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Derivation of the period of the eclipsing variable star C.P.D. -61°2062 from Harvard observations

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Derivation of the period of the eclipsing variable star C.P.D. — 61°2062 from Harvard observations,*) by *Ejnar Hertzsprung*.

The variability of C.P.D. — 61°2062 was announced in *B.A.N.* 95, 108, the star having been found faint on one night only out of 146. This interesting case was communicated to the Harvard observatory and I am indebted to Professor H. SHAPLEY for kindly providing me with so many observations of this object on Harvard plates, that a determination of its period could be made. In fact the star was at Harvard found distinctly faint on 10 plates, viz: on one plate from 1894 April 3 and on 9 plates out of 450 taken between 1914 and 1924. VAN DEN BOS has taken 3 additional plates on J.D. 2424543 shortly before the end of a minimum. These 3 plates and the 2 mentioned in *B.A.N.* 95 were, together with 7 plates on which the star was of normal brightness, measured by VAN GENT in the Schilt thermopile photometer. The observations during minimum are collected in Table I. Considering all the plates on which the variable was found fainter than 10^m.6, as indicating an epoch of minimum, the formula:

$$(1) \text{ Min. J. D. hel. M. astr. T. Grw.} \\ 2421020.982 + 176.060 (E - 46) \\ \pm \quad .021 \text{ (m. e.)}$$

was derived by least squares. The residuals $O-C$ are given in the fourth column of Table I. A plot of the observations according to this period did however not show a satisfactory distribution of the different magnitudes within the minimum. A better distribution was obtained with a somewhat shorter period and the following formula was finally adopted:

$$(2) \text{ Min. J. D. hel. M. T. Grw. } 2421725.224 + 176.027 \\ (E - 50).$$

The corresponding phases in fractions of the period:

$$P = .00568095 \text{ (J. D. hel. M. astr. T. Grw.} \\ - 2421725.224) + 50$$

are given in the last column of Table I. The representation of the observations according to the final formula is shown in the Figure.

It will be noted that the star has been found faint at one odd epoch only. The period being nearly half a year, either the even or the odd minima will be out of reach for a couple of years.

*) See also the ADDENDUM on p. 204.

The form of the minimum is not yet well defined, but it is pretty certain that the eclipse only lasts for about .03 of the period, which is an extraordinary small fraction.

The period, 176^d, or nearly 6 lunar months, is the third longest so far known for any eclipsing variable star, the 2 longest being 9900^d for ϵ Aurigae and 262^d for RZ Ophiuchi.

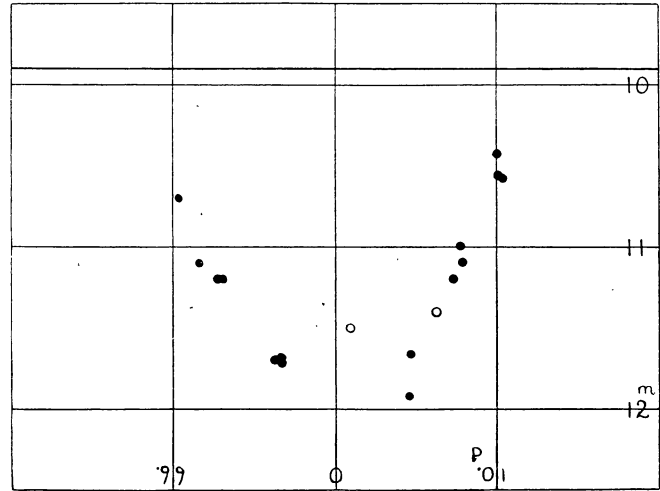


TABLE I.

J. D. hel. M. astr. T. Grw.	phgr. mag. Harvard scale	epoch	$O-C$ formula (1)	phase formula (2)
d	m	E	d	P
2412922.661	11.2	0	+ .5	.9931-1
2420315.528	11.1	42	- 1.2	41.9916
6668.488	11.7	44	- .4	43.9967
0843.815	11.2	45	- 1.1	44.9928
1020.513	11.7	46	- .5	45.9966
1022.498	11.0	46	+ 1.5	46.0078
1022.507	11.1	46	+ 1.5	46.0079
1371.487	10.7	48	- 1.6	47.9904
1724.577	11.7	50	- .6	49.9963
2078.574	11.2	52	+ 1.2	52.0074
4190.408	11.93	64	+ .3	64.0046
4190.430	11.66	64	+ .4	64.0047
4543.422	10.44	66	-	66.0100
4543.432	10.56	66	-	66.0101
4543.442	10.58	66	-	66.0102