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COMMUNICATIONS FROM THE OBSERVATORY AT LEIDEN.

The orbit of 37 Pegasi, Σ 2912, Bu 11763, by *W. H. van den Bos*.

R. A 1925 $22^{\text{h}} 26^{\text{m}} 10^{\text{s}}$ mag. 5.7, 7.1
Dec. 1925 + $4^{\circ} 3'$ spec F 5.

The motion in this pair in some respects resembles that in Σ 1834, for which a provisional orbit has been given in *Proc. Acad. Amsterdam* **30**, 72. The apparent orbit is a very narrow ellipse, but there is no uncertainty about the quadrant in this case, and the measures near periastron are much more reliable. Moreover, if the position angles of the old observers are correct, their measures cover the maximum separation, which was not the case in Σ 1834. On the other hand the general accuracy of the measures is less in consequence of the greater difference in brightness. Reliable measures of distance are almost wholly lacking between 1854 and 1896.

The motion may be briefly described by the following data:

1837 maximum separation of $1''.16$ in 117° .

1891—96 single.

1905 maximum separation of $0''.35$ in 297° .

1915—20 single or too close.

1921 distance above $0''.1$, back in second quadrant.

The symmetry about 1905 suggests the assumption, for a provisional set of elements, that the major axis coincides with the line of nodes; the elements are then easily found.

In CAMPBELL's notation we have:

$$P = 136 \quad n = 2^{\circ}65 \quad T = 1905.0 \quad e = 0.534$$

$$a = 0''.72 \quad i = \pm 84^{\circ}6 \quad \omega = 180^{\circ}0 \quad \Omega = 117^{\circ}0$$

angles increasing, precession neglected.

The INNES elements are:

$$A = +0''.3269 \quad F = +0''.0604$$

$$B = -0''.6415 \quad G = +0''.0308,$$

hence for the ephemeris:

$$x = \rho \cos \theta = +0''.327 X + 0''.060 Y$$

$$y = \rho \sin \theta = -0''.642 X + 0''.031 Y.$$

The dynamical parallax, total mass $2 \odot$, is $0''.022$; to bring the system in harmony with EDDINGTON'S

mass-luminosity curve the parallax should be $0''.018$, giving the masses 2.1 and $1.5 \odot$ and the absolute bolometric magnitudes $+1.7$ and $+3.1$.

In the following list of observations the columns give the date, the observer, the aperture of the telescope, the number of nights, the observed angle and distance (estimates in parentheses), the residuals observed minus computed in angle, same reduced to arc, and in distance. MÄDLER'S results, which show large discordances from contemporaneous observations, are given separately.

