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ON THE PERIOD OF THE ECLIPSING BINARY RW PERSEI

The aim of this note is to establish a numerical value of the period change of the eclipsing binary RW Persei and to test its significance. Hall (1969) collected all available times of minimum till 1968 and mentioned a sudden period decrease around 1925. A period increase, suspected around 1960 (Baldwin, 1974), has been confirmed by Hall & Stuhlinger (1974), but their observational data were not sufficient for a refinement of Baldwin's period ($13^d.198940$). Bush (1976) recently published additional times of minimum which enable us to get an idea of the behaviour of the period of RW Persei during the last fifteen years.

The whole set of data can be divided in three time intervals in which a linear regression of the times of minimum yields periods which differ significantly (Table 1, Fig. 1). The number of cycles elapsed at each minimum has been calculated from Woodward's linear ephemeris

$$\text{Min } (JD_{hel.}) = 2429217.587 + 13^d.198454\ E$$

From table 1 we conclude that the amount of period decrease around 1925 is $4.95\ 10^{-4} \pm 2.15\ 10^{-4}$ days, while we find an increase of $5.11\ 10^{-4} \pm 3.38\ 10^{-4}$ days around 1960.

Table 1

Time interval	Epoch of Mid interval	Period	Mean error
1898 - 1924	-745	$13^d.198938$	$\pm 0^d.000099$
1925 - 1955	+ 55	$13^d.198443$	$\pm 0^d.000116$
1955 - 1972	+794	$13^d.198954$	$\pm 0^d.000222$

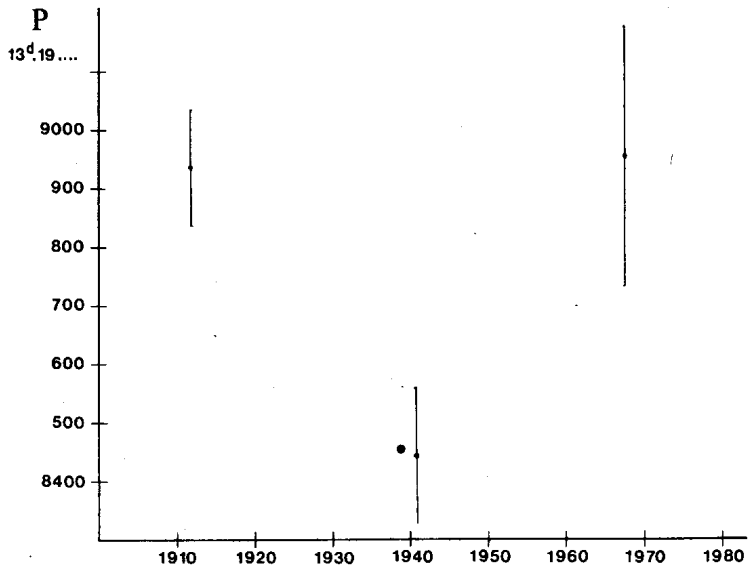

Fig. 1 : The variation of the period of RW Persei

⊙ : Woodward's value
• : this note (the mean errors are indicated)

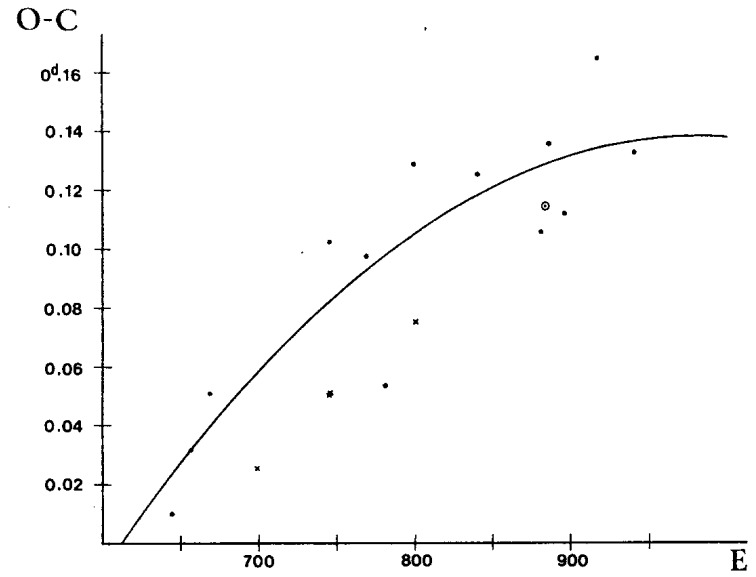

Fig. 2 : (O-C) residuals of Busch's times of minimum

× : values of Hall (1969)
⊙ : value of Hall & Stuhlinger (1975)

A parabolic least squares fit of the (O-C)-values on the other hand yields a linear decrease of the period of $0.66\ 10^{-6} \pm 0.09\ 10^{-6}$ days/cycle in the interval $-1200 < E < 0$, while the same procedure in the interval $0 < E < 800$ gives an increase of $0.72\ 10^{-6} \pm 0.20\ 10^{-6}$ days/cycle.
These values agree with the abovementioned results.

The time interval 1960 - 1972 cannot be divided in subintervals in which a linear regression of the times of minimum reveals significant different values of the period. The (O-C) residuals in this interval, which are plotted in Fig. 2, fit the straight line $-0.25 \pm 4 + 0.00042 \pm 6\ E$. This indicates that the period was nearly constant between 1960 and 1972. On the other hand the coefficient of the quadratic term of the least squares parabola fitted to Busch's residuals (indicated in Fig. 2) amounts $-0.10\ 10^{-5}$ days/cycle^2 $\pm$ $0.08\ 10^{-5}$ days/cycle^2.
So we conclude that the results from Busch's data show a tendency towards a decreasing period for the system. New times of minimum are needed to confirm the hypothesis that the period of RW Persei is decreasing again.

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References :

Baldwin, B.W. : 1974, I.B.V.S. N° 910
Busch, H. : 1976, I.B.V.S. N° 1121
Hall, D.S. : 1969, Mass Loss from Stars, p.171-183
Hall, D.S. & Stuhlinger, T. : 1975, I.B.V.S. N° 972
Woodward, E.J. : 1943, Harvard Bull. 917, p.7