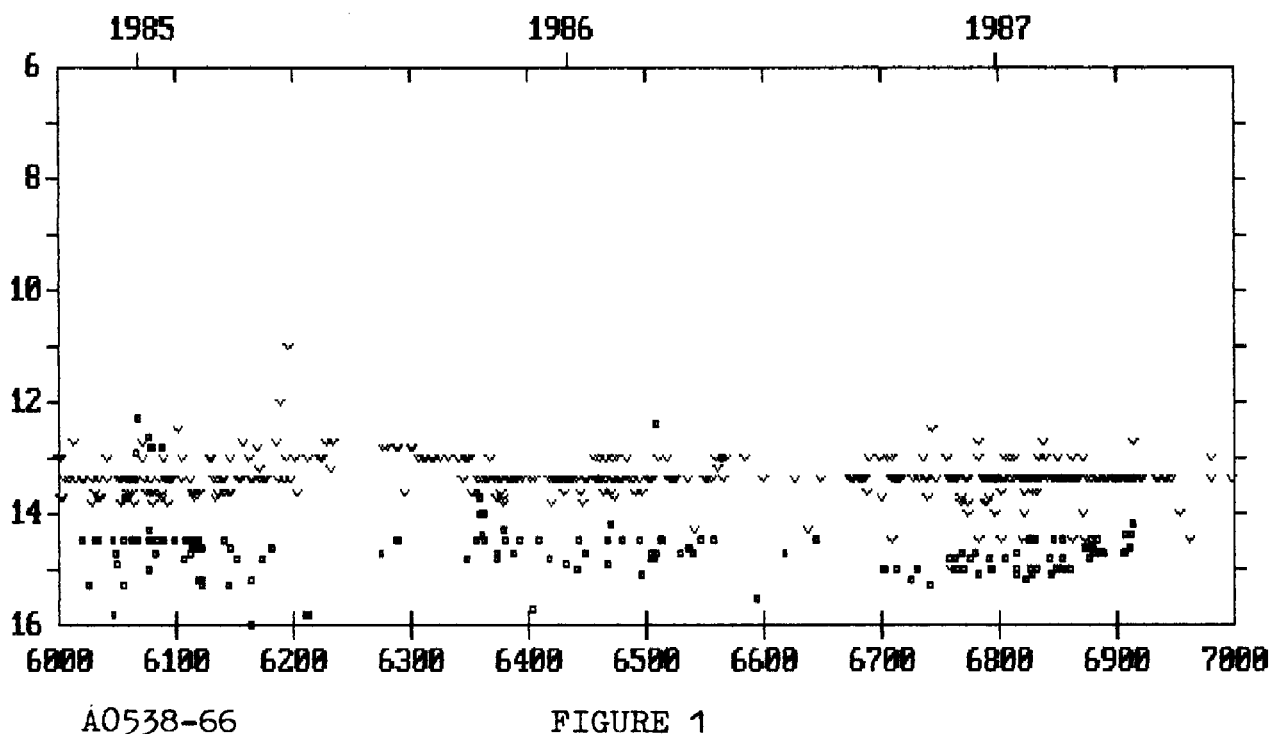
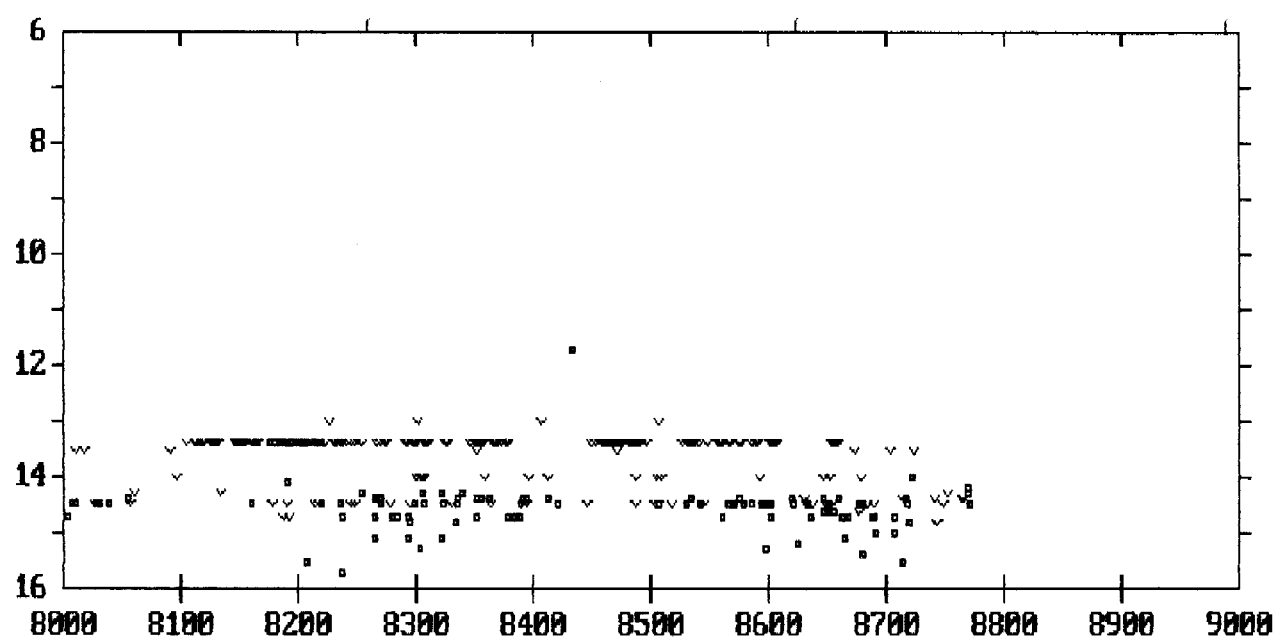
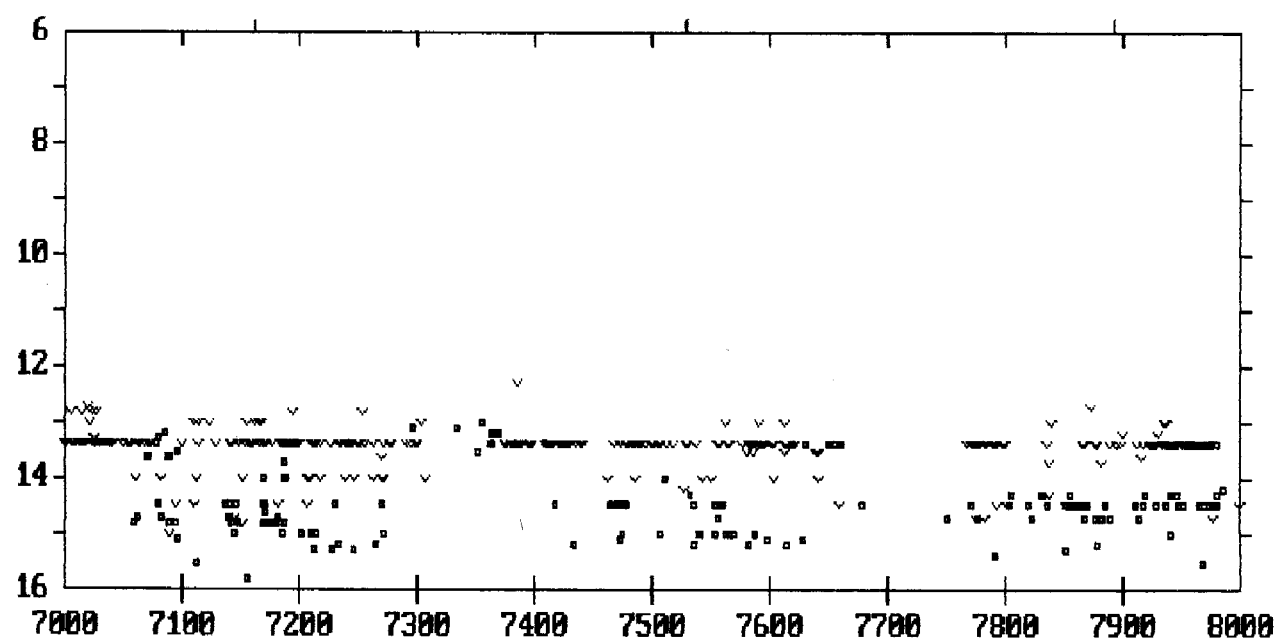


FIGURE 1
LIGHT CURVE FROM INDIVIDUAL OBSERVATIONS
J.D. 2,446,000 - J.D. 2,447,000



A0538-66

FIGURE 2

LIGHT CURVE FROM INDIVIDUAL OBSERVATIONS

J.D. 2,447,000 - J.D. 2,448,771

THE DISCOVERY OF NOVA PUPPIS 1991

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SUMMARY: An account of how Nova Pup 1991 was discovered is given. This nova could have easily been discovered visually had any one been observing the old nova CP Pup in December 1991.

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I bought a 85mm f/2 lens and EM camera body after the discovery of Nova Oph 1991 No.2. I began taking photos on November 24 1991, but found only some known variables by the end of the moon free period in mid December.

A lot of high level cloud after the December full moon prevented me from taking any photos until December 27. However this high level cloud persisted so that the limiting magnitude of my photos was 9 instead of the usual 12. The next day I searched a few of the photos but decided to leave the rest until the sky cleared and I could retake these fields down to magnitude 12, after which I would search all fields.

The clouds cleared by January 1 enabling me to photograph all my usual fields again. The next day I searched most of the photos finding only a few known variables. I did not have time to search six of the fields I had taken. On January 3 I searched two of these photos finding nothing. I then cut and mounted the third photo and began to search it. I noticed a bright 7th magnitude star near the top centre of the photo. This object was not visible on a photo I had taken on December 11 which reached down to magnitude 12. I was therefore certain it was a nova. I had taken photos of this area on December 27 so on examining these I found that the nova was slightly brighter on them. On comparing the field with the Uranometria Atlas I found that the nova was close to the variable, Y Pup and the old nova CP Pup (Nova Pup 1942). I thought for a few seconds that CP Pup was having another outburst until a closer look showed that the new object was about 14 arc minutes north of CP Pup. I was certain that I had discovered a nova after comparing my photos to atlases that had a limiting magnitude of 15 and showed no object at the position of the nova. I then measured the position of the nova on my photos and checked that this was not identical with any known or suspected variable listed in the catalogues.

Once I was satisfied that it was a nova and I had measured its position as well as determining its magnitude on my photos it was a matter of advising Rob McNaught, Frank Bateson and Alan Gilmore, so that confirmation could be made of the discovery, accurate positions measured and advice sent to Brian Marsden. The resultant details have already been published so there is no need to repeat them here.

It was at this stage I realised, because the nova was close to CP Pup, that there was already available a suitable chart with a good sequence. It is worth pointing out that had any visual observer been observing CP Pup the nova could easily have been discovered visually.

Nova Pup 1991 is the first nova to be discovered in Puppis since 1963 and the fifth to be found in that constellation. I suggest that the few discoveries of novae in Puppis is simply due to the lack of searches in this area. I estimate that this area of the Milky Way should produce 2 or 3 novae each year.

It is interesting to recall that, excluding novae in the Magellanic Clouds, the years with the most novae discoveries have been:

1936 (7); 1962 (6); 1975 (6); 1991 (8)

As far as I know I have found the most novae discovered by any observer in one year. This is a record I hope to keep adding to.

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LIGHT CURVE OF NOVA PUPPIS 1991

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SUMMARY: The light curve of Nova Puppis shows a decline of three magnitudes in 286 days. The decline rate for the first 50 days was 0.03 magnitudes per day, thereafter it was 0.003 magnitudes per day.

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1. OBSERVATIONS

The light curve of Nova Pup 1991 appears in Fig. 1. This is based on 637 observations made by members of the Variable Star Section, RASNZ from J.D. 2,448,624 to 2,449,047. The estimates were made using the visual sequence for CP Pup as shown on charts 1078/9 (1). This sequence was subsequently replaced by the V magnitudes for comparison stars determined by Alan Gilmore at Mt. John University Observatory (2;3).

2. DISCUSSION

Daily Means were used to determine the decline rate. Nova Pup 1991 declined at 0.03 mags per day for the first 50 days. Thereafter this rate slowed to 0.003 mags/day. A decline of three magnitudes from a maximum of 8.80 occurred in 286 days.

3. CONCLUSION

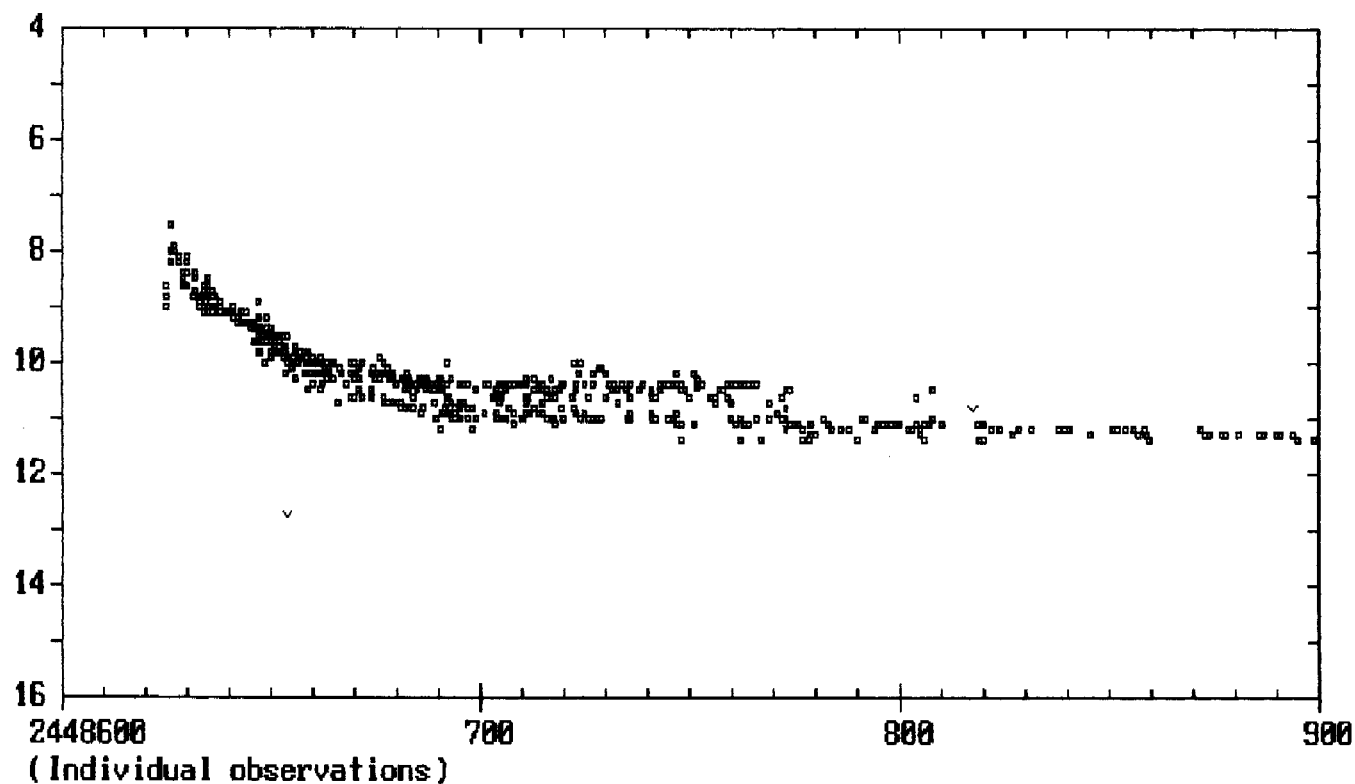
Nova Pup 1991 is a slow nova. The observations are continuing.

ACKNOWLEDGEMENTS

All observers are thanked for their estimates.
 Ranald McIntosh kindly produced the computer light curve.

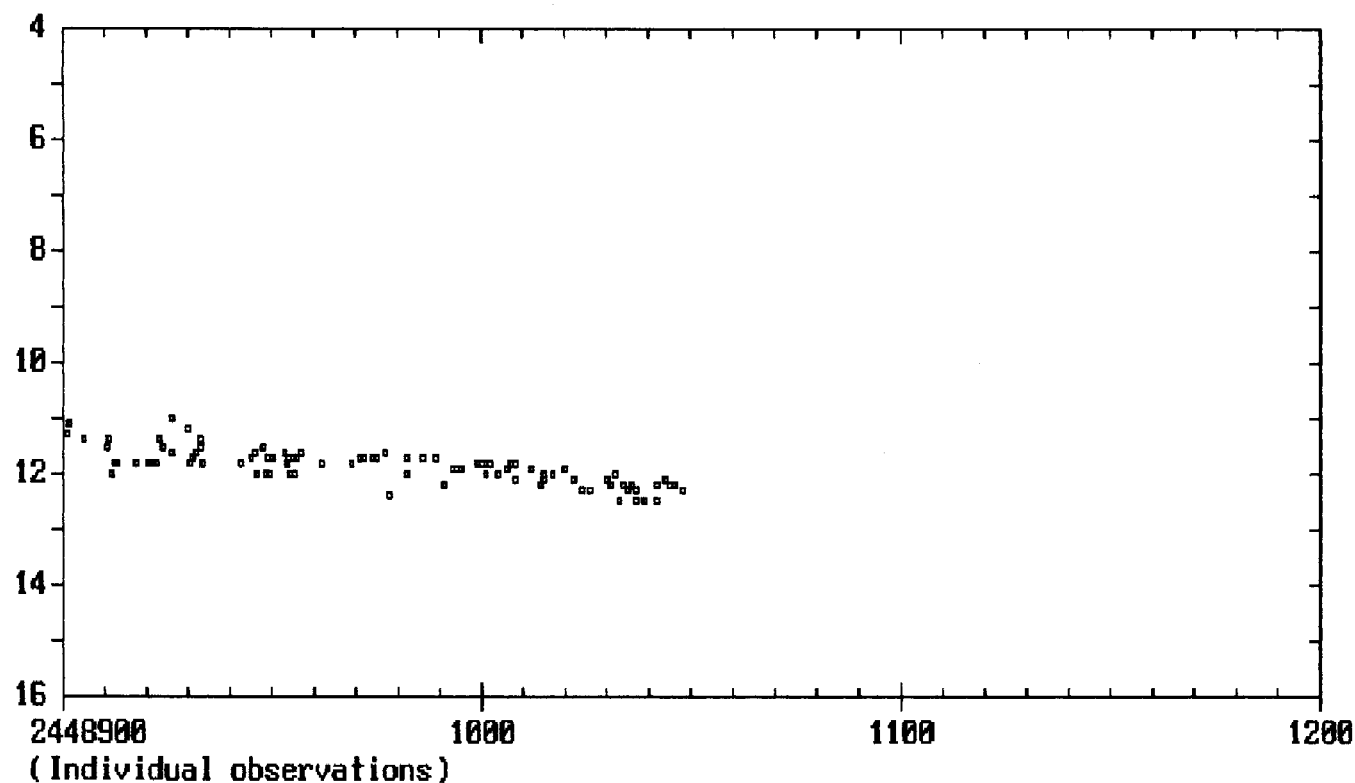
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-000734

NV PUP 1991



NOVA PUP 1991

FIGURE 1

LIGHT CURVE FROM INDIVIDUAL OBSERVATIONS

J.D. 2,448,624 - J.D. 2,449,047

TWO COLOUR SEQUENCE FOR 052532 TV COLUMBAE

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Comparison stars for TV Col were lettered on Charts 1097 and 1098 (1). V and B-V measures were obtained for these stars on March 5 & 6 1993.

Three readings were obtained for each star except "s" which had one reading. Star "r" could not be measured owing to its proximity to the variable. An attempt will be made later to measure this star.

The values obtained are shown below:

<u>STAR</u>	<u>V</u>	<u>S.D.</u>	<u>B-V</u>	<u>S.D.</u>	<u>ADOPTED Mag</u> <u>for visual</u> <u>estimates</u>
k	12.66	+/-0.02	0.59	+/-0.02	12.7
l	12.29	+/-0.01	1.01	+/-0.03	12.3
m	12.89	+/-0.03	0.61	+/-0.02	12.9
p	13.16	+/-0.03	0.55	+/-0.07	13.2
q	13.87	+/-0.06	0.67	+/-0.13	13.9
s	15.2		0.5		15.2

Visual observers should use the magnitudes in the last column in their estimates for TV Col.

REFERENCE

- (1) Bateson, F.M. & Morel, M. 1993. Charts for Southern Variables, Series 23. Publ. by Astronomical Research Ltd., Tauranga, New Zealand.

THE SEMI-REGULAR VARIABLE RX LEPORIS

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SUMMARY: RX Lep is shown to have a visual range of 5.1 to 7.0 with semi-regular period of 62.5 days from maxima and 70.2 days from minima. Suggestions are given to improve the accuracy of observations of bright Binocular variables.

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1. INTRODUCTION

Variable stars which can be observed with Binoculars appeal to observers without previous experience in observing variables. This is because they are both bright and easy to locate, whereas experienced observers tend to avoid such stars in favour of more important objects. Thus there is usually more scatter in the estimates than is desirable. The absence of observations from experienced observers prevents the determination of the systematic deviation for new observers.

However, some simple precautions will improve the accuracy of any new observer. All observations must be made with binoculars or a small finder telescope and never with the naked eye or your main telescope. Make certain that the binoculars or finder are in perfect adjustment. Always use the same instrument. Make certain that you allow your eyes to become dark adapted; in other words don't dash outside from bright indoor lights and commence observing at once. Always use the binocular chart provided and the sequence of comparison stars thereon. Avoid observing in bright moonlight; in fact it is best to make observations with the moon absent. Make certain that you identify the variable and comparison stars correctly, always checking with the chart and not relying on memory. These guide-lines should be followed for all binocular variables and will help the inexperienced observer to greatly improve the accuracy of his or her observations.

2. OBSERVATIONS

Visual observations from J.D. 2,446,800 to 2,448,765 are plotted in Figs. 1 & 2. The majority of the estimates were made by new observers gaining experience in the art of visual observations. This causes more scatter in the estimates than usual. There are a few data points that are

obviously in error, probably due to misidentification of the variable or comparison stars and these have been rejected. All observations were made using Binocular Chart B3 and the sequence of V magnitudes shown thereon.

The 496 estimates were grouped into ten days means, each of which had from 1 to 11 individual estimates with an average of 3 observations in each mean. Table 1 lists the dates of maxima and minima determined from these means.

3. DISCUSSION

The dates given in Table 1 must be regarded as approximate due to the nature of the observations. For example, RX Lep can remain at maxima for a protracted interval making the determination of the date of maximum a matter of personal judgement having regard to the weight given to the observations in each mean.

The individual observations range from 5.1 to 7.0 whilst for maxima range from 5.43 to 6.20 and minima from 6.07 to 6.8. Columns 4 and 7 in Table 1 give the intervals between successive maxima and minima respectively. These are enclosed in brackets when the dates are not considered to be consecutive, mainly due to breaks in the records when RX Lep was unobservable.

RX Lep has a slow, semi-regular variation with a wide variation in the intervals between consecutive maxima (or minima).

4. CONCLUSIONS

RX Lep is a semi-regular variable with a visual range of 5.1 to 7.0. Thirteen maxima that appear to be consecutive give a period of 62.5 days with intervals showing a wide spread of from 22 to 102 days. The mean period from 12 minima is 70.2 days with intervals between minima that are considered to be consecutive ranging from 28 to 106 days. These results should be regarded as approximate because of the nature of the observations as pointed out in Section 1 on the previous page.

ACKNOWLEDGEMENTS

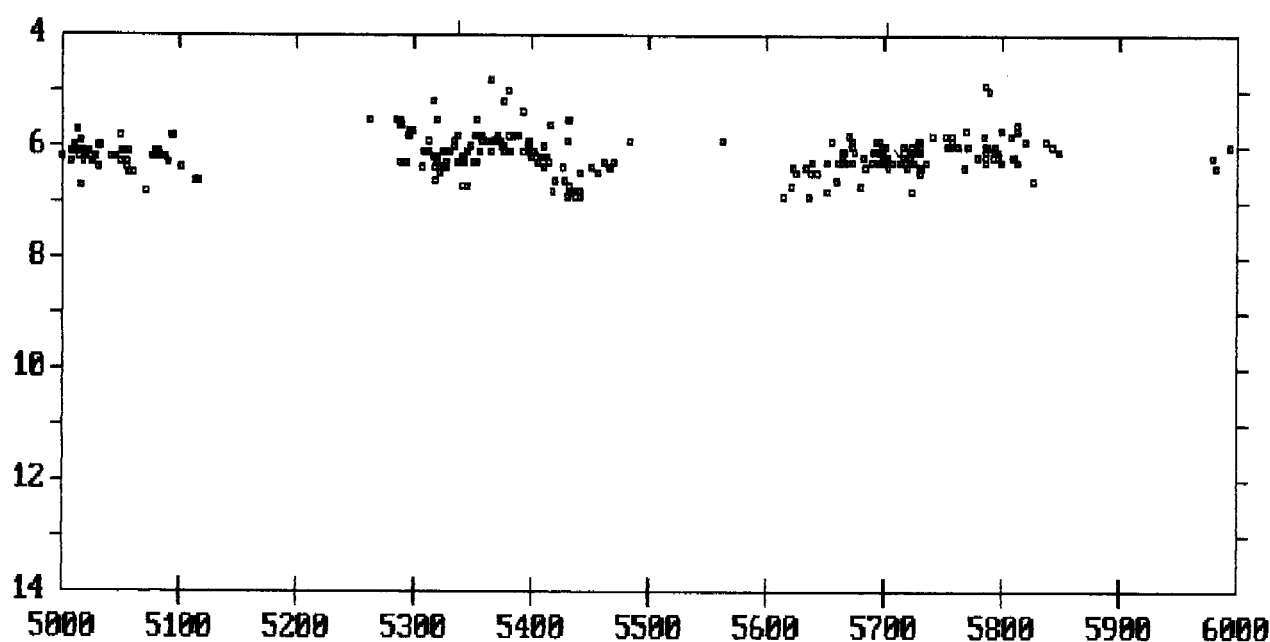
My thanks are extended to all observers for their estimates and to Don Brunt for processing the data and to Ranald McIntosh for the computer light curves.

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TABLE 1
RX LEPORIS - MAXIMA & MINIMA

No.	MAXIMA			MINIMA		
	Mean Max JD 244	Mean Max Mag _v	Int. d	Mean Minimum JD 244	Mean Min Mag _v	Int. d
1	6920	-	-	6828	6.7	-
2	7070	6.05	-	7010	6.8	(182)
3	7130	5.97	(150)	7099	6.32	89
4	7209	6.16	60	7142	6.47	43
5	7260	6.2	79	7248	6.42	106
6	7387	5.93	51	7288	6.07	40
7	7489	5.7	(127)	7440	6.40	(152)
8	7549	5.70	102	7528	6.07	88
9	7619	5.90	60	7560	6.10	32
10	7651	5.70	70	7642	6.10	82
		5.90	32	7763	6.20	(121)
11	7933	6.03	(282)	7844	6.7	81
12	7998	6.00	65	7960	6.57	(116)
13	8020	5.6	22	8038	6.8	78
14	8169	5.5	(149)	8250	6.47	(112)
15	8301	5.68	(132)	8240	6.51	90
16	8378	5.43	77	8506	6.7	(166)
17	8552	5.7	(174)	8590	6.48	84
18	8601	6.0	49	8618	6.50	28
19	8669	5.87	68	8710	6.40	92
20	8747	5.7	78	-	-	-

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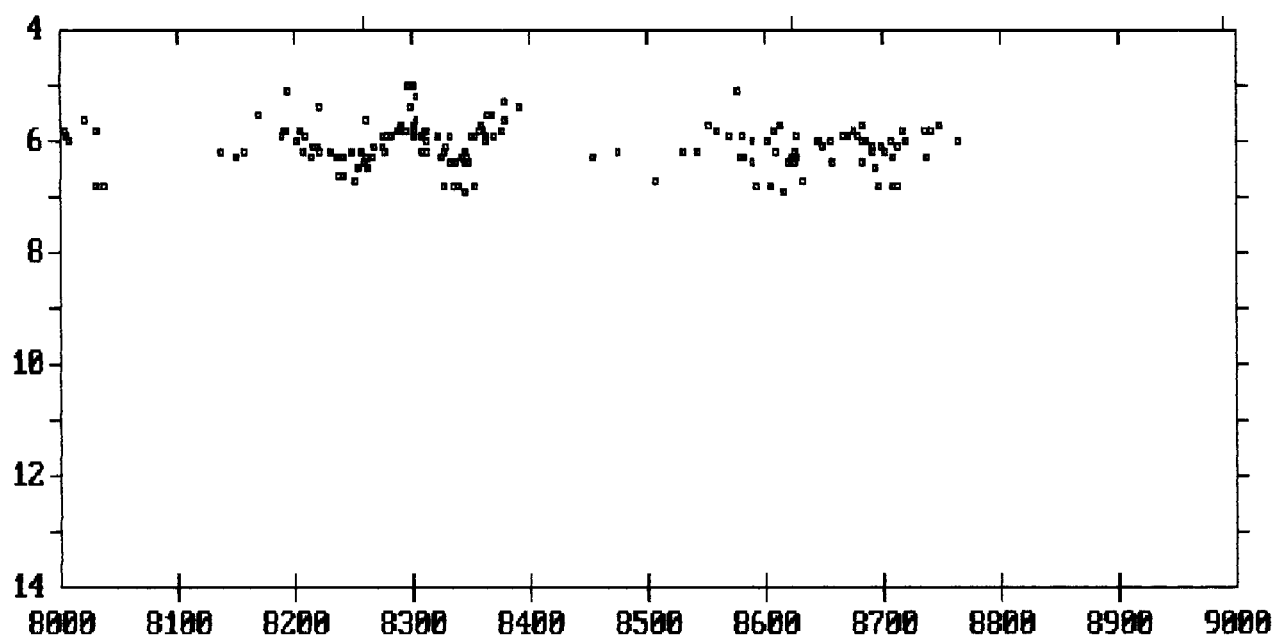
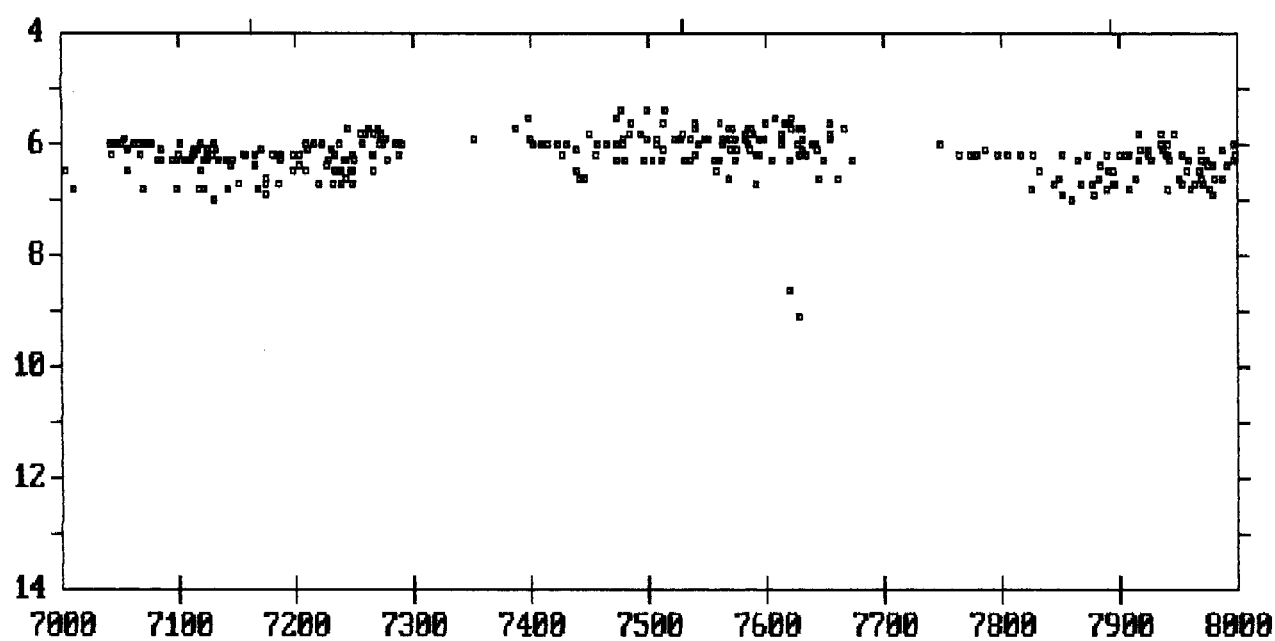
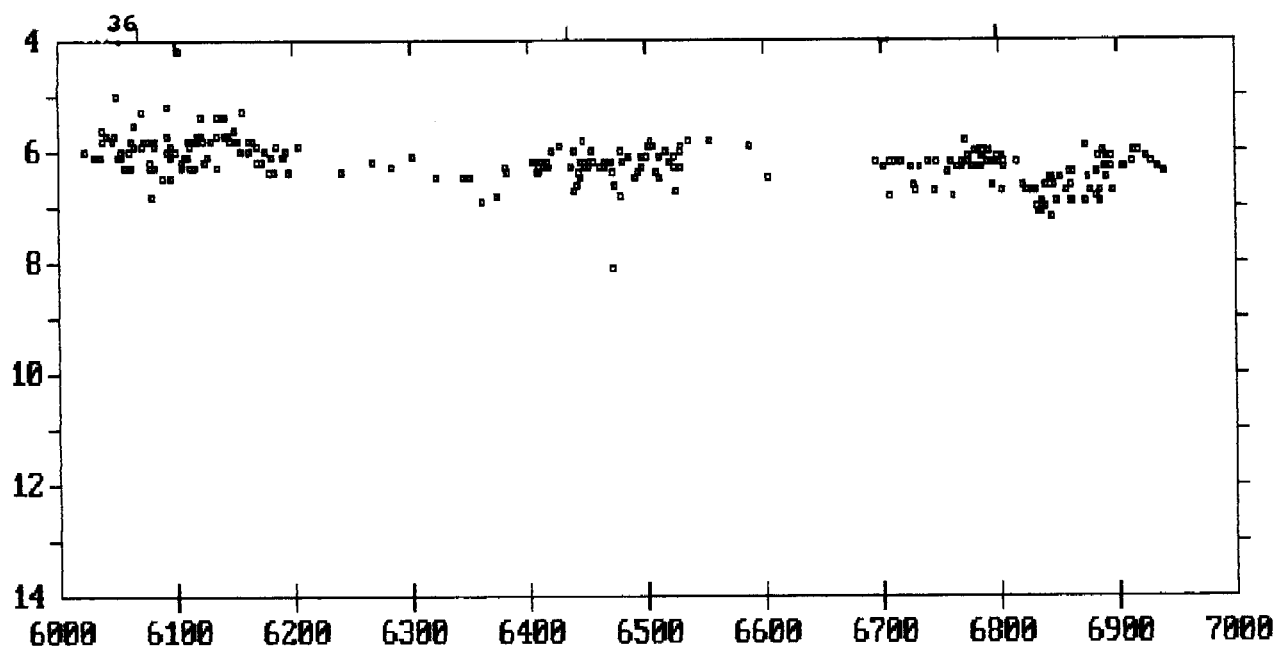


RX LEP

FIGURE 1

LIGHT CURVE FROM INDIVIDUAL OBSERVATIONS

J.D. 2445,000 - J.D. 2446,000



RX LEP

FIGURE 2

LIGHT CURVE FROM INDIVIDUAL OBSERVATIONS
J.D. 2446,000 - J.D. 2448,900

THE FADING OF S DORADUS

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(2) 31 Ranui Road, Stoke, Nelson, N.Z.

