for objects which are less than "an infinite distance" away. The true position is given by $\mathbf{P} = \mathbf{S} + R(\sec z \mathbf{Z} - \mathbf{S})$ where z is the zenith distance, $\mathbf{Z}$ is a unit vector directed toward the zenith, $\mathbf{S}$ is a unit vector corresponding to the uncorrected astrographic position, $\mathbf{P}$ is the unit vector representing the true direction to the object, and R is a pseudo-refraction-constant, which is a function of the height of the object above the surface of the earth.

$$R(h_n) = \frac{\sum_0^n (h_n - h_{n-1})(\mu_n - 1)}{(h_n - h_0)}$$

Cincinnati Observatory
Cincinnati, Ohio

Hodge, Paul W. *Globular clusters of the Large Magellanic Cloud.*

Globular clusters of the Large Magellanic Cloud have been identified on plates taken with the ADH Baker-Schmidt telescope of the Boyden Observatory. The series of plates employed emulsion and filter combinations that correspond to B and V colors. Twenty plates in each color cover the Cloud, giving a total surveyed area of 10° by 12.5° . The plates were exposed to a uniform limiting magnitude of about 18.5. The correcting plate was diaphragmed to eliminate vignetting.

There are about 70 objects on the plates which, in their general appearance, resemble globular clusters. Not all can be true globulars, however; some have early-type spectra and blue integrated colors. The present work involved the investigation of colors and magnitudes of the brightest stars in each cluster. The color-magnitude diagrams for the brightest stars of 35 objects show them to be globular clusters similar to those of our galaxy. They have widely differing sizes, integrated brightnesses, and degrees of concentration.

The remaining clusters have stars on the main sequence as well as in the giant region. Their color-magnitude diagrams appear to be similar, within the accuracies of the photometry, to those of open clusters in our galaxy. The most notable difference is the very great total number of stars. A number of these pseudo-globular clusters contain what appear to be ordinary classical Cepheid variables. In clusters containing more than one variable, the periods of the Cepheids

are nearly equal. Periods are directly related to the magnitudes of the brightest stars in the cluster in the sense that the shorter periods are found in the clusters with the fainter stars.

Harvard College Observatory
Cambridge, Mass.

Jacchia, Luigi G. *Corpuscular radiation and the secular acceleration of satellites.*

In an earlier paper it was shown that the secular acceleration of satellites fluctuates in unison with such indices of solar activity as the 10.7-cm solar flux or the sunspot number, exhibiting the occasional 27-day periodicity associated with these data. Another more transient type of disturbance was detected in the acceleration of satellite 1958 $\delta 1$ at the time of the great geomagnetic disturbances of July 9 and September 4, 1958. Both disturbances were preceded by a flare of importance 3 on the sun, which apparently did not affect the satellite motion. The perturbations in the acceleration started only with the onset of the magnetic storms, reached their peak at the center of the storms and ended with the end of the storms. This clearly shows that the perturbing agent in the upper atmosphere was corpuscular radiation.

Satellites 1958 α and 1958 $\beta 2$ show large "diurnal" effects and for both of them the 27-day fluctuations become small or actually disappear when their perigee is in the dark hemisphere. This shows that the cause of the 27-day fluctuation must reside in variable electromagnetic radiation, probably extreme UV. An accurate evaluation of the magnitude of the diurnal effect for 1958 α and 1958 $\beta 2$ is made difficult by a large atmospheric perturbation which started around mid-August 1958 and lasted two months or more; no good explanation for such perturbation has been found so far.

Smithsonian Astrophysical Observatory
Cambridge, Mass.

Johnson, Hollis R. and Athay, R. Grant. *The excitation of chromospheric He I lines.*

Relative intensities of singlet and triplet lines of He I in the solar chromosphere allow a determination of $b_n \exp [\chi_n/T_e]$, where χ_n is the ionization energy of the level n and b_n is a non-thermodynamic equilibrium factor. We have computed b_n 's for values of T_e ranging from