

conditions to masses of about 10^{34} g, consistent with observed main sequence stellar masses.

A basic question is raised by the existence of the $10^{-4.3}$ bound for aggregates other than stars. Some generalized form of degeneracy for larger aggregates may be implied.

Computations Concerning Use of the Princeton Nomographs for Eccentric Orbit Cases. ROBERT E. WILSON, *Georgetown College Observatory*.—Shifts in the depth and shape relations for eclipsing binaries in eccentric orbits are computed. These shifts depend on the eccentricity, longitude of periastron, radii of the components, orbital inclination, ratio of the luminosities, and whether primary eclipse is a transit or an occultation. The present computations supply a moderately large collection of sets of these seven input variables, along with the corresponding displacements of the depth and shape relations. Purposes are (1) to enable those attempting to solve light curves of eccentric systems to estimate the errors that would be made by ignoring the eccentricity and (2) to aid evaluations of solutions taken from previous investigators who have disregarded small eccentricities.

Results of the U. S. Naval Observatory Program of Visual Double-Star Observations. CHARLES E. WORLEY, *U. S. Naval Observatory*.—Intermittent series of visual double-star observations have been made at the Naval Observatory for more than a century. The present program was begun in 1961. More than 9000 measures have been made with the 12- and 26-in. refractors in Washington, and the 40- and 61-in. reflectors in Flagstaff, in this program. Automatic readout equipment developed in collaboration with A. H. Mikesell was used in the measures. Emphasis has been placed on pairs of astrophysical interest, including close, rapidly moving binaries, nearby stars, and intrinsically faint stars. With the 61-in. astrometric reflector, pairs of separation of $0''.06$ – $0''.07$ have been observed. Separations of $0''.11$ – $0''.12$ are possible with the 26-in. refractor. Intercomparison of the author's measures with those

made by van den Bos show good agreement with little evidence of systematic differences.

The automatic equipment includes two gear-operated shaft encoders, a memory unit, a manual entry unit, and a solenoid-operated printer. The equipment has proved reliable in service, has eliminated reading errors, and has doubled the number of observations possible under good seeing conditions.

A New Catalogue of $H\alpha$ Emission Objects in the Southern Hemisphere. JAMES D. WRAY, *Dearborn Observatory*.—Objective prism plates obtained by K. G. Henize at the Lamont Hussey Observatory have been searched for $H\alpha$ emission objects, S stars, and carbon stars. A previous search by Henize of medium-exposure plates covering the entire southern hemisphere to $+10.5 m_v$ at a dispersion of $450 \text{ \AA/mm}$ at $H\alpha$ has yielded 1100 stars tentatively classified as early-type $H\alpha$ emission stars. The recent search by the author of long-exposure plates covering the southern Milky Way from 240 – 10° galactic longitude to $+13.0 m_v$ has revealed an additional 800 probable early-type emission stars, and a few new objects of type P, C, and S.

Coordinates (α , δ) accurate to $\sim \pm 15''$ p.e. have been computed for all objects found on the long exposure plates by means of a 12 constant-plate reduction theory modified to account for tangential distortion introduced by the objective prism. All standard stars were of spectral type A0, providing a well-defined absorption line at $H\alpha$ for measurement. Plate measures were obtained on a fully digitized Mann 621 comparator with punched card output. Use of a digital x,y plotter for identification of comparison stars, evaluation of plate reduction residuals, and measure data confirmation greatly facilitated the data reduction.

A preliminary analysis of the surface distribution of southern hemisphere early-type emission stars reveals the strong concentration of the galactic plane and the irregular distribution in longitude similar in nature to that found in the northern hemisphere by Merrill. The relatively high surface concentration in the Carina–Crux region previously examined by Bok is fully confirmed by this survey.