SUMMARY: Visual observations show that there was a very small decline in the mean magnitude of S Dor from 1987 to 1990. The rate of decline increased from 1991. It is suggested that this marks the start of a fading to a deep minimum.

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1. INTRODUCTION

S Dor is the prototype for a small group of high luminosity, blue irregular variables. These objects are amongst the brightest ones found in galaxies. Members interested in a review of these stars should consult A.S. Sharov (1).

S Dor had deep minima in 1891, 1900, 1930, 1940, 1955 and 1964 (2)

2. OBSERVATIONS

The visual observations are given in Table 1 as a means for every 100 days from J.D. 2,447,000 as shown in column 1. One of us (AFJ) was responsible for by far the largest number of estimates. The means from his observations are shown in the second column with the number of estimates for each mean in brackets. Column 3 gives the same results from the estimates by Peter Williams, whilst the means from the few observations by other members appear in the last column. The light curve is shown in Fig 1.

S Dor is a difficult star to observe due to the diffuse nebula in which it is situated in the Large Magellanic Cloud. The variable and a sequence of comparison stars with V magnitudes are shown on chart 906 (3).

3. DISCUSSION

The means in the second column of Table 1 shows there was an irregular decline of 0.17 magnitudes over the first 1,200 days (1987 to 1990). The rate of fading then increased in 1991. T. Cooper (4), a member of the VSS, used data from our Monthly Circulars in his paper (4). He suggested that the start of a decline may have commenced in 1991.

From about mid-June 1991 southern skies were dimmed by a huge blanket of volcanic dust. This appears to have formed a continuous sheet high in the stratosphere and was not patchy. We believe its effect was uniform and affected both the variable and the comparison stars equally.

The first eight means from P. Williams in column 3 of the table show that he made S Dor definitely fainter than AFJ with a tendency to show a possibly irregular brightening. His later means appear to confirm a fading with means becoming very close to those in column 2. One of us (FMB) was responsible for researching the data. He was confronted with the fact that both observers are highly skilled and extremely accurate visual observers. Then why is there such a marked difference in their estimates? Possibly the lower altitude and the much greater light and other pollution over the general Sydney area compared to better sky conditions over Nelson might account for the difference. However, that idea is not acceptable because it fails to explain why their more recent estimates are in close or precise agreement. Perhaps as the sheet of volcanic dust drifted over more southerly latitudes it had the effect of dimming stars over Nelson leaving Sydney skies unaffected by this cloud.

Then why are their estimates for other variables close to the same declination as S Dor in such perfect agreement? Unfortunately there were few observations from other observers. Only in one 100 day interval were there sufficient to provide a comparison. That mean agreed very closely with the mean from AFJ. Otherwise these means appear to support a fading of S Dor.

The conclusion is that S Dor is a difficult object to observe and estimates are affected by prevailing sky conditions.

4. CONCLUSIONS

We are satisfied that S Dor has faded to a marked degree from 1991 and may be heading towards another deep minima.

ACKNOWLEDGEMENTS

We thank Peter Williams for his observations in particular and other observers for their limited estimates. Also Don Brunt and Ranauld McIntosh for computer processing the data and for the computer light curves.

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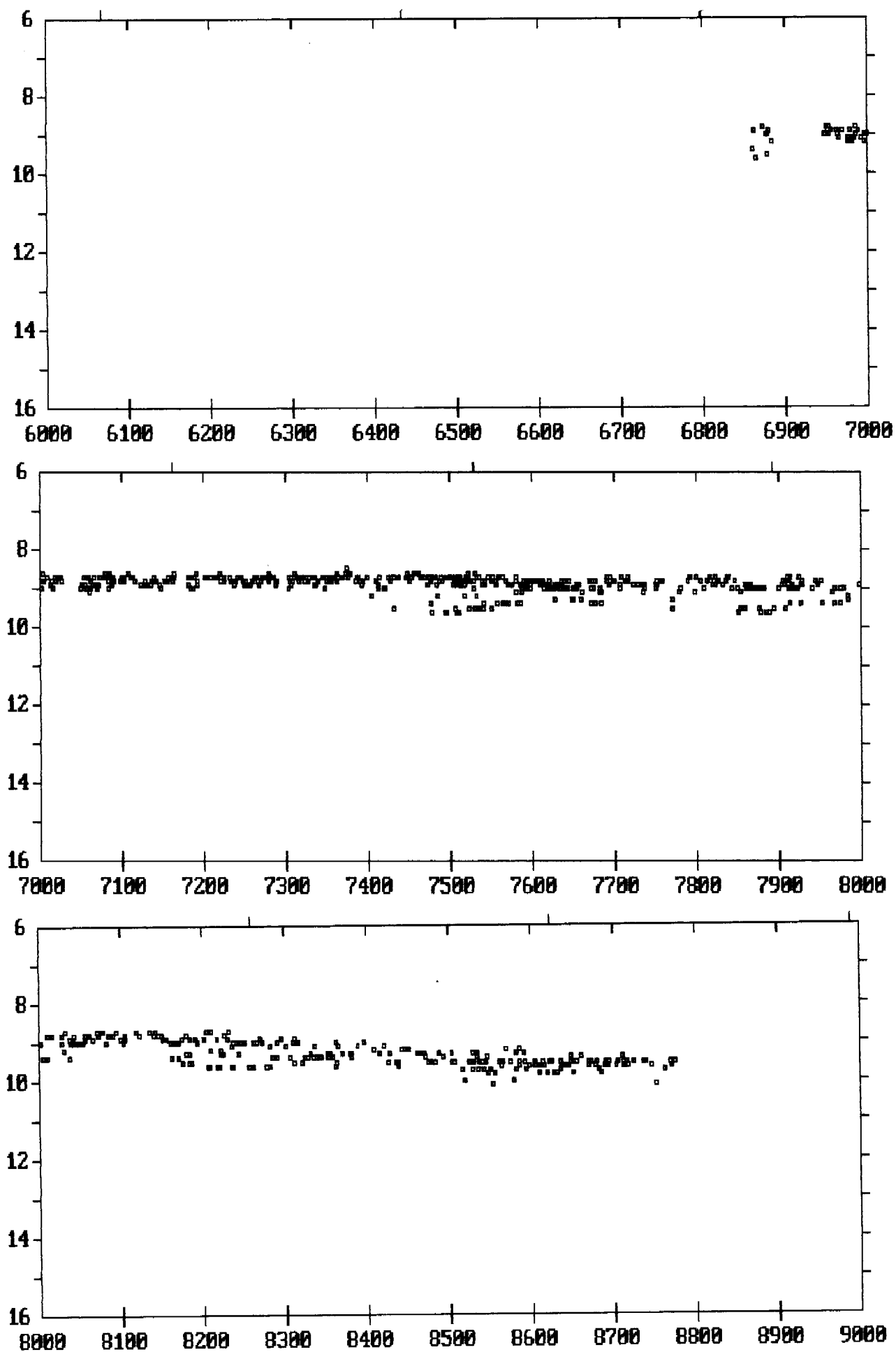
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TABLE 1S DORADUS - 100 DAY MEANS

<u>JD 100^d From</u> <u>2,44. . . .</u>	<u>Mean Mag</u> <u>AFJ</u>	<u>Mean Mag</u> <u>PW</u>	<u>Mean Mag</u> <u>Others</u>
7000 - 7100	8.79 (56)	-	-
7100 - 7199	8.79 (40)	-	9.0 (1)
7200 - 7299	8.75 (56)	-	-
7300 - 7399	8.74 (59)	-	-
7400 - 7499	8.70 (43)	9.60 (4)	8.88 (6)
7500 - 7599	8.79 (43)	9.47 (12)	8.81 (37)
7600 - 7699	8.90 (42)	9.27 (7)	-
7700 - 7799	8.89 (34)	-	-
7800 - 7899	8.89 (31)	9.55 (8)	-
7900 - 7999	8.93 (30)	9.41 (7)	-
8000 - 8099	8.86 (27)	9.33 (3)	-
8100 - 8199	8.89 (24)	9.45 (2)	9.40 (5)
8200 - 8299	8.96 (21)	9.57 (13)	9.23 (3)
8300 - 8399	9.20 (19)	9.41 (7)	9.55 (2)
8400 - 8499	9.34 (22)	9.5 (1)	-
8500 - 8599	9.65 (27)	9.66 (5)	-
8600 - 8699	9.60 (22)	9.64 (13)	-

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S Dor

FIGURE 1

Light Curve from Individual Observations
J.D. 2,446,800 - 2,448,800

OUTBURSTS OF THE DWARF NOVA IP PEGASI

Frank M. Bateson

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SUMMARY: Sixteen outbursts of IP Peg from 1987 to 1992 were observed. The mean cycle is 74.8 days with long outbursts more frequent than short. Segments of the light curve are reproduced.

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1. INTRODUCTION

V.P. Goranskij, et al (1) summarised photographic observations of IP Peg, classifying it as a dwarf nova of SS Cyg type with eclipses. A mean cycle of 95 days was found from six outbursts found on the Moscow plates. The B maxima magnitudes ranged from 12.0 to 13.9.

2. OBSERVATIONS

This paper reports on the visual observations, totalling 802 by members of the V.S.S., RASNZ between J.D. 2,446,924 and 2,448,629 (1987 May 8 - 1992 October 28). Observations were made using charts 855/6 (2). Large gaps occur in the estimates during the interval when the star is unobservable.

3. DISCUSSION

Details of observed outbursts are given in Table 1 and segments of the light curve are shown in Figs. 1 - 3. IP Peg has not been as closely monitored as the southern dwarf novae.

Nine of the outbursts in Table 1 are probably consecutive with intervals ranging from 16 to 111 days, giving a mean cycle of 74.8 days, compared to 95 days from the Russian observations (1).

Outbursts for which the maxima magnitudes appear reliable range from 12.0 to 13.3. Long outbursts are more frequent than short, but this is probably because the former are more likely to be seen. The monitoring has not been close enough to show any effect of eclipses. There are a few observations between 14.0 and 15.0 but as minima are well below the threshold of the instruments used nothing can be stated concerning behaviour at minimum.

4. CONCLUSIONS

IP Peg has a mean cycle of 78.4 days with long and short outbursts. The former have a mean maximum magnitude of 12.15 and a width of 7.5 days at 13.0. The corresponding values for short outbursts are 12.^m4 and 3 days. Minima are far too faint to be observed and the estimates are too scattered to show eclipses at maxima. The observed outbursts are too few to make the conclusions definite.

ACKNOWLEDGEMENTS

My appreciation is extended to all observers for their estimates, and especially to Danie Overbeek who was responsible for 65% of the observations. I thank Ranauld McIntosh for the light curve.

REFERENCE

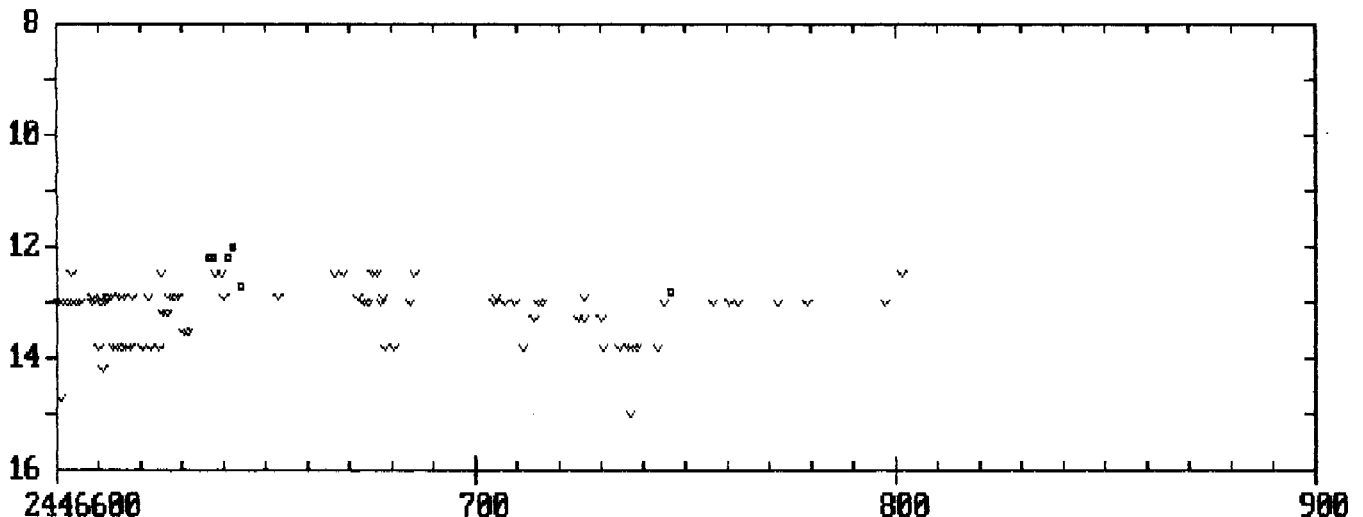
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 (2) BATESON, F.M. & MOREL, M. 1987. Astronomical Research Ltd. Tauranga, New Zealand.

TABLE 1

IP PEG - OBSERVED OUTBURSTS

No.	JD Max 2,44.....	Max M _v	Int. d.	Type	13.0 I	13.0 D	Width 13.0 I-D d.	No. Obs	Remarks
1	6,633	12.0	-	?	-	-	-	5	
2	6,744?	12.5	111	?	-	-	-	1	
3	6,993	12.2	(149)	L	993?	999	6?	6	(a)
4	7,080?	13.3	87	-	-	-	-	1	
5	7,122	12.5	12	-	122	-	-	2	(b)
6	7,347	11.6?	(225)	L	347	355	8	10	(c)
7	7,657	12.9	(310)	?	-	-	-	1	(d)
8	7,718	12.0	61	L	717	724	7	9	
9	7,797	12.4	79	L	796	803	7	12	
10	7,888	12.5	91	S	888	891	3	4	
11	8,092	12.7	(204)	?	091	?	-	3	
12	8,154	12.2	62	L	153	160	7	10	
13	8,292?	12.0	138	?	-	-	-	1	(e)
14	8,437	11.5?	145	L	436	445	9	12	(f)
15	8,551	12.3	114	S	550	553	3	2	
16	8,577	12.0	26	L	576	584	8	4	

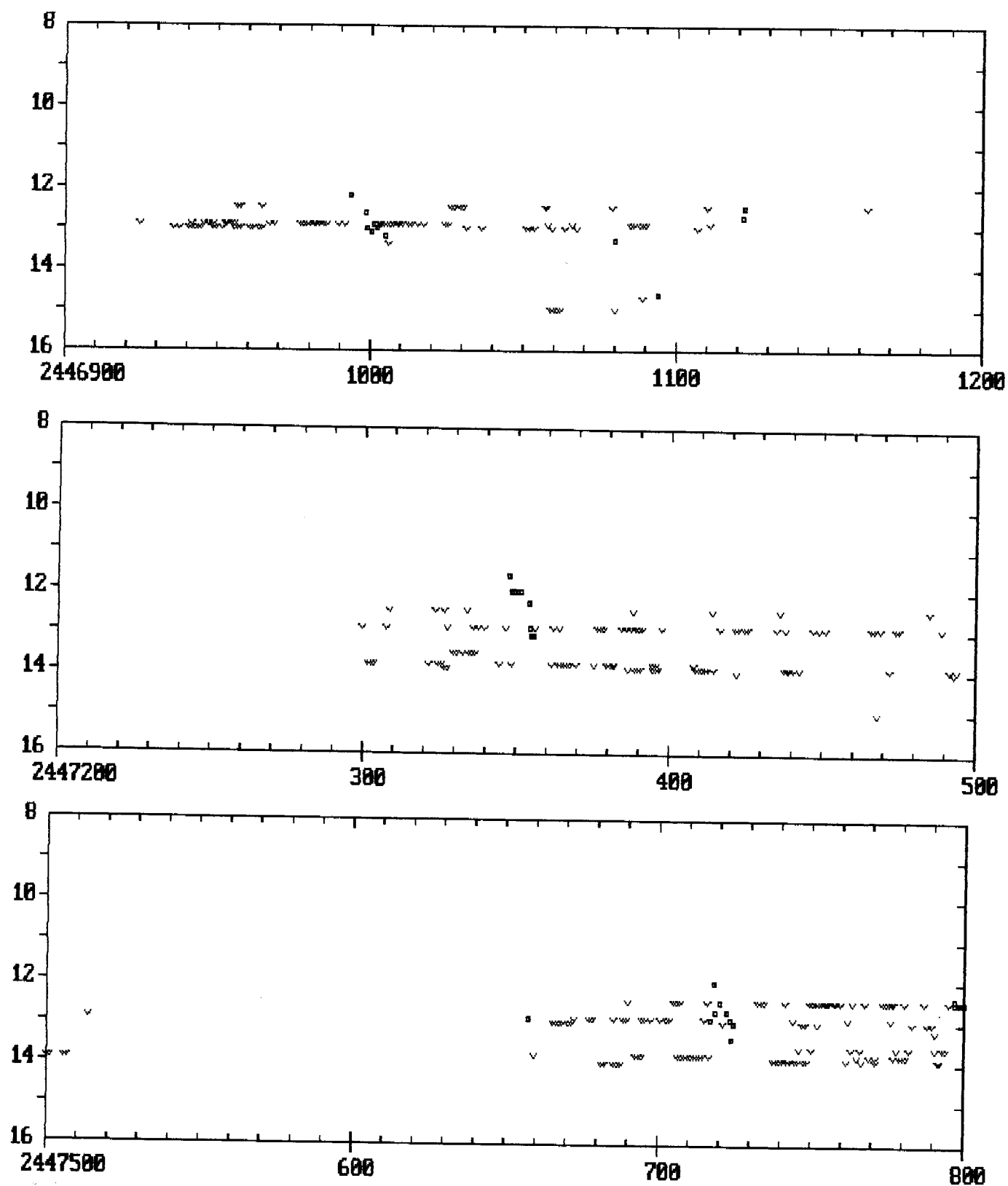
Remarks: (a) Gap of 2^d before 993.
 (b) Gap 11^d " 122
 (c) Max mag 11.6? - Probably too bright.
 (d) Gap 144^d before 657
 (e) Gaps 15^d before & 3^d after 292.
 (f) Max mag of 11.5? - Probably too bright.



IP Peg

FIGURE 1

LIGHT CURVE FROM INDIVIDUAL OBSERVATIONS
 J.D. 2,446,600 - 2,446,900

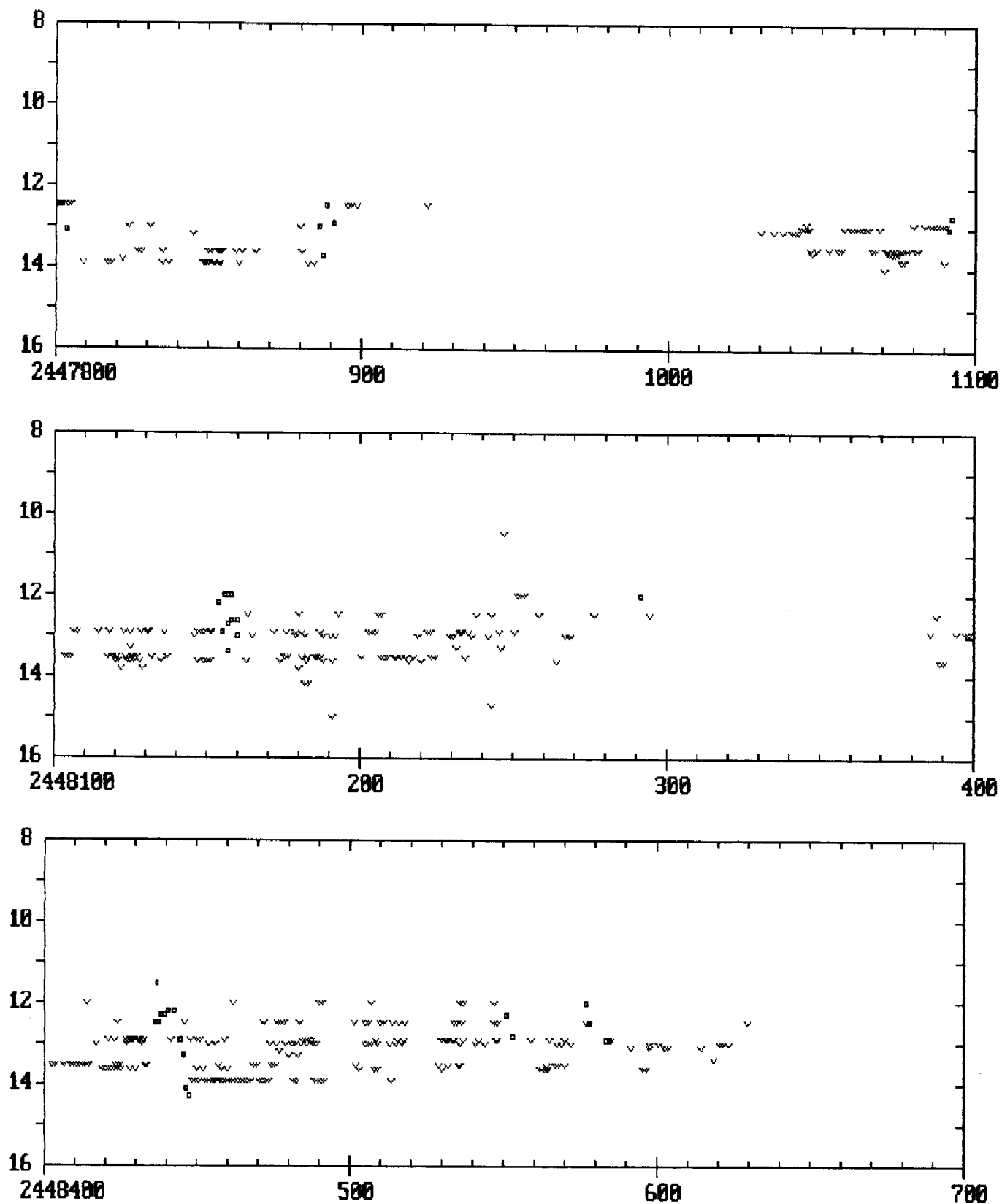


IP Peg

FIGURE 2

LIGHT CURVE FROM INDIVIDUAL OBSERVATIONS

J.D. 2,446,900 - 2,447,800



IP Peg

FIGURE 3

LIGHT CURVE FROM INDIVIDUAL OBSERVATIONS

J.D. 2,447,800 - 2,448,700

LIGHT CURVES OF SOME MIRA VARIABLES

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SUMMARY: Computer light curves covering six decades of visual observations are reproduced for the Mira variables S Pic; T Cen; RS Sco; T Gru; S Gru and R Ind.

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1. INTRODUCTION

On July 27, 1928 Bateson (1) formed the N.Z. Branch, Southern Variable Star Section of the B.A.A. (N.S.W.). The following year this became the VSS of the Astronomical Society of N.Z., which became the RASNZ many years later. The initial programme was that of the B.A.A. consisting of Mira variables and one R CrB variable. In the late 1930s and early 1940s the programme was extended to include a larger number of southern Miras and a variety of other types of variables. In the 1950s southern dwarf novae were added to the observing list.

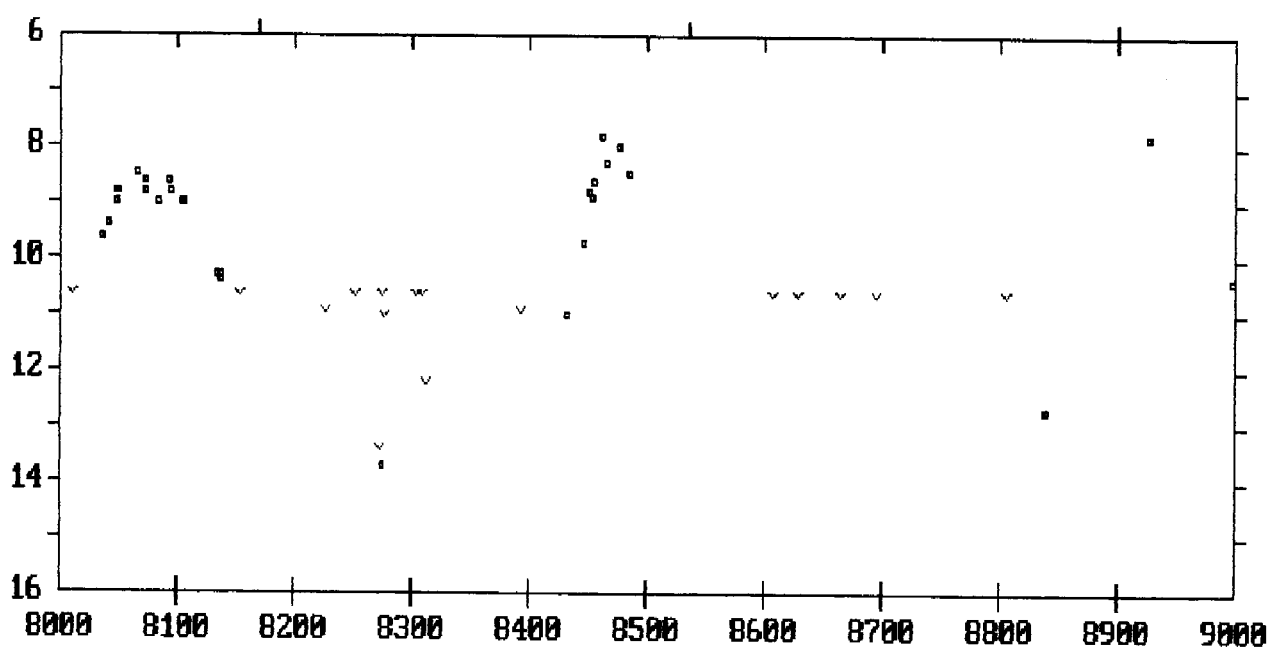
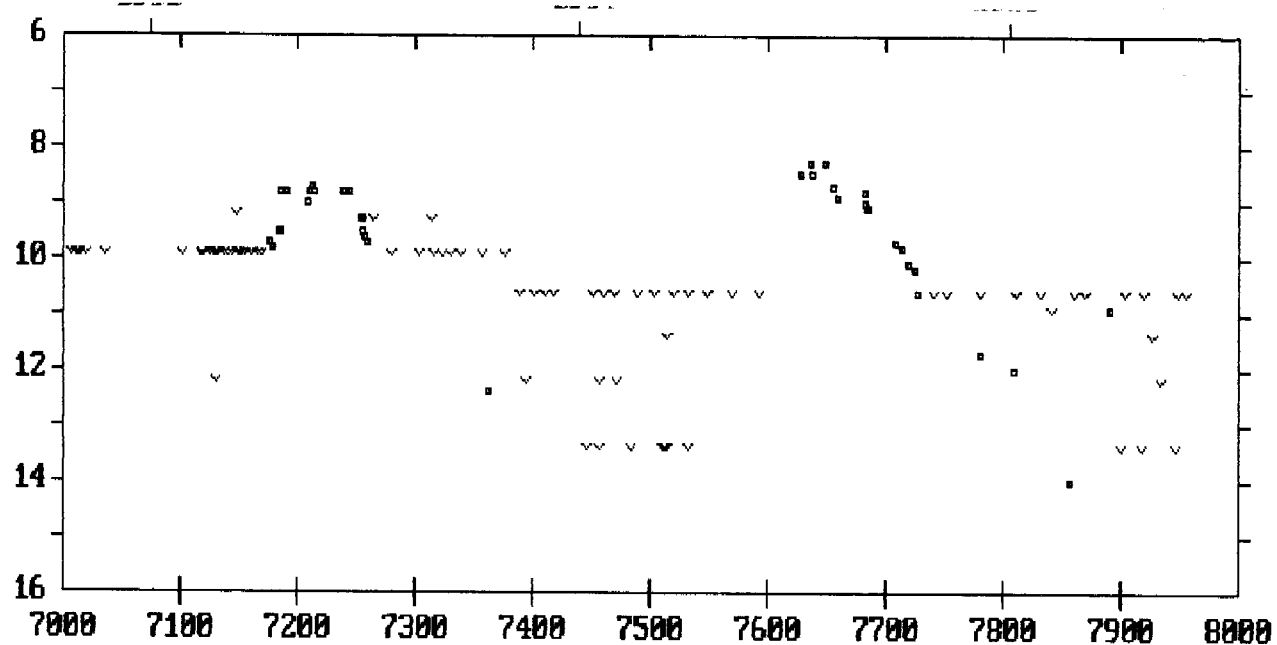
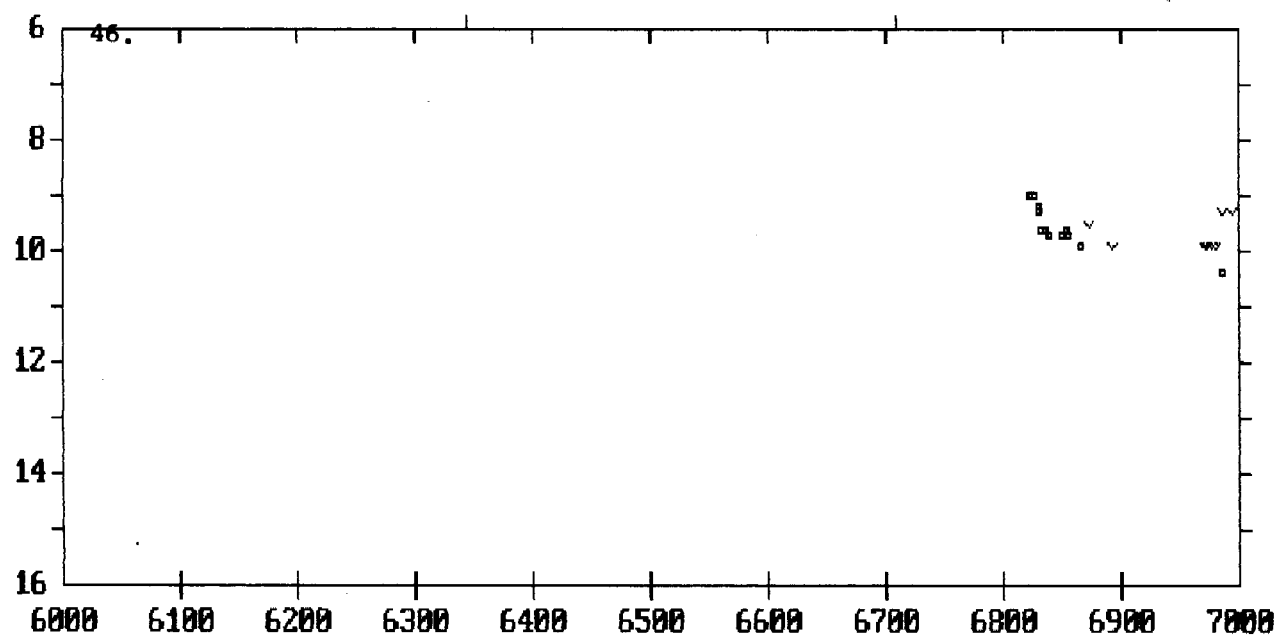
All observations to 1st April 1987 were entered by hand on to ledger sheets. The results were published in Circulars (2) and the First Memoir (3). Computers have made it possible to transfer all the old records on to disks to which are added each month data after 1st April 1987. This has made it possible to commence publication of computer drawn light curves. This paper commences the publication of the light curves for Miras, which will be continued in subsequent publications and concluded with a table of the elements found from the light curves.

2. OBSERVATIONS

All observations have been made visually by members of the VSS, RASNZ, using the standard charts and sequences. The following pages contain the light curves for: S Pic; T Cen; RS Sco; T Gru; S Gru; and R Ind. The earliest plots contain few observations but sufficient to determine a few points of maxima and minima. Comments on the light curves will be made in the final paper listing the elements found.

