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AY Mus: A TRIPLE SYSTEM?

The eclipsing binary AY Mus was observed photographically in 1924-1931 (Refs.1,2) and was found to have equal minima about 0.3 magnitudes deep. The secondary minimum fell at phase 0.48, thus the orbit is eccentric with $e \geq 0.03$. In January 1973 however, photoelectric UBV-observations with ESO's 50 cm telescope at La Silla failed to show any eclipses deeper than 0.02 magnitudes. A closer examination of the records possibly shows the primary minimum near the expected phase, giving the improved ephemeris

$$JD_{pr} = 2441683.80 + 3^d 20555 E \\ \pm .01 \pm .00001$$

The secondary minimum could not be found in these observations: it may be (if observable) anywhere in the phase-interval 0.45-0.55. In Fig.1. are shown the present B light-curve and the old photographic one. The present observations were made relative to the comparison stars in Table 1; no variations greater than 0.01 magnitude were found for them.

Table 1. Measured UBV-values

	CPD	HD (E)	Sp (HD)	V	B-V	U-B
AY Mus	-64°1669	310592	B9	10.31	0.18	-0.14
Comp 1	-64°1677	100638	A0	7.16	0.10	-0.35
Comp 2	-64°1682	101174	B8	7.41	0.09	-0.44

The only tenable explanation of the present absence of eclipses is a third body in the system, causing nodal regression and consequently changed inclination to the plane of the sky for the eclipsing pair. Reasonable assumptions about the dynamics of the system leads to an expected period for the third body in the interval $100^d < P_3 < 900^d$.

A more detailed discussion of the observations and their interpretation is to be published elsewhere. Meanwhile, further observations of AY Mus are of course desirable: photometric to study changes in the depths of minima; spectroscopic in order to possibly reveal the third star, either by its spectrum or by its influence on the bary-

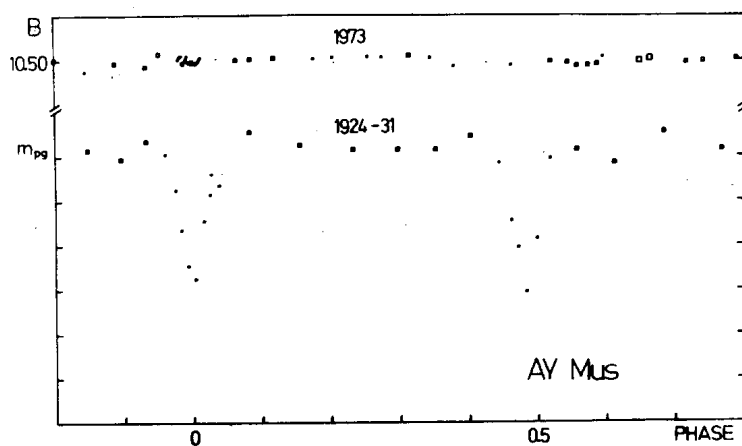


Figure 1. The light-curve of AY Mus from photographic estimates compared to the new photoelectric observations. Ordinate unit 0.1 magnitudes. Sizes of symbols proportional to their weight.

centric velocity of the close pair (the velocity amplitude may be about 10 km/s). Also, any old photographic plates taken near minimum light would be valuable in tracing the development of the light-curve.

STAFFAN SÖDERHJELM
Lund Observatory
S-22224 Lund, Sweden.

References:

- 1) Utterdijk J., 1932, BAN 6, 295.
- 2) Oosterhoff P.Th., and van Houten, C.J., 1949, BAN 11, 63.