| | | | | | | | | | |
|---------|------------|-----------------|---|--------|-------------------------------|---|------|-------|-------------|
| 1831.12 | Σ | $9\frac{1}{2}$ | 3 | 112.6 | $1''.16$ | — | 3.8 | —0.08 | +0.07 |
| 35.67 | Σ | $9\frac{1}{2}$ | 2 | 115.6 | $1''.15$ | — | 1.4 | —0.03 | +0.05 |
| 35.81 | Smy | 6 | 1 | 116.8 | $1''.3$ | — | 0.2 | —0.00 | +0.2 |
| 39.66 | Smy | 6 | 1 | 118.9 | $1''.1$ | + | 1.6 | +0.03 | —0.0 |
| 39.69 | Da | 7 | 1 | 119.0 | $1''.22$ | + | 1.7 | +0.03 | +0.13 |
| 41.65 | O Σ | 15 | 1 | 123.5 | $1''.13$ | + | 6.0 | +0.12 | +0.04 |
| 41.88 | Da | 7 | 2 | 118.1 | | + | 0.6 | +0.01 | |
| 42.35 | Gsh | 12 | 2 | 115.4 | $1''.10$ | — | 2.2 | —0.04 | +0.02 |
| 43.85 | Da | 7 | 2 | 116.7 | $1''.11$ | — | 1.0 | —0.02 | +0.03 |
| 45.57 | Mtl | 11 | 1 | 121.8 | $0''.97$ | + | 3.9 | +0.07 | —0.10 |
| 51.89 | Σ | 15 | 1 | 114.4 | $1''.31$ | — | 4.1 | —0.08 | +0.28 |
| 52.67 | O Σ | 15 | 1 | 116.4 | $0''.83$ | — | 2.1 | —0.04 | —0.20 |
| 53.88 | Da | 6 | 1 | 118.7 | $1''.11$ | + | 0.2 | +0.00 | +0.10 |
| 54.74 | Da | $7\frac{1}{2}$ | 3 | 118.5 | $0''.91$ | — | 0.1 | —0.00 | —0.09 |
| 57.09 | Se | $9\frac{1}{2}$ | 4 | 117.9 | $0''.74$ | — | 1.0 | —0.02 | —0.23 |
| 57.87 | Jb | 6 | 2 | 116.3 | (.7) | — | 2.7 | —0.04 | |
| 60.69 | Da | $8\frac{1}{4}$ | 1 | 119.8 | | + | 0.3 | +0.00 | |
| 63.66 | D | 7 | 3 | 113.2 | | — | 6.7 | —0.10 | |
| 66.71 | Wnl | 15 | 2 | 99.1 | (.5) | — | 21.2 | —0.31 | |
| 66.71 | Srl | 15 | 3 | 115.3 | (.5) | — | 5.0 | —0.07 | |
| 67.65 | D | 7 | 1 | 111.8 | | — | 8.7 | —0.13 | |
| 69.39 | Prc | 15 | 3 | 128.3 | | + | 7.3 | +0.11 | |
| 71.92 | WS | $8\frac{1}{4}$ | 1 | 122.3 | (.5) | + | 1.0 | +0.01 | |
| 72.56 | D | 7 | 1 | 116.7 | | — | 4.6 | —0.06 | |
| 73.78 | WS | $8\frac{1}{4}$ | 1 | 119.3 | (.5) | — | 2.4 | —0.03 | |
| 73.87 | Glh | $8\frac{1}{4}$ | 1 | 119.6 | (.5) | — | 2.1 | —0.03 | |
| 73.88 | D | 7 | 1 | 130.6 | | + | 8.9 | +0.11 | |
| 77.75 | D | 7 | 1 | 118.8 | (.3) | — | 4.2 | —0.04 | |
| 78.63 | β | $18\frac{1}{2}$ | 1 | 130.0 | .32 | + | 6.5 | +0.06 | —0.19 |
| 79.57 | β | $18\frac{1}{2}$ | 1 | 113.4 | (.25) | — | 10.7 | —0.09 | (—0.23) |
| 79.86 | Sbk | $8\frac{1}{4}$ | 1 | 128.3 | | + | 4.3 | +0.04 | |
| 85.53 | En | $7\frac{1}{2}$ | 5 | 131.4 | .34 | + | 3.2 | +0.02 | +0.05 |
| 90.56 | β | 36 | 2 | 167 | (.1) | + | 19 | +0.03 | (± 0) |
| 91.64 | β | 36 | 3 | single | (computed distance $0''.07$) | | | | |
| 96.66 | A | 36 | 3 | 294.1 | .28 | + | 12.2 | +0.03 | +0.14 |
| 97.54 | A | 36 | 3 | 295.0 | .31 | + | 9.9 | +0.03 | +0.14 |
| 99.78 | SBn | 26 | 3 | 292.9 | .32 | + | 2.2 | +0.01 | +0.07 |
| 99.78 | See | 26 | 3 | 293.6 | .40 | + | 2.9 | +0.01 | +0.15 |
| 99.79 | A | 36 | 2 | 297.0 | .27 | + | 6.3 | +0.03 | +0.02 |
| 99.83 | Sbk | $8\frac{1}{4}$ | 4 | 303.1 | | + | 12.0 | +0.05 | |
| 1900.61 | Hu | 36 | 1 | 302.7 | .20 | + | 10.0 | +0.05 | —0.08 |
| 00.7 | GrO | 28 | 9 | 288.9 | .32 | — | 4.1 | —0.02 | +0.04 |