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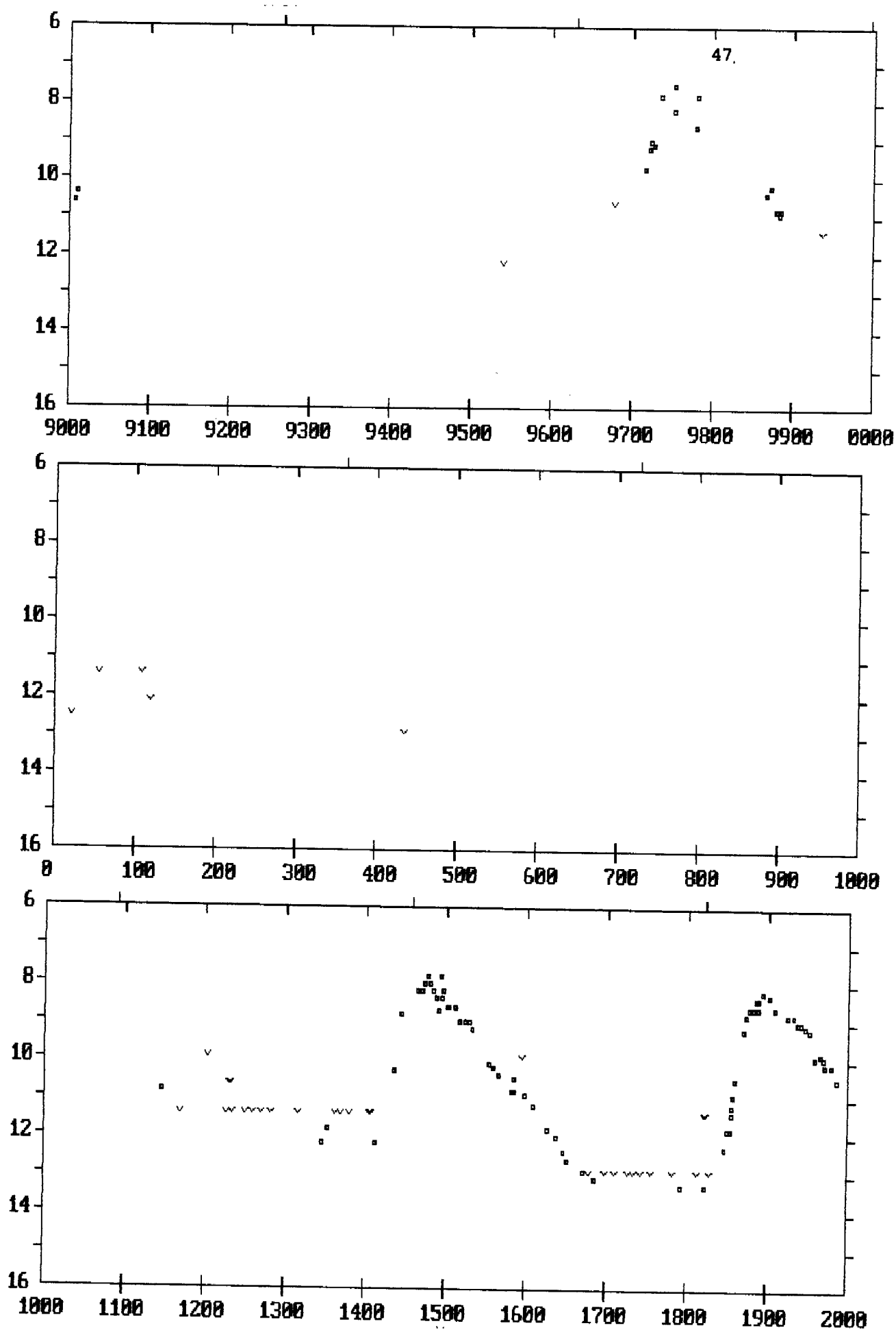


S PIC

LIGHT CURVE FROM INDIVIDUAL OBSERVATIONS

J.D. 2,426,800 - J.D. 2,429,000

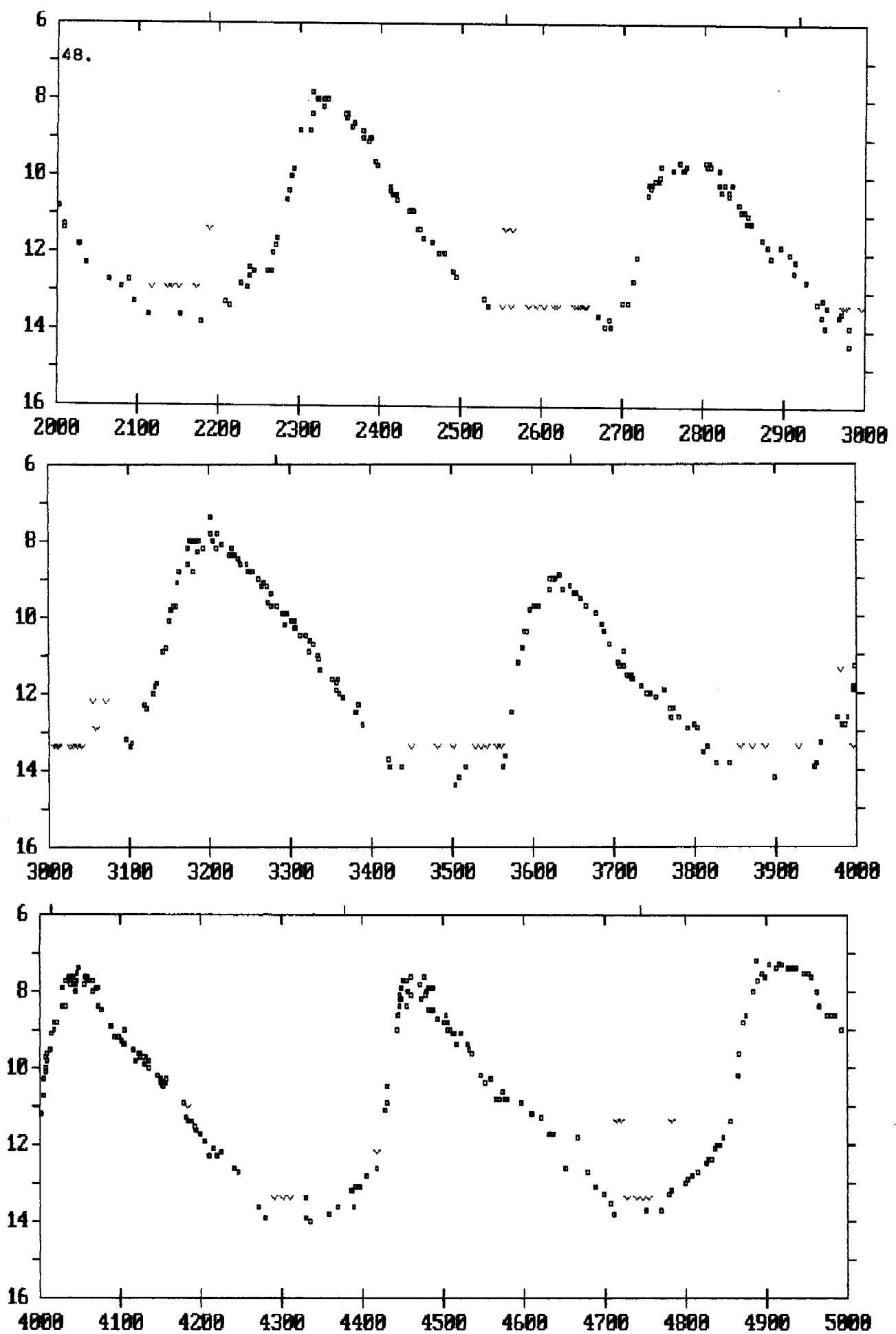
Fig. 1



S PIC

Fig 2

LIGHT CURVE FROM INDIVIDUAL OBSERVATIONS
J.D. 2,429,000 - J.D. 2,432,000

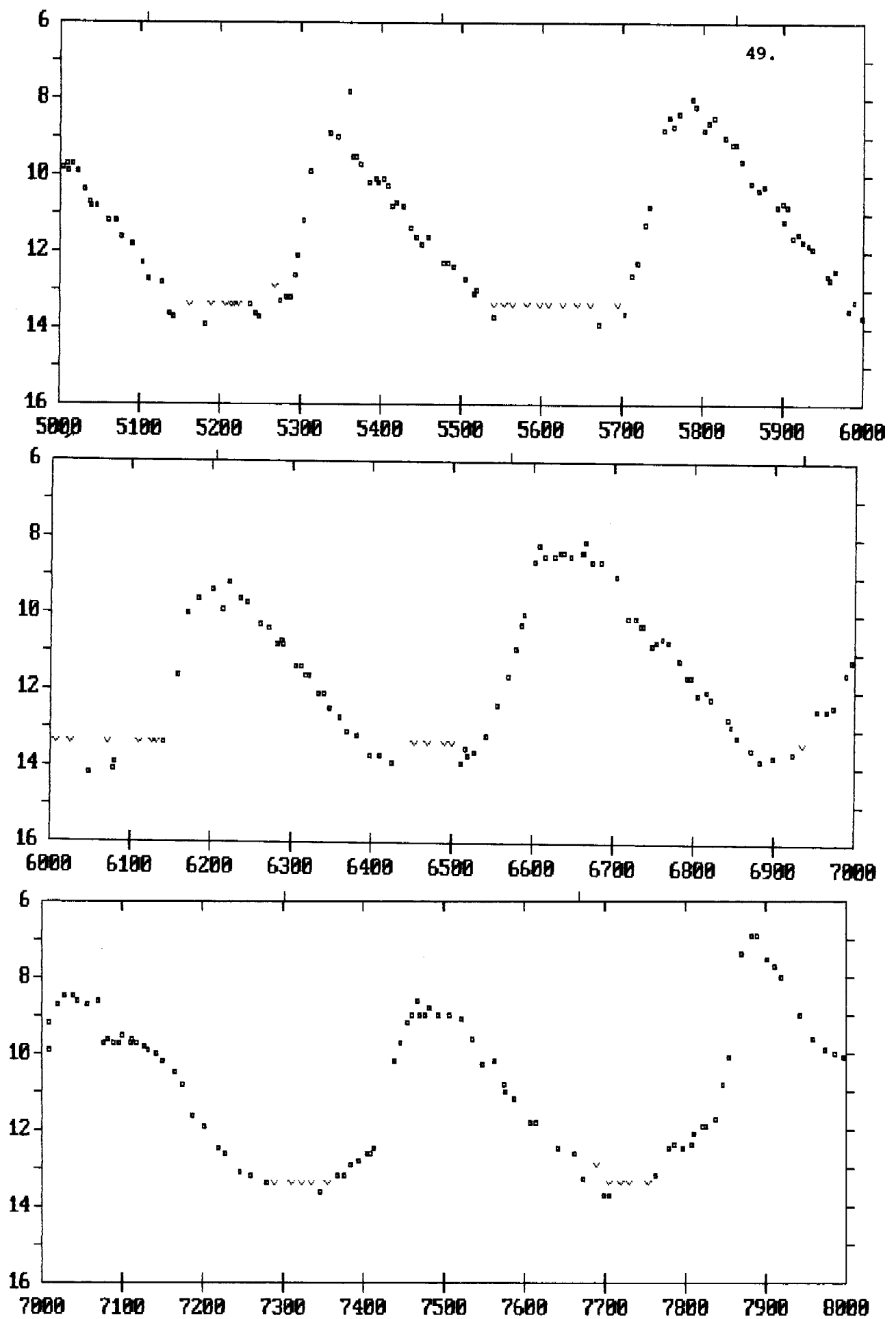


S PIC

Fig. 3

LIGHT CURVE FROM INDIVIDUAL OBSERVATIONS

J.D. 2,432,000 - J.D. 2,435,000

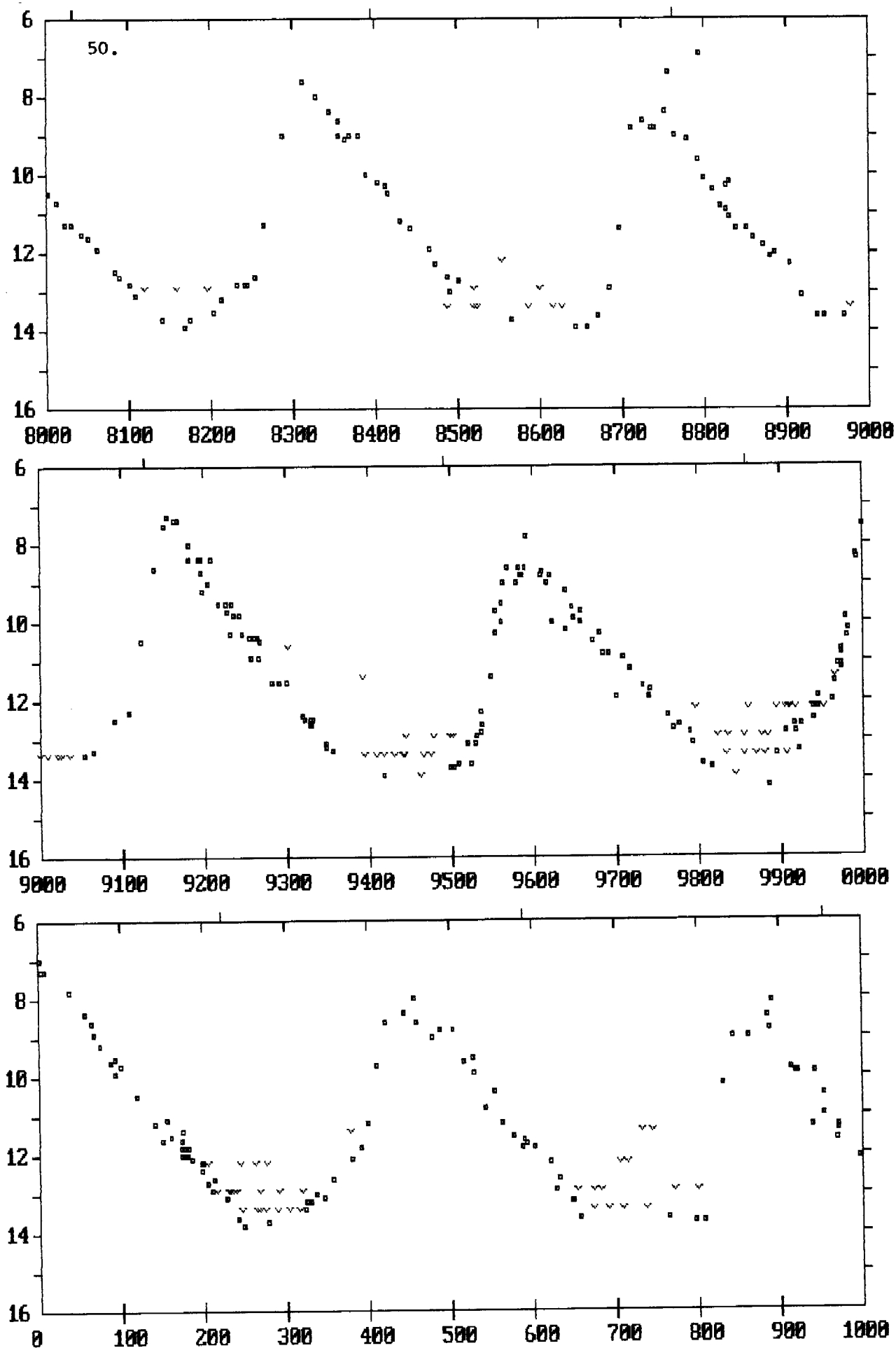


S PIC

Fig. 4

LIGHT CURVE FROM INDIVIDUAL OBSERVATIONS

J.D. 2,435,000 - J.D. 2,438,000

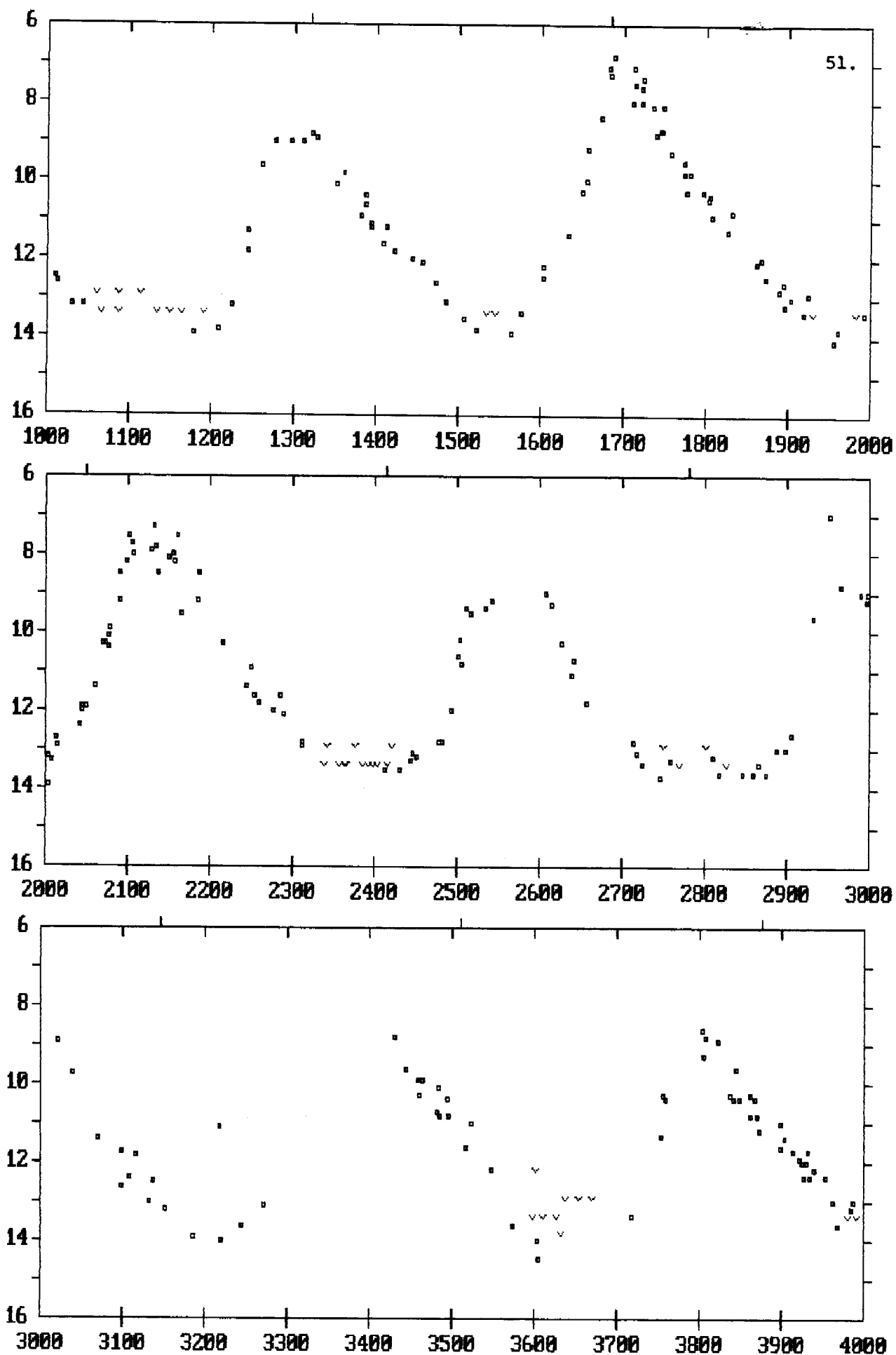


S PIC

Fig. 5

LIGHT CURVE FROM INDIVIDUAL OBSERVATIONS

J.D. 2,438,000 - J.D. 2,441,000

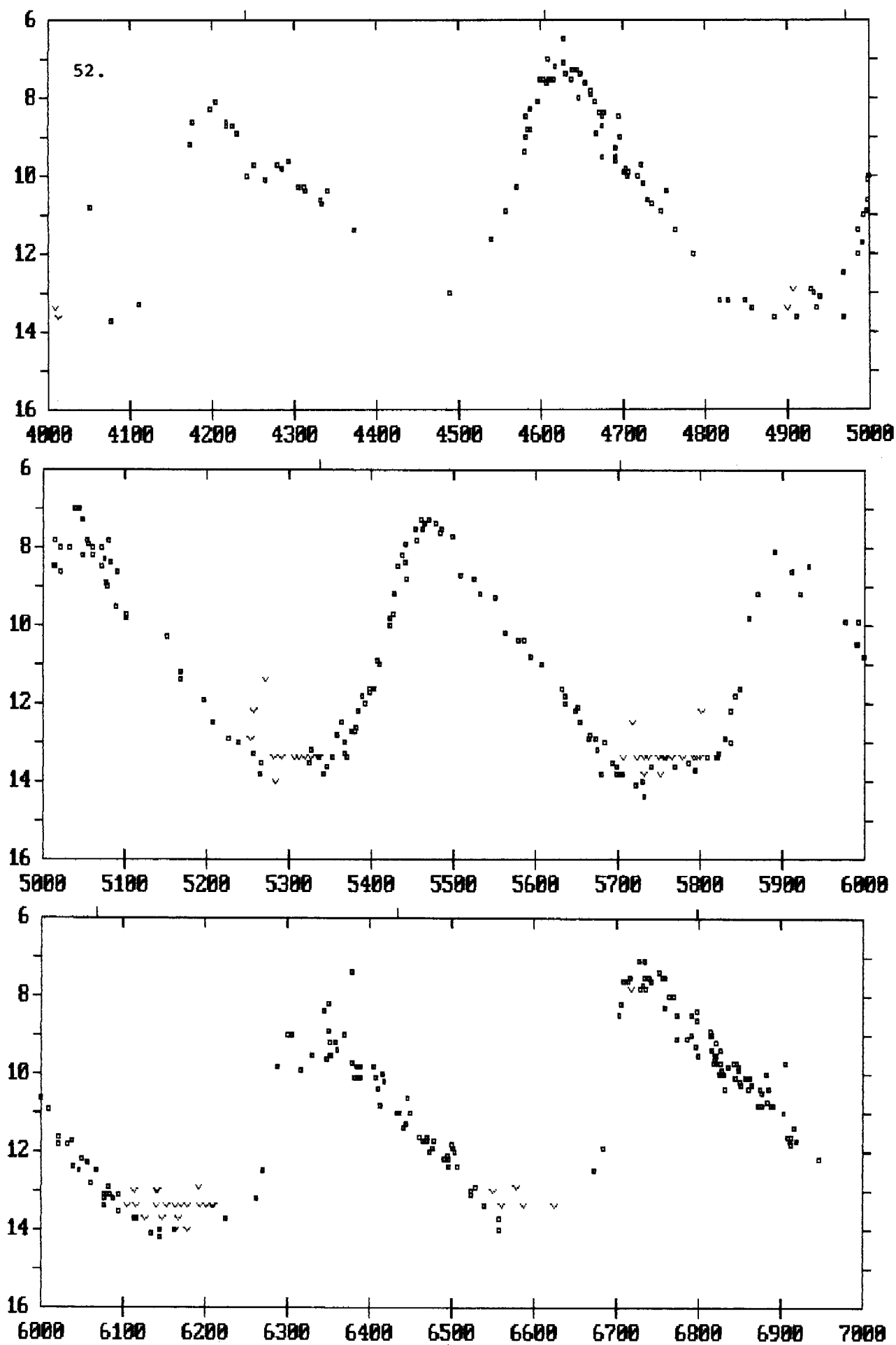


S PIC

Fig. 6

LIGHT CURVE FROM INDIVIDUAL OBSERVATIONS

J.D. 2,441,000 - J.D. 2,444,000

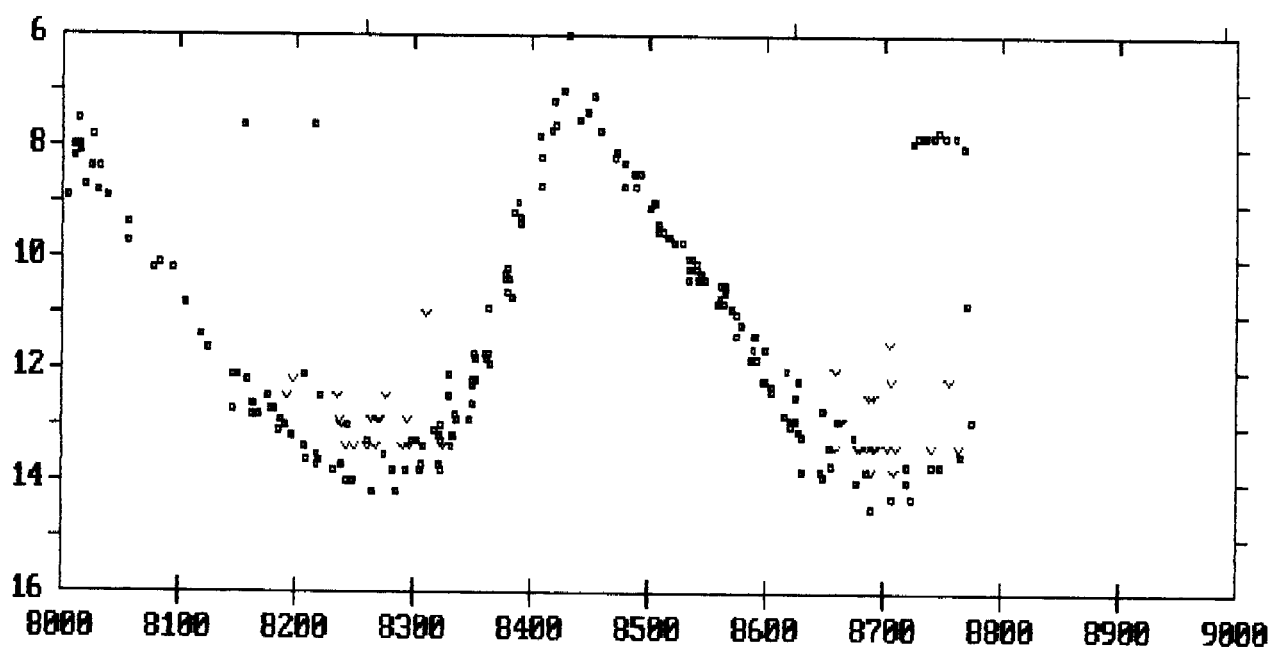
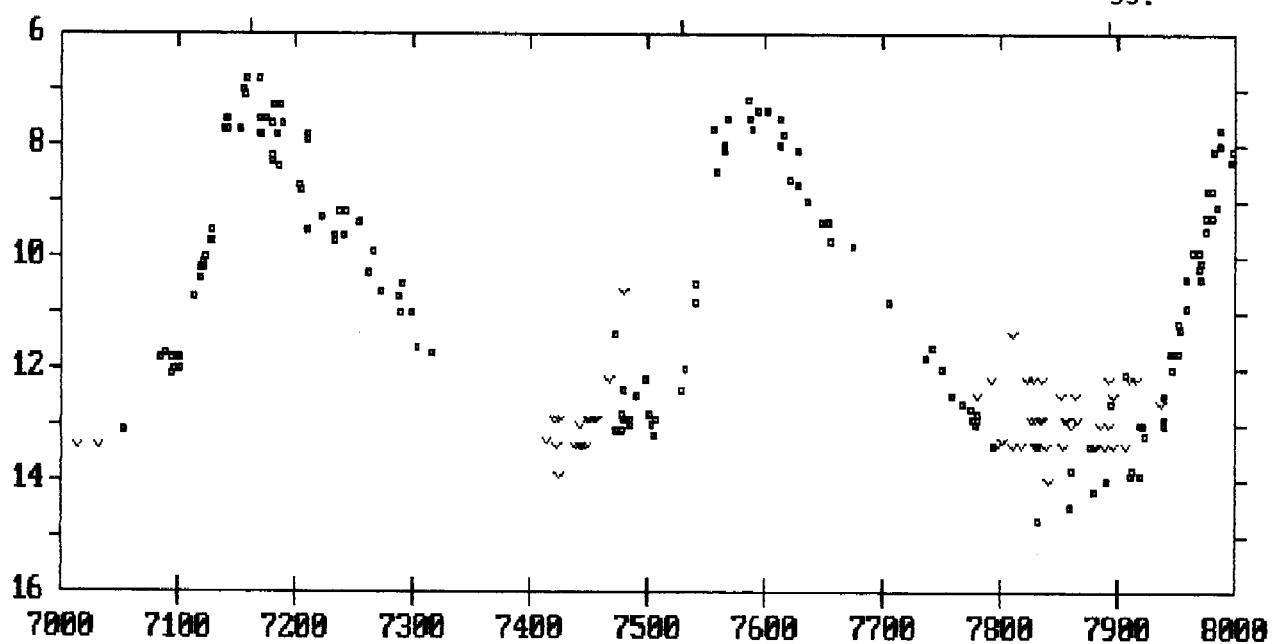


