# Provisional elements of a new eclipsing variable

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REMARKS:

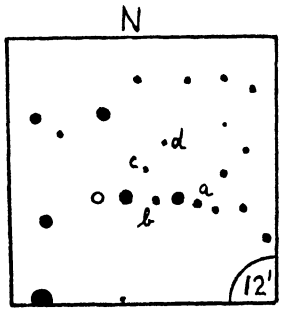
1. For further companion see *B. A. N.* No. 257.
2. It is unknown which component is the variable.
3. In list 2 of *B.A.N.* No. 257; companion *E* not seen by VAN DEN BOS; all stars nebulous; several components variable?
4. In list 2 of *B.A.N.* No. 257; variability confirmed by VAN DEN BOS (unpublished).
5. Fainter component of T Draconis (see *B.A.N.* No. 257).
6. Further companions.
7. Probably optical.
8. See GUTHNICK, *Sitzungsber. Akad. Berlin* 1934, 521.
9. See GUTHNICK, *Abh. Akad. Berlin* 1937, 3.
10. OLIVIER identifies Taylor 2 with CE Cas though $\delta$ is 7′ too small. The coordinates of Leo 55 agree with those of CE Cas. Probably the two pairs are identical with a reversal in position angle. CE Cas is one of the brightest stars in NGC 7790 (*A.N.* **243**, 115).

**ERRATUM** in *B.A.N.* No. 257:
List 2, last line, for *A.N.* **235**, 71 read *A.N.* **238**, 71.

## Provisional elements of a new eclipsing variable, by *L. Plaut.*

The variability of the star $17^h19^m55^s$–$31°01'·9$ (1875) has been found by Prof. HERTZSPRUNG. On 296 Franklin–Adams plates with the centre at C.P.D. —31°4931 taken by the Leiden observers at Johannesburg this star and the four comparison stars shown in Figure 1 have been measured with the second Schilt photometer of the Leiden Observatory. The plates

FIGURE 1.




are of the brand Guilleminot La Superguil, size 20 × 20 cm. Many plates show an irregular plate fog. Diaphragms of 5 and 6 mm, or ·14 and ·17 mm diameter as projected on the plate, have been used. The galvanometer readings have been converted into provisional magnitudes by the aid of the table given by WESSELINK (*B.A.N.* No. 318). The magnitudes of the comparison stars have been determined in the following ways (compare *B.A.N.* No. 323):

1. by the aid of the means of the $m_{prov}$ from all plates,
2. from measurement of three plates taken with a grating in front of the objective,
3. from star counts (*Groningen Publ.* No. 43, Table 10),
4. from a comparison with the magnitudes of stars in Selected Area 157 (*Harv. Ann.* **101** with the corrections of Table F, *Groningen Publ.* No. 43).

The results of the different methods are given separately in Table 1.

TABLE 1.

| a | b | c | d | zero point | |
|---|---|---|---|---|---|
| m | m | m | m | m | |
| —·67 | —·30 | +·37 | +·60 | — | prov. magnitudes |
| —·80 | —·30 | +·47 | +·62 | — | grating plates |
| —·56 | —·23 | +·32 | +·48 | 13·77 | star counts |
| —·59 | —·30 | +·24 | +·65 | 13·33 | Selected Area 157 |
| —·66 | —·28 | +·35 | +·59 | 13·55 | adopted magnitude |

The provisional magnitudes $m_{prov}$ of every plate have been converted into definitive magnitudes $m$ by the aid of linear relations between the provisional and the adopted magnitudes (last line of Table 1) of the comparison stars. The mean magnitude of the comparison stars has been taken as zero point. The observations show that the variable is an eclipsing star with a constant maximum. The period has been determined by the aid of a least squares solution from the observations which give the variable fainter than $+^m·33$ (Table 2). Weights have been used

TABLE 2.

| J.D. 242.... | number of plates | epoch | *O—C* |
|---|---|---|---|
| d | | | d |
| 7665·361 | 1 | 0 | —·035 |
| 7688·289 | 1 | 7 | —·028 |
| 7711·251 | 2 | 14 | +·014 |
| 7986·286 | 6 | 98 | +·005 |
| 8346·484 | 2 | 208 | +·026 |
| 8428·323 | 1 | 233 | +·007 |
| 8693·421 | 1 | 314 | —·115 |
| 8749·240 | 1 | 331 | +·040 |
| 8772·214 | 1 | 338 | +·094 |
| 8775·324 | 1 | 339 | —·071 |

according to the number of plates $n$. The resulting elements are:

Minimum = J.D. $2428346^d·457 + 3^d·27433\ E$
$\pm 33 \qquad \pm 10$ (m.e.)

It cannot be decided whether the period has to be doubled or not.

The mean error in magnitude has been derived from the observations in the constant maximum. The plates were arranged into three groups according to the plate fog:

1st group plates which could be measured with a galvanometer reading of 25 cm for the plate fog, while a diaphragm of 5 mm has been used,

2nd group plates with a fog which, measured with a diaphragm of 5 mm, did not allow to use a galvanometer reading of 25 cm for it,

3rd group plates with a fog so that a diaphragm of 6 mm had to be used in order to obtain a fairly large galvanometer reading.

The mean error of one observation is found as follows:

| group | m.e. | weight | number of plates maximum | all |
|---|---|---|---|---|
| | m | | | |
| 1 | ± ·065 | 4 | 144 | 161 |
| 2 | ± ·085 | 2 | 101 | 112 |
| 3 | ± ·127 | 1 | 21 | 23 |

There is no systematic difference between the observations of the three groups. Normal points are given in Table 3. The phases have been computed by the formula

phase = $^{d-1}$ ·305406 (J.D. hel. M.A.T. Grw. — 2420000).

TABLE 3.

| Phase | $m$ | $p$ | $n$ | Phase | $m$ | $p$ | $n$ |
|---|---|---|---|---|---|---|---|
| P | m | | | P | m | | |
| ·010 | + ·18 | 12 | 4 | ·402 | — ·02 | 35 | 13 |
| ·026 | + ·26 | 13 | 5 | ·438 | — ·01 | 34 | 10 |
| ·039 | + ·31 | 11 | 5 | ·492 | — ·02 | 36 | 11 |
| ·044 | + ·35 | 12 | 3 | ·534 | + ·01 | 36 | 11 |
| ·050 | + ·41 | 12 | 3 | ·558 | + ·06 | 34 | 12 |
| ·061 | + ·43 | 12 | 4 | ·593 | ·00 | 36 | 9 |
| ·069 | + ·40 | 14 | 4 | ·620 | + ·02 | 38 | 10 |
| ·091 | + ·28 | 12 | 4 | ·659 | ·00 | 36 | 12 |
| ·119 | + ·04 | 12 | 5 | ·694 | + ·01 | 36 | 13 |
| ·136 | — ·01 | 35 | 12 | ·748 | — ·01 | 34 | 12 |
| ·164 | — ·04 | 36 | 15 | ·798 | + ·05 | 36 | 10 |
| ·215 | — ·02 | 35 | 11 | ·842 | + ·03 | 36 | 12 |
| ·249 | ·00 | 36 | 9 | ·893 | + ·02 | 35 | 12 |
| ·285 | — ·03 | 36 | 11 | ·921 | + ·02 | 35 | 12 |
| ·306 | — ·06 | 36 | 11 | ·964 | ·00 | 34 | 13 |
| ·348 | — ·04 | 36 | 18 | | | | |

The weights given above have been used for the three groups; their sum $p$ is given for each normal point in column 3 of Table 3, whereas $n$ in column 4 is the number of plates.

FIGURE 2.