lution of T Tauri stars into dwarf flare stars or other stars near the main sequence in the H-R diagram.

Amherst College Observatory,
Amherst, Mass.
and Smith College Observatory,
Northampton, Mass.

White, Marvin L. Oscillatory currents in the ionosphere.

The solar thermal and gravitational excitation of oscillations in the earth's ionosphere is responsible for the production of "worldwide" atmospheric current systems and "quiet day" magnetic variations at the earth's surface. A proper theoretical approach to this problem, attempted here, involves the extension of the resonance tidal theory initiated by Taylor and Pekeris for a neutral component atmosphere so as to include traces of an ionized component in the presence of the earth's dipole field. Also necessary to the problems is a theory for formation of the electrified atmospheric layers by solar ionizing radiation, day and night effects included. Layers so formed are said to be solar controlled. Large distortions from this condition of strict solar control are produced in the F-layers by thermal and tidal oscillatory motions. It turns out that the theory is, in essence, nonlinear due to thermal excitation of sum and difference frequencies by an I^2R source function (electrodynamic viscosity). Even for the lower un-ionized regions of the earth's atmosphere, Stokes' "dissipation function," of second degree, accounts for observable nonlinear effects. The end result in the theory is, in part, to predict spacial and temporal variation of ionospheric electron densities; in Schuster and Chapman's previous dynamo theory, height variations of the current system were ignored as the ionosphere was idealized as a thin shell.

National Bureau of Standards,
Boulder, Colo.

Wilson, Raymond H., Jr. A gravitational force function for the earth representing all deviations from a spherical geoid.

In the present treatment each area of deviation from a uniform spherical gravitational field is represented by a separate series of Legendre polynomials having its pole of reference centered on the area. Thus the earth's north and south polar oblateness deviations are represented separately so that their inequality can be investigated. The series for minor deviations centered at general latitudes and longitudes has been transformed to terms of variables in the inertial coordinate system for practical computation. The vector sum of these expressions for the earth's spherical gravitational field and its deviations, together with explicitly presented geocentric expressions for the fields of the moon and sun, would thus constitute a complete force function for satellite orbit development by numerical integration.

U. S. Naval Research Laboratory,
Washington, D. C.

Wood, Frank Bradshaw. The eclipsing variables, TZ Corona Austrini, V Tucanae, RS Leporis, ST Carinae.

The following systems were selected for observation because the published data assigned them the following characteristics: Algol-type light curve, spectral class A, periods of from 17 to 30 hours, and deep primary eclipses with duration from 3 to 6 hours.

The short periods mean either extraordinarily large masses or small distances between the components. Similar systems which have undergone detailed analysis have shown normal masses for the brighter components; this, plus the short period, calls for a distance between components so small that the radii of the brighter components can only be about ½ those of normal A stars; this in turn locates the A components below their normal place in the HR-diagram. The secondary components in such cases have frequently been found to fill the limiting Jacobian surface and hence are in an interesting evolutionary stage. Lack of appreciable light change between eclipses, in such close systems can be most simply explained by a large mass-ratio. If this explanation survives detailed analysis, the fainter components of these systems must have abnormally low masses.

The photoelectric light curves obtained of these four stars in general confirm the earlier photographic work, and are now being subjected to detailed analysis. The chief features of the different systems follow. Attention is called to the importance of spectrographic observation.

TZ Cr A New: JD 243 6080.035 + 0^d.68674954 E. There is no strong evidence for change of period. Depths of eclipse: yellow 0.73 mag., 0.12