S PIC

Fig. 7

LIGHT CURVE FROM INDIVIDUAL OBSERVATIONS

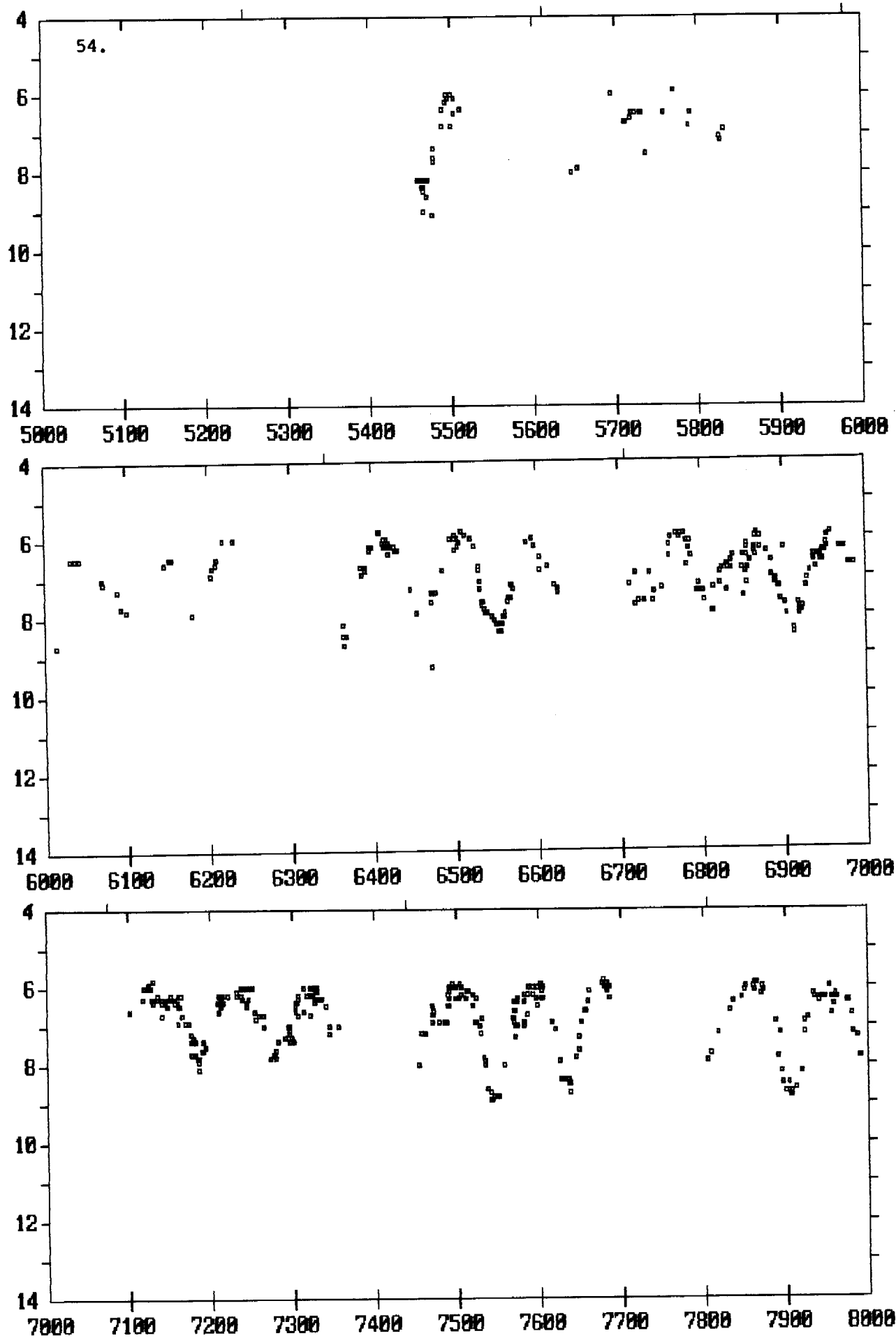
J.D. 2,444,000 - J.D. 2,447,000



S. PIC

Fig. 8

LIGHT CURVE FROM INDIVIDUAL OBSERVATIONS
J.D. 2,447,000 - J.D. 2,448,775

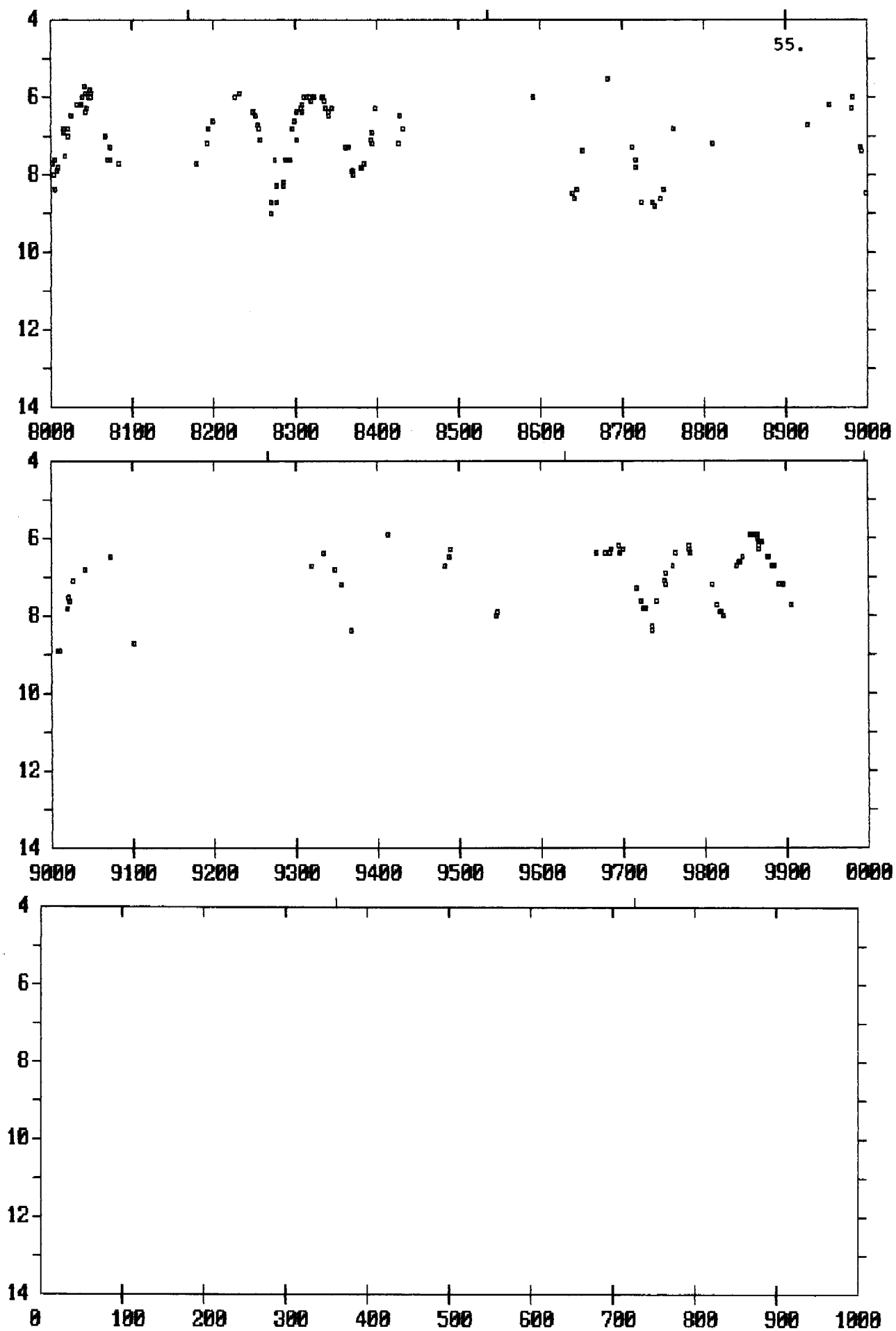


T CEN

Fig. 9

LIGHT CURVE FROM INDIVIDUAL OBSERVATIONS

J.D. 2,425,450 - J.D. 2,428,000

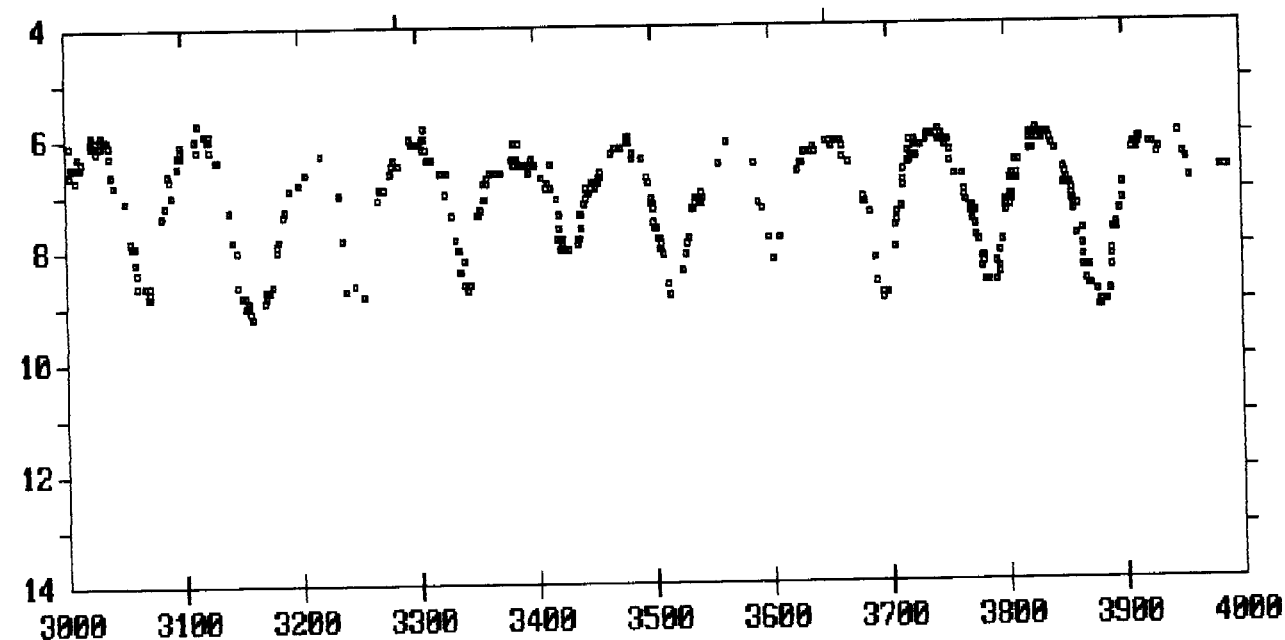
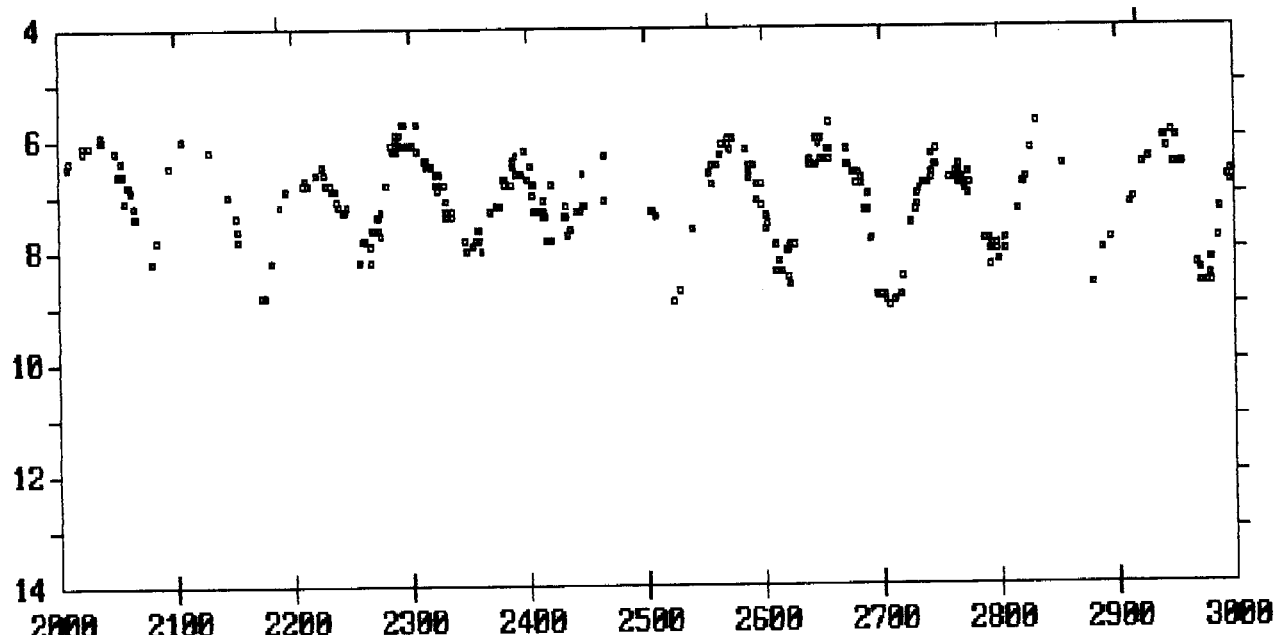
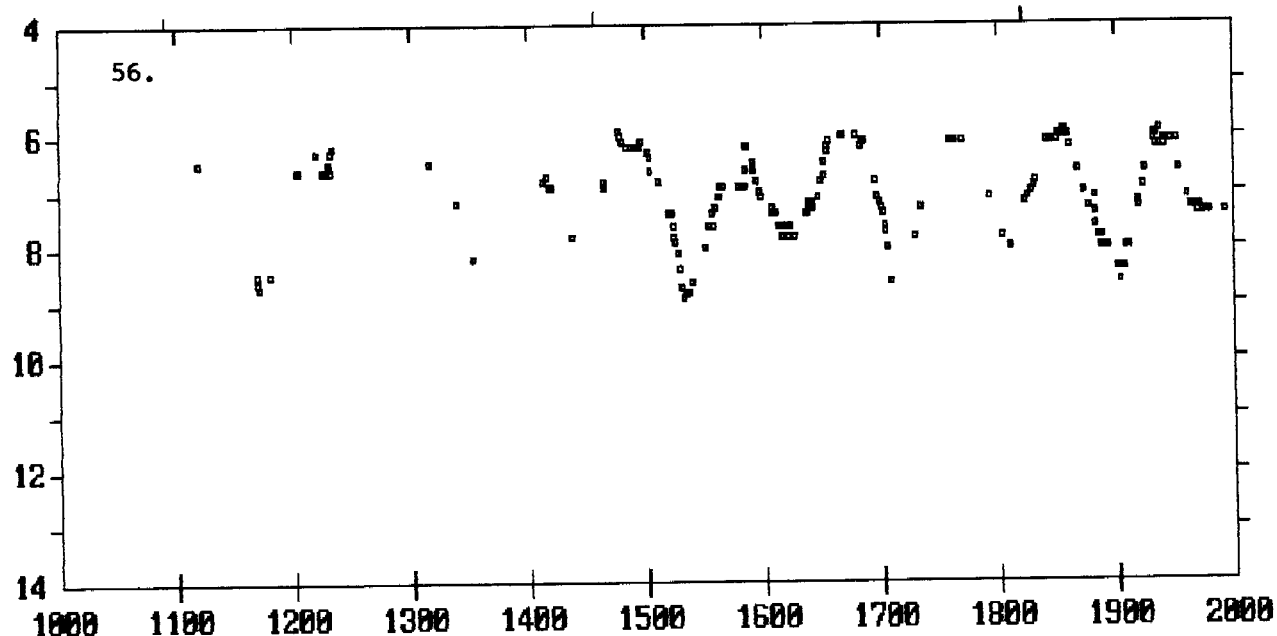


T CEN

Fig. 10

LIGHT CURVE FROM INDIVIDUAL OBSERVATIONS

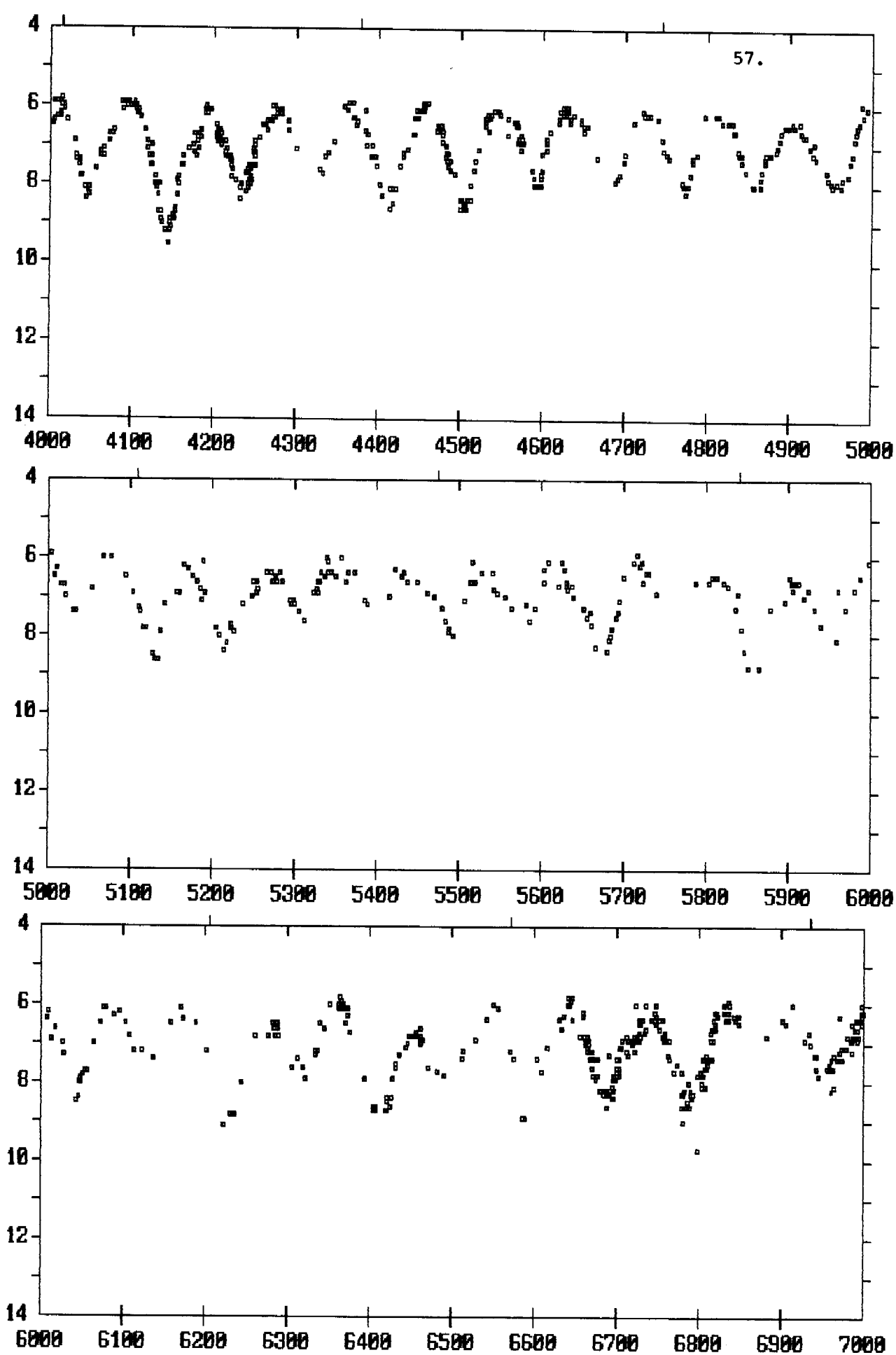
J.D. 2,428,000 - J.D. 2,431,000



T CEN

Fig. 11

LIGHT CURVE FROM INDIVIDUAL OBSERVATIONS
J.D. 2,431,000 - J.D. 2,434,000

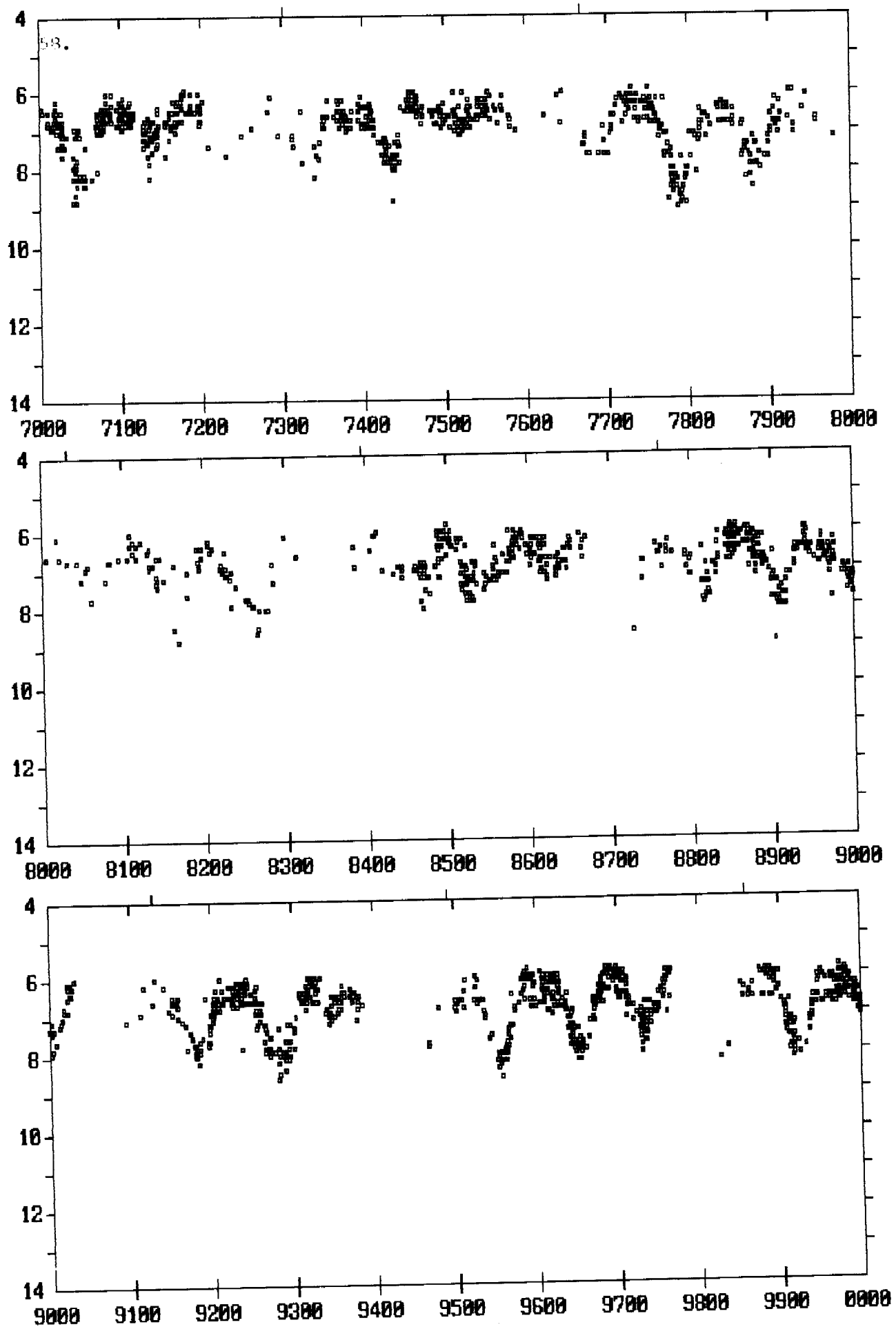


T CEN

Fig. 12

LIGHT CURVE FROM INDIVIDUAL OBSERVATIONS

J.D. 2,434,000 - J.D. 2,437,000



T.CEN

Fig. 13

LIGHT CURVE FROM INDIVIDUAL OBSERVATIONS
J.D. 2,437,000 - J.D. 2,440,000

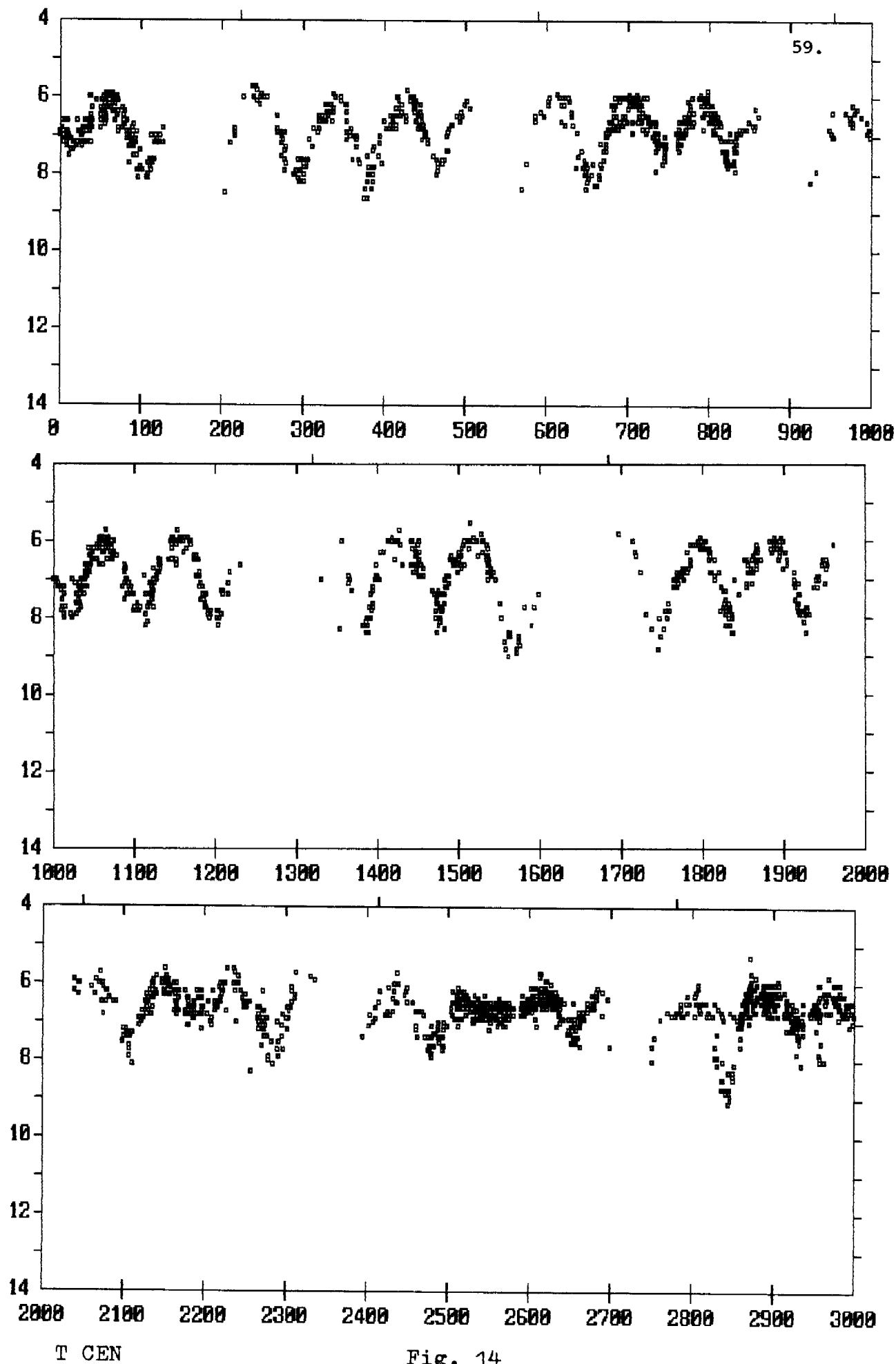
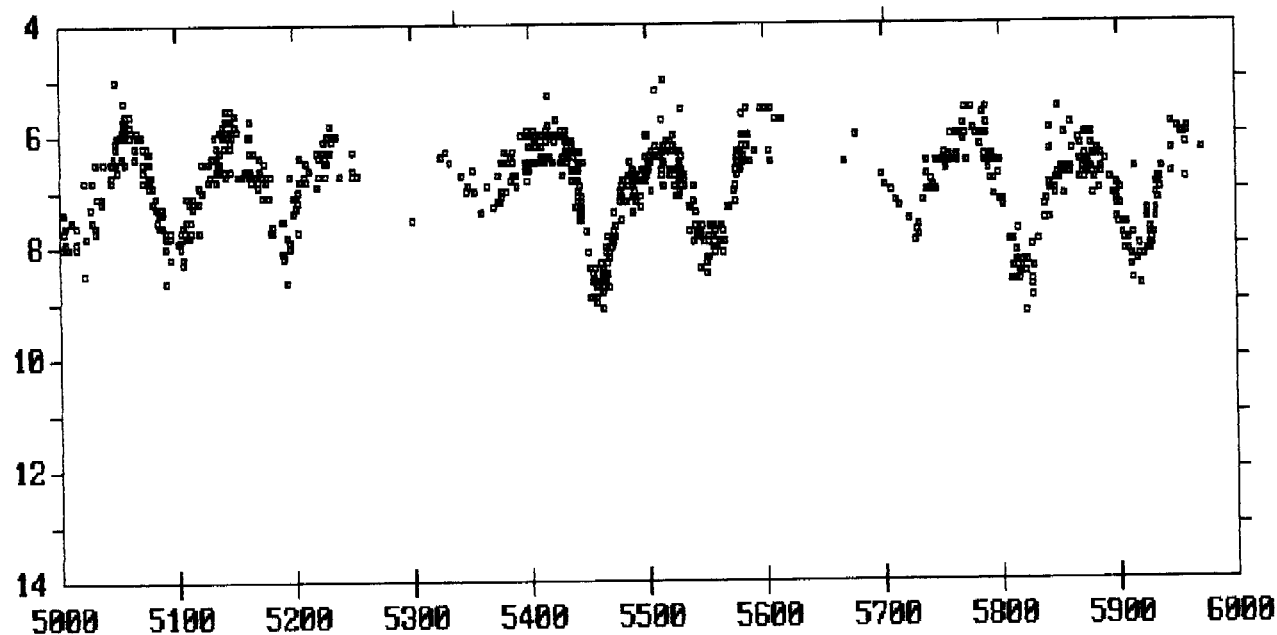
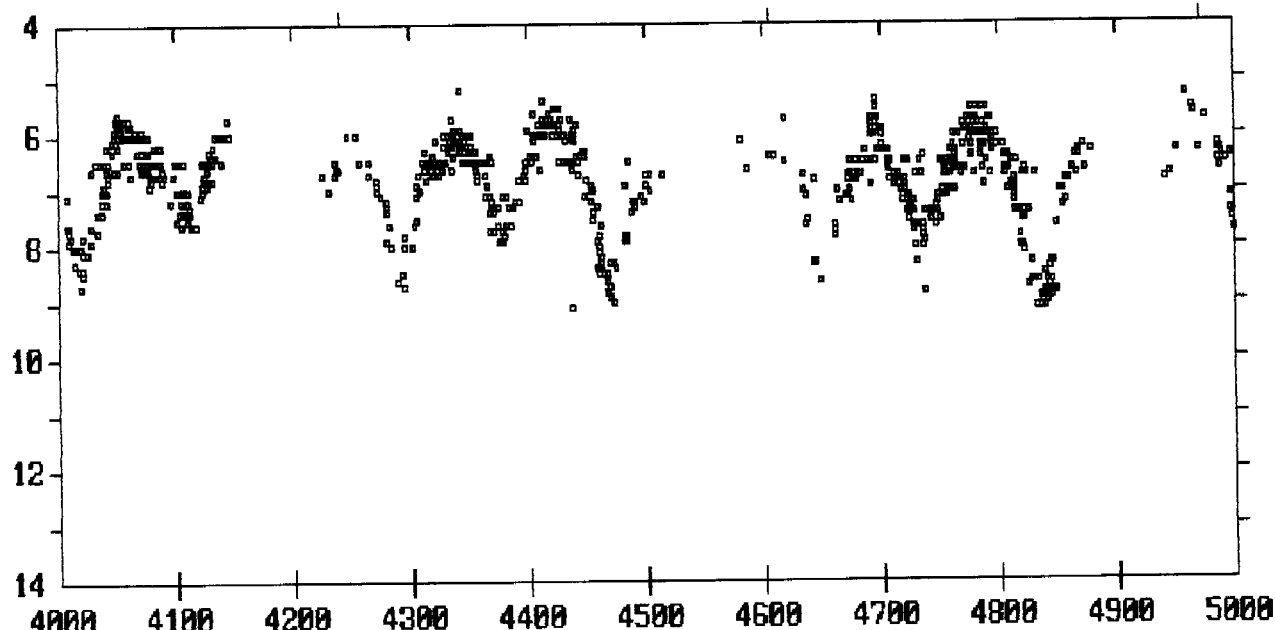
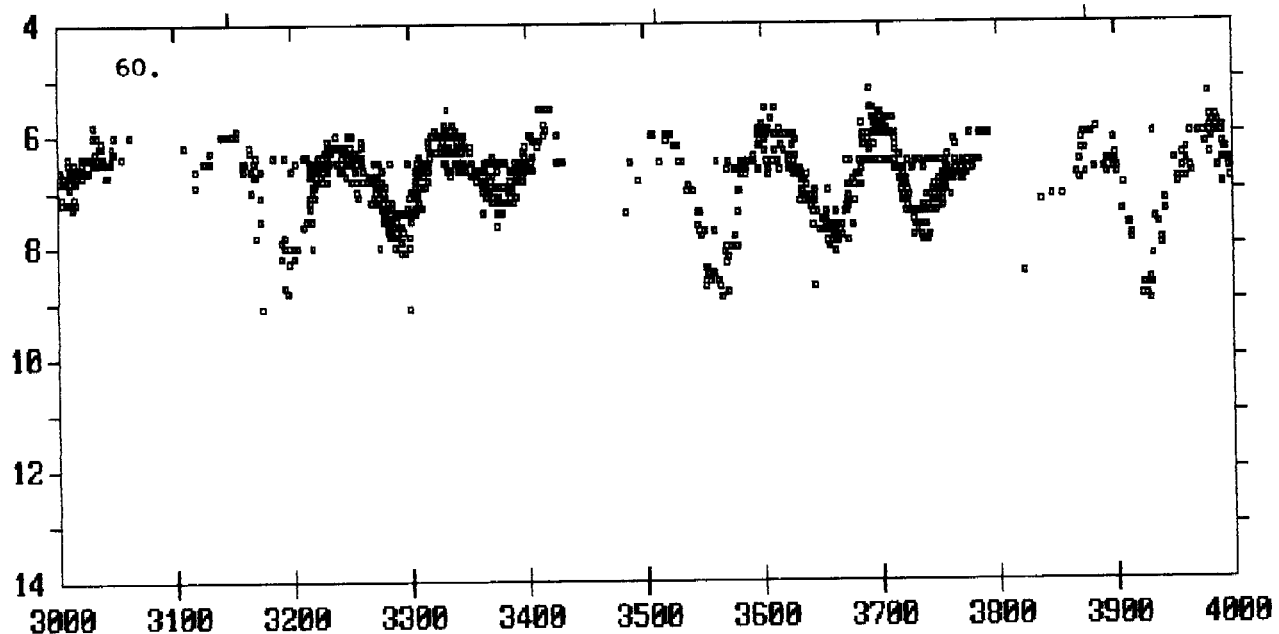


