The present paper discusses quantitatively, from theoretical considerations, the relative visibility of fringes for the particular separations of a double star of $\frac{1}{2}$ and $\frac{1}{3}$ the resolving limit, i.e. 0".078 and 0".052, respectively. The intensity I of the interference image as a function of x , the coordinate measured perpendicular to the fringes, is approximately of the form:

$$I = A[\cos^2 x + \cos^2(x + \phi)].$$

Here A is a constant depending on the particular star and telescope, while the two cosine terms represent the contribution of each component of the double. Thus ϕ will be a measure of the distance between components, from $\phi = 0$ for distance zero to $\phi = 90^\circ$ for distance 0".155 when the intensity is constant. For separation of 0".078, $\phi = 45^\circ$, and for 0".052, $\phi = 30^\circ$. The curve of the intensity has been traced for a whole period in each case.

The visibility of fringes was calculated as varying directly with two quantities: (1) the relative depth of minimum intensity, and (2) the relative width of interval over which the intensity is, say, less than $\frac{1}{4}$ the intensity at the maximum point. Such a definition gives visibility = 1 for zero separation, and visibility = 0 for separation 0".155. It turns out that the visibility is 0.5 for separation 0".078, and 0.77 for separation 0".052.

When it is recalled that there are about ten fringes in an image, it seems reasonable to expect that their simultaneous decrease to less than 80 per cent visibility should be detectable under favorable conditions. Hence, doubles as close as 0".05 could, with fair assurance, be detected and their coordinates estimated with an interferometer on the 18-inch refractor.

*Flower Observatory,
University of Pennsylvania,
Upper Darby, Pa.*

Wood, Frank Bradshaw. New light elements for selected eclipsing stars.

Minima of the following stars were observed photoelectrically: ζ Aur, TU Cam, and AO Cas at the Steward Observatory; TW Dra at the Lick Observatory. All times are heliocentric.

ζ Aur. From 38 photoelectric observations on the ingress and 31 on the egress, the center of minimum of the 1947-8 eclipse was determined as JD 2432553.666. From this and the 1939-40 eclipse time of JD 2429637.18 found by Christie from the work of various observers, new light

elements of Pr. Min. = JD 2432553.666 + 972^d.162 E are derived. The residuals between previously observed minima and those computed from these elements lie well within the error of the older observation.

TU Cam. The mean light curve shows primary occurring approximately 2 hours before the time predicted by Zverev's elements. The elements, Pr. Min. = JD 2432633.655 + 2^d933 229 E represent the best that can be given at present; the epoch represents the time of primary in my mean light curve.

TW Dra. Observed minima at JD 2432372.759, 2432389.600, 2432400.823, and 2432414.860 are not satisfied by the older light elements. It is well known that the period of this star is variable. However, there is no evidence of change in the last 1500 epochs. Until further changes occur, the elements Pr. Min. = JD 2432389.600 + 2^d806716 E should prove satisfactory for prediction. These satisfy not only my observations but more recent ones by Szczeponowska, by Szafraniec, and by Ahnert and the spectrographic work of B. Smith.

AO Cas. Observations of this star in 1946-7 indicated a large change of period had occurred. Combination of these observations with earlier ones of Bennett gave improved linear elements; secondary was centrally located. In 1947-8 a time of secondary from the mean curve gave the residual -0^d.08; there were insufficient observations in primary for determination of its epoch. In 1948-9, Hiltner reported a residual of primary 0^d.059 and of secondary 0^d.114 from my elements, and Struve's spectrographic observations required the correction -0^d.07. However, a well-covered curve in 1949-50 shows both primary and secondary agreeing quite closely with times predicted from my original elements. The plot of all the above epochs suggests either a periodic fluctuation, or at least two additional large period changes since 1946. The older observations show no evidence of a periodic fluctuation of this amplitude. Very tentatively, I suggest new elements as Pr. Min. = JD 2433255.301 + 3^d52415 E. It is extremely important to continue observations of this star.

*Flower Observatory,
Upper Darby, Pa.*

Yowell, E. A least-squares method of determining the periods of variable stars.

One possible way in which the period of a variable star can be determined is to represent