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COMMUNICATIONS FROM THE OBSERVATORY AT LEIDEN.

A new faint variable star of the RR Lyrae-type, by *Ejnar Hertzsprung.*

On plates taken with the Franklin-Adams instrument of the η Carinae region the star $11^h\,0^m\,8^s{\cdot}1$, $-54°\,17'{\cdot}4$ (1875) was found to be a cluster variable. The comparison stars used are:

	α (1875)	δ (1875)	
a	$10^h\,59^m\,55^s{\cdot}0$	$-54°\,17'{\cdot}8$	$^s{\cdot}0$
b	$11^h\,0^m\,3^s{\cdot}3$	$-54°\,18'{\cdot}3$	·53

The variable was estimated on 388 plates taken between JD 2423786 and 2424208 and on 9 plates from previous years. The observations had to be considered carefully in order to connect with some certainty the old plates with the recent ones. The observed times of maximum are compared with two different countings of epochs, the first counting assuming 5499 and the second one 5500 epochs between the fourth and the fifth of the observed maxima. It will be noted that the first assumption ($\Delta E = 5499$) leaves some indication of run in the differences $O-C$ concerning the newer plates, while this run disappears on the second assumption ($\Delta E = 5500$), without materially increasing the sum of the squares $(O-C)^2$, viz: from ·0136 to ·0202, mainly due to the change of the first value of $O-C$ from $-^d{\cdot}05$ to $-^d{\cdot}09$, which observation is marked as somewhat uncertain. The periods derived on the two assumptions are $^d{\cdot}5137541 \pm {}^d{\cdot}0000021$ (m. e.) and $^d{\cdot}5136754 \pm {}^d{\cdot}0000026$ (m. e.) respectively.

To decide between these two periods the 388 recent observations were then treated more rigorously. For as many nights as possible the moment on which the variable passed the brightness ·4 on the ascending branch of the lightcurve was determined. The times thus obtained are given in Table 2. The period derived from this material is $^d{\cdot}513746 \pm {}^d{\cdot}000013$ (m. e.), thus deciding between the two periods mentioned above in favour of the first, the differences being $+{}^d{\cdot}000008 \pm {}^d{\cdot}000013$ (m. e.) and $-{}^d{\cdot}000071 \pm {}^d{\cdot}000013$ respectively.

The observations were then arranged according to phase P = 1·9464565 (J. D. hel. M. astr. T. Grw. − 2420000) and divided into 16 groups. The mean results thus obtained are given in Table 3 and shown graphically in the accompanying diagram. The lightcurve, showing a long flat minimum followed by a quick rise to maximum, is characteristic for cluster variables. The mean between maximum and minimum brightness measured in steps, $-^s{\cdot}25$ and $^s{\cdot}78$ respectively, is reached at the phase ·990 on the ascending branch of the lightcurve. The ephemeris for this moment is

J. D. hel. M. astr. T. Grw. $2423937^d{\cdot}9200 + {}^d{\cdot}5137541\,E$
$\pm$ ·0025 $\pm$ ·0000021
(m. e.)

The maximum occurs about $^P{\cdot}044$ or $^d{\cdot}03$ later. The limits of photographic magnitude, between which the star varies, are roughly estimated to be about 13^m and 14^m.

It should be kept in mind that the maxima given in Table 1 are systematically too late by about $^P{\cdot}01$ owing to the asymmetrical form of the lightcurve.

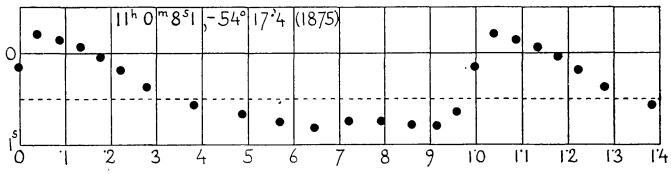

TABLE 1.

max. obs.	E	$O-C$	E'	$O-C$
d		d		d
242 0327·25	− 6737	−·05	− 6738	−·09
0605·26	− 6196	+ 2	− 6197	+ 2
0623·25	− 6161	+ 3	− 6162	+ 3
0963·32	− 5499	− 1	− 5500	+ 5
3788·50	0	+ 4	0	+ 2
89·52	+ 2	+ 3	+ 2	+ 1
90·56	4	+ 5	4	+ 2
91·52	6	− 2	6	− 5
3874·27	167	+ 1	167	0
83·49	185	− 1	185	− 2
3910·23	237	+ 1	237	+ 1
11·26	239	+ 1	239	+ 1