Fig. 14

LIGHT CURVE FROM INDIVIDUAL OBSERVATIONS

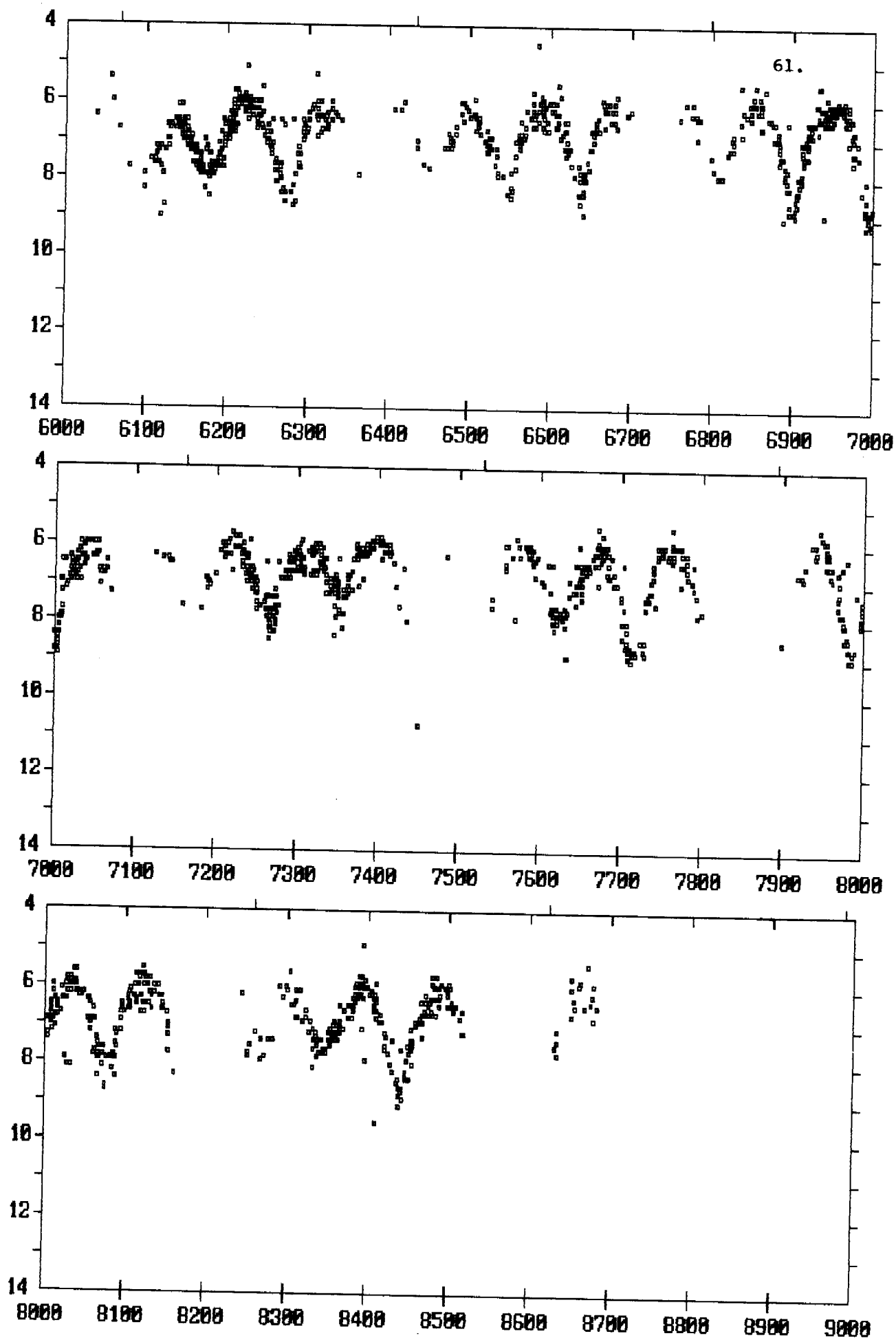
J.D. 2,440,000 - J.D. 2,443,000



T CEN

Fig. 15

LIGHT CURVE FROM INDIVIDUAL OBSERVATIONS
J.D. 2,443,000 - J.D. 2,446,000

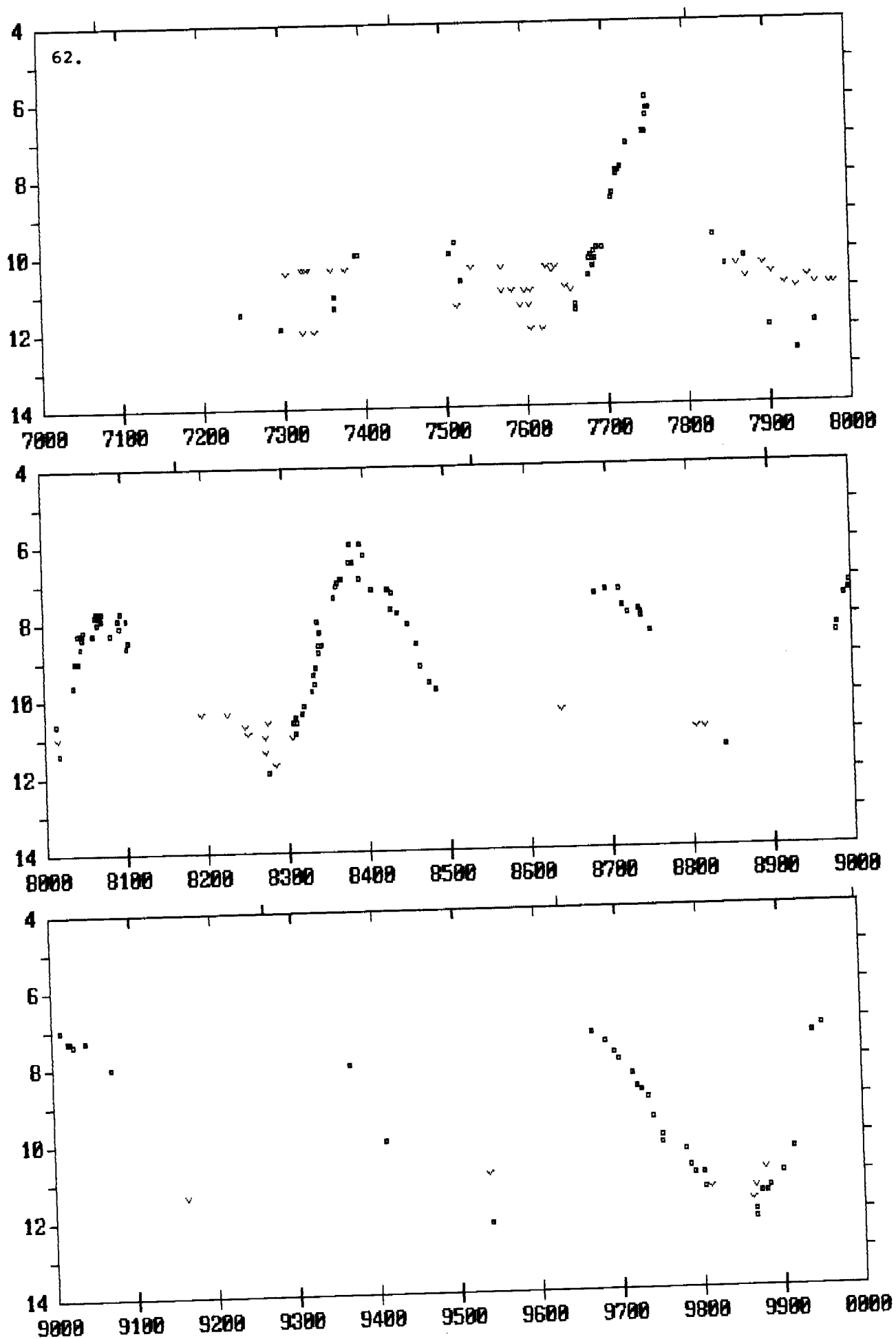


T CEN

Fig. 16

LIGHT CURVE FROM INDIVIDUAL OBSERVATIONS

J.D. 2,446,000 - J.D. 2,448,680

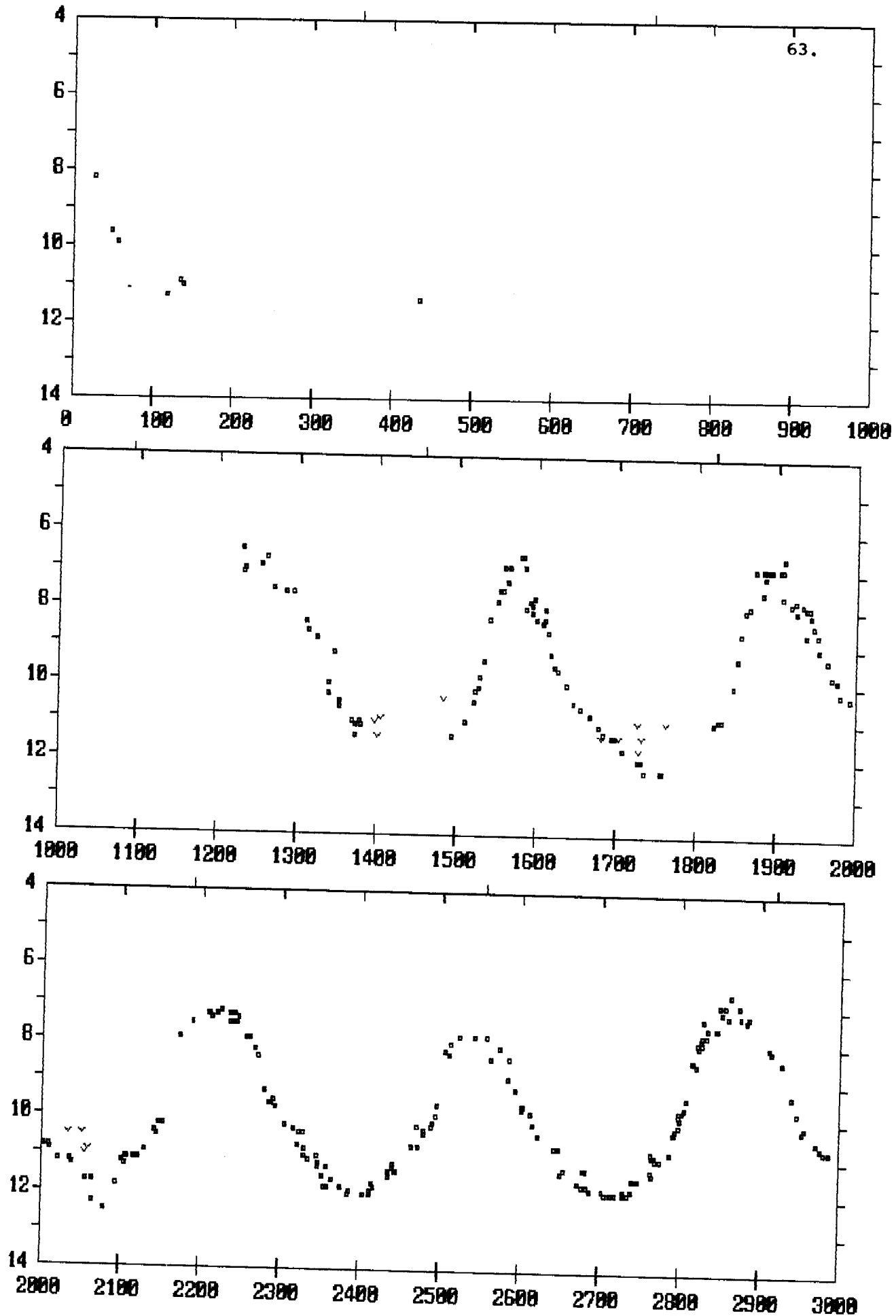


RS SCO

Fig. 17

LIGHT CURVE FROM INDIVIDUAL OBSERVATIONS

J.D. 2,427,240 - J.D. 2,430,000

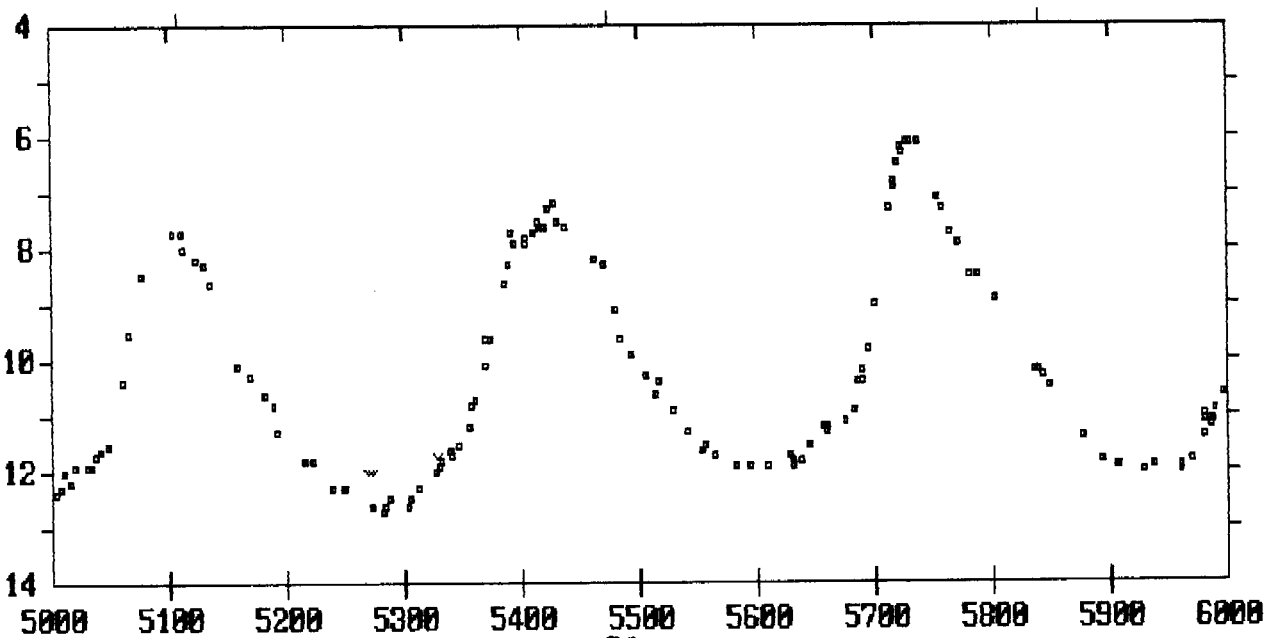
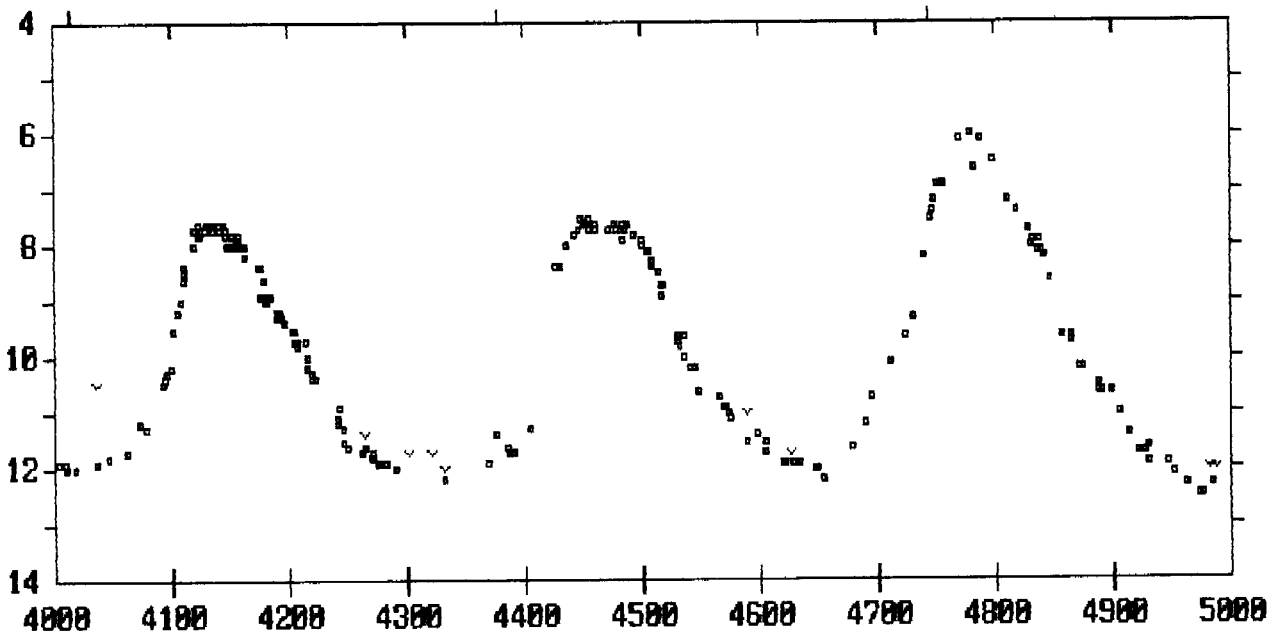
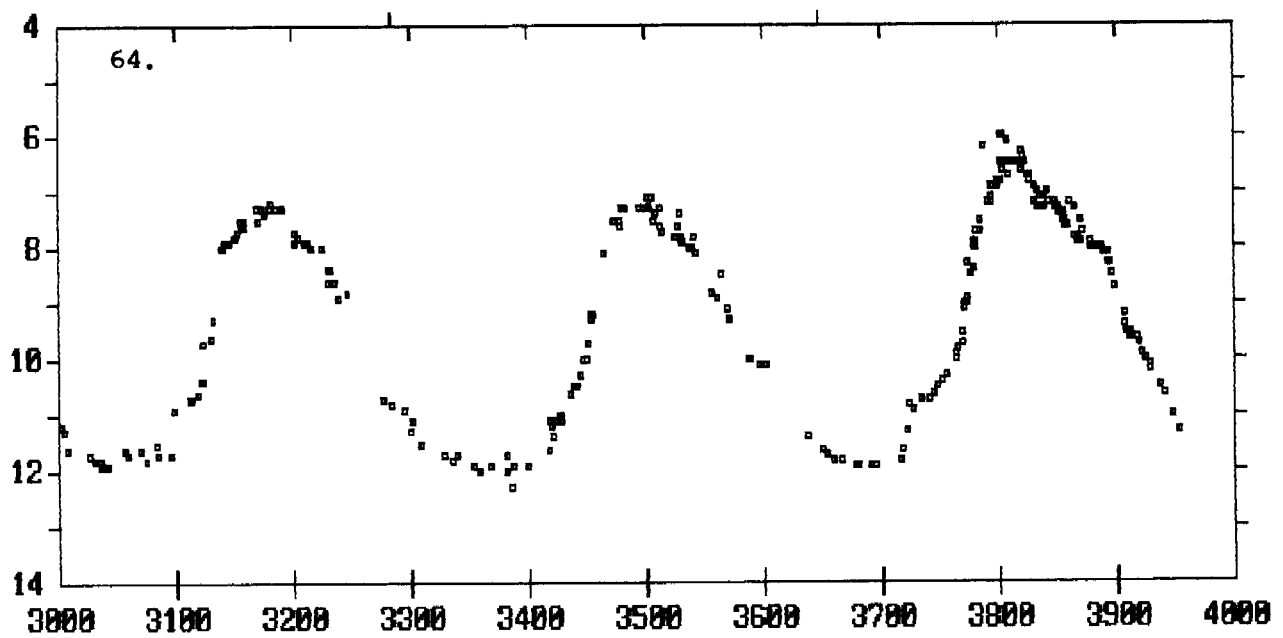


RS SCO

Fig. 18

LIGHT CURVE FROM INDIVIDUAL OBSERVATIONS

J.D. 2,430,000 - J.D. 2,433,000

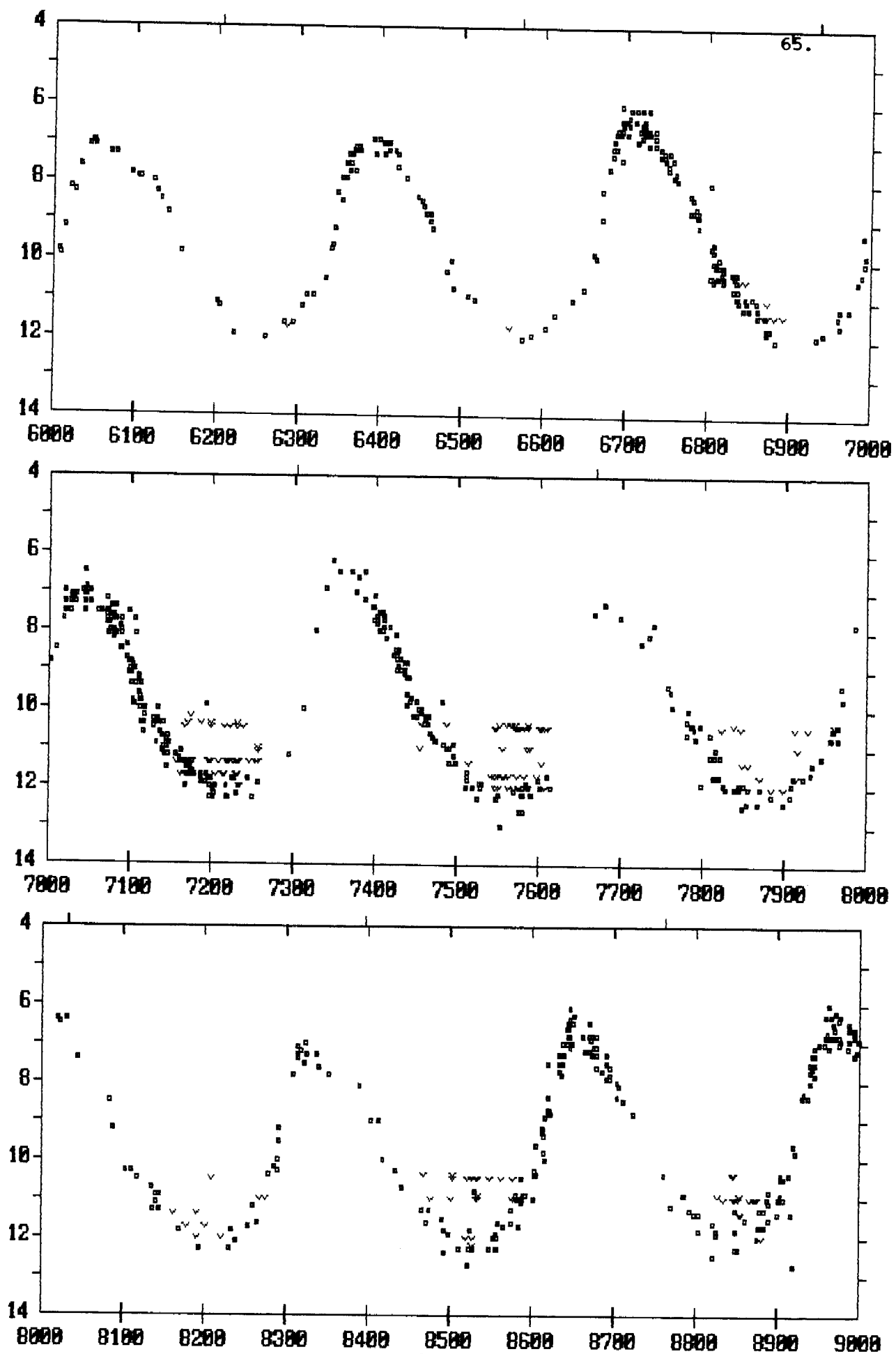


RS SCO

Fig. 19

LIGHT CURVE FROM INDIVIDUAL OBSERVATIONS

J.D. 2,433,000 - J.D. 2,436,000

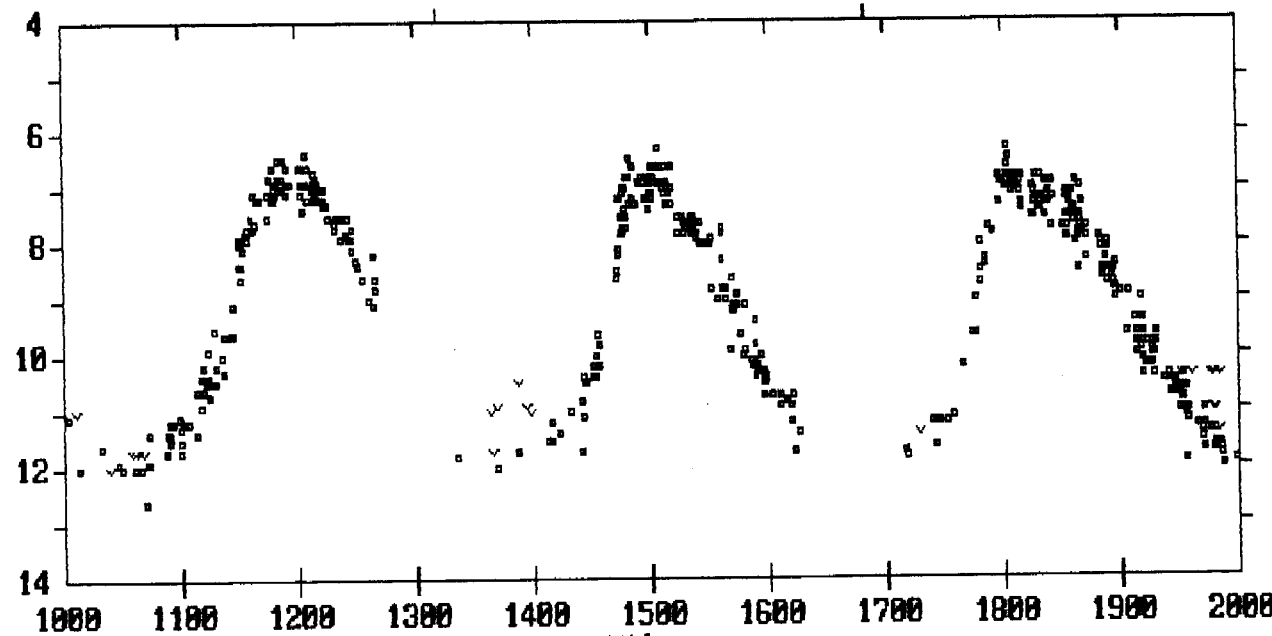
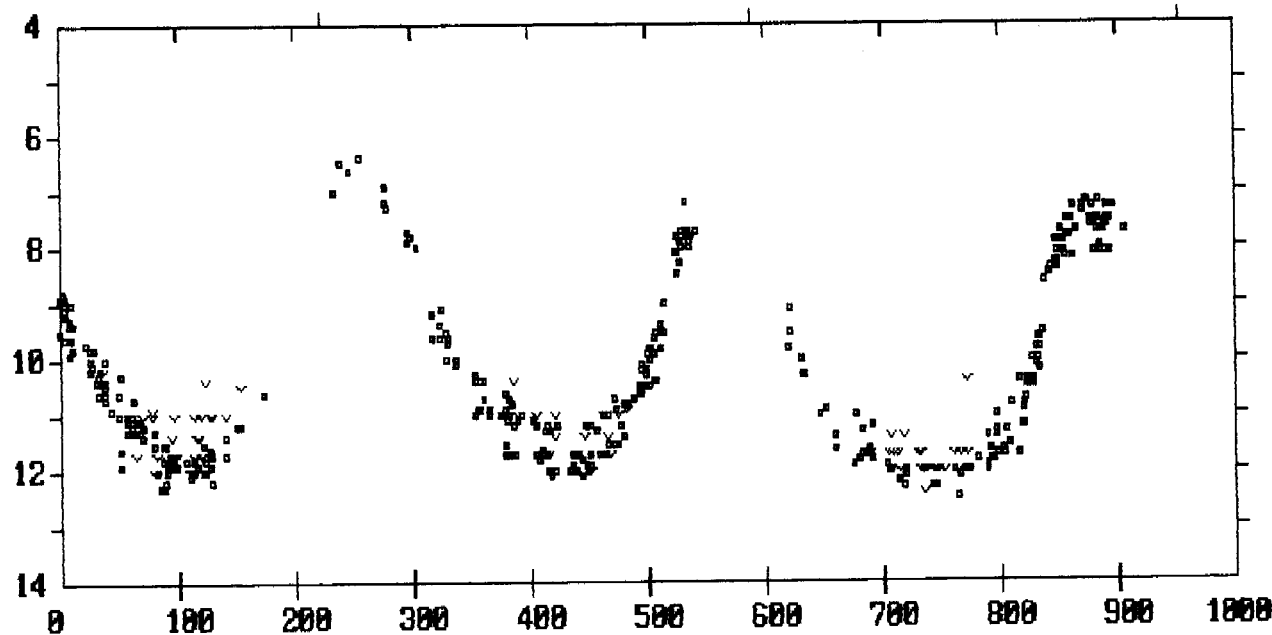
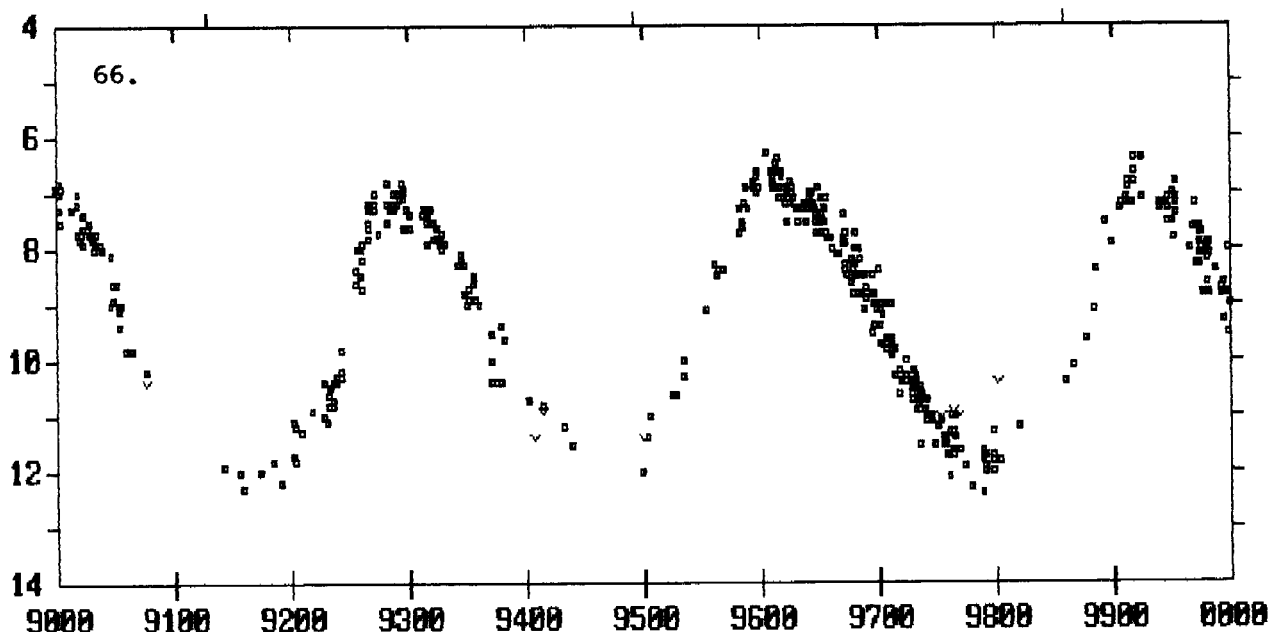


RS SCO

Fig. 20

LIGHT CURVE FROM INDIVIDUAL OBSERVATIONS

J.D. 2,436,000 - J.D. 2,439,000



RS SCO

Fig. 21

LIGHT CURVE FROM INDIVIDUAL OBSERVATIONS

J.D. 2,439,000 - J.D. 2,442,000

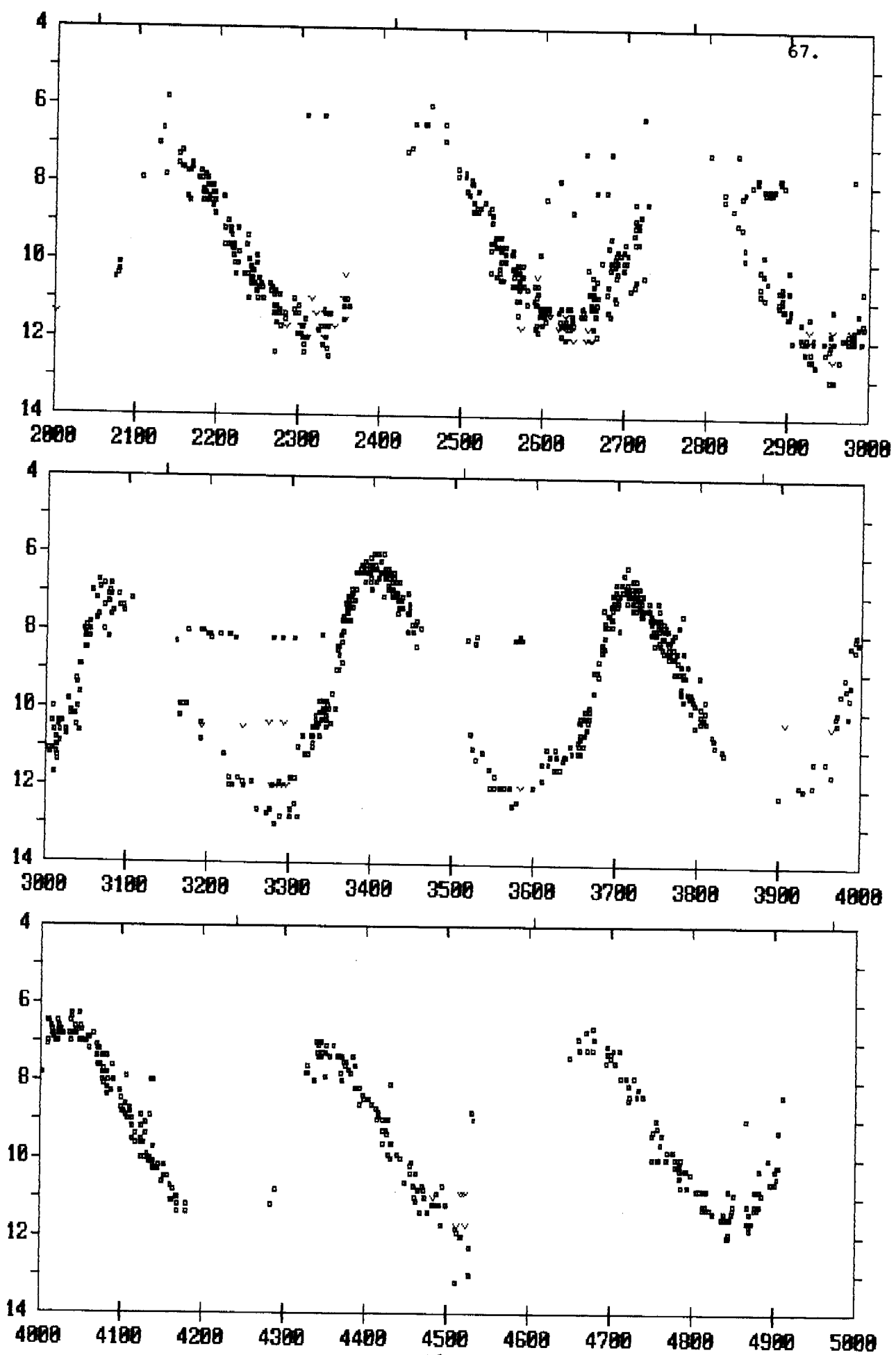
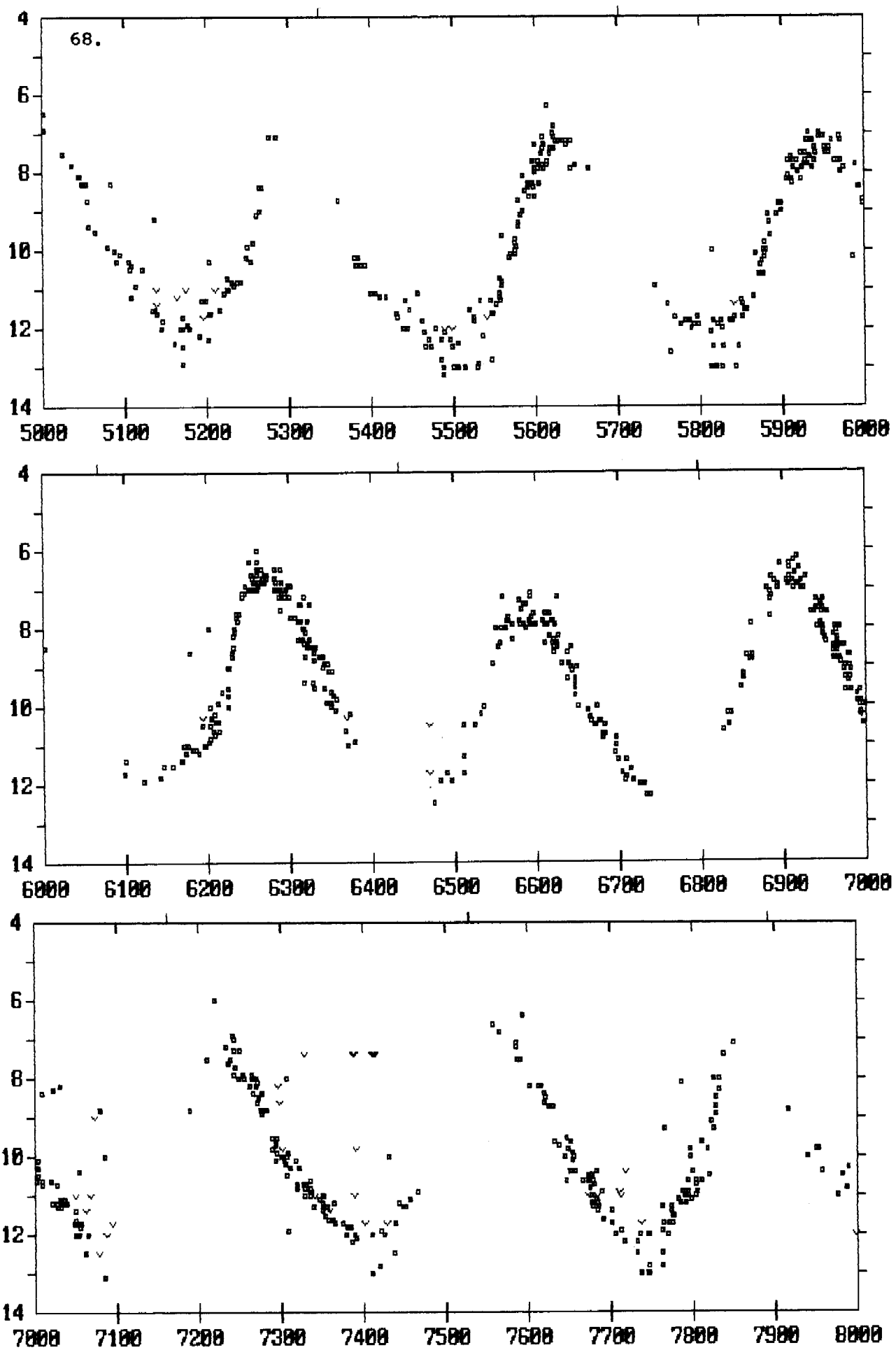


