Ko star to an uncertainty in the color temperature of about 100°K.

1. *Ap. J.* **89**, 472, 1939.

*Washburn Observatory,
Madison, Wis.*

Whitney, Balfour S. The variation of the period of FL Orionis.

Light elements of FL Orionis:

$$J.D. 2427452.271 + 1^d55095 E$$

were published by Piotrowski some twelve years ago. The star has been observed photographically and photovisually at the University of Oklahoma Observatory for the past five years. The minima are deep and sharp. Thirteen minima observed here are represented by the elements

$$J.D. \odot 2431889.603 + 1^d550993 E$$

with an average residual of $\pm 0^d001$, or less than two minutes. But the residual of Piotrowski's epoch from these elements is 0^d058 , or nearly an hour and a half. Unless it is assumed that his epoch was in error by this amount, then it must be granted that the period has changed. During the past five years, it has been 2.5 seconds longer than it was 12 or 13 years ago.

*University of Oklahoma Observatory,
Norman, Okla.*

Wood, Frank Bradshaw. The eclipsing variables, AG Virginis, AR Lacertae and TX Ursae Majoris.

The observations were made photoelectrically in 1938–39 using the 36-inch reflector and photoelectric photometer of the Steward Observatory.

The light-curve of AG Virginis shows marked asymmetry. The stars are highly elliptical. The reflection coefficient is negative, and is treated as an arbitrary correction in addition to the large sine term. The most satisfactory solution assumes degree of darkening 0.4. The primary eclipse is annular.

$$\begin{array}{lll} k = 0.047 & J_b/J_f = 2.5 & r_b = 0.491 \\ L_1 = 0.922 & i = 79^{\circ}6 & r_f = 0.224 \end{array}$$

The observations of AR Lacertae indicate a sudden shortening of the period. Large night errors present in the observations are most reasonably explained by the assumption that the star of greater surface brightness is intrinsically variable. The primary eclipse is total. The most satisfactory solution assumes degree of darkening 0.8.

$$\begin{array}{lll} k = 0.609 & J_b/J_f = 3.2 & r_b = 0.194 \\ L_1 = 0.457 & i = 90^{\circ} & r_f = 0.319 \end{array}$$

The secondary minimum of TX Ursae Majoris is displaced forward by 0^d05 . This, together with the sine curve shown by the residuals of the times of primary minimum, confirms the rotation of the apse announced by Pearce. The photometric eccentricity is 0.024. Combination of photometric and spectrographic results permits the determination of the degree of central condensation of the fainter component. The central condensation thus found is high but lies in the range of other well-determined systems. The fainter component is a sub-giant; this is the first measure of the central condensation of a star of this type. The eclipse is partial with the large star in front at primary eclipse. Uniform and darkened solutions differ little; the darkened solution gives

$$\begin{array}{lll} k = 0.650 & J_b/J_f = 26 & r_b = 0.181 \\ L_1 = 0.084 & i = 81^{\circ}6 & r_f = 0.279 \end{array}$$

*Princeton University Observatory,
Princeton, N. J.*

Wright, K. O. Curves of growth for stars of class F determined from lines of neutral iron.

Following the observation¹ that the shapes of the curves of growth—the relation between the observed intensity of a line and the number of atoms producing it—were different when the curve for ionized atoms was compared with that for neutral atoms in the spectrum of α Persei, lines of neutral iron were studied in more detail. It was found that when lines of approximately the same excitation potential were plotted together, they could be fitted to theoretical curves of growth, but lines of low excitation potential fitted curves calculated for greater turbulent velocities than those of high excitation potential. In α Persei, the turbulent velocity is 7.0 km/sec for lines with E.P. = 0.0 volts and it decreases to 3.6 km/sec for E.P. = 4.6 volts; the variation with excitation potential is quite uniform and seems to be greater than the probable error of each determination. Similar results were obtained for other F-type stars— α Canis Minoris, α Carinae, γ Cygni and δ Canis Majoris.

A slight extension of the theory permits a variation of turbulent velocity with excitation potential and this has been used to determine excitation temperatures from neutral iron lines. These are somewhat higher than excitation temperatures obtained previously but are lower than the effective temperatures of these stars.

1. *J. R. A. S. Canada* **40**, 183, 1946.

*Dominion Astrophysical Observatory,
Victoria, B. C.*