

COMMISSION 27 OF THE I. A. U.
 INFORMATION BULLETIN ON VARIABLE STARS
 Number 2862

Konkoly Observatory
 Budapest
 11 February 1986
 HU ISSN 0374 - 0676

AX URSAE MAJORIS

The elements of AX Ursae Majoris, an RR Lyrae variable (RRab) discovered in 1958 (Romano, 1958) in the field of Chi Ursae Majoris, were published in 1964 (Romano, 1964). The ephemeris:

$$\text{Max.} = 2435951.354 + 0.^{\text{d}}53510 \cdot \text{E} \quad (1)$$

satisfied the photographic observations taken during the period March 1957 - May 1963.

In a recent GEOS note, Boninsegna (1985) determined new elements of this star considering only the visual estimates of three GEOS observers

Table I

max. 24...	E	O-C	max. 24...	E	O-C
38737.637	5207	+0. ^d 070	42541.549	12317	+0. ^d 067
849.431	5416	+ .039	870.504	12932	+ .017
39201.432	6074	- .015	43161.521	13476	+ .014
323.389	6302	- .047	191.544	13532	+ .079
448.573	6536	- .060	459.513	14033	+ .035
614.477	6846	- .016	512.488	14132	+ .049
40270.465	8072	+ .034	688.462	14461	+ .024
326.556	8177	- .051	966.532	14981	- .078
416.419	8345	- .071	986.446	15018	+ .043
563.567	8620	- .051	44017.484	15076	+ .054
621.395	8728	- .004	203.570	15424	- .019
943.443	9330	- .030	406.420	15803	+ .089
41057.438	9543	+ .009	668.498	16293	+ .050
119.450	9659	- .038	45029.484	16968	- .040
302.462	10001	+ .004			
417.459	10216	- .023	45074.440	17052	- .017
42044.513	11388	+ .025	075.522	17054	- .005
066.381	11429	- .041	382.563	17628	- .009
120.417	11530	- .038	402.355	17665	- .008
158.537	11601	+ .098	406.622	17673	- .020
190.533	11661	- .004	698.689	18219	- .016
373.532	12003	+ .032	809.409	18426	- .022
511.527	12261	+ .004	818.524	18443	- .001

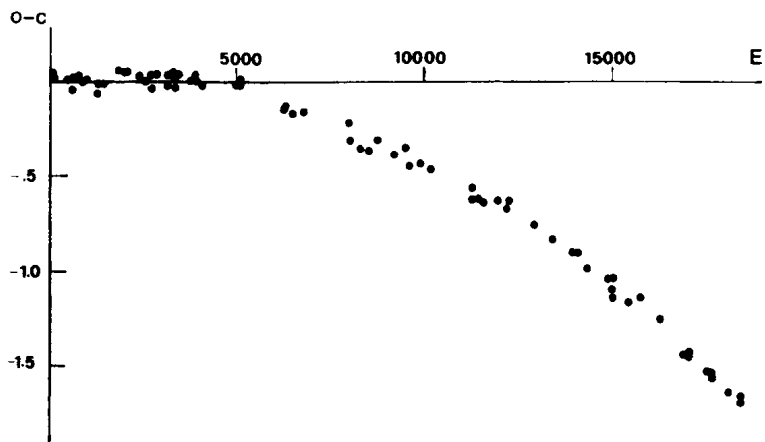


Figure 1

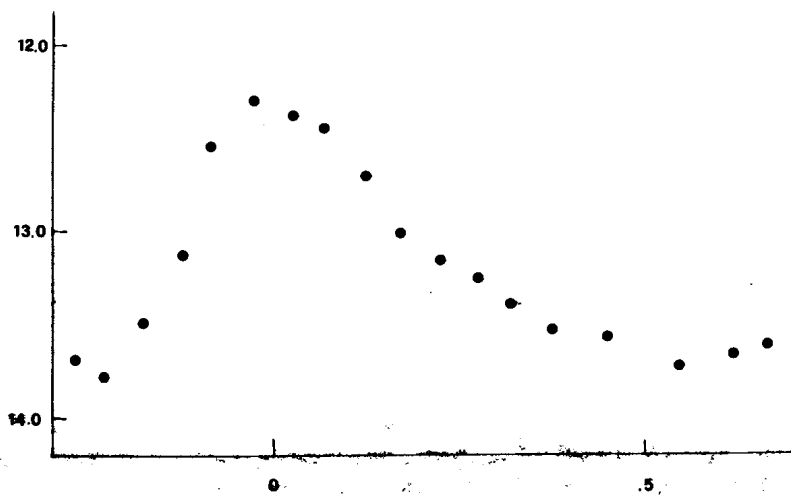


Figure 2

Table II

m	phase	n	m	phase	n
13.70	0.730	13	13.03	0.173	8
13.79	.768	10	13.18	.225	17
13.50	.827	14	13.25	.276	9
13.14	.875	16	13.40	.321	10
12.56	.915	12	13.53	.375	10
12.32	.975	11	13.56	.451	20
12.41	.251	10	13.73	.546	21
12.45	.702	12	13.65	.623	12
12.71	.127	11	13.59	.665	11

(ten maxima between J.D. 2445074 and 2445818) but the period derived by him does not agree with the observations made during the years 1958 - 1964.

A continuous survey of the Chi Ursae Majoris field made at Asiago Astrophysical Observatory with the Schmidt telescopes (67/90/210 cm and 40/50/100 cm) during the period May 1964 - December 1983 produced 227 photographic plates (103a0+GG13). These plates were used for determining the magnitudes of this variable star.

Using the list of the observed maxima (also those of Boninsegna) I derived the variation of the O-C using the elements (1). In some cases it exceeded the double of the period. Figure 1 gives the O-C curve. As one can see in this figure, the period of AX UMa had remained nearly constant over the first 5000 epochs, then it decreased continuously.

Analysing the O-C curve I derived the following new improved elements that were valid for the interval between J.D. 2438522 - 2445818:

$$\text{Max.} = 2435951.441 + 0.5351002 \cdot E - 0.52 \cdot 10^{-8} E^2$$

The average light curve is shown in Figure 2 and Table I lists all the maxima, the epochs and the residuals obtained with the new elements. Table II lists the magnitudes, the phases and epochs plotted in Figure 2.

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References:

- Boninsegna, R., 1985, GEOS Circ., RR8, May 1985.
Romano, G., 1958, Specola Ariel, Pub. n.12.
Romano, G., 1964, Specola Ariel, Pub. n.33