Fig. 22
 LIGHT CURVE FROM INDIVIDUAL OBSERVATIONS
 J.D. 2,442,000 - J.D. 2,445,000

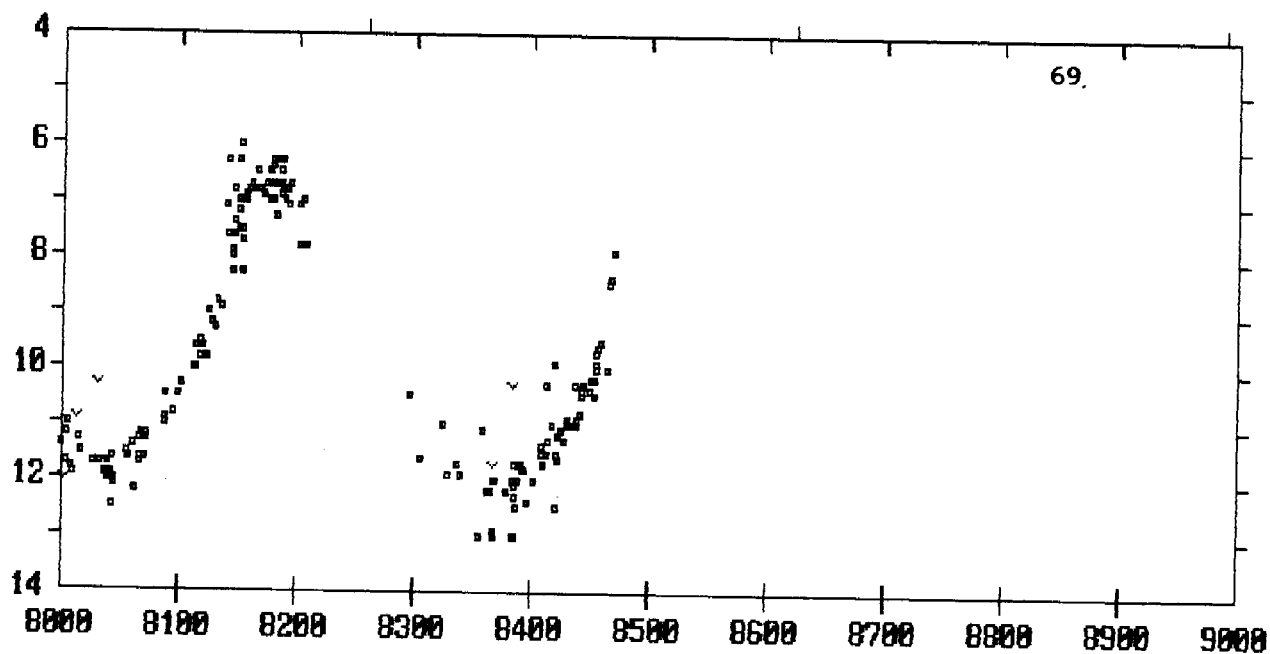


RS SCO

Fig. 23

LIGHT CURVE FROM INDIVIDUAL OBSERVATIONS

J.D. 2,445,000 - J.D. 2,448,000



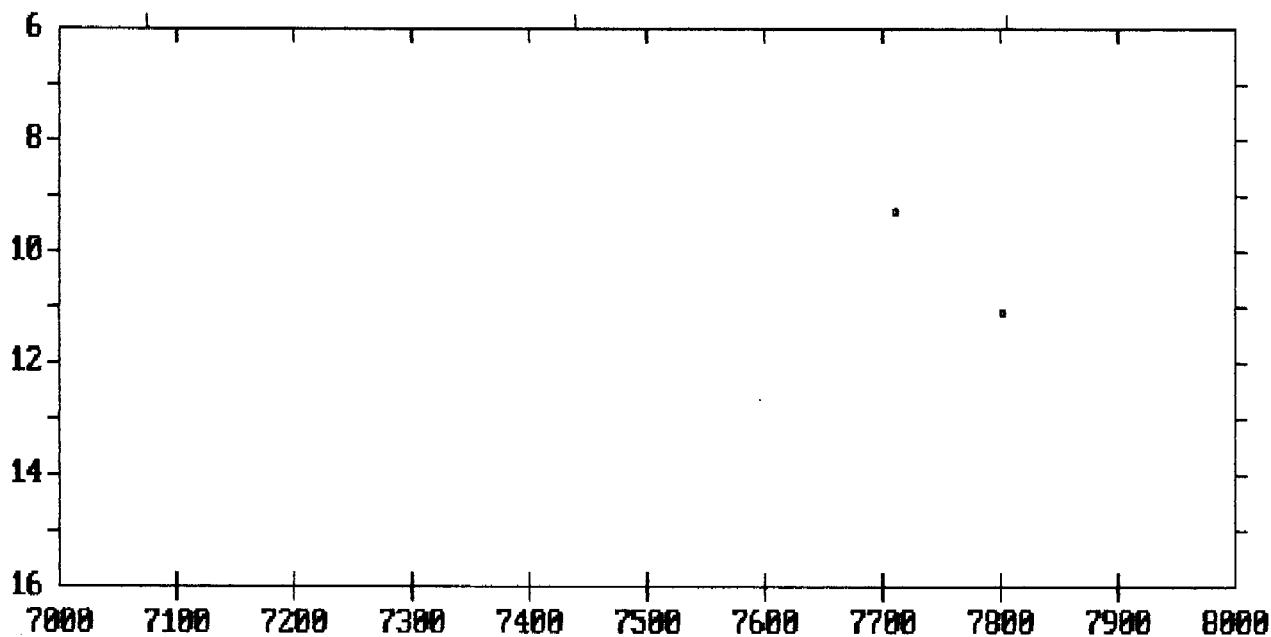
RS SCO

Fig. 24

LIGHT CURVE FROM INDIVIDUAL OBSERVATIONS

J.D. 2,448,000 - J.D. 2,448,475

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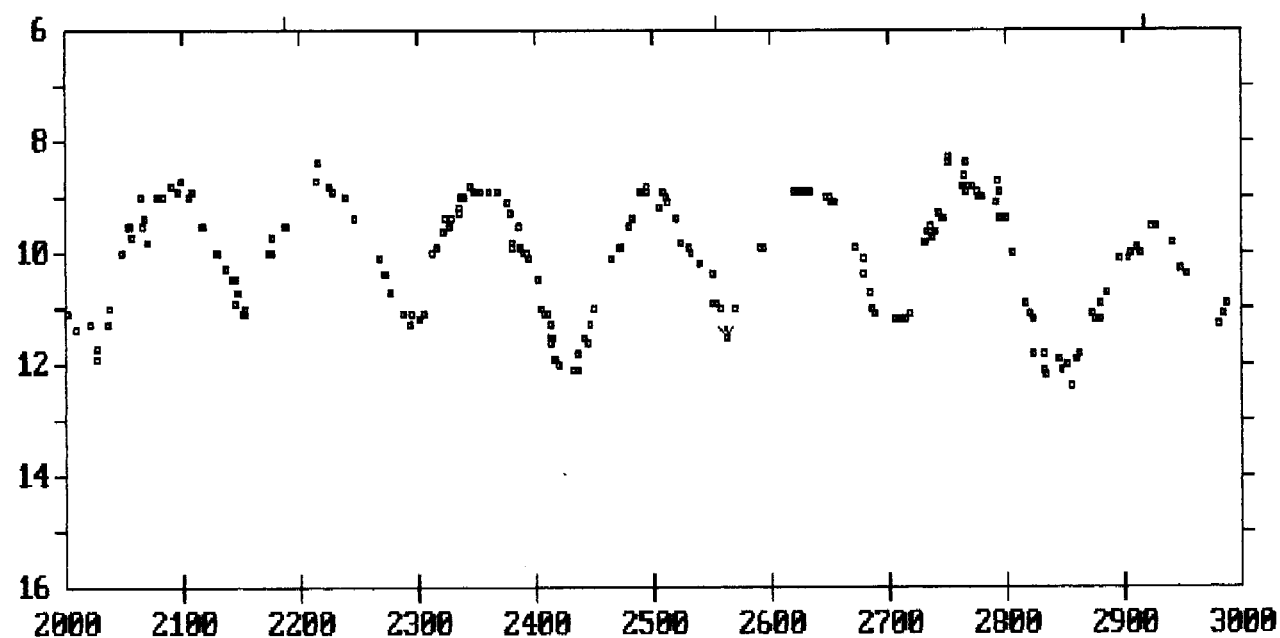
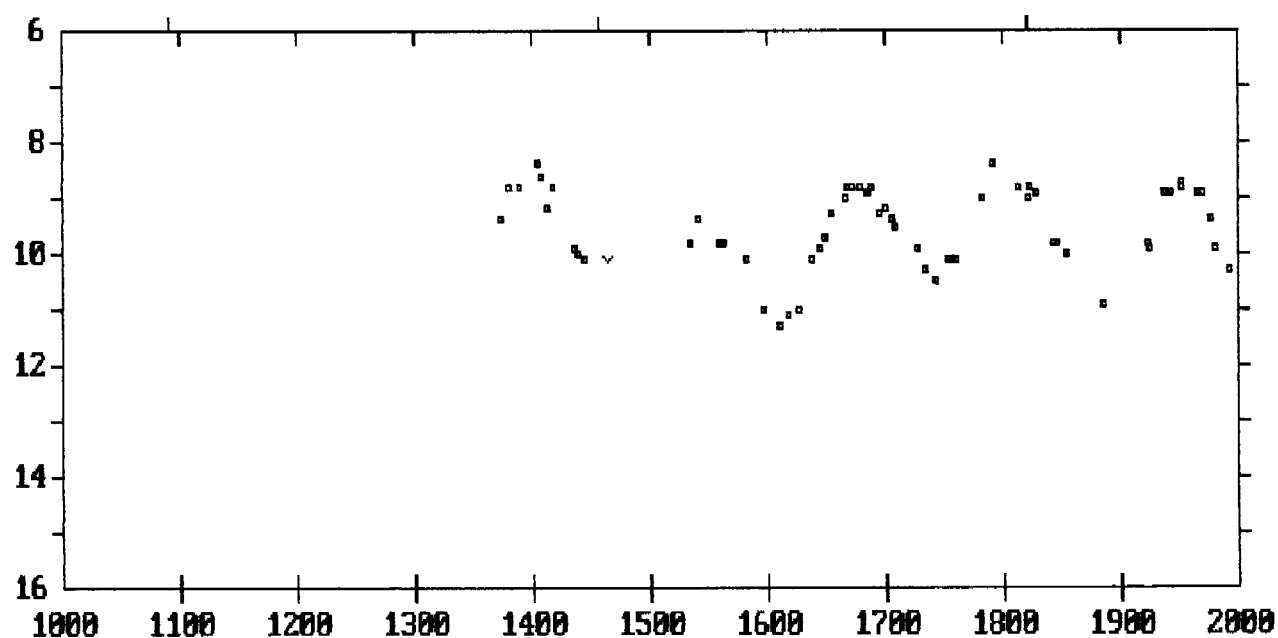
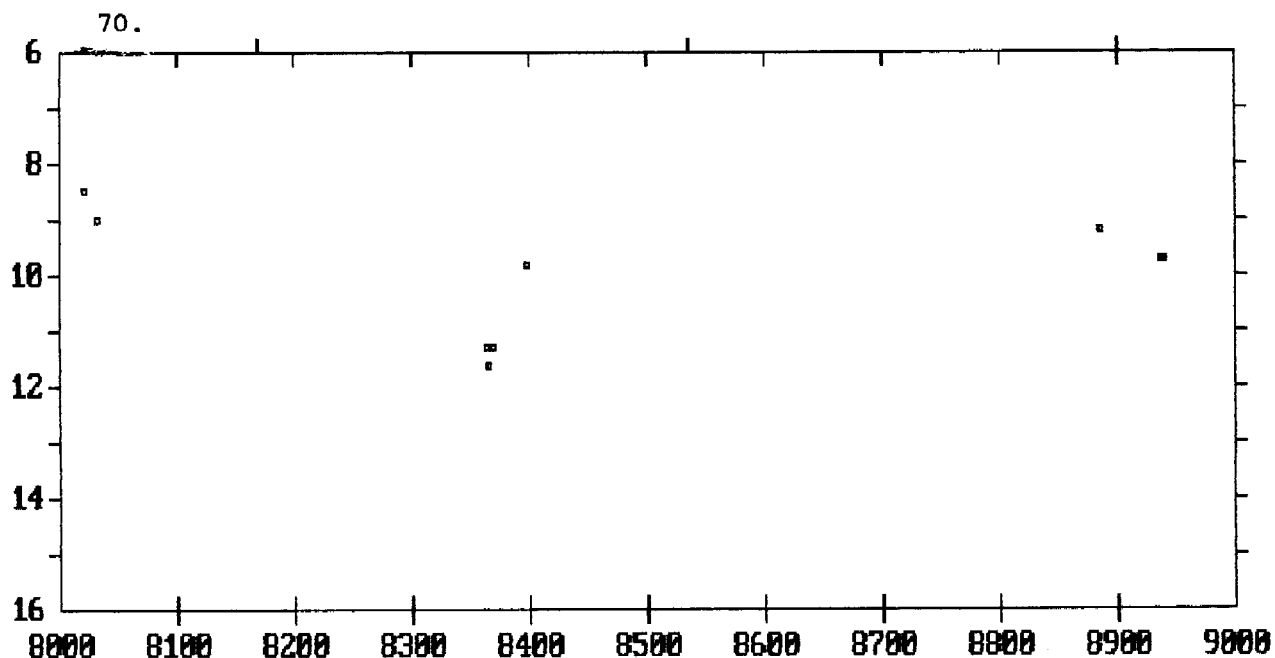


T GRU

Fig. 25

LIGHT CURVE FROM INDIVIDUAL OBSERVATIONS

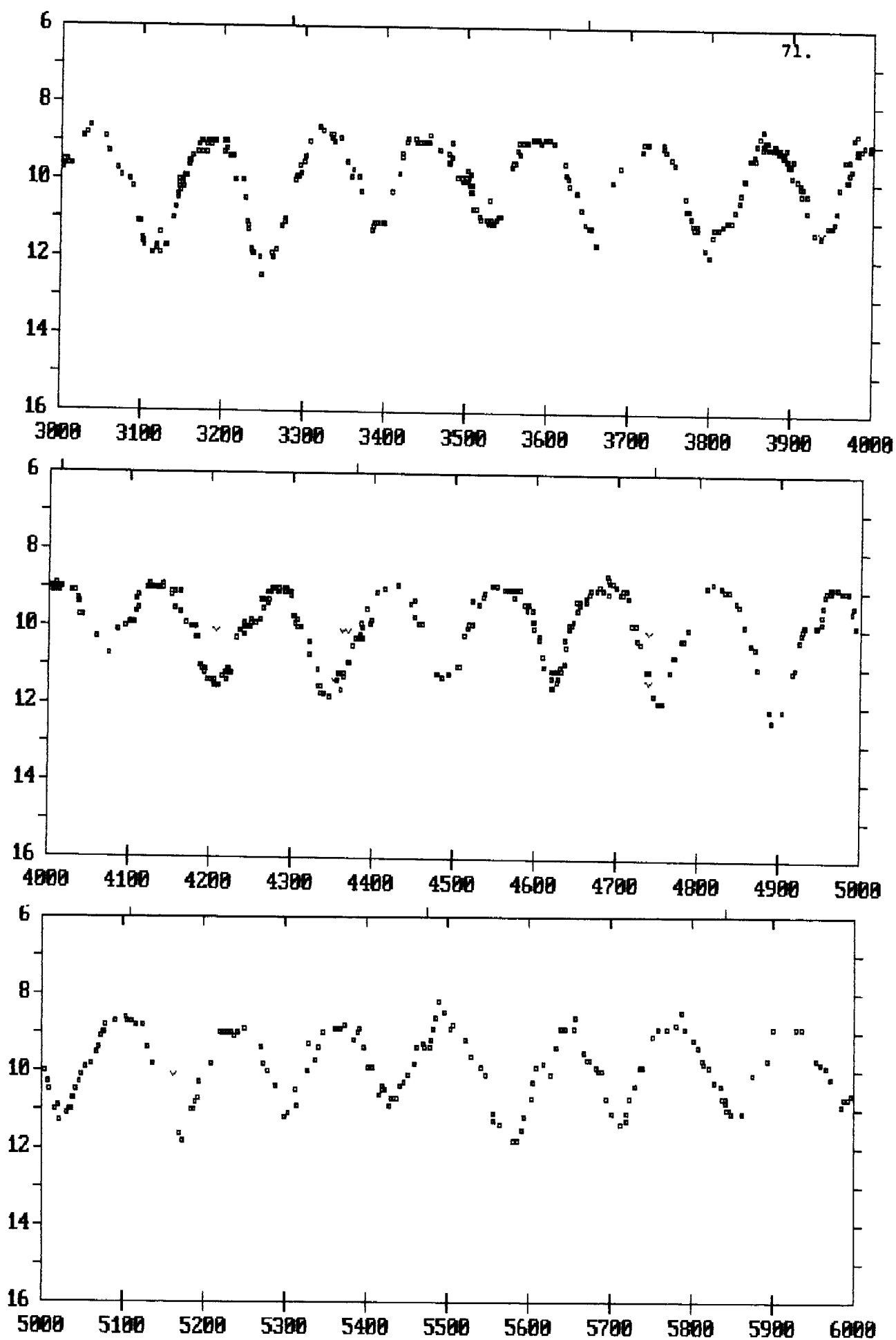
J.D. 2,427,700 - J.D. 2, 428,000



T GRU

Fig 26

LIGHT CURVE FROM INDIVIDUAL OBSERVATIONS
J.D. 2,428,000 - J.D. 2,433,000

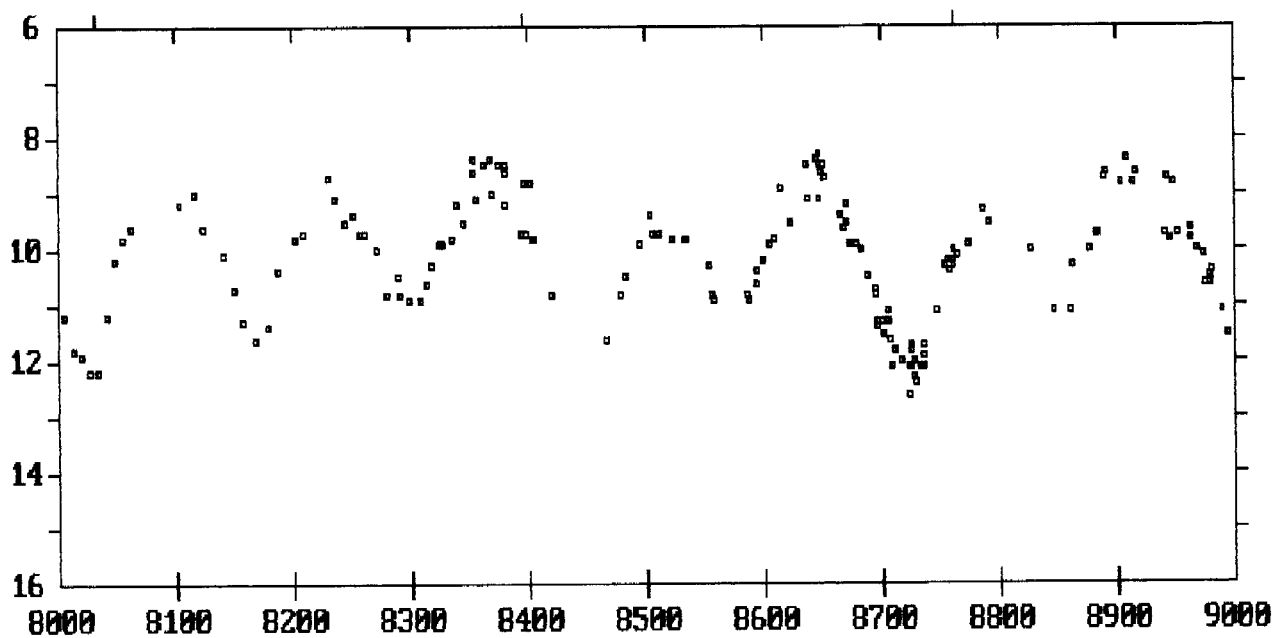
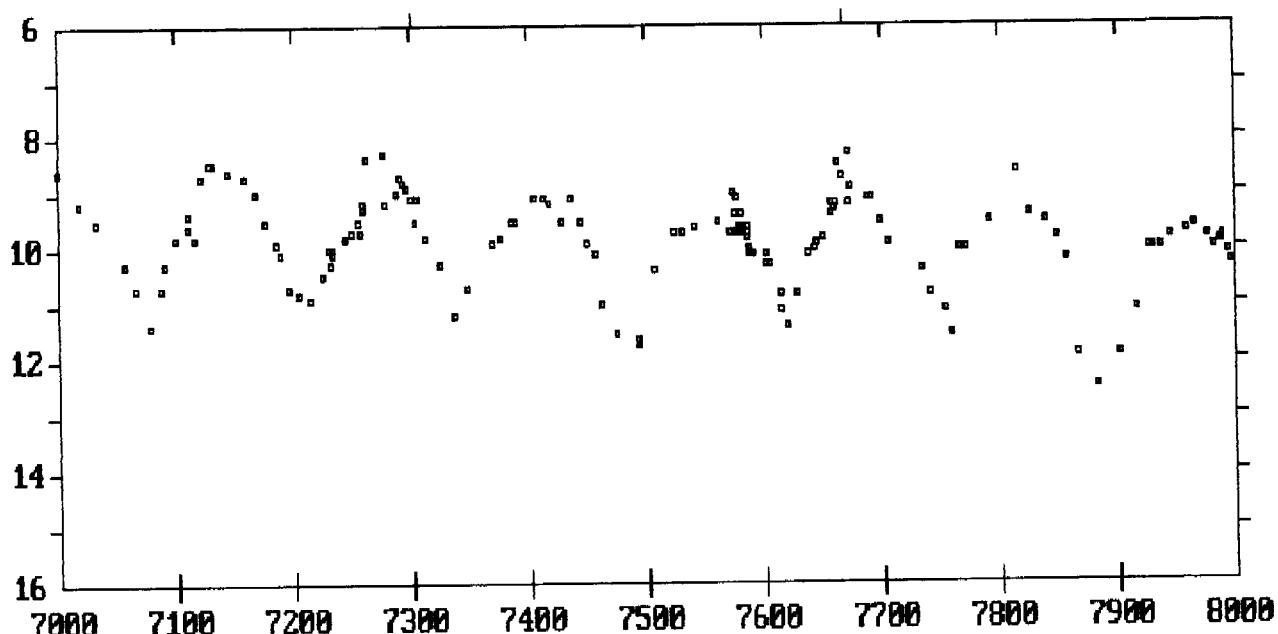
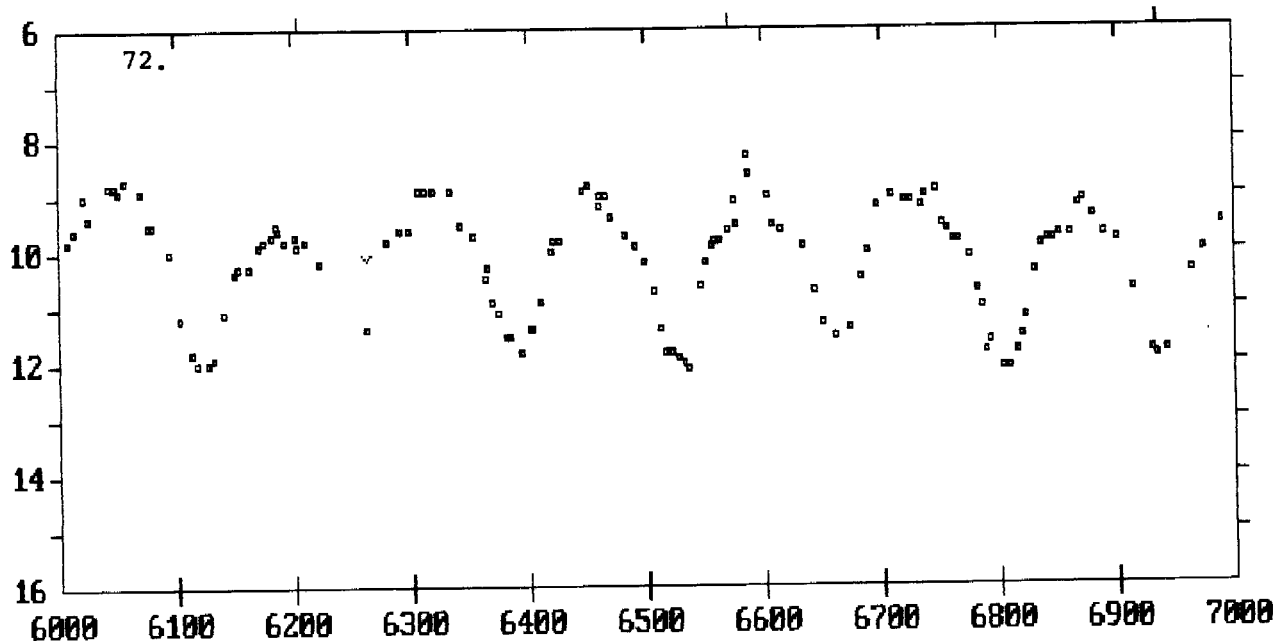


T GRU

Fig. 27

LIGHT CURVE FROM INDIVIDUAL OBSERVATIONS

J.D. 2,433,000 - J.D. 2,436,000

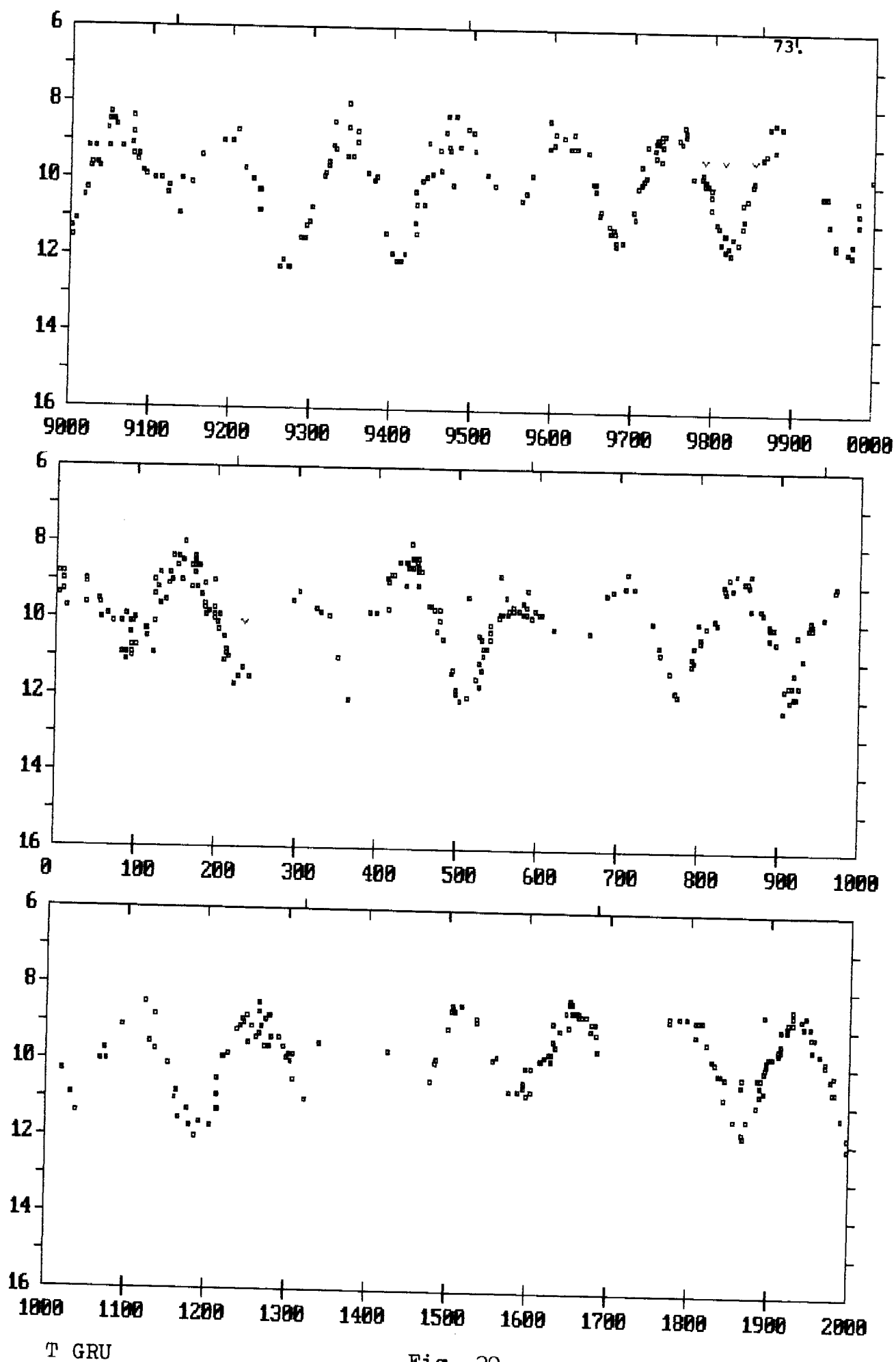


T GRU

Fig. 28

LIGHT CURVE FROM INDIVIDUAL OBSERVATIONS

J.D. 2,436,000 - J.D. 2,439,000

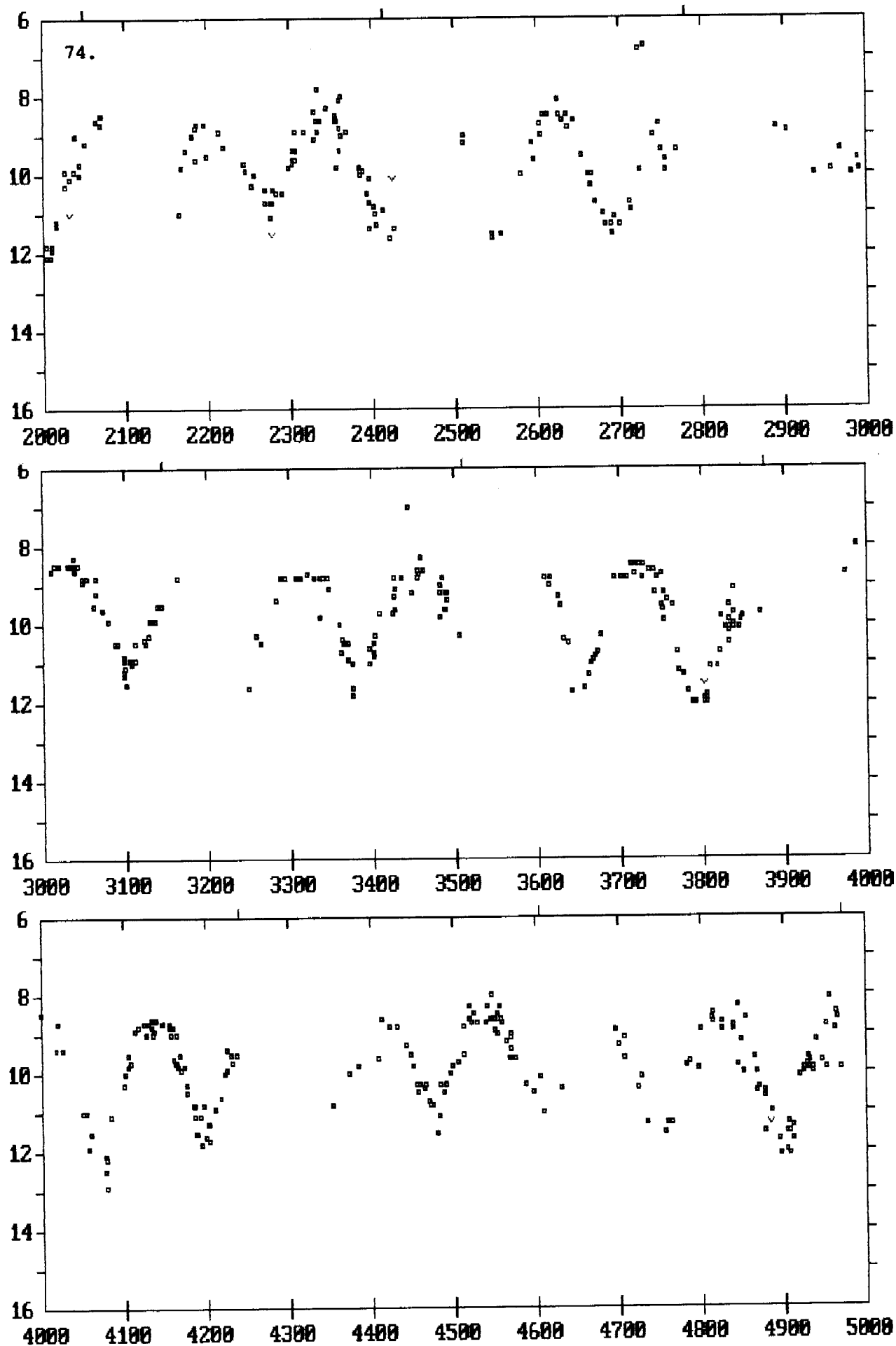


T GRU

Fig. 29

LIGHT CURVE FROM INDIVIDUAL OBSERVATIONS

J.D. 2,439,000 - J.D. 2,442,000



T GRU

Fig. 30

LIGHT CURVE FROM INDIVIDUAL OBSERVATIONS

J.D. 2,442,000 - J.D. 2,445,000

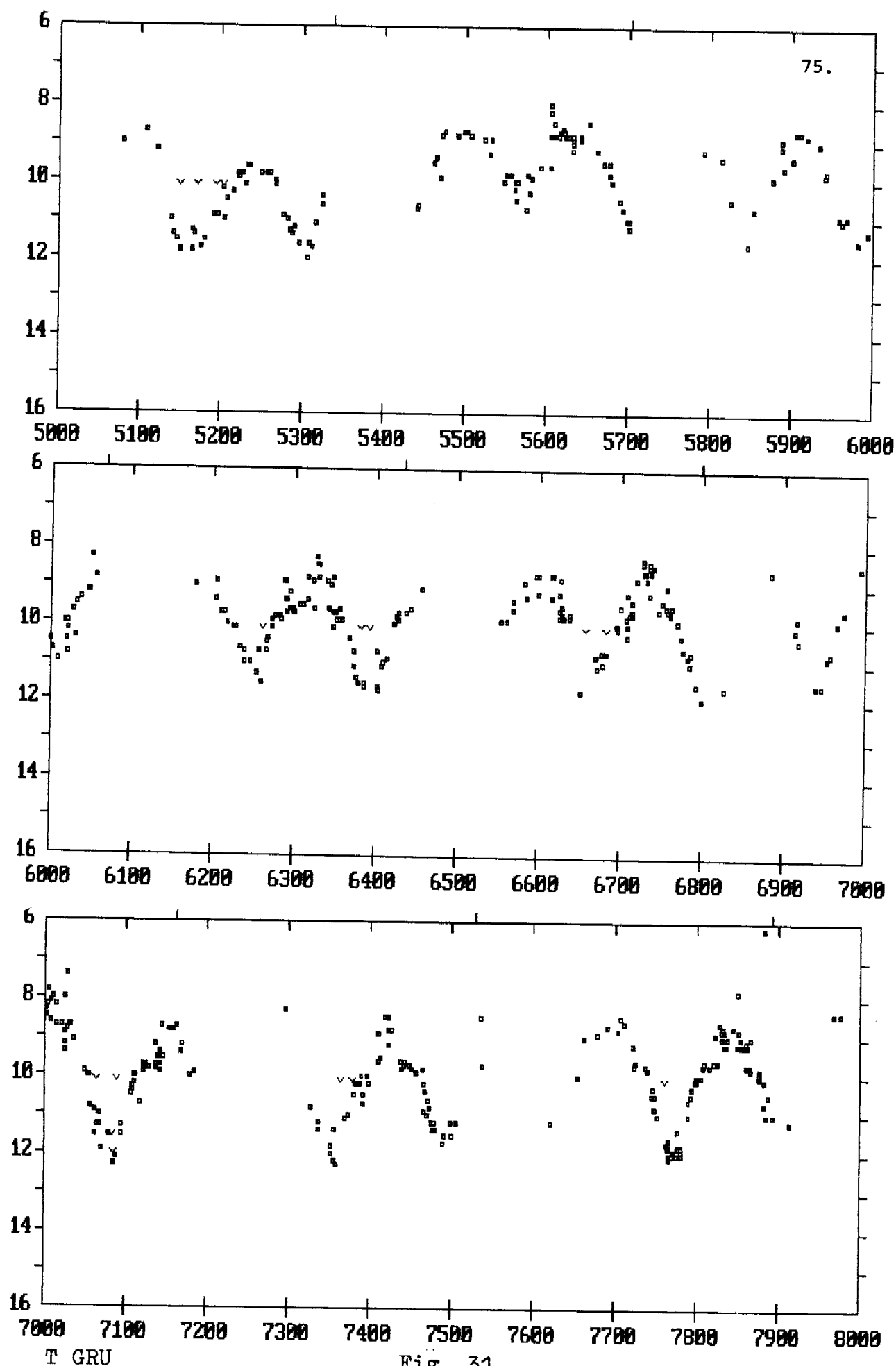
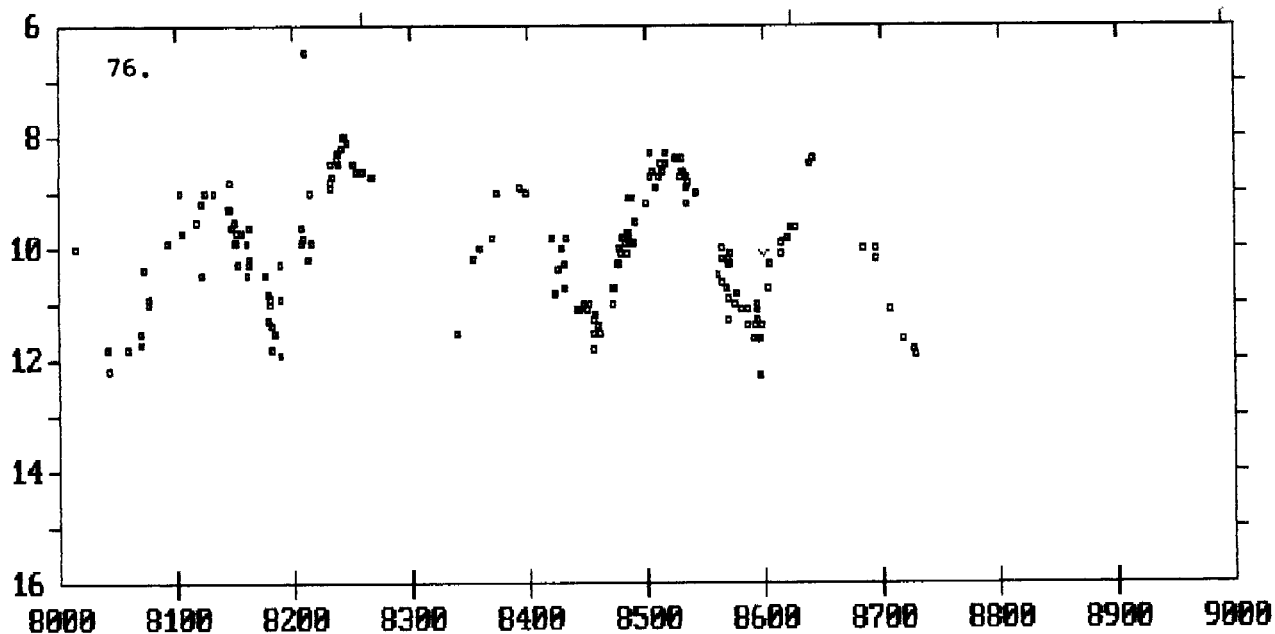


Fig. 31

LIGHT CURVE FROM INDIVIDUAL OBSERVATIONS

J.D. 2,445,000 - J.D. 2,448,000



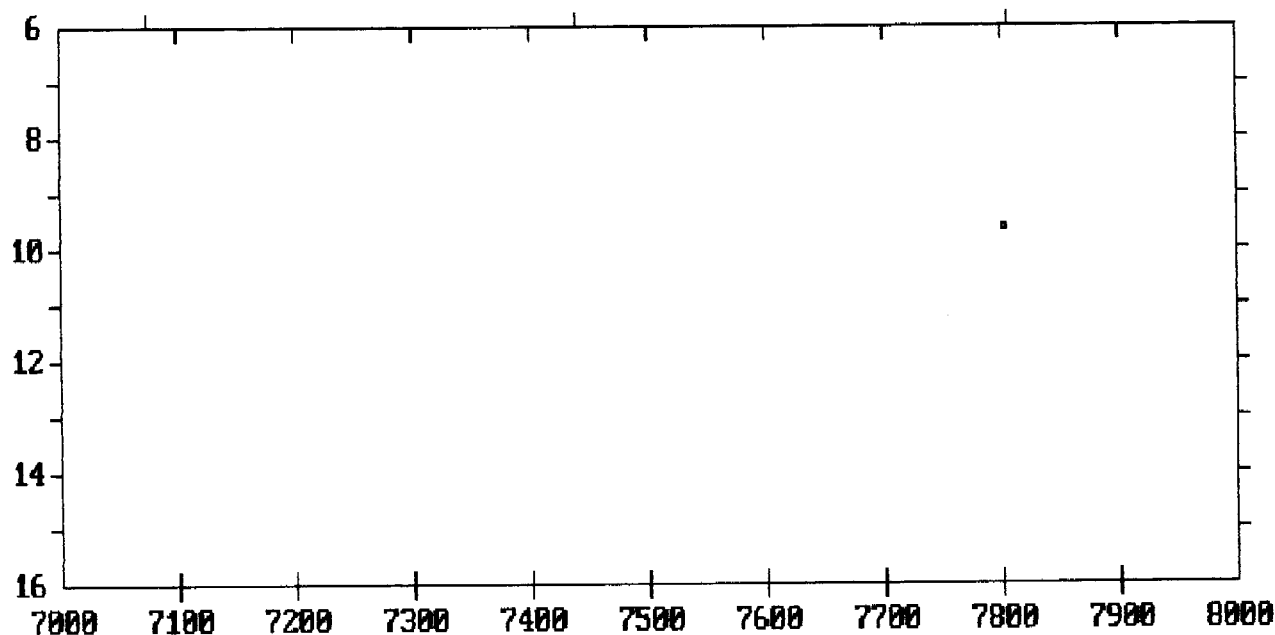
T. GRU

Fig. 32

LIGHT CURVE FROM INDIVIDUAL OBSERVATIONS

J.D. 2,448,000 - J.D. 2,448,728

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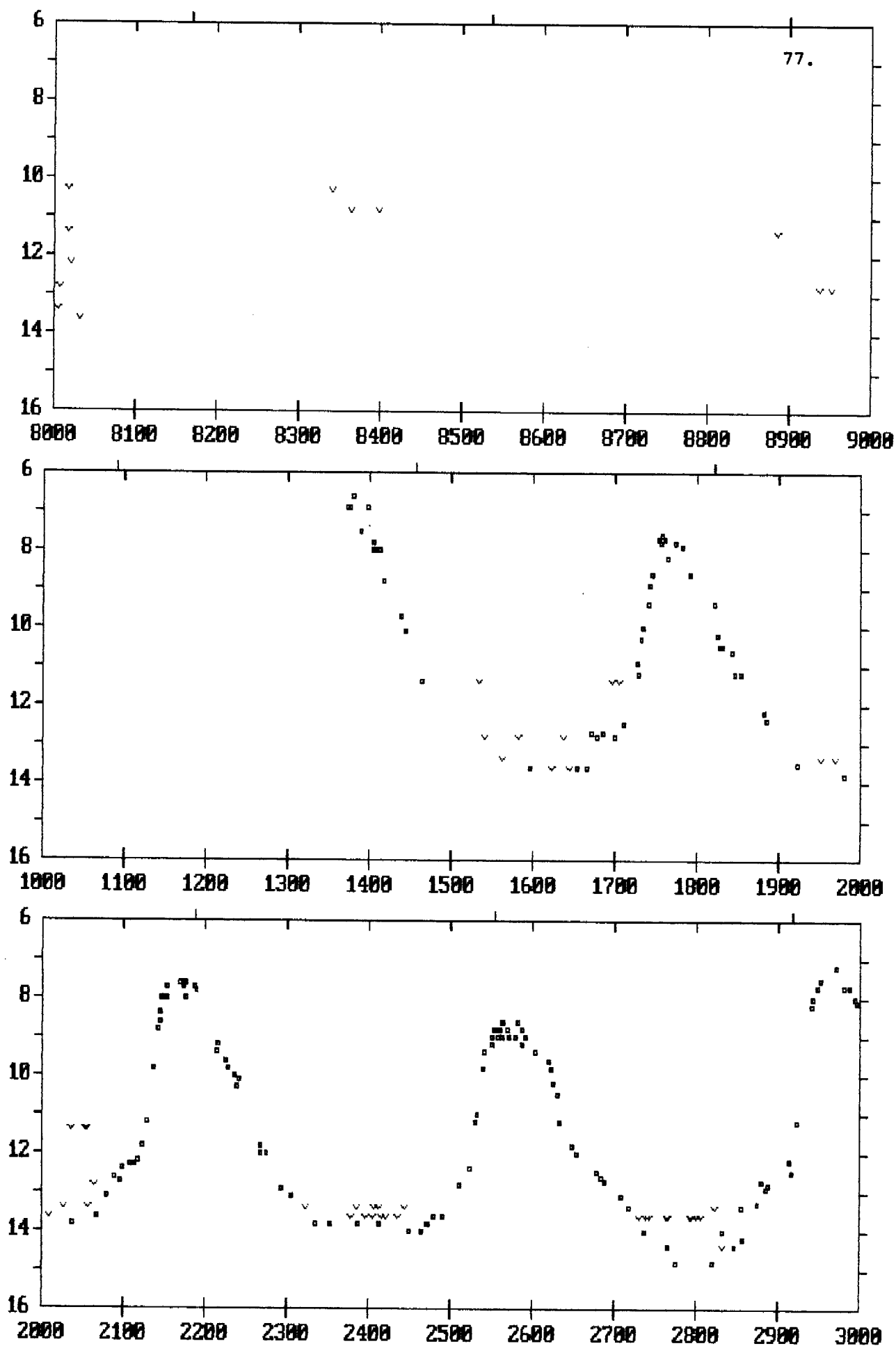


S GRU

Fig. 33

LIGHT CURVE FROM INDIVIDUAL OBSERVATIONS

J.D. 2,427,800 - 2,428,000

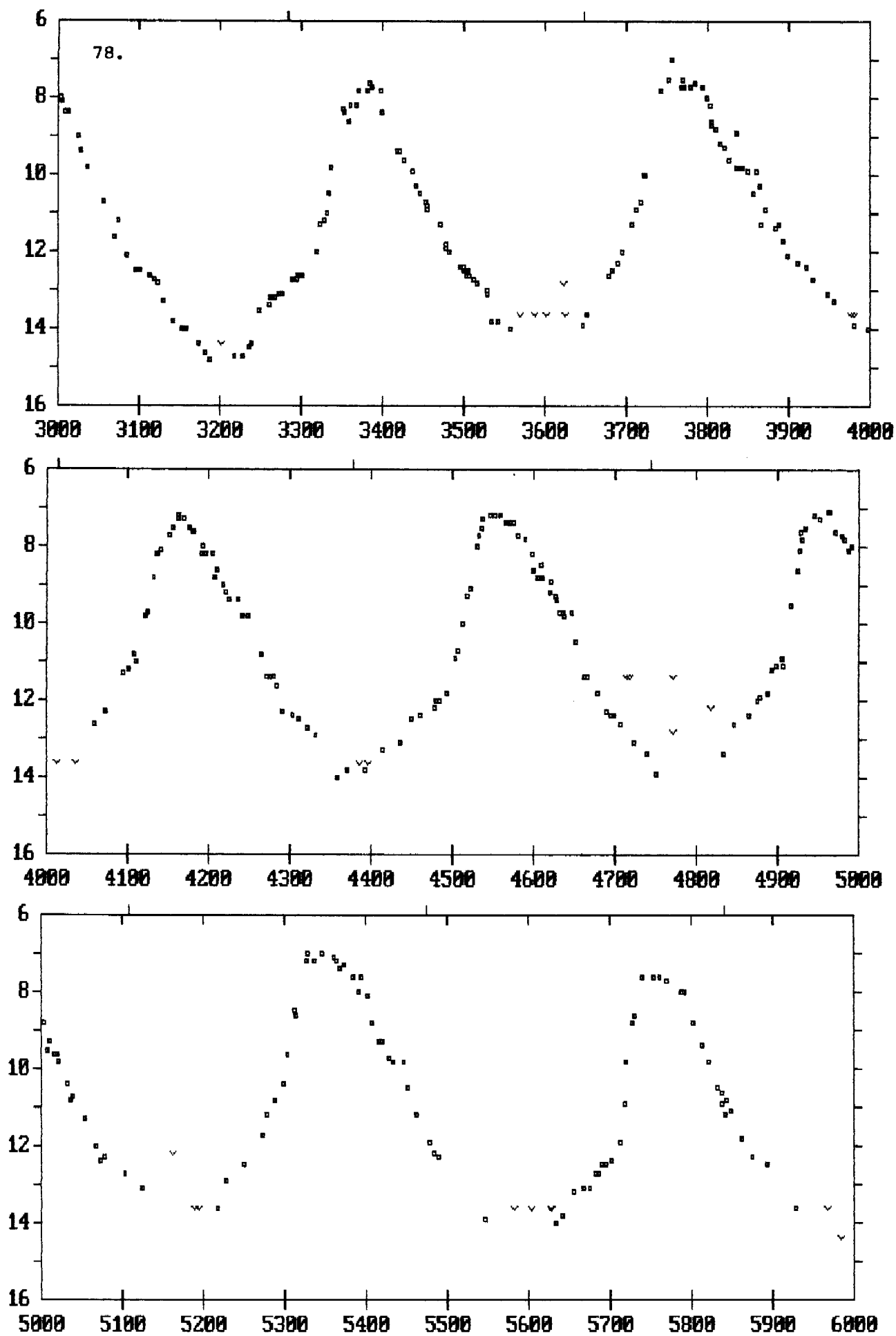


S GRU

Fig. 34

LIGHT CURVE FROM INDIVIDUAL OBSERVATIONS

J.D. 2,428,000 - J.D. 2,433,000

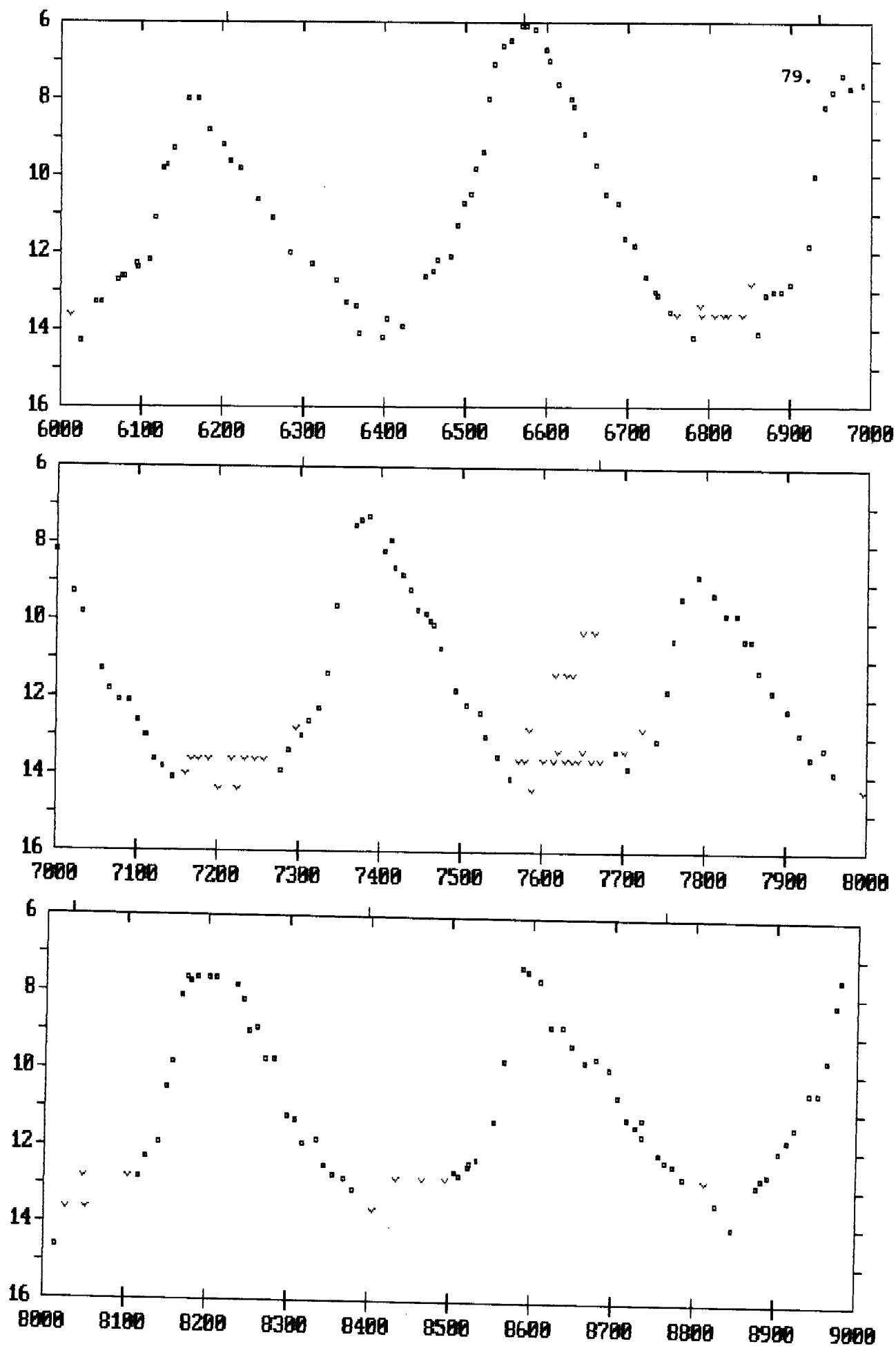


S GRU

Fig. 35

LIGHT CURVE FROM INDIVIDUAL OBSERVATIONS

J.D. 2,433,000 - J.D. 2,436,000

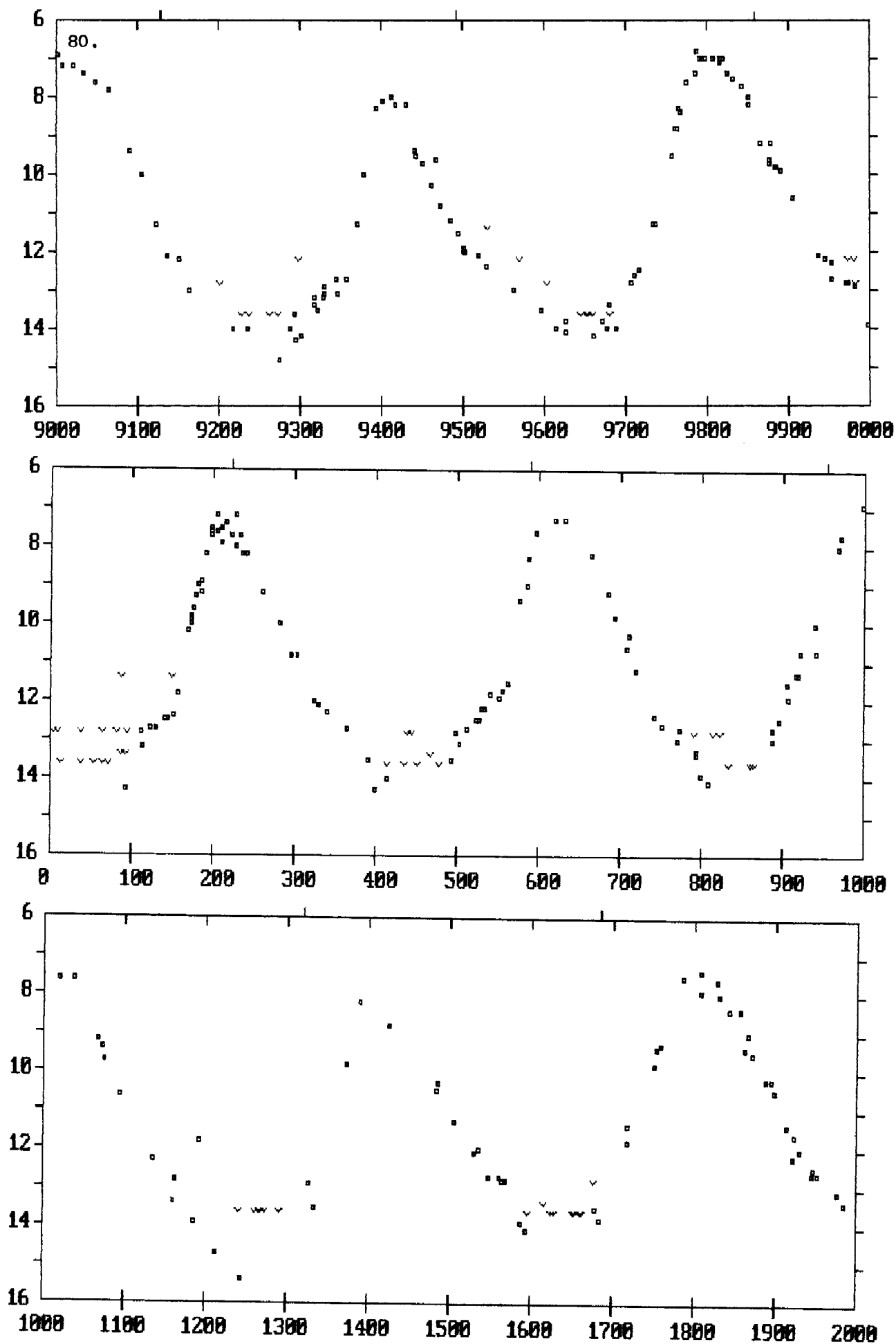


S GRU

Fig. 36

LIGHT CURVE FROM INDIVIDUAL OBSERVATIONS

J.D. 2,436,000 - J.D. 2,439,000

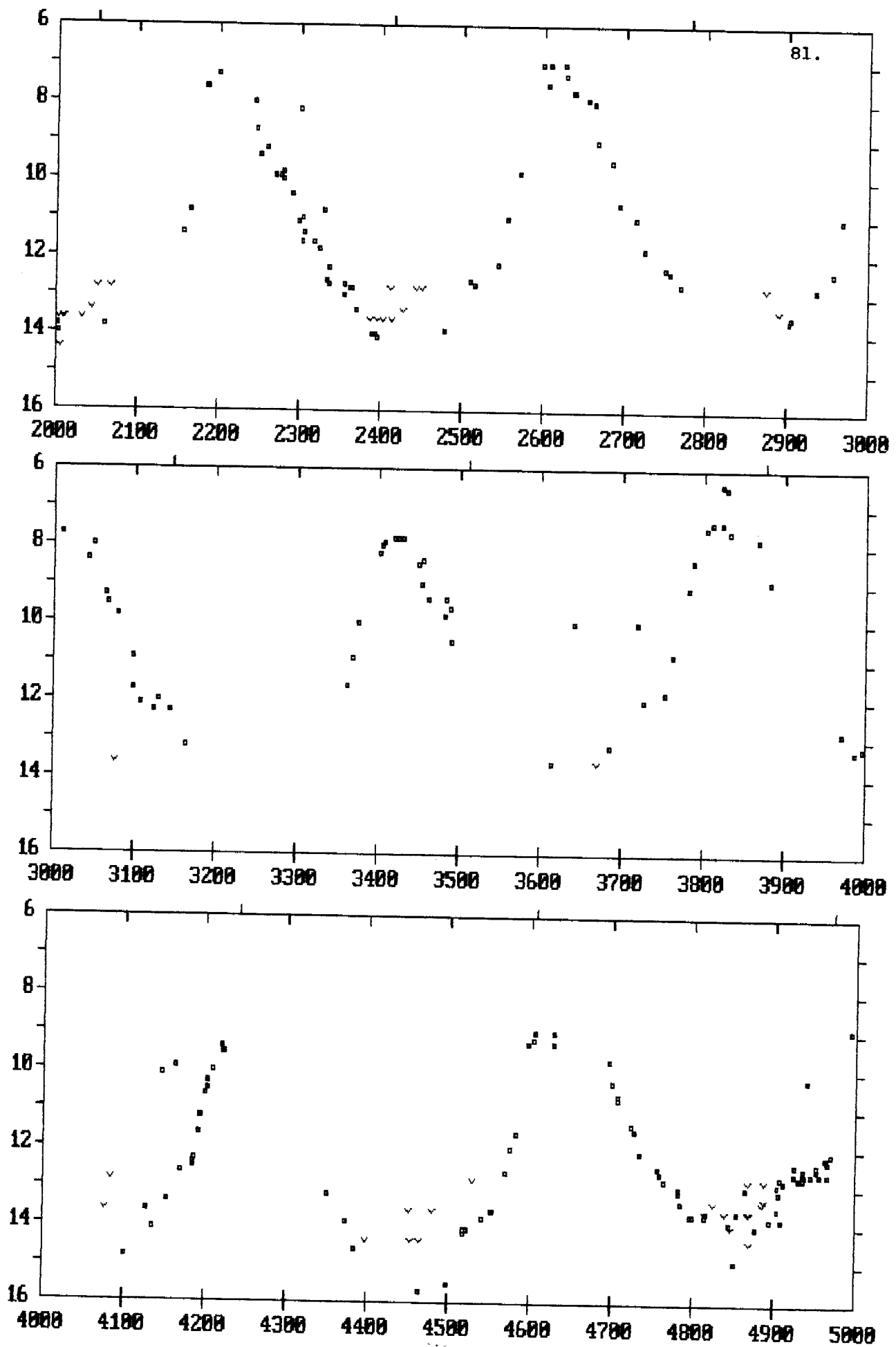


S GRU

Fig. 37

LIGHT CURVE FROM INDIVIDUAL OBSERVATIONS

J.D. 2,439,000 - J.D. 2,442,000

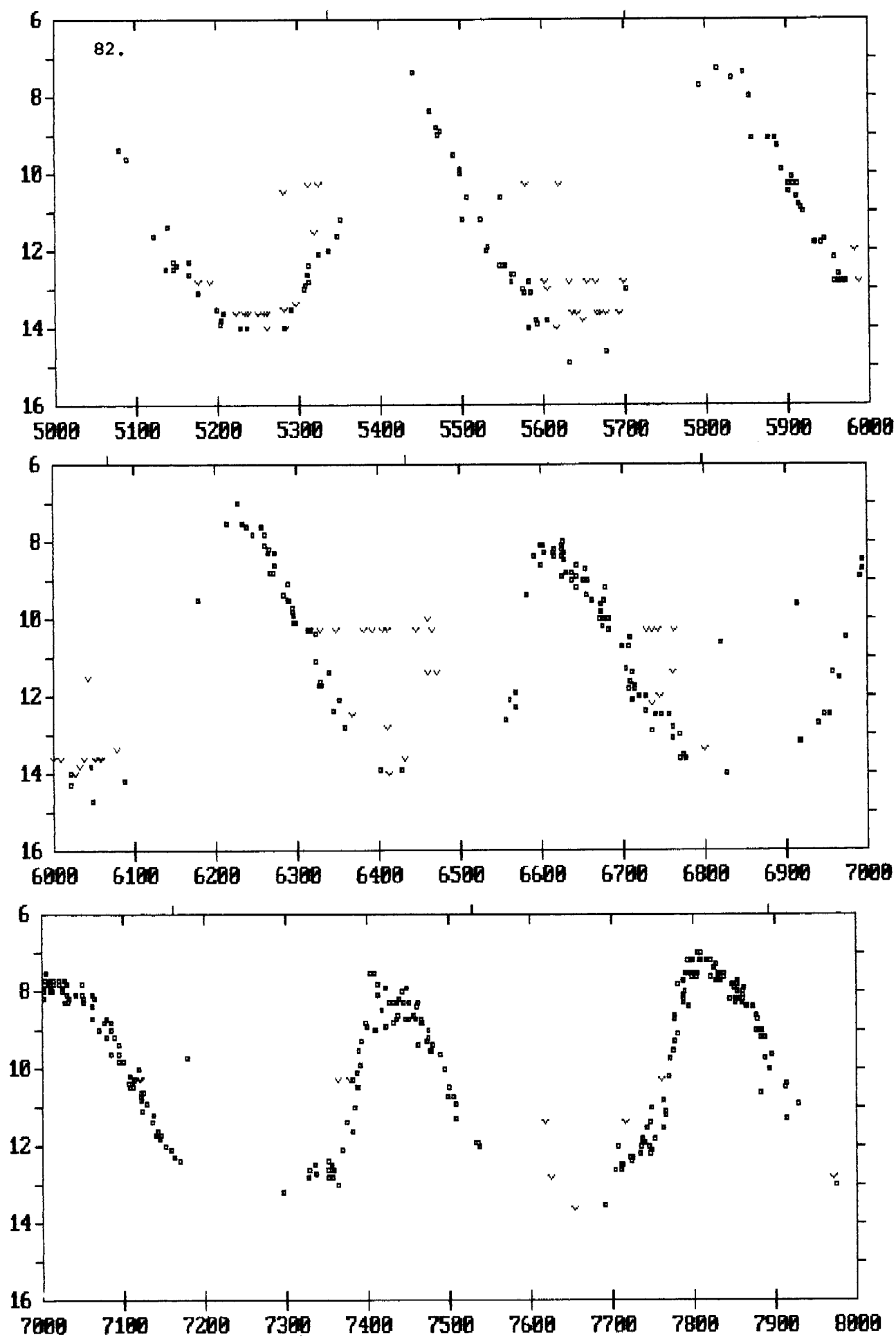


S GRU

Fig. 38

LIGHT CURVE FROM INDIVIDUAL OBSERVATIONS

J.D. 2,442,000 - 2,445,000

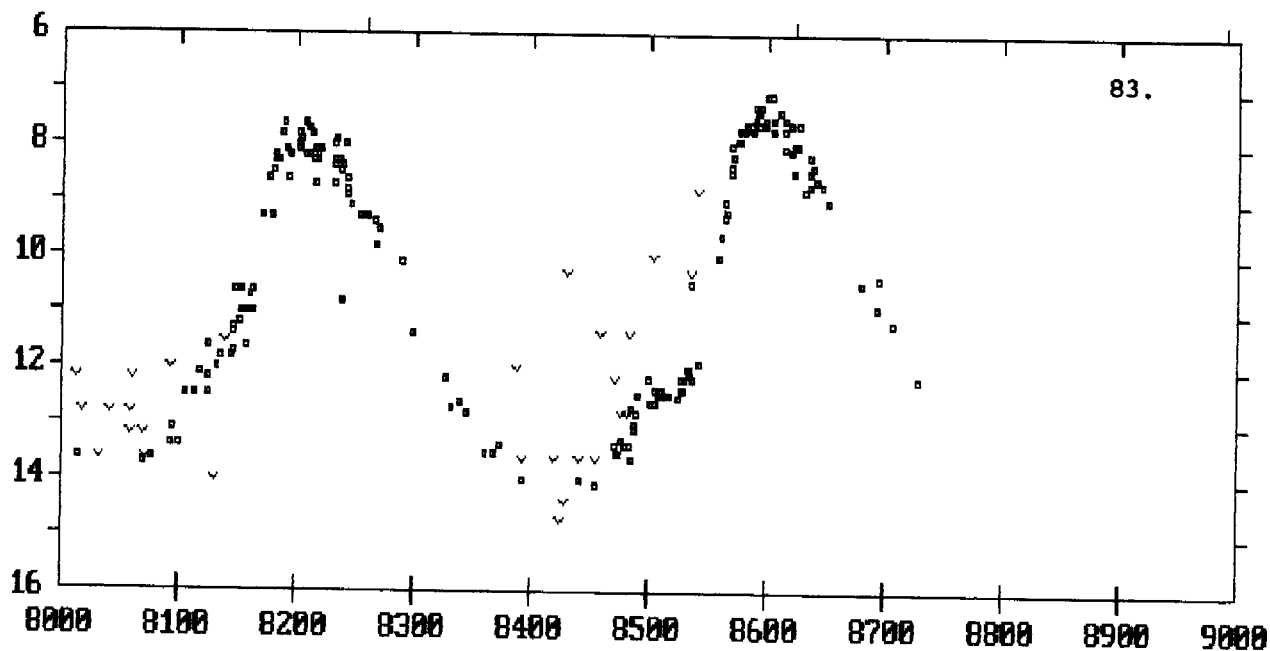


S GRU

Fig. 39

LIGHT CURVE FROM INDIVIDUAL OBSERVATIONS

J.D. 2,445,000 - J.D. 2,448,000



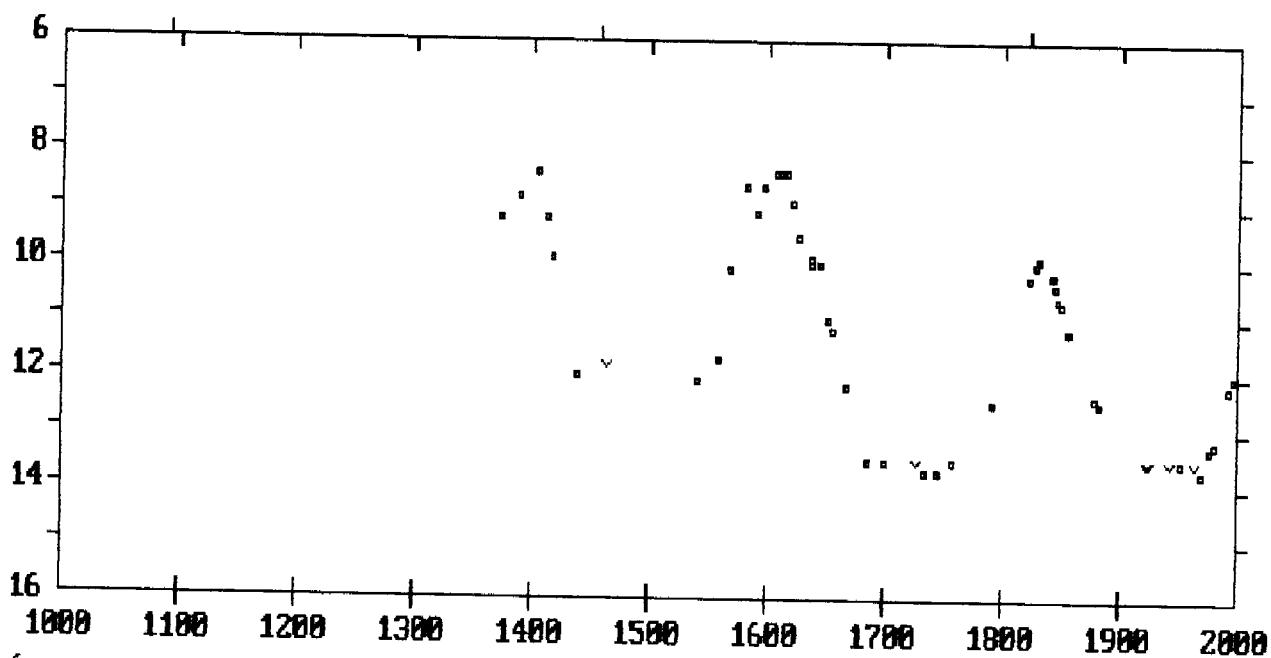
S GRU

Fig. 40

LIGHT CURVE FROM INDIVIDUAL OBSERVATIONS

J.D. 2,448,000 - J.D. 2,448,728

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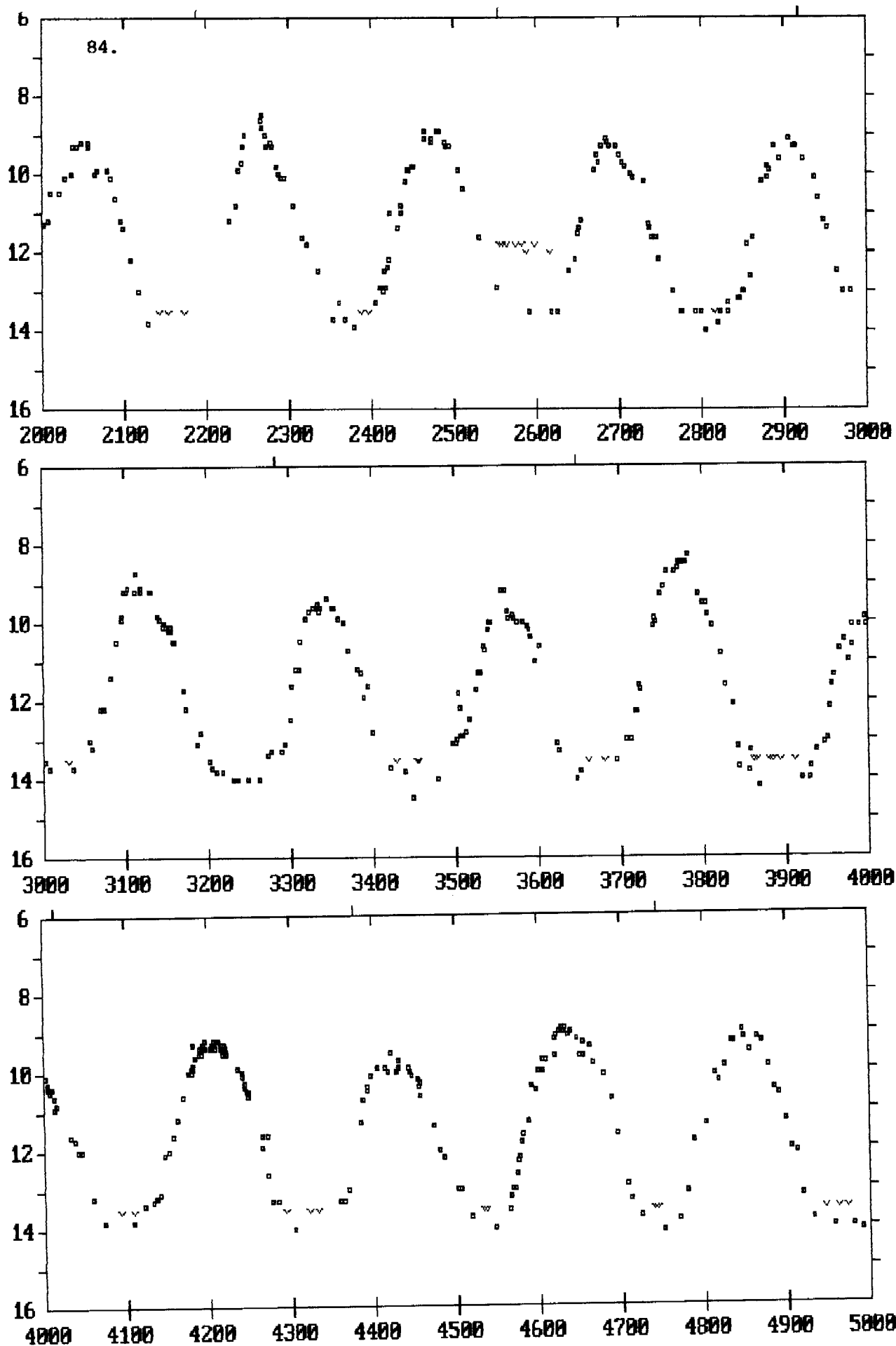


R IND

Fig. 41

LIGHT CURVE FROM INDIVIDUAL OBSERVATIONS

J.D. 2,431,368 - J.D. 2,432,000

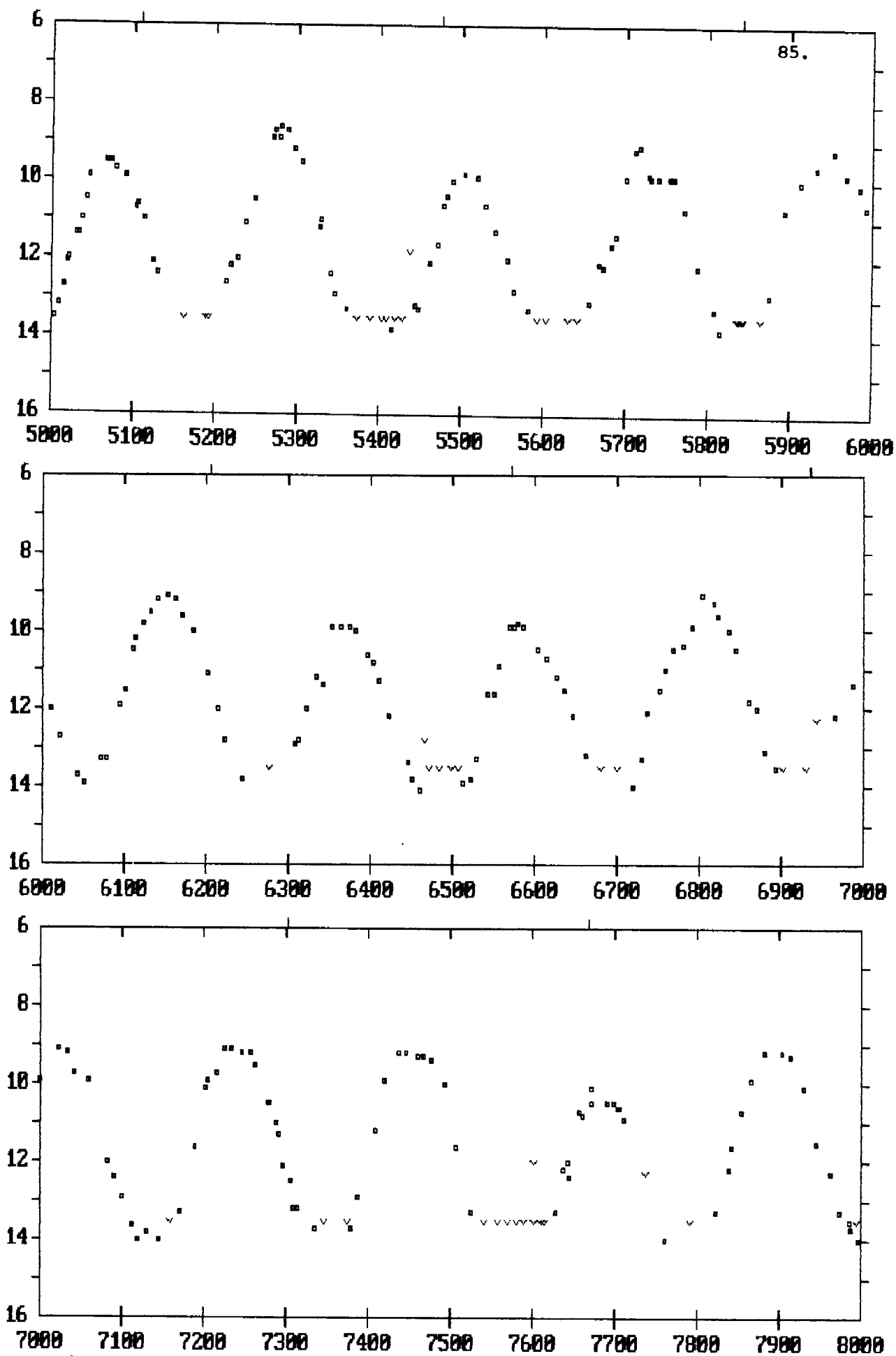


R IND

Fig. 42

LIGHT CURVE FROM INDIVIDUAL OBSERVATIONS

J.D. 242,000 - J.D. 2,435,000

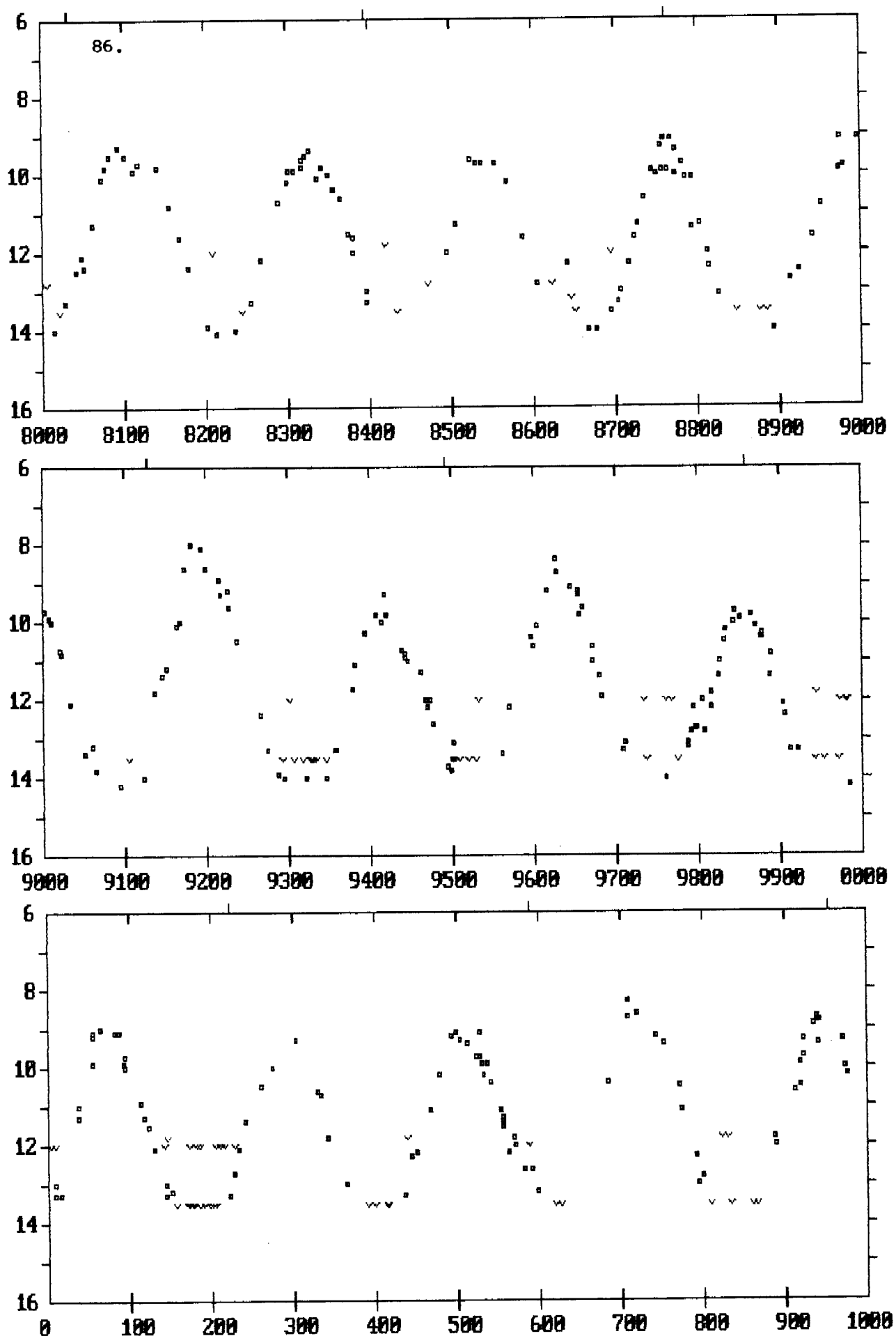


R IND

Fig. 43

LIGHT CURVE FROM INDIVIDUAL OBSERVATIONS

J.D. 2,435,000 - J.D. 2,438,000

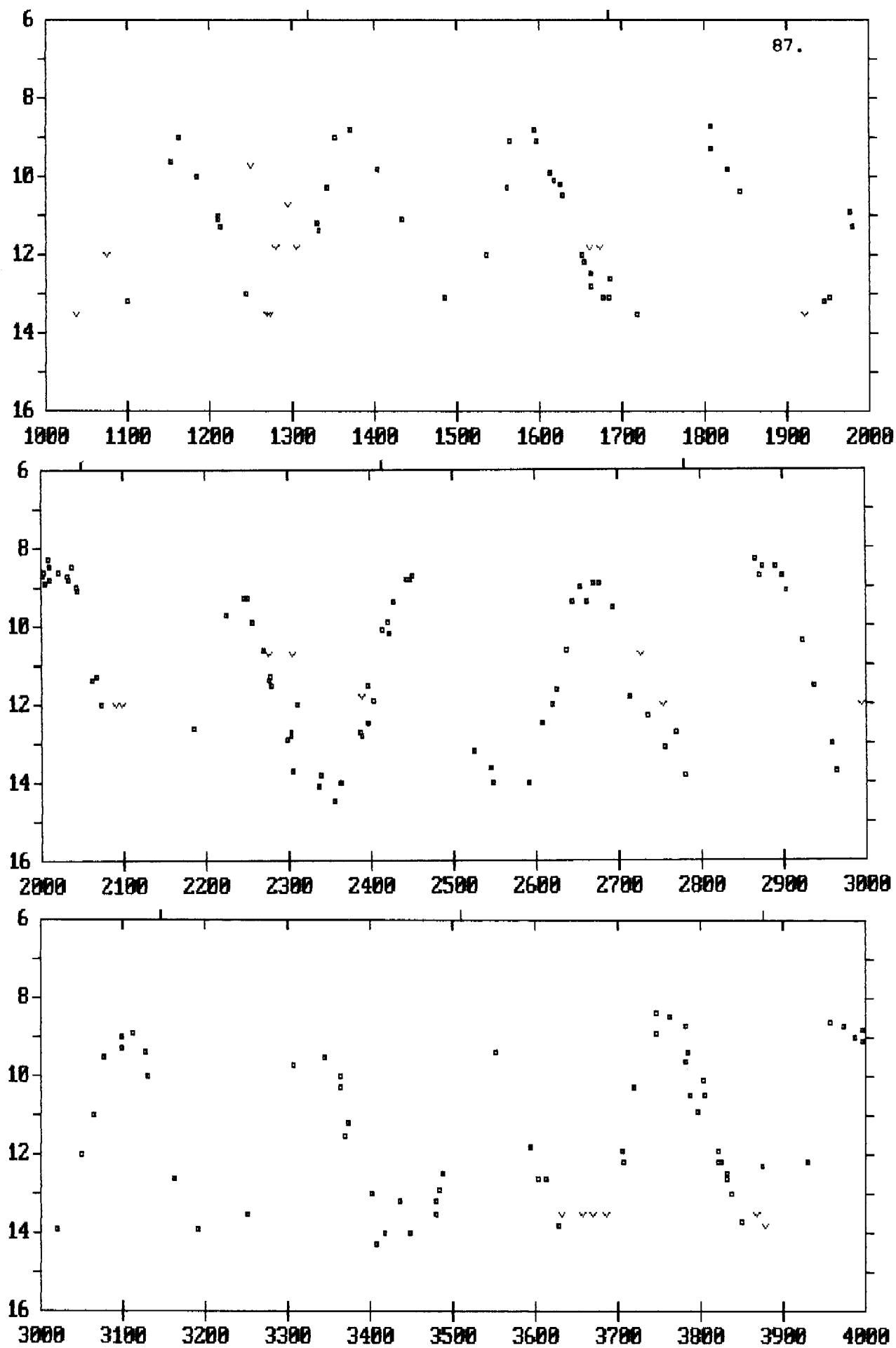


R IND

Fig. 44

LIGHT CURVE FROM INDIVIDUAL OBSERVATIONS

J.D. 2,438,000 - J.D.2,441,000

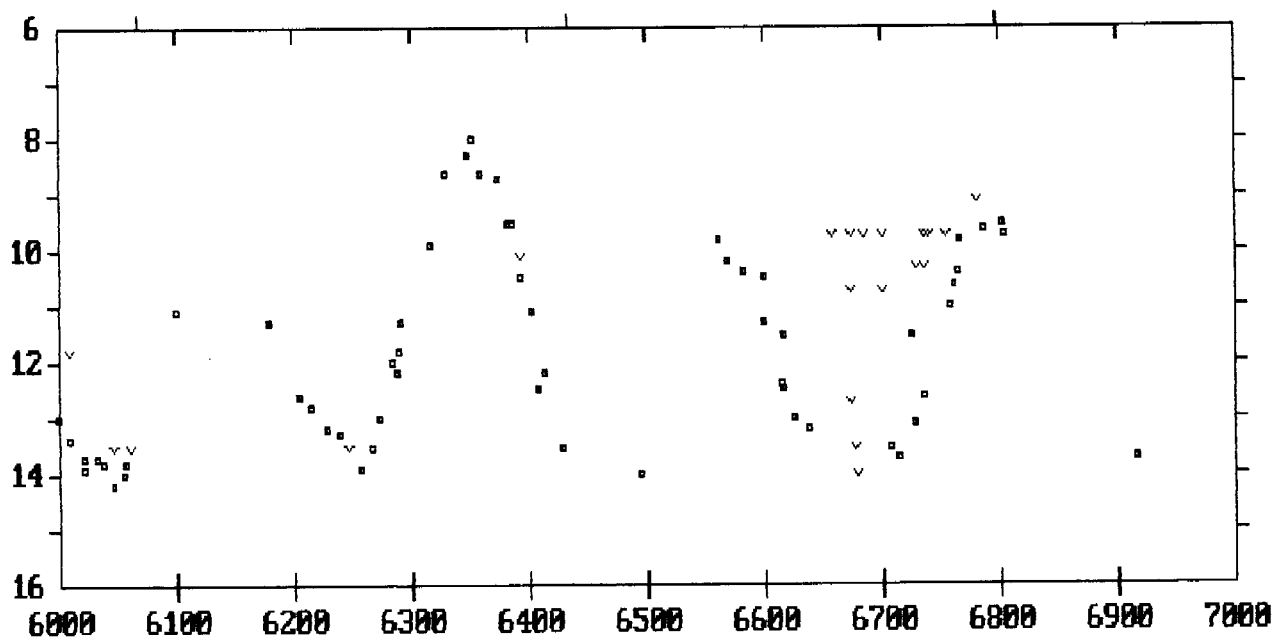
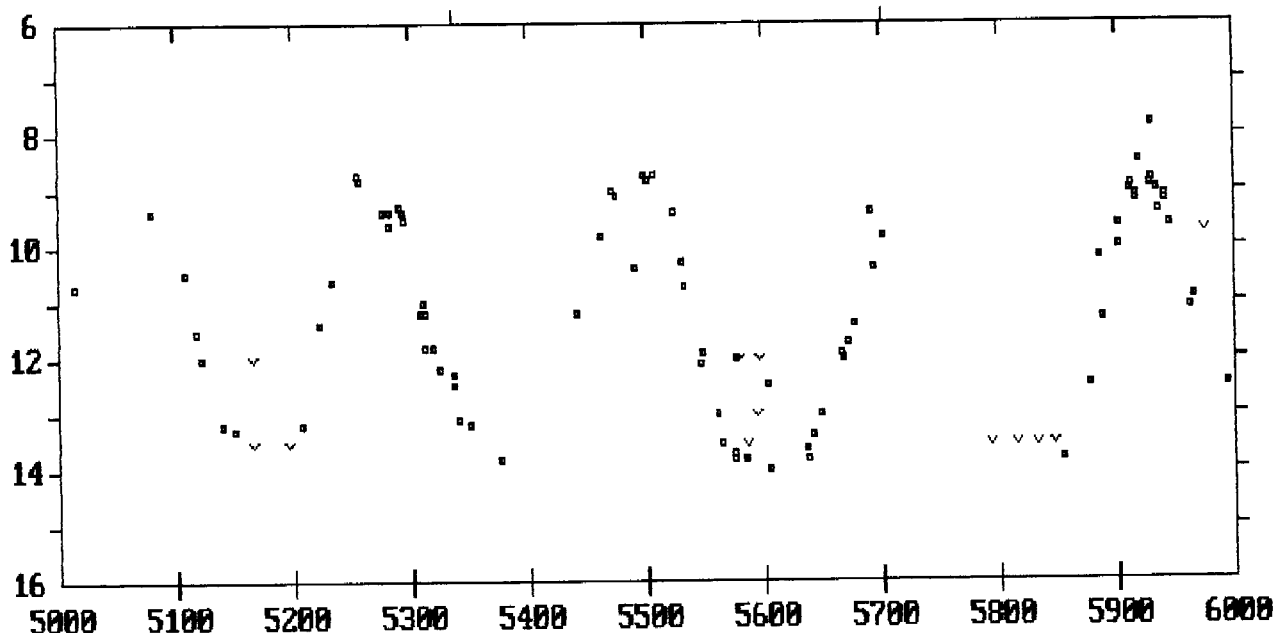
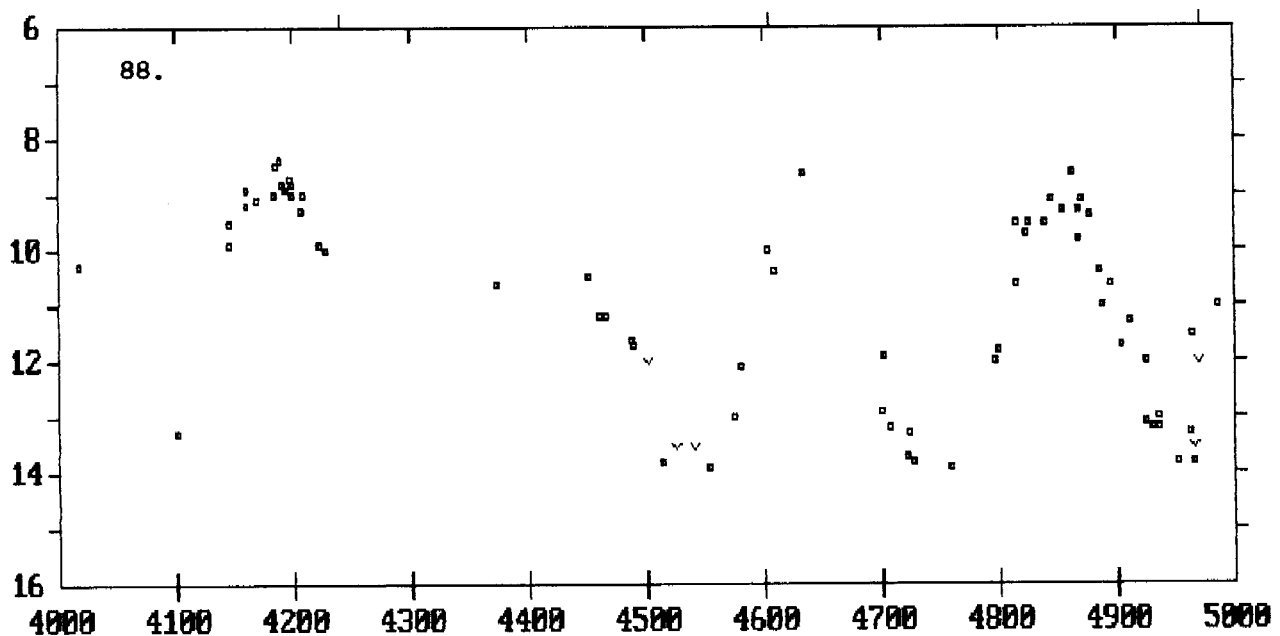


R IND

Fig. 45

LIGHT CURVE FROM INDIVIDUAL OBSERVATIONS

J.D. 2,441,000 - J.D. 2,444,000



R IND

Fig. 46

LIGHT CURVE FROM INDIVIDUAL OBSERVATIONS

J.D. 2,444,000 - J.D. 2,447,000

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

For year ended 31 DECEMBER 1992

1. OBSERVATIONS. Total 76,299 exclusive of those received from the B.A.A. (U.K.) for southern stars as part of a co-operative programme with the B.A.A. This again is a record, despite the unusual adverse weather during the prime observing season. The individual totals from each observer appears following this report. As usual totals are for the 12 months to 31 August, 1992, in order to provide strict comparison with previous years before the Society's year was changed to 31 December.
 The monthly distribution of observations is shown on the last page of this report, showing the normal decrease in late spring and early summer. The large increase in May was due to the close monitoring of many dwarf novae in outburst and of novae discovered by Paul Camilleri. This graph was kindly supplied by Ranauld McIntosh.
 As usual Danie Overbeek and Abby Jones made outstanding contributions whilst 12 other observers contributed over 1,000 each.

2. GRANTS. We wish to express our very sincere appreciation to the following for grants for specific purposes: The Edward Corbould Trust of the Astronomical Association of Queensland; The Scientific Research Committee, N.Z. Lottery Board and the Trust Bank, Bay of Plenty.

3. DONATIONS. An appeal was issued in Publications No. 17 seeking donations particularly to provide part-time office assistance at Headquarters. This has brought a most gratifying response and I sincerely thank all the following for their support.
 W.M.B. Albrecht; Auckland Astronomical Society; Auckland Observatory & Planetarium Trust Board; Canterbury Astronomical Society; Dr. S. Dreves; E. Harries-Harris; Dr. B.J.M. Hassall; G. Herdman; Mrs. A. Leslie; R. McIntosh; M.D. Overbeek; A. Pearce; N.J. Rumsey; J. Simpson; Sutherland Astronomical Soc; Tauranga Rock & Mineral Club; Dr. N.W. Taylor; Mrs. D. Watson.

4. COMPUTER DATA PROCESSING.

The 1991 Annual Report outlined the objectives in processing on computer all the hand written observational records prior to 1 April 1987. Excellent progress in so doing had been made through the splendid assistance of Don Brunt as well as help from Bill Goltz and Maureen Phizacklea. Ranald McIntosh has added all these results to his files and produced the resultant light curves and print-outs. Bob Winnett, Peter Nelson and Stan Walker are assisting me in reducing some of the data to a suitable form for publication. I am working on a large stack of these light curves for publication.

Ranald McIntosh has continued to punch into the computer all current observations as they come to hand each month. He supplies all the print-outs for the Monthly Circulars which are now printed on our computer at headquarters. Ranald has also supplied all the light curves and print-outs for requests from professionals for data.

Dr. T.J. Richards, La Trobe University, has agreed to provide storage for our data and in due course those requiring our data will be able to obtain it from the Computer Department at La Trobe. In 1993 I hope to list the variables for which records can be transferred to La Trobe. An announcement will be made in due course of the stars concerned and the dates that the records cover. Ultimately the aim is to have all records, other than recent and current observations stored there so that anyone interested can obtain whatever they require. This will relieve any storage problems which Ranald McIntosh has. Naturally it will require some time to accomplish this.

5. PUBLICATIONS.

Publications No. 17 was distributed early in the year. No. 18 should be available from the printer within a few weeks and will be followed by No. 19.

6. CIRCULARS.

In addition to the Monthly Circulars, two Special Circulars were published and a number of others dealing with Novae discoveries were faxed to observers.

There were four issues of CHANGING TRENDS, which serve to keep observers in touch with each other and also list special programmes.

7. REQUESTS FROM PROFESSIONALS FOR VISUAL DATA.

Throughout the year there has been a steady and increasing request from professionals for both prompt alert notices when the variables in which they are interested exhibit unusual behaviour. There were also many requests for subsequent visual light curves and print-outs of the observations covering the period of unusual activity. This is understandable because the observations from large ground based telescopes and from space are made at wavelengths other than the visual yet it is essential to

REQUESTS FROM PROFESSIONALS FOR VISUAL DATA (Cont.)

know how the particular variable behaved in the visual. Obviously it would be a sheer waste of time and money to use the costly modern technology to monitor stars in the hope that something unusual would happen. This is why visual observations have become so important and their results cannot be duplicated by any other method even in this age of automated photo-electric instruments. I stress these facts merely to show observers that they play a vital, if humble part, in astronomical research.

The aim of our Alert Notices is to have the advice of any unusual event reach those requesting such notices within 5 to 10 minutes of the event being observed.

Most members are aware of the special programmes run during the year but it seems that the main ones should be summarised in this report as this will show members the value of their efforts. Brief details of where so much of our data has gone to appear on the following pages.

ROSAT. Last year I reported that this programme had finished. However, this year I received an urgent request for light curves of VW Hyi for use at a meeting at the University of Birmingham where a discussion on the ROSAT results were to be held. Subsequently Barbara Hassall, R.G.O., obtained our results on a number of past super outbursts of this well studied dwarf nova. Later she advised that they had obtained so much data - almost too much - that reduction would take some time.

I.U.E. Programmes were run on several dwarf novae with Tim Naylor (Keele University) for which light curves and print-outs of our data were supplied.

GALACTIC HALO DWARF NOVAE. Several alert notices were faxed to Steve Howell (Planetary Science Institute, U.S.A.) as part of the long term observation of these stars for which spectroscopic and other observations are made with several large ground-based telescopes in U.S.A.

PRE MAIN SEQUENCE STARS. John Graham (Carnegie) obtained spectra of a group of these stars in Corona Austrina for which we supplied light curves and print-outs.

HST. The only CV for which priority was given in the first year of HST was OY Car. I was informed by Tom Marsh (Oxford) that the success of the observations depended entirely on our detection of the super outburst promptly. The response from observers was wonderful. For several months prior to this outburst OY Car was observed on every night except on December 26, 1991 and on most nights there were at least three, and usually more observations. The outburst was detected promptly and throughout the outburst the coverage was perfect. Complete light curves were supplied to both Oxford and the Space Telescope Science Institute.

NOVAE.

(a) Michael Friedjung (France) requested light curves of a number of past novae to compare their published variations of emission line fluxes with light curves in order to test the classification claimed by Bob Williams. We supplied several light curves.

(b) H. Durbeck (Germany) used our data on old novae that are still visible in members instruments for use in his theoretical papers on the hibernation theory of novae.

(c) Light curve of Nova Sgr 1992 No. 2 was supplied to James Bryan (U.S.A.) for use in a paper he is submitting to A.S.P.

(d) V603 Aql (Nova Aql 1918). Alex Schwarzenberg-Czerby requested our visual data during the period in October 1992 that observations were being made from ROSAT/IUE/Voyager. He also asked that we continue these observations throughout the current observing season and again in 1993. He has been sent all our records plus some photo-electric data kindly supplied by Ed. Budding.

Eta Car. Roberto Viotti (Italy) was supplied with our light curve for use in the studies at his institution of this star and of AG Car. Details of the latter had already been supplied to our member, Tim Cooper, for presentation of his paper at a meeting in South Africa. The up-dated light curve of AG Car for Viotti is now being processed.

V517 Oph. All our data, mainly from observations by Abby Jones, of this probable R CrB variable went to S.A.A.O. Jones and myself were co-authors with the S.A.A.O. group of the paper that was published in THE OBSERVATORY.

TV Col. At the request of Coel Heller (Mullard Space Science Laboratory but now in U.S.A.) TV Col and V1223 Sgr were placed on our observing list and charts issued in Series 23. A Jones has made observations of TV Col which will be reduced as soon as reliable magnitudes of the comparison stars are available. Meanwhile the preliminary results indicate that these stars are intermediate polars and similar to EX Hya in many respects.

EX Hya. Coel Heller was also supplied with all the details of the bright outbursts of EX Hya. He may request the complete light curve covering many decades and I am awaiting word from him about this.

ASSISTANCE TO GRADUATES. Karen Pollard (University of Canterbury, N.Z.) spent a few days at headquarters collecting data on RV Tau stars for her thesis. Light curves and observations of WW Ceti were supplied to University of Sussex for use by a graduate and his supervisor; S. Duck (Leicester, U.K.) also requested light curves for use with his thesis.

CO-OPERATIVE PROGRAMME WITH B.A.A., (U.K.) Monthly print-outs have been supplied to the B.A.A. for stars north of the equator in which they and the V.S.S. combine data. They are having some problems in bringing their processing up to date but these will be overcome, and they have supplied us with some earlier observations. John Isles retired as Director of the Variable Star Section, B.A.A. and I would like to thank him for the long and pleasant association over so many years. I am certain that the same close co-operation will be established with his successor.

R CrB VARIABLES. We have continued to send S.A.A.O. alert notices whenever one of these stars has faded.

The foregoing are additional to many routine programmes that have continued with many professionals for years. Abby Jones has observed variables not on our regular programme for requests from Ed. Budding, Peter Cottrell and Warwick Lawson. He was co-author with Warwick Lawson for a paper published in the OBSERVATORY.

8. CHARTS FOR SOUTHERN VARIABLES.

Series 23 was published by ASTRONOMICAL RESEARCH LTD. Series 24 will be issued during 1993. As usual the drafting of all charts has been done by Mati Morel, who has maintained his very high standard.

9. SEQUENCE MAGNITUDES.

There is still need for reliable magnitudes in many variable star fields. During the year, as arranged with Alan Gilmore and Pam Kilmartin (Mt. John University Observatory) I prepared two lists of the fields concerned. The first listed a limited number of fields for which the requirement is urgent and the second listed a number of fields from charts issued over the past several years. It is hoped that as time permits it will be possible for Alan and Pam to work through these lists.

Dr. Tom Richards has supplied preliminary charts on request from the G.S.C. and especially for Novae as they have been discovered. These were distributed by fax followed later by charts prepared by Mati Morel. We are indebted to Alan Gilmore and Pam Kilmartin for supplying V magnitudes for these novae, discovered by Paul Camilleri and Bill Liller.

10. FUTURE OF THE V.S.S.

Members and myself have been concerned for some time about the future direction of the V.S.S. after I go. Late in 1992 I circulated two Circulars to selected senior members. One set out what the V.S.S. does and how it operates; the other listed a number of options for the future.

FUTURE OF THE V.S.S. (Cont.)

The replies received to date show agreement on some points, whilst other members have requested more time to consider the problems raised.

The points of agreement are:

- (a) That, despite the fact that Abby Jones is Deputy Director, it would be most undesirable if he had to shoulder the routine running of the Section. This recognises the fact that if he had to do so it would mean either the end of his observing or a considerable curtailment thereof. Everyone agrees that this would not be desirable considering his pre-eminence as an observer.
- (b) There is also agreement that the Section should continue to be directed from New Zealand and/or Australia and that amalgamation with any similar foreign organisation should not be considered under any circumstances.
- (c) There is a definite preference for Option No. 2, i.e. the establishment of a permanent Headquarters with sufficient finance to employ at least one permanent staff member.
- (d) Failing (c) being impossible there is, so far, agreement that Options 3 or 4 should be chosen, i.e. to find a person, or group, to eventually take over. It is suggested that for the sake of the reputation of New Zealand astronomy the V.S.S. should continue to operate from New Zealand but if that is not possible then from Australia.

At this stage I refrain from comment pending the receipt of replies from members who requested more time to consider the problem, except to say that the professionals I consulted are in agreement with the conclusions of members.

11. HEADQUARTERS.

There has been a marked increase in the number of observers wishing to take up visual observation of Variable Stars, especially in Australia. This interest has been to a great extent stimulated by Peter Williams with his regular articles on Variable Stars. Fraser Farrell has been responsible for forming an active group in Adelaide.

The result of this interest is that supplies of the 4th edition of "THE OBSERVATION OF VARIABLE STARS" is now exhausted. The 5th edition will be written in 1933 which will also include instructions from Ranald McIntosh on the format in which observations should be submitted on diskettes. This is necessary as more observers now submit their results on diskettes and this tendency is likely to increase in the future.

HEADQUARTERS (Cont.)

The financial donations acknowledged earlier in this report has permitted Maureen Phizacklea to be employed throughout the year which has been a great help to me. Maureen now has acquired the experience that has allowed me to leave the accountancy work to her as well as the production of the Monthly Circulars on our computer. She also transcribes from the Dictaphone nearly all the very large volume of correspondence.

The special grants acknowledged earlier in this report will greatly facilitate the publication of light curves of which there is now a large accumulation due to the work of Don Brunt, Bill Goltz and Ranald McIntosh.

Over the next few months I will be concentrating on this work which may mean some delay in answering letters but the objective is to have all data published at least to the end of 1991. If this can be attained it means that any successor will only have to deal with current data especially when records that have already been published are transferred to La Trobe.

Last year I referred to the problems of space at headquarters. The situation now reminds me of what my wife said years ago .. "One day I can see all your papers being inside and we will be outside in the garden!"

I will not elaborate further on the work at headquarters since all members have been kept informed on what goes on through "CHANGING TRENDS".

ACKNOWLEDGEMENTS

First and foremost I wish to thank all observers for their observations. Your efforts be the number of observations large or small, are why the Section exists. The care and high standards you all maintain are why the V.S.S. has acquired such a high reputation. In particular I thank Danie Overbeek and Abby Jones for their outstanding observations.

My special thanks go to Ranald McIntosh for his wonderful processing of observational results on his computer and the light curves he produces with such cheerfulness and alacrity. Don Brunt has kindly continued to process the earlier data at an almost alarming rate. Bill Goltz has also given valuable assistance in this.

I am indebted to Jan Hers, Director of the Southern African Section for his co-operation and sending their estimates on diskettes. Peter Nelson, Fraser Farrell and Sue Dreves are thanked both for their support and for stimulating interest in observing in their respective Australian groups.

ACKNOWLEDGEMENTS (Cont.)

As always I appreciate the very high standard maintained by Mati Morel in chart production and his continued support and assistance to observers.

Tom Richards has provided rapid and prompt preliminary charts for novae and for other variables on request.

Alan Gilmore and Pam Kilmartin have given the Section invaluable assistance by providing sequence magnitudes. Without their help and friendship the Section would be much poorer.

Dich Hull has, as always, supplied the Julian Date calendar distributed with the last issue of CHANGING TRENDS.

My appreciation is expressed to the many professionals who have supported the Section as well as finding our results useful.

My sincere appreciation goes to Maureen Phizacklea for so cheerfully and efficiently coping with a varied and at times perplexing work load.

Finally my grateful thanks are extended to all members and supporters for their friendships and assistance in so many ways.

1992 December 31

Frank M. Bateson
DIRECTOR

97.

VSS OBSERVATIONS RECEIVED FOR YEAR ENDED 1992 AUGUST 31

<u>Observer</u>	<u>Obs. code</u>	<u>Obs. total</u>
Albrecht, W.M.B.	Aj	5245
Brown, N.J.	BA	106
Bryant, K.	Bk	53
Bennie, I.D.	BN	4
Boattini, A.	BS	334
Blane, D.	Bz	1170
Cooper, T.	CH	1581
Cragg, T.A.	Cj	2464
Cook, J.C.	CJ	63
Camilleri, P.	CM	200
De Beer, G.	DE	52
Dreves, Dr. S.	Dx	1052
Farrell, F.	Fm	238
Goltz, W.	Gp	6698
Geyser, M.J.	Gq	49
Herdman, G.	HA	1337
Hernshaw, C.	HH	703
Harries-Harris, E.	Hi	889
Hull, O.R.	Hl	4285
Hers, J.	Hz	680
Ives, F.	Iv	895
Jooste, J.L.	Jf	33
Jones, R.W.	Jg	1962
Jones, A.F.	Jo	15966
Kent, Mrs. K.E.	Kn	62
Lumley, E.	Lm	331
Leslie, Mrs. A.	Ls	71
Menzies, B.	Mf	540
Murray, A.M.	MG	247
Monard, L.A.G.	MIA	333
Morel, M.	Mv	19
Nelson, P.	Nl	826
O'Kane, J.	Ok	1732
Orchiston, Dr. W.	Or	199
Overbeek, M.D.	Ov	21326
Park, J.	Pj	196
Robinson, N.	RB	297
Richards, T.	Ri	122
	RN	22
Stabenow, R.	SE	344
Stephanopoulos, G.	SK	108
Smit, Dr. J.A.	SP	913
Skilton, P.	SU	193
Turner, D.	Tq	129
Tregaskis, T.B.	Tr	883
Taylor, Dr. N.W.	Ty	2198
Venimore, C.W.	Ve	173
Villar, W.	Vf	4
Van Blommestein, P.	Vn	9
Watson, Mrs. D.	WJ	363
Williamson, L.J.	Wm	395
Wadhwa, S.S.	WM	52
Walsh, S.	WP	229
Warnes, P.	WQ	51
Ward, R.	Wr	38
Williams, P.	Wy	3038

TOTAL: 76299

**Variable Star Section Observations